Free Mobility with the EU and Immigration of North American Brains to Switzerland: What Consequences?

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Abstract

In 2002, Switzerland implemented free mobility with the European Union; simultaneously immigration rules for citizens from the rest of the world became more stringent. This paper shows that immigration of North American brains has been adversely affected. Substitution in favor of Swiss and Europeans has increased and North Americans are more inclined to contribute to home professional networks rather than to Swiss ones. Also, non-European innovators are less likely to be hired decreasing the likelihood of collaboration with innovators from the rest of the world which may in the future increase Swiss firms' entry cost into those markets.

Keywords: Skilled Immigration, decision, North America, Switzerland, free mobility policy.
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1. Introduction

In this paper, I investigate the factors that drive North American brains to Switzerland before and after the implementation of the free mobility agreement with the European Union in 2002. The focus is on immigrants in occupation categories requiring high education levels who came from Canada and the United States between 1990 and 2009. The main question is: Has the free mobility agreement led to substitution away from North American in favour of European and Swiss brains[1] and, if so, are there potential medium-term adverse economic consequences to having the large majority of skilled expatriates originating from a single region of the world, i.e. Europe?

After almost a decade of increasing free mobility with the European Union, there are mixed reactions in the Swiss society about the perceived impact of the policy especially on high-skill expatriates. Some argue that not only foreign university professors are taking jobs of Swiss citizens but the diversity of foreign academics' origins is extremely low. Muller (2010), p. 78, for example, states: "The Swiss People's Party (…), a right-wing group notorious for its nationalist politics, accused the University of Zurich of having too many German nationals on its faculty." Others, the business sector in particular, hold opposite views. When asked whether skilled labor was readily available, business executives estimated that Switzerland was performing less well in 2010 than in 2002. In 2010, the index value was 7.01 on a scale to 10 compared to 7.25 in 2002 (IMD, 2010). Executives appear to blame the new immigration policy as the perception that immigration legislation prevented companies to

[1] High-skill immigrants/expatriates/workers and brains are used interchangeably in this paper.

employ foreigners has risen from 5.56 in 2002 to 7.55 in 2010.[2] Yet, when asked whether foreign high-skill people were attracted to their country's business environment, executives evaluated Switzerland at 9.12 in 2010 compared to 7.95 in 2002. So it appears that according to business executives Switzerland has become more attractive to high-skill immigrants but, hiring them has become more difficult despite the introduction of free mobility with the EU. These perceptions have been confirmed by an observed shortage of highly educated professionals and calls for easier immigration procedures for highly skilled individuals from non EU/EFTA countries (Swiss American Chamber of Commerce and Boston Consulting Group, 2008, p. 54-55).

Such divergences in opinions raise questions about the actual impact of the introduction of free mobility with EU countries on access to high-skill immigrants from other countries of the world. When skills are internationalised, substitution among brains from various origins may not appear to have costly consequences for the economy. However, there are potential economic costs beyond the nationalistic argument against homogenous ethnic origins made by the Swiss People Party. There is growing evidence that ethnic skilled diasporas contribute to improving the world competitiveness of their host country's firms (see for example, Foley and Kerr, 2011). Hence, in the long run, by having to give priority to EU citizens Swiss firms may miss on opportunities to build competitive advantage on other foreign markets.

In this study the rest of the world is represented by Canada and the United States and the results show that the introduction of free mobility with the EU in 2002 has had a substantial negative effect on skilled immigrants from those two countries. The impact was

[2] It is worth noting that the perception about brain drain hindering competitiveness has been constant since the introduction of free mobility (7.43 in 2002 versus 7.5 in 2010), suggesting the degree of Swiss brains' exodus has hardly change.

not limited to a time-specific drop but the role of the factors influencing immigration changed significantly. North American highly skilled people used to be attracted by Swiss professional networks. Since 2002, they choose to contribute rather to their home networks (i.e., stay at home) and there has been a clear substitution away from them, in favour of Europeans and Swiss. In addition employers must now offer attractive financial conditions to North American brains. So not only do Swiss employers have limited access to North American brains but they face stiffer competition to attract them. Finally, the effect of the new policy on highly skilled innovators might in the future diminish Swiss firms' competitiveness on world markets as North American expatriates who are likely to contribute to innovations face more volatility in hiring.

The rest of the paper is organized in the following way: Section 2 presents a brief survey of Swiss immigration policy since the mid-1990s. Section 3 describes changes in the composition of immigration to Switzerland since the implementation of free mobility. In Section 4, a model of skilled immigration from Canada and the United States is estimated to evaluate the nature and magnitude of substitution between North American and European brains and, economic implications are discussed. Section 5 concludes.

2. Swiss policies

Swiss immigration policy experienced little change between the early 1970s and the late 1990s but the approval by popular vote of free mobility with the EU/EFTA in 2000 led to drastic changes to the law for citizens coming from third countries.[3] Swiss policy has always been demand-driven and, thus, requires foreigners obtain a one-year or longer job contract

[3] For a detailed history of immigration policy in Switzerland and its impact on the foreign resident population, see Gross (2006).

prior to applying for a "permanent" work/residence permit.[4] Another avenue, until 2002, was through conversion of temporary status (i.e., *seasonal permits*). Generally one-year permits (i.e., *sojourn permit*) were automatically renewed conditional on employment. After a certain number of years of residence with such permits, immigrants and their family could apply for an unlimited, unconstrained permit (i.e., *establishment permit*). Yearly annual quotas were set for the number of new sojourn permits, not including seasonal conversions.

Until the mid-1990s, there was no defined priority for the hiring of foreign workers. In 1995, the government developed the new *circle-policy* with priority given to citizens of countries similar in culture to Switzerland. Also, anticipating on the signing of an agreement with the EU, in November 1998, the government introduced the *dual recruiting* system by advising employers to give preferences to workers from the European Union; they could however, still prospect worldwide for skilled workers.

Following approval by popular vote, the implementation of the free mobility agreement with the EU/EFTA countries started on June 1st, 2002 and a new immigration legislation was in place in December 2005.[5] The most relevant component of the new legislation for this study is the specification of search priorities for employers who want to hire foreign workers: Third countries' citizens can be considered only if they are skilled and no worker is available on the domestic or EU/EFTA labor markets. Hence, priority must be given to Swiss citizens, foreigners living in Switzerland with permanent status and residents in EU/EFTA countries. Employers must prove they have searched extensively before submitting a request for hiring from third countries. Furthermore, only skilled candidates (i.e.,

[4] The word "permanent residents" covers foreigners residing in Switzerland for a period of one year or longer (OFS, 2009, p.5). This definition is different from the one used by settlement countries such as Canada and the United States where only people with unlimited authorizations are considered permanent.

[5] See ODM (2011) for a brief description and see Confederation Suisse (2011a, 2011b) for the original documents.

managers, specialists and workers with tertiary education) can be considered with a few exceptions, i.e., in case of intra-firm transfers or exchanges, acute shortages of labor in economically key occupations, or firm's creation leading to local employment growth. The conditions may also be relaxed to gain access to new markets, expand exports or for non economic activities such as arts, culture, religion and international organisations. Once their hiring has been approved, third-country citizens receive a sojourn permit (*livret B*) valid for one year, renewable. They are eligible for an establishment permit generally after ten years, in some cases after five.

From 2002, there was a five year transitory period with quotas before implementation of complete free mobility. Initially, the agreement concerned only 15 EU member countries and the EFTA countries. On April 1st, 2006 it was extended to the ten new EU members.[6] By June 1st, 2007, the transition period was completed for the initial 15 countries plus Cyprus and Malta, and complete free mobility applied to their citizens. The latest step in the process has been the start of the transitory period for Bulgaria and Romania on June, 1st, 2009. By 2014, all EU/EFTA countries are expected to benefit from full free mobility with Switzerland. It must be noted that free mobility does not exempt foreign citizens from applying for permits. Their sojourn permit (*livret B*) is valid for five years after which period they can apply for an establishment permit. To obtain a sojourn permit they must be employed, show proof of independent activity or if inactive, have financial resources and health insurance coverage.

The major change that is likely to have affected brains from third countries is priorities imposed on employers for hiring. Non-European skilled individuals are still eligible for

[6] EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden, and the UK. In 2004, 10 countries joined the EU, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and, Slovenia. EFTA members are Iceland, Liechtenstein, Norway in addition to Switzerland.

immigration to Switzerland but only after potential candidates in Switzerland and the EU countries have been considered. Such regulation is expected to lead to substitution among skilled immigrants from various geographical areas.

The remaining of this paper provides a descriptive and econometric analysis to identify whether the new legislation has actually led to substitution away from North American brains in favor of European and Swiss ones after 2002.

3. Brain immigration to Switzerland

The choice of Canada and the United States to represent third countries is guided by the fact that the two countries have historically provided the most educated immigrants to Switzerland. In 2000, 49.7% of Canadian and 57.6% of American expatriates in Switzerland had tertiary education. Only immigrants from the United Kingdom and Sweden had a comparable levels of education with 50.1% and 52.2% respectively (Docquier and Marfouk, 2005). Also, their education standards are relatively similar to those of Europe and Switzerland which is likely to have made it easier for employers to substitute away from them in favour of Europeans and Swiss skilled workers.

The legislation targets new immigrant workers and Figure 1 shows the evolution of the inflows of workers (total and skilled) from Canada and the United States from 1990 to 2010.[7] Not surprisingly at the beginning of the 21st century, there is a sharp drop in the total annual number of North Americans coming to Switzerland. In 2003, after nineteen months of implementation of the free mobility treaty with the EU/EFTA, the number of Canadians migrating to Switzerland had fallen by 61.1% and that of Americans, by 52.2% (Table 1,

[7] Skilled is defined according to the International Standard Classification of Occupation (ISCO) from the International Labour Office (ILO) and includes legislators, senior officials and managers (ISCO-1), professionals (ISCO-2) and, technicians and associate professionals, (ISCO-3; ILO, 1990).

Column 6). The restrictions on hiring also affected skilled immigration yet slightly less drastically. By 2003, the annual flow of skilled Canadians had dropped by 49.1% and that of Americans, by 49.7% (Table 2, Column 2).

Between 2001 and 2003 other factors than the introduction of the new legislation may have affected North American immigration to Switzerland as overall immigration decreased by 15.5% and, that from EU15, by 11.6% (Table 1, Column 6). However, by 2010, the inflow from EU15 countries, had grown back and passed the 2001-level by about 70%. The recovery has been most spectacular for Germany as total annual immigration in 2010 was 90.4% above the 2001-level. France and Italy experienced slightly smaller increases. As a result, the share of EU15 in total immigration rose from 63.7% in 2001 to 85% in 2010 (ODM, 2010). However, by 2010, immigration from the United States was about 2/3 of its peak 2001-level and immigration from Canada was only about 1/3 of it.

The sharp falls in the early 2000s followed a long period of steady increases especially in North American immigration. From 1994, a year before the introduction of the circle policy, until 2001 the total inflow of immigrants from Canada and the United States rose by 110.7% and 31.8% respectively (Table 1, column 5). During that period, immigration from EU15 countries grew only by 8.2%. However, when only skilled workers are considered in Table 2, Column 1, the growth rates for European countries are much larger than for total immigration while they are close for North America. Hence, before free mobility at the end of the 20th century, the skill intensity of European migrants to Switzerland was growing quite fast while that of North American, already the highest, was constant.

Generally, the government's recommendation to give priority to European workers at the end of 1998 (i.e., dual recruiting) does not appear to have had much of an impact on

employers' hiring strategies. However, when the recommendation became law in 2002, the flows from North America were reduced drastically and remained low throughout the decade. So, it is likely that substitution occurred and the permanent drop in North American immigration was compensated by immigration from EU countries.

Consistent with the new legislation, the shift in the origin of foreign workers has been accompanied by a shift in the skill composition: By 2010 the shares of high-skill immigrants were 86.4% for Canadians and 87.3% for Americans up from an average of 68.3% and 78.1% respectively between 1994 and 2001 (Table 2, Column 7). Thus, North American immigration to Switzerland which had been historically high in skill content became even more skill intensive after the introduction of free mobility with the EU. Since employers could hire low-skill workers only from EU countries, it is not surprising that these countries have experienced a fall in skill intensity since 2001 after the 1990s' rise. France and Germany show the largest falls: -12.5 and -25.2 percentage points respectively (Table 2, Columns 5 and 7).[8]

In short North Americans coming to Switzerland are now more educated but their number has dropped drastically in favour of Europeans. Next the econometric analysis focuses on identifying how the substitution occurred and whether it has implications for the future of the Swiss economy.

4. What drives North American brains to Switzerland?

For this analysis, skilled immigrants are classified in eleven occupation categories based on ILO-ISCO. They cover managers (F), professionals (A, C, D, E, H, I, J, L) and,

[8] It is worth noting that Germany is the only border country for which the share of high-skill immigrants in 2010 is not only lower than in 2001 but also lower than in 1994 (43.2% in 2010 versus 68.4% in 2001 and 61% in 1994).

technicians (G, B; see Appendix I, Table A.I.1. for details). Table 3 shows the levels of occupation flows from Canada and the United States to Switzerland during nine years before (1993-2001) and nine years after (2002-2010) the start of the implementation of the free mobility agreement. The total flows from the two countries fell by about the same magnitude between the two periods (-31.3% from Canada; -31.8% from the United States) and there are similarities as well as differences between occupation categories.

For both countries the maximum positive change occurred for managers (+89.4% from Canada; +73.9% from the United States); a result which is not surprising since managers' migration is likely to result from intra-firm transfers that are exempted from the hiring priority rule set by the new legislation. Also, American companies have long found Switzerland attractive for establishing regional or world headquarters.[9] The only other occupation categories with positive growth are Canadian engineers (E; +42.9%) and American architects and related specialists (A; +14.3%). A major difference between the two countries is the magnitudes of the drops across occupation categories. Three categories from Canada experienced more than fifty percent decline (commercial and financial technicians, -60.6%, teachers, -62.6%, and scientists, -51.3%) while five from the United States did so (social scientists and humanities related professionals, -75.7%, health and science technicians, -73.0%, scientists, -68.1%, and, commercial and financial technicians, -62.6%). Finally, the flow of academics declined but relatively modestly, i.e., -21.0% from Canada and -7.0% from the United States.

The consequence of these changes has been a re-distribution of the categories' shares between the two periods (Figure 2). Managers now dominate the skilled immigrant flows

[9] According to OSEC et al. (2008), p.7, in 2008, 150 US companies were present in Switzerland against only ten Asian companies. See also Arthur D. Little (2009).

from North America (59.3% for the United States in the 21st century; 32.1% for Canada). But the flows from Canada remain more diversified than those from the United States. No other occupation category represents more than 10% of skilled immigration from the United States, while from Canada health and science technicians (G) represent almost the same share as managers (30.8% vs. 32.1%). For both countries architects and related specialists (A) engineers (E), IT professionals (I) and academics (L) saw their share increase slightly. In short, the drop in immigration was not uniform.

Given, the questions investigated in this study, the analytical framework must be able to accommodate individual choices (i.e. supply-side) as well as policy issues (demand-side). A commonly used model for migration flows is the gravity model[10] which is consistent with the individual's utility maximizing present value decision and, is flexible enough to accommodate policy factors. The general gravity equation is,

$$Fl_{jk} = G_{jk}\left[w_j\left(M_j^{\alpha}\right)w_k\left(M_k^{\beta}\right)\right]/\, d_{jk}^{b}\ , \qquad (1)$$

with Fl_{jk} the flow between country j and k which is a function of weighted mass (wM) in each country and distance between the two countries (d). The weighted mass in the case of skilled migration is educated population corrected by the standard of living (Isard, 1998); distance can be physical, cultural, political or professional, depending on the case under investigation. A log linear specification of (1) is thus:

$$\begin{aligned} FlRate_{jit}^{CH} &= c_{ji} + \beta_1 lEarn_{it}^{CH} + \beta_2 lEearn_{jit} + \beta_3 URUni_t^{CH} + \beta_4 URUni_{jt} \\ &\quad + \beta_5 lLFUni_t^{CH} + \beta_6 lLFUni_{jt} + Policy2002 + \varepsilon_{jit}\ . \end{aligned} \qquad (2)$$

The dependent variable ($FlRate^{CH}_{jit}$) is the immigration rate of skilled individuals with occupation i (i=1 to 11), from country j (j=Canada, United States), in year t (t=1990 to 2009),

[10] See for example, Foot and Milne (1984), Helliwell (1997), Karemera et al. (2000), Lewer and Van den Berg (2008) and, Gross (2011).

to Switzerland (CH). The model is estimated over 440 observations. The fixed effect (c_{ji}) accounts for time-invariant, source country-specific and, occupation-specific factors, such as cost of moving, international transferability of skills, cultural and psychological costs. Variables are in natural logs except the rates.

The dependent variable is the annual inflow from Canada and the United States of skilled people as a share of the Swiss university-trained labor force in thousands. Destination rather than source labor force is used for standardization to ensure consistency across panels. The average rate for Canada is 0.029 and for the United States, 0.087. The variations across occupation groups are quite large with a minimum of zero for both countries and a maximum of 0.208 for Canada and 0.391 for the United States (see Table 4). Not surprising both maximum values are reached in the manager categories, in 2001 for Canada and in 2007 for the United States.

The explanatory variables representing individual maximisation are real occupation-specific earnings and unemployment rates in the source countries ($lEarn_{jit}$; $URUni_{ji}$) and in Switzerland ($lEarn^{CH}_{it}$; $URUni^{CH}_{t}$).[11] Relatively higher earnings and lower unemployment among tertiary-educated people in Switzerland are expected to increase the flow of highly skilled foreigners as relative financial rewards and probabilities to find a job improve. The Swiss unemployment rate also captures the labor market driven immigration policy since new immigrant must have a job contract.

Tertiary-educated labor forces in the source countries and in Switzerland ($lLFUni_{jt}$; $lLFUni^{CH}_{t}$) are expected to have a positive sign in the traditional gravity model as bigger masses generate larger flows. In the context of brains, larger pools can be seen as proxies for professional networks. So, a larger skilled labor force at destination (i.e. Switzerland) can be

[11] The variables and how they are measured are described in detail in the Appendix.

seen as attractive for North Americans and increases the flow of immigrants. However, larger networks at home may decrease the incentive to migrate. In addition, the policy since 2002 that requires employers to choose among local candidates first would also decrease the flow of immigrants when the Swiss skilled labor force increases as employers have more choice domestically. Hence, because of the opposite effect from sizes (mass effect) and quality (network effect) of labor forces, the signs are indeterminate. Nevertheless, after 2002, the negative impact of the Swiss labor force through substitution is likely to have increased.

The move to free mobility with the EU is tested in several different ways. First, a simple dummy variable (*Policy 2002*) with value 0 until 2002, 0.5 in 2002 and 1 afterwards is used to capture a fixed impact of the new policy at introduction. The dummy variable is also interacted with the explanatory variables to evaluate potential changes in elasticities. Second, the impact of free mobility is measured through the sudden direct access to a much larger pool of skilled workers including not just residents of Switzerland but also residents of the European Union. Two variables are considered: The supply provided by the border countries ($LFBord_t$) and the supply provided by EU countries eligible to free mobility with Switzerland ($LFEU_t$).[12] The use of the supply from border countries only (i.e., Austria, France, Germany and Italy) is based on geographical closeness and on the sharing of languages with Switzerland, two characteristics likely to favour their citizens within the new priority set-up for immigrants. Also, immigrant workers from these four countries represented more than 90% of the European annual inflow and 60% of total annual inflow. The measure is the weighted sum of university trained labor supplies from the four countries with the weights equal to the share of each country in the total length of the border with Switzerland. The

[12] Unfortunately labor force statistics for six of the 15 EU countries (Ireland, Luxemburg, Netherlands, Finland, Greece and, Sweden) are not consistently available over the whole period. Together they represent less than 5% of EU15 immigration since 2002.

supply from eligible EU countries is the weighted sum of university trained labor supply with the weights equal to the inverse of the distance between the capital of each country and Bern, the capital of Switzerland. Each weighted labor force is introduced with the constraint of equality of coefficients with the Swiss labor force after 2002 which is consistent with the fact that employers must consider them as perfect substitutes.[13] Finally a dummy is also tested for the introduction of the dual recruiting system (*Policy 1998*) which recommended priority to Europeans. The model is first estimated in its basic gravity form then various policy specifications are used to test the robustness of the results.

Because the time dimension of the sample is relatively long (20 years), before starting the estimations I ran unit-root tests. Table 5 shows that the hypothesis of a common unit root across panels or of individual unit roots can be rejected at 5% except in one case. In that case the test is for common unit-root processes and there is no obvious reason why such a restriction would be valid since hiring in occupation categories has no reason to follow the same dynamics. Hence, the estimations are run in levels and spurious correlation is unlikely.

The various experiments with the policy dummy for the introduction of free mobility are presented in Table 6. The results of the fixed effect test and an AR(2) serial correlation test require the use of fixed effect panel estimation with serial correlation robust standard errors. In Column 1 free mobility has a significant adverse effect on immigration flows from North America. Column 2, confirms there is no significant difference in the average fall in inflow of brains from Canada and the United States in 2002-2003; also the recommendation by the government to give priority to Swiss and EU citizens in 1998 does not have a significant impact (Column 3). Hence, only legislated priorities affected the inflow of North

[13] Statistically, it is not possible to enter the European and the Swiss labor force measures separately because of high correlation (about 0.980; see Table A.II.2).

American brains. Finally, the 2002-policy, in addition to the impact effect, is modelled by augmenting the Swiss labor force with the two measures of the EU labor force alternatively (Columns 4 and 5). Neither variable is significant and there is no major change in the results. Overall, the lack of significance of most explanatory variables except the Swiss unemployment rate and the policy shift dummy, suggests that the introduction of free mobility has led to changes beyond a simple impact effect and the basic model is likely to be under-specified.

In Table 7 all elasticities are allowed to vary after 2002 and the results confirm that the one-step impact modelling of free mobility with the EU is not sufficient.[14] In Column 1, the negative impact of Swiss unemployment embodying the condition of having a job contract does not vary after 2002. However, the gravity dynamics (i.e., Swiss and North American labour forces) changes substantially. Before free mobility the network effect dominated: An increase in skilled labor force in North America and in Switzerland (i.e., expansion of networks) attracted Canadian and American brains. So *ceteris paribus* brain migration was influenced by the presence of stimulating environments at home or abroad. After the introduction of free mobility with EU/EFTA, the substitution with Swiss highly skilled labor force completely offsets the network effect.[15] Also the home network effect becomes stronger (-0.281 with t-value 2.6) and slows down immigration to Switzerland further. So, the fact that the Swiss labor market became much less accessible to North American brains also induced them to focus more on their professional home networks. Finally, an increase of unemployment in North America slowed down migration after 2002 which is an unexpected

[14] Note that the impact effect is dropped from the specification because of its high correlation with the labor force variables that change very slowly over time.
[15] The coefficient after 2002 is positive but not significant: 0.121; t-value 1.63; p-value 0.105.

result in the traditional individual maximisation model but it is consistent with the barriers imposed by the new Swiss policy.

Considering the significant change in the role of Swiss and source-country skilled labor force under the new policy, four alternative specifications are tested. The first one, based on the results in Table 6 Column 4, allows for the Swiss and EU labor force to be perfect substitutes after 2002 (Column 2). All the results of the model pre- and post-2002 are stable with respect to Column 1 except Swiss earning which is positive and significant. Again the attractiveness of Switzerland's networks for North American brains is substantially weakened after 2002[16] as substitution in favour of Swiss and European brains increased under the new legislation. The magnitude of the post-2002 change in substitution is given by the coefficient on the Swiss-EU labor force (-0.147 significant at 1%). Hence, there are clear indications that employers have been following the priority rules in hiring. In addition, North American brains, after 2002, respond to financial incentives as the coefficient on Swiss earnings is positive and significant. Limiting the labor force to border countries generates similar results (Column 3). This is not surprising since the border countries include three of the largest European economies and the simple correlation between the two measures is extremely high (0.998). Finally, rather than consider the whole European labor force as the potential pool of applicants for jobs in Switzerland, only unemployed Europeans are considered (Column 4) implying that only the unemployed would be interested in working in Switzerland. Even though this is an extremely restrictive assumption, there is a significant yet smaller substitution effect (0.105 versus 0.147 for the whole labor force) probably because the unemployed are less diversified and may not fit the demand characteristics as well.

[16] The Wald-test hypothesis that the after 2002 effect cancels the basic effect (i.e., H_0: 0.353-0.147=0 can be rejected; p-value 3.36%); so the net effect is still positive.

The next two experiments (columns 5 and 6) consider whether the labor forces from the three regions (Europe, North America and Switzerland) were treated similarly when the legislation allowed employers to do so. In Column 5, the European labor force is assumed to be considered perfect substitute for the Swiss labor force before and after 2002 because in 1998, the government recommended employers gave priority to Europeans over citizens from the rest of the world. Before 2002, the network effect is much smaller and not significant than for the Swiss labor force alone; after 2002, the result hardly changes and there is substitution against North Americans in favour of Europeans and Swiss. So European skilled workers were not quite considered equivalent to Swiss workers before 2002 and they were not given priority over North Americans. In Column 6, North American and European workers are allowed to be considered substitutes before 2002 and European and Swiss, after 2002. The quality of the fit is poorer and most variables are not significant. So, these two experiments suggest that prior 2002, skilled labor from the three regions were considered distinct in hiring: Employers chose the most suitable brain regardless of origin. After 2002, Swiss and EU skilled workers had to be given priority over North Americans and employers did so to the extent that it completely offsets the attractiveness of Swiss skilled networks for North Americans. In other words, North Americans no longer come to Switzerland for the benefits of a stimulating professional environment. They also now expect a financial reward in terms of higher earnings. In conclusion all the experiments are consistent with a significant substitution away from North American brains in favour of European and Swiss ones once hiring priorities became legislated.

One questions arising naturally from these results is: Does this evolution in the distribution of geographical origins of skilled immigrants to Switzerland and the fact that the

drop was not uniform across occupations have a potential impact on the country's future economic performance?

During the past decade evidence that a diaspora facilitates economic links between their home and host countries has been growing. For example, expatriates have been shown to contribute to the expansion of trade between countries (see Rauch, 2001). This aspect appears to have been taken into consideration by Swiss legislators through the provision that priorities in hiring can be relaxed for economic reasons such as access to new markets or expansion of exports (Confédération Suisse, 2011a). There is also growing evidence that ethnic networks contribute to foreign direct investment (see for example Javorcik et al., 2011) and firms' competitiveness on world markets (Foley and Kerr, 2011). In both cases, the role of skilled expatriates is to provide information advantage (directly or indirectly) to firms that employ them which lowers entry barriers on foreign markets. Foley and Kerr show that having more innovations by ethnic inventors increase affiliates' activity in those countries and lowers the need for joint venture partners for new affiliates. This suggests that if Swiss firms are constrained by law to hire skill immigrants mostly from the same region (i.e., the European Union), they might be penalised in their attempts to penetrate markets in other regions of the world. This could be a particularly important adverse effect of the immigration law given the rapid development of Asia and the fierce competitiveness among foreign firms to serve those markets. So the next step is the estimation of the model for occupation categories of innovators (i.e., Engineers, E, Scientists, J, and Academics, L).[17]

Innovators have experienced smaller than average declines after 2002. In Table 3, the average annual inflow of Canadian engineers increased by 42.9% while that from the United

[17] Foley and Kerr (2011) use engineers and scientists. Academics are added because in Switzerland they are major contributors to innovations especially at the EPFL and ETHZ.

States fell only by 5.4%. Flows of academics decreased but their shares in total inflow grew: From 1.8% to 2% for Canada and, from 2% to 2.8% for the United States (see Figure 2). Scientists from both countries however experienced sharp declines.

The results of the estimations for the innovators are quite different from those for all skilled immigrants but the new immigration legislation still has some adverse effect.[18] In Table 8, while there is no significant fixed impact of the legislation (Column 1) there has been shift in elasticities and the focus of the discussion is Column 2.[19] There are three important points about the results. First, the impact of the state of the Swiss labor market on the probability to get a job is three times larger after 2002 than before (i.e., the elasticity of the Swiss unemployment rate decreases from -0.002 to -0.006). So the hiring of North American innovators has become much more sensitive to the state of the labor market while it was slightly less than average before 2002. The mean tertiary-educated unemployment rate has risen over the sample from 2.27% between 1990 and 2001 to 2.49% between 2002 and 2009 which may cause a lasting decline in North American brain inflows. Higher volatility and a possible adverse trend in hiring are likely to decrease geographical heterogeneity among foreign innovators. This may be costly to Swiss firms in the medium term for market access. Second, substitution with Swiss brains is lower *ceteris paribus* after 2002 as the impact of the Swiss labor force is halved (-0.154 to -.071). So, the new legislation did not benefit local innovators. One possible explanation is the high level of specialisation in those occupations and the fact that such individuals from different regions with different training and experience are unlikely to be perfect substitutes. Finally, there is no change in incentive to leave North

[18] The sample being much smaller (120 observations) the efficiency of the results is expected to be weaker.
[19] In Column 3, the estimated coefficient after 2002 is positive for the European labour force when constrained to be the same as for the Swiss labour force but the overall fit is lower than in Column 2 suggesting the constraint is not warranted and might introduce a bias.

America for innovators. Overall these results suggest that the new legislation has been beneficial neither to North Americans nor to Swiss innovators.

5. Conclusion

In 2002, Switzerland started to implement the free mobility agreement with the EU/EFTA member countries. Simultaneously, it established priorities in nationalities for hiring that restricted skilled immigration from the rest of the world. As a result, Swiss employers saw the pool of potential applicants increase 40-fold[20] but at the same time, they no longer had the freedom to hire the best of all potential candidates since they had to search sequentially across geographical areas. Clearly that policy affected Canadian and American brains and their chance to obtain a job in Switzerland. Globally, the new policy, as expected, led to substitution in favour of Swiss and Europeans. But it has also had some undesirable side effects. North American brains have become more inclined to contribute to their home professional networks rather than to Swiss networks and earnings in Switzerland has become a significant determinant, increasing competitive pressure on Swiss employers.

The new policy may also penalise Swiss firms' competitiveness on world markets in the future. Since 2002, hiring of North American engineers, scientists and academics is much more dependent on the state of the labor market which exhibits higher average unemployment. Increased volatility over the business cycle and a possible negative trend may have adverse consequences for Swiss firms' competitiveness in Asia and for the economic prosperity of Switzerland in the future. Foley and Kerr (2011), p. 19, find that "(…) firms with more innovative activity performed by inventors of a certain ethnicity are more likely to

[20] The factor is computed using the mean of weighted EU labour force by the mean Swiss labour force with tertiary education from Table A.II.1..

conduct R&D in countries associated with that ethnicity; (…) to collaborate with inventors located in such countries to generate new patents." This effect is particularly relevant for Switzerland as between 2004 and 2006 the country had the highest proportion of patent applications with co-inventors located in the European Union among OECD countries (OECD, 2009, Table 4.1). Thus, by raising barriers on hiring from North America and other regions of the world such as Asia, the new legislation may have decreased the possibility of collaboration with inventors from those regions and thereby increased firms' entry cost into those markets.

In conclusion, the problem is not too many Europeans as nationalists argue but rather it might be too much homogeneity in regions of origin of skilled immigrants. This is a first evaluation of the impact of free mobility with the EU on brain diversity; clearly the question should be investigated further especially at a more disaggregated level and in conjunction with foreign direct investment.

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Appendix I

The 11 categories of occupations for skilled immigrant workers are based on the American classification (USDJINS, 2002). ISCO codes up to 4 digits were used to determine the components of the occupation categories. Details are presented in Table A.1.

Table A.1: Occupation Categories

Category	Occupation Titles	ISCO Code	Short name
A	Architects, cartographers, surveyors, and urban or land use planners.	2141&2148	Architects and related specialists
B	Administrative officers, bookkeepers, clerks, financial and investment analysts, insurance underwriters, marketing and sales personnel, secretaries (except legal and medical), securities agents, investment dealers, and brokers.	340-343 & 400-422	Commercial and financial technicians
C	Kindergarten, elementary school and secondary school teachers, vocational and educational counselors.	232-235	Teachers
D	General practitioners and family physicians, other professional occupations in health diagnosing and treating, specialist physicians (including opticians, dentists, podiatrists), and veterinarians	222 &3224[a/]	Physicians
E	Engineers	2142-2147	Engineers
F	Corporate managers, managers of small enterprises, and senior officials of organizations.	100-131	Managers
G	Air pilots; flight engineers; flying instructors; air traffic control and related occupations; ambulance attendants and other paramedical occupations; audiologist and speech language pathologists; elementary and secondary school teachers' assistants; engineering inspectors and regulatory officers; dieticians and related occupations; life science and health (except nursing) technicians and associate professionals; pharmacists, physiotherapists and related associate professionals; physical and engineering science operators, technicians, and technologists	300-334 & 344-345 (minus 3224)	Health and science technicians
H	Archivists; librarians; artistic, entertainment and sport associate professionals; business professionals (including accountants, specialists in HR); counselors (except educational); journalists, editors, reporters, public relations, announcers; law professionals (including paralegals); religious professionals; social scientists; social workers; translators, terminologists, interpreters, writers; creative or performing arts.	240-247 & 346-348[b/]	Social and human scientists, technicians and related professionals
I	Computer programmers and developers, information system analysts and consultants, mathematicians, statisticians, actuaries, and web designers.	212-213	IT professionals
J	Natural scientists and physical scientists.	211 &221	Scientists
L	College and vocational instructors, post-secondary teachers, and research assistants and university professors.	231	Academics

[a/] Category D technically includes professionals as well as technicians. The average percentage of professionals between 1990-2010 is 95.6% for Canada and 98.7% for the United States, so, the category is considered to represent professionals.

[b/] Category H technically includes professionals as well as technicians. The average percentage of professionals between 1990-2010 is 82.6% for Canada and 93.9% for the United States, so, the category is considered to represent professionals.

Appendix II: Definitions of variables.

The matching of skill definitions across skill-specific variables is given in Table A.II.3. Destination country is identified by *k*.

$FLRate^{CH}_{jit}$:	Flow skilled labor from source country *j* (*j*=1 to 2) in occupation category *i* (*i*=1 to 12) to Switzerland during year *t* (t=1990 to 2010) as a share of the tertiary educated labor force in Switzerland ($LFUni^{CH}$) in occupation category *i* at time *t* (ODM, 2010).
$lEarn^{CH}_{it}$, $lEarn_{jit}$:	Log of earnings in Switzerland and source country *j*, occupation category *i*, at time *t*. In Canada, log of annual earnings of individuals by NOC-S in 2005-constant dollars (SLID, Statistics Canada, 2011); sub categories are computed from ratio of that category to overall from 1995-Census (Statistics Canada, 2008) converted in 2005 US$ at the annual 2005 exchange rate (Bank of Canada, 2011). In the United States, total private weekly private average earnings in 2005 dollars (US BLS, 2011a) weighted with ratio of occupational hourly compensation to average in 1997 (US BLS, 1999). In Switzerland, gross nominal annual revenue by ISCO 2-digit level (ESPA, Table 3.4.3.1., OFS, 2011), corrected with CPI (Table 5.2.1., OFS, 2011) in 2005 US$ at the average of monthly 2005 exchange rate (SNB, 2011); the missing income observations for 1990 were built using average growth rates over the following decade.
$lLFBord_t$, $lLFEU_t$:	Log of the weighted average of tertiary educated labor force from 4 border countries of Switzerland (France, Italy, Germany, Austria) and from 9 of the EU15 countries (border countries + United Kingdom, Belgium, Spain, Portugal, Denmark). The tertiary educated labor force (LF) is computed from employment (E) and unemployment rate (UR) for tertiary educated such that LF=E/(1-UR) for people aged 15 to 64 with tertiary education (i.e., ISCED 5-6, ISCED 1997, European Commission, 2011). The missing observations for 1990-1991 for Italy and Germany, 1990-1992 for France and 1990-1994 for Austria are built using average growth rates in the tertiary educated labor force over the available period. In the case of the border countries, the weights are the share of each country's border length in the total border of Switzerland (www.switzerlandonline.org/). In the case of the EU countries, the weights are the inverse of the distance in kilometers between the Swiss capital city, Bern, and the capital city of each country (www.mapcrow.info).
$lLFUni^{CH}_t$, $lLFUni_{jt}$:	Log of labor force aged between 15 and 65 years old with a university degree in Canada (Statistics Canada 2011). In the United States, labor force with a bachelor's degree and higher, 25 years and over; the missing labor force numbers, 1990–91 are extrapolated using the average growth rate for the period 1992–2000, (US BLS, 2011b). In Switzerland, labor force with tertiary education (university and advanced professional education; ESPA, OFS, 2011); the missing observations for 1990 are built using average growth rates over the available period.
$URUni^{CH}_t$, $URUni_{jt}$:	Unemployment rate in destination and source country *j*, at time *t*. In Canada, unemployment rates both sexes, university degree, 15 years and over (Statistics Canada, 2011, Table v2627998). In the United States, unemployment rate for tertiary level of education computed from labor force and employment level data 25 years and over (US BLS, 2011b). In Switzerland, unemployment rate for tertiary level of education computed from labor force and unemployment level data (OFS, 2011).
Policy 2002:	Dummy with value 0.5 for 2002, 1 from 2003 to 2010 and, 0 otherwise; measures the introduction of free mobility with EU and EFTA.
Policy 1998:	Dummy with value 1 from 1999 to 2010 and, 0 otherwise; measures the circle policy with recommendation to give priority to EU workers (i.e., dual recruiting) after November 1998.

Table A.II.1: Correlations between independent variables.

	$lEarn^{CH}_{it}$	$LEarn_{jit}$	$URUni^{CH}_{it}$	$URUni_{jit}$	$lLFUni^{CH}_{t}$	$lLFUni_{jt}$	$lLFBorder_t$
$lEarn^{CH}_{it}$	1						
$LEarn_{jit}$	0.438	1					
$URUni^{CH}_{t}$	0.016	-0.021	1				
$URUni_{jt}$	0.042	0.216	0.072	1			
$lLFUni^{CH}_{t}$	0.023	0.168	0.120	-0.048	1		
$lLFUni_{jt}$	0.003	-0.253	0.025	-0.859	0.157	1	
$lLFBorder_t$	0.015	0.176	0.111	-0.091	0.983	0.160	1
$lLFEU_t$	0.015	0.174	0.145	-0.098	0.978	0.161	0.998

Table A.II.2: Correspondence between occupation categories across countries for explanatory variables.

Occupation categories	**ISCO Code**	**Canada NOC-S Unemp. rates** (Stats Can)	**Switzerland ISCO Earnings** (OFS, ESPA; ILO)	**US ISCO Unemp. Rates** (ILO)	**Canada NOC-S Earnings** (Stats Can CANSIM)	**Switzerland ISCO Earnings** (OFS, ESPA)	**US Compensation Survey 1997 Earnings** (BLS)
A	2141,2148	C05	ISCO2	ISCO2	C05	ISCO2	Architect
B	340-343, 400-422	B	ISCO3,4[b]	ISCO3,4[b]	B	ISCO3,4[b]	EAM: management-related
C	232-235	E13	ISCO2	ISCO2	E13	ISCO2	Teachers, except college and university
D	222, 3224	D01	ISCO2	ISCO2	D01	ISCO2	Physicians
E	2142-2147	C03	ISCO2	ISCO2	C03	ISCO2	Engineers
F	100-131	A	ISCO1	ISCO1	A (all)	ISCO1	EAM
G	300-334, 344-345 (minus 3224)	C1	ISCO3	ISCO3	C1	ISCO3	Technical
H	240-247, 346-348	F0	ISCO2,3[b]	ISCO2,3[b]	E0,E2[a]	ISCO2,3[b]	Librarians, social scientists, social recreation workers, lawyers and, writers[a]
I	212-213	C07	ISCO2	ISCO2	C06	ISCO2	Mathematic, Computer scientists
J	211, 221	C01	ISCO2	ISCO2	C01	ISCO2	Natural scientists
K	223	D1	ISCO2	ISCO2	D1	ISCO2	Registered nurses
L	231	E11,E12	ISCO2	ISCO2	E11,E12	ISCO2	Teachers, college and university

[a] Simple average of the classes. [b] Employment weighted average of the two classes.

Table 1: Total annual immigration flows from North America and selected EU countries

	1.	2.	3.	4.	5.	6.	7.
	1994 Year before 3-circle policy	**2001 Year before free mobility.**	**2003 19 months after free mobility.**	**2010**	**% change 1994-2001**	**% change 2001-2003**	**% change 2001-2010**
Total	40,331	41,867	35,396	53,193	3.8	-15.5	27.1
Canada	364	767	298	264	110.7	-61.1	-65.6
United States	1,037	1,367	654	891	31.8	-52.2	-34.8
EU15	24,651	26,681	23,574	45,235	8.2	-11.6	69.5
Austria	1,010	1,704	927	1,541	68.7	-45.6	-9.6
France	2,849	3,774	2,640	6,416	32.5	-30.0	70.0
Germany	4,727	9,892	7,132	18,830	109.3	-27.9	90.4
Italy	4,031	2,982	1,846	5,664	-26.0	-38.1	89.9

Table 2: Skilled immigration from North America and selected EU countries

	Growth skilled flows [a/]			**Share of skilled immigrant workers**			
	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**
	% change 1994-2001	**% change 2001-2003**	**% change 2001-2010**	**1994**	**2001**	**2003**	**2010**
Canada	110.2	-49.1	-55.7	67.3	67.1	87.9	86.4
United States	34.6	-49.7	-16.7	76.6	78.2	82.3	87.3
Austria	137.1	-40.3	-14.8	31.8	44.7	49.0	42.1
France	77.6	-29.2	33.3	43.0	57.7	58.4	45.2
Germany	134.5	-30.6	20.3	61.0	68.4	65.8	43.2
Italy	28.5	-33.1	75.6	19.7	34.2	37.0	31.6

[a/] Skilled is defined according to the ILO International Standard Classification of Occupation (ISCO) and includes legislators, senior officials and managers (ISCO-1), professionals (ISCO-2) and, technicians and associate professionals, (ISCO-3; ILO, 1990).

Table 3: North American annual average flows of skilled immigrants per occupation categories (1990-2000; 2002-2010)[a/]

Occupation categories		From Canada			From the United States		
		1993-2001	2002-2010	% change	1993-2001	2002-2010	% change
	Total	3,496	2,402	**-31.3%**	9,212	6,278	**-31.8%**
A	**Architects and related specialists**	9	9	**0.0**	21	24	**+14.3**
B	**Commercial and financial technicians**	378	149	-60.6	1,224	458	-62.6
C	**Teachers**	703	263	-62.6	1,623	488	-69.9
D	**Physicians**	38	30	-21.1	77	48	-37.7
E	**Engineers**	63	90	**+42.9**	241	228	-5.4
F	**Managers**	407	771	**+89.4**	2,141	3,724	**+73.9**
G	**Health and science technicians**	1,313	739	-43.7	1,047	283	-73.0
H	**Social scientists and humanities related professionals**	346	188	-45.7	2,097	510	-75.7
I	**IT professionals**	138	95	-31.2	419	298	-28.9
J	**Scientists**	39	19	-51.3	135	43	-68.1
L	**Academics**	62	49	-21.0	187	174	-7.0

[a/] From March to June 2008, a much larger proportion of immigrants did not declare an occupation (between 14% and 31% instead of about 2%) and thus the 2008-flow is slightly underestimated. In 2008, the share of workers not declaring an occupation was 12.7% against 11.7% in the preceding year. So, the overall effect on total worker immigration is negligible and it is likely to be even smaller on skill- and country-specific flows.

Table 4: Statistical characteristics of the variables.

	Mean	Maximum	Minimum	S.D.
Dependent variables				
$FLRate^{CH}_{jit}$	.058	0.391	0	0.083
Canada	.029	0.208	0	0.043
United States	.087	0.391	0	0.103
Independent variables				
$Earn^{CH}_{it}$	78,201	88,972	57364	8,430
$Earn_{jit}$ (2005-US$)	64,646	163,942	35,052	22,274
Canada	70,907	163,843	43,962	27,390
United States	58,385	89,948	35,052	12,866
$URUni^{CH}_{t}$	2.36	4.50	1.18	0.76
$URUni_{jt}$	3.64	5.83	1.67	1.24
Canada	4.69	5.83	3.68	0.61
United States	2,59	4.61	1.67	0.68
$LFUni^{CH}_{t}$ (,000)	980.61	1,462.00	707.10	215.12
$LFUni_{jt}$ (,000)	19,466.42	45,634.00	1,940.05	17,015.60
Canada	3,013.28	4,268.78	1,940.05	706.91
United States	35,919.56	45,634.00	26,375.29	5,999.97
$LFBord_{t}$ (,000)	3,861.10	5,293.37	2,774.84	753.14
$LFEU_{t}$ (,000)	41,175.06	56,781.22	28,276.10	8578.06

Table 5: Unit root tests for the flow rates from Canada and the United States to Switzerland (1990 to 2010)

	Specification with individual effects	Specification with individual effects and time trend
H_0: there is a common unit-root process:		
Levin, Lin & Chu t*	-2.53 (0.006)[a/]	-1.32 (0.09)
Im, Pesaran & Shin W-stat.	-2.00 (0.023)	-2.68 (0.004)
ADF-Fisher Chi-sq.	67.96 (0.012)	69.90 (0.008)

[a/] P-values in parentheses.

Table 6: Immigration from Canada and the United States to Switzerland

	Fixed Effect[a/]	**Canada vs US**	**Dual Recruiting 1998**	**EU9 LF**	**Border Countries LF**
	1.	**2.**	**3.**	**4.**	**5.**
$lEarn^{CH}_{it}$	-.015 (0.1)	-.021 (0.1)	-.026 (0.1)	-.023 (0.1)	-.024 (0.1)
$lEarn_{jit}$	.067 (1.2)	.042 (1.0)	.075 (1.2)	.053 (1.1)	.060 (1.1)
$URUni^{CH}_{t}$	-.004 (2.2)*	-.003 (1.9)	-.008 (1.6)	-.004 (2.4)*	-.005 (2.4)*
$URUni_{jt}$	-.001 (0.2)	-.002 (0.3)	-.001 (0.1)	-.001 (0.3)	-.002 (0.2)
$lLFUni^{CH}_{t}$	-.110 (1.2)	-.029 (0.7)	-.129 (1.2)	-	-
$lLFUni_{jt}$	.090 (1.5)	.015 (0.6)	.146 (1.3)	.173 (1.3)	.154 (1.3)
Policy 2002	-.035 (3.0)**	-.055 (2.5)**	-.031 (2.6)**	-.032 (2.8)**	-.033 (2.8)**
Canada*Policy2002	-	.036 (1.1)	-	-	-
Policy 1998	-	-	-.021 (1.0)	-	-
$l(LFUni^{CH}_{t}*LFEU_t)$	-	-	-	-.097 (1.2)	-
$l(LFUni^{CH}_{t}*LFBord_t)$	-	-	-	-	-.091 (1.2)
Adj. R^2	0.784	0.791	0.786	0.787	0.787
N	22	22	22	22	22
T	20	20	20	20	20
Schwarz	-3.328	-3.349	-3.327	-3.345	-3.341
F(21,411): $c_{ji}=c$ (p-value)	55.72 (0.0000)	-	-	-	-

[a/] Serial correlation robust standard errors in parentheses. The uncorrected residuals show first order correlation in an AR(2) process such that e_{jit}=*-0.0001 (0.88) + 0.833 (16.7) - 0.003 (0.10)*; with t-values in parentheses.

Table 7: Impact of Free Mobility with the EU.

	2002-Policy	EU Labor force after 2002	Border Labor force after 2002	EU Unemployment	EU Labor force before and after 2002	EU/CAN/US before 2002 Swiss/EU after 2002
	1.	**2.**	**3.**	**4.**	**5.**	**6.**
$lEarn^{CH}_{it}$	.084 (0.4)	.107 (0.5)	.101 (0.5)	.068 (0.3)	.081 (0.4)	.053 (0.2)
$lEarn_{jit}$	-.042 (0.7)	-.047 (0.8)	-.046 (0.8)	-.033 (0.5)	-.040 (0.7)	-.071 (1.0)
$URUni^{CH}_{t}$	-.003 (2.0)*	-.003 (2.2)*	-.003 (2.1)*	-.003 (2.1)*	-.004 (2.4)*	-.006 (2.8)**
$URUni_{jt}$	-.001 (0.2)	-.003 (0.4)	-.002 (0.4)	.001 (0.1)	.002 (0.4)	-.008 (0.1)
$lLFUni^{CH}_{t}$	.395 (2.2)*	.353 (2.4)*	.373 (2.3)*	.371 (2.1)*	-	-
$lLFUni_{jt}$	-.248 (2.3)*	-.218 (2.6)**	-.232 (2.6)*	-.224 (2.2)*	-.260 (1.7)	-
$lEarn^{CH}_{it}$*Policy2002	.135 (1.9)	.196 (2.4)*	.176 (2.2)*	.096 (1.7)	.152 (2.0)*	.091 (1.8)
$lEarn_{jit}$*Policy2002	.060 (1.9)	.060 (1.8)	.060 (1.9)	.061 (1.9)	.061 (1.9)	.066 (1.9)
$URUni^{CH}_{it}$*Policy2002	-.002 (0.5)	-.001 (0.2)	-.001 (0.1)	.015 (2.1)*	-.009 (2.0)*	-.021 (2.4)*
$URUni_{jit}$*Policy2002	-.009 (2.2)*	-.009 (2.3)*	-.009 (2.3)*	-.003 (0.6)	-.009 (1.8)	.004 (0.7)
$lLFUni^{CH}_{t}$*Policy2002	-.274 (2.4)*	-	-	-	-	-
$lLFUni_{jt}$*Policy2002	-.033 (3.1)**	-.031 (2.9)**	.032 (3.0)**	-.028 (2.4)*	-.034 (3.0)**	-
$l(LFUni^{CH}_{t}*LFEU_{t})$*Policy2002	-	-.147 (2.8)**	-	-	-.116 (2.6)**	-
$l(LFUni^{CH}_{t}*LFBord_{t})$*Policy2002	-	-	-.155 (2.7)**	-	-	-
$l(LFUni^{CH}_{t}*LFEU_{t})$	-	-	-	-	.175 (1.7)	-
$l(LFUni^{CH}_{t})$*Before 2002	-	-	-	-	-	-.033 (0.2)
$l(LFUni_{t}*LFEU_{t})$*Before 2002	-	-	-	-	-	.035 (0.7)
$lLFUni_{jt}$*After2002	-	-	-	-	-	.026 (0.6)
$l(LFUni^{CH}_{t}*LFEU_{t})$*After2002	-	-	-	-	-	-.085 (3.5)**
$l(LFUni^{CH}_{t}*UnempEU_{t})$*Policy2002	-	-	-	-.105 (2.3)*	-	-
Adj. R^2	0.818	0.826	0.824	0.815	0.821	0.816
N	22	22	22	22	22	22
T	20	20	20	20	20	20
Schwarz	-3.446	-3.491	-3.476	-3.427	-3.461	-3.434

Table 8: Immigration of North American Innovators (Scientists, Engineers, Academics)

	Fixed Effect[a/]	2002-Policy	EU Labor force after 2002	Border Labor force after 2002
	1.	**2.**	**3.**	**4.**
$lEarn^{CH}_{it}$	.001 (0.1)	-.032 (1.5)	-.029 (1.4)	-.032 (1.5)
$lEarn_{jit}$	.010 (0.8)	-.002 (0.2)	-.002 (0.2)	-.002 (0.2)
$URUni^{CH}_{it}$	-.002 (1.7)	-.002 (3.3)**	-.002 (3.3)**	-.002 (3.3)**
$URUni_{jit}$	.001 (0.7)	.002 (1.6)	.002 (1.5)	.002 (1.5)
$lLFBA^{CH}_{t}$	-.049 (2.8)**	-.154 (5.5)**	-.147 (5.2)**	-.149 (5.4)**
$lLFUni_{it}$	.022 (1.8)	.084 (4.4)**	.079 (4.1)**	.081 (4.3)**
Policy2002	.002 (0.4)	-	-	-
$lEarn^{CH}_{it}$*Policy2002	-	-.056 (5.1)**	-.078 (5.1)**	-.069 (5.2)**
$lEarn_{jit}$*Policy2002	-	.006 (2.5)*	.006 (2.5)*	.006 (2.5)*
$URUni^{CH}_{t}$*Policy2002	-	-.004 (2.2)*	-.005 (2.6)**	-.004 (2.6)*
$URUni_{it}$*Policy2002	-	.001 (0.8)	.002 (1.2)	.002 (1.1)
$lLFUni^{CH}_{t}$*Policy2002	-	.083 (5.7)**	-	-
$lLFUni_{it}$*Policy2002	-	-.0004 (0.2)	-.001 (0.3)	-.001 (0.3)
$l(LFUni^{CH}_{t}*LFEU_{i})$*Policy2002	-	-	.046 (5.4)**	-
$l(LFUni^{CH}_{t}*LFBord_{i})$*Policy2002	-	-	-	.047 (5.6)**
Adj. R^2	0.729	0.813	0.811	0.812
N	6	6	6	6
T	20	20	20	20
Schwarz	-6.625	-7.045	-7.033	-7.038
F(5,107): $c_{ji}=c$ (p-value)	14.87	-	-	-

[a/] Serial correlation robust standard errors in parentheses. The uncorrected residuals show first order correlation in an AR(2) process such that e_{jit}*=-0.0002 (0.4) + 0.210 (2.3)+ 0.335 (4.4)*; with t-values in parentheses.

Figure 1: Immigration of Americans and Canadians to Switzerland

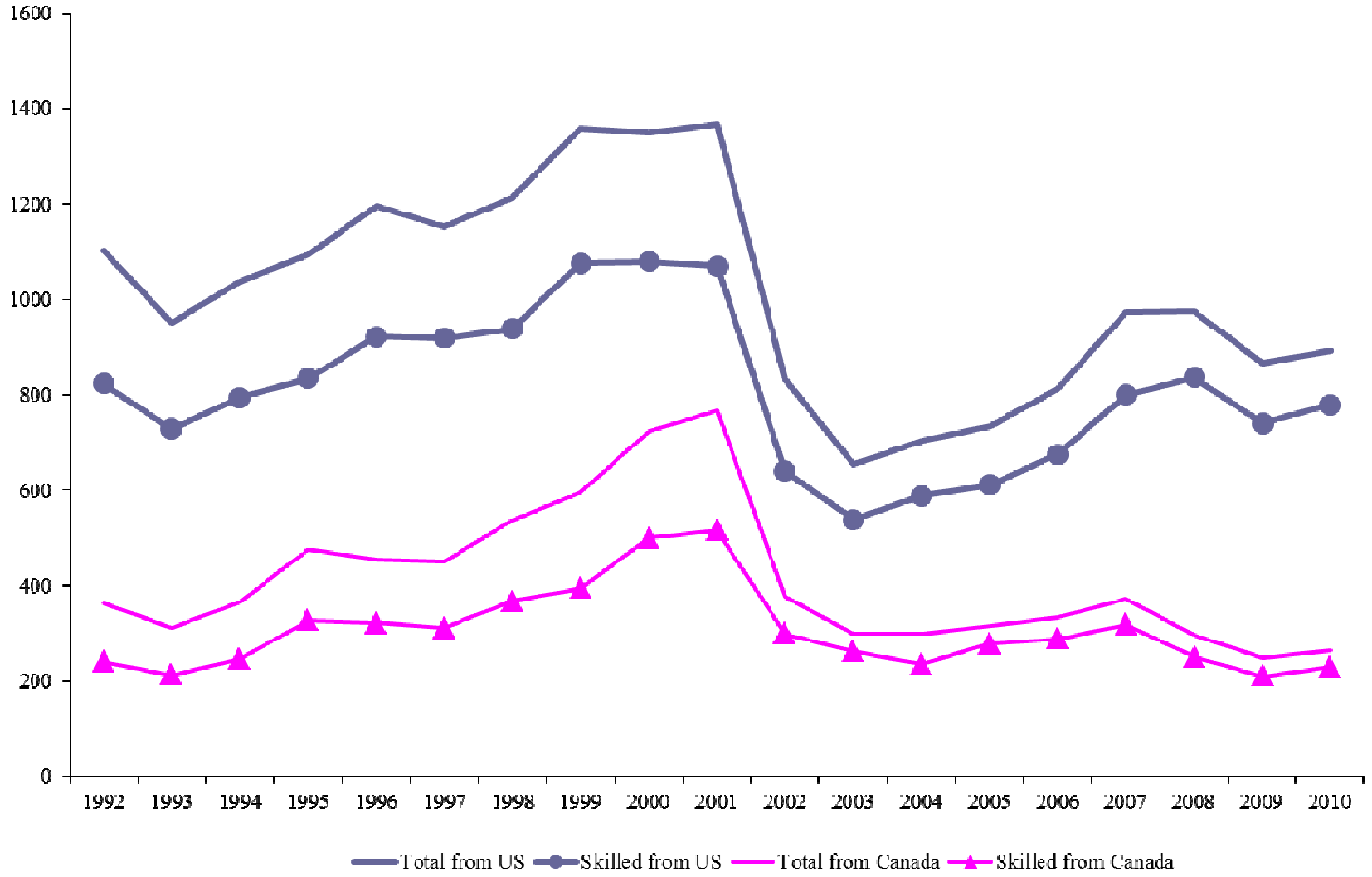

Figure 2: Share of each occupation group before and after free mobility