European Scientists in Canada:
The Transatlantic Brain Drain

by

Michelle Irene Drenker

B.A., The University of Oregon, 2008

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

The Faculty of Graduate Studies

(Geography)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

October 2011

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Abstract

This study focuses on the emigration of scientists from the European Union to Canada, and the resulting ‘brain drain’ for Europe. While brain drain encompasses a wide array of professions and industries, the scientific research community is relatively cohesive, highly internationalized, and affords an arguably significant level of mobility for successful contributors. The European Union has attempted to remedy this loss of ‘star scientists’ by implementing a variety of schemes and initiatives aimed at re-attracting and retaining top scientists in Europe. Through the creation of the European Research Area, the EU has made an effort to better coordinate scientific research and development across member-states. At the same time, the allocation of funding to reintegration grants provides economic incentive for scientists who have left to return to Europe. Both schemes aim to position the European research community as a key player in the global competition for scientific talent. These initiatives notwithstanding, a significant percentage of scientists who have left have Europe have no intention to return.

The question arises: why are European scientists emigrating to North America, specifically Canada, and why do they remain there, despite the variety of policies and programs aimed to attract and retain the highly skilled workforce in the European Union? The question is examined through qualitative methods, including both policy analysis as well as primary data gathered from 20 in-depth interviews. The project provides a close-up perspective on the motivations and concerns underpinning the migration decisions of these ‘star scientists’, and the ways in which they navigate not only the research sector, but also the world.
Preface

Parts of this thesis included in-depth interviews with human subjects, and thus the project was subject to the review of the Behavioural Research Ethics Board (BREB) at the University of British Columbia. The certificate of approval for the study is on file with the BREB at the Office of Research Services, under the certificate number H10-01951.
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Acknowledgements

A sincere thank you to my supervisor, Merje Kuus, whose wisdom, support, patience, and welcomed critiques helped see me through this endeavor. In addition, much gratitude to my second reader, Gerry Pratt, for not only encouraging the project from its inception at Spring Review, but also for taking the time to read and comment on the thesis within an especially short time frame. A big thanks to all the professors who led the graduate seminars, many of which helped to inform the project at hand, especially Geography of Migration with Dan Hiebert.

A big thanks to my family and friends, who always made it a point to ask how the thesis was progressing, but never actually knew what it was about. And an even bigger thanks to those who stuck by through the stressful times of impending deadlines. To all my writing buddies, friends-turned-editors, and sounding boards – thank you.

And finally, a warm thank you to all my research participants. Without your contribution, the thesis would be nothing.
1  European Scientists on the Move: Researching the Brain Drain

In May 2010, the Globe and Mail published an article claiming Canada had ‘poached academic stars’ from across the world to bolster its own scientific research sector (Chase and Church, 2010). The article outlines the bidding war that ensued following the global scouting for talent to fill the nineteen positions for the Canada Excellence Research Chairs (CERC) Program. At the tune of $190 million in federal grants, and an additional $17 million raised by the private sector and provinces, the effort succeeded in winning not only the employment of Nobel laureate-stature researchers but also their accompanying research teams, according to the Globe and Mail. The objective of the CERC Program is to create ‘clusters of excellence’ in order to reach a ‘critical mass of global excellence’ in research areas most important to Canada (Chase and Church, 2010).

Twelve of the nineteen individuals appointed as the Research Chairs obtained their education from a European university, four of which are considered the top scientists in the United Kingdom (CERC, 2010). Such a high representation of this cohort of Europeans is indicative of a trend whereby highly skilled Europeans are emigrating to take academic and research positions in North America. European universities and governments are understandably concerned about this brain drain of the ‘best and the brightest’ to the United States and Canada. The loss of human capital has sparked highly contentious debates about migration management and research policy across Europe.

The emigration of European scientists to North America has long been considered detrimental to the European scientific research community. In 1963, the Royal Society of the
United Kingdom conducted a survey to determine the extent of the loss of scientists and engineers to the United States. The survey indicated an overall loss of 16 percent of British doctoral students, which included the top 13 percent of graduate classes (Balmer et al., 2009). The Minister of Science publicly appealed to the British Parliament to put a stop to the United States living ‘parasitically on the brains of other nations in order to supply their own needs’, coining the loss as ‘brain drain’ (Committee of the Royal Society, 1963).

Half a century later, however, scientists and engineers continue to emigrate from the (now much wealthier) United Kingdom and other European countries to North American research institutions. Much of the focus has been given to the United States, which historically attracted the vast majority of immigrants. In 2003, migration sociologist Wendy Hansen, in collaboration with the Maastricht Economic Research Institute on Innovation and Technology, published an alarming report that some 400,000 European science graduates were living and working in the U.S., of which only 13 percent intended to return to Europe (Hansen, 2003). However, in a post-September 11th era, Canada has emerged as a chief player in direct competition for scientific talent with the United States.

The Globe and Mail reported that the British media is ‘screaming bloody murder’ following the announcement of the CERC positions and the consequential loss of some of Britain’s top scientists. This reflects the rhetoric of urgency that is correlated with the brain drain — a term that evokes a strong negative connotation. The European Union has attempted to remedy this loss of researchers through a variety of policies and initiatives aimed at re-attracting and retaining top scientists. The European Commission believes that the loss of highly skilled researchers can be attributed to structural flaws within both EU and member-state research policy. However, the various initiatives that have been implemented to counteract these
structural shortcomings have largely been unsuccessful in attracting and retaining highly skilled EU expatriates in the European Research Area (ERA). European academics and researchers alike continue to immigrate to North America. Indeed, a significant population of leading European researchers now resides outside the European Union. In Canada alone, more than 3,300 Master’s qualified Europeans arrived between 2000 and 2002 (Hansen, 2003a). As of 2001, 684 EU permanent residents in Canada held a doctorate degree (Hansen, 2003a). While the total population of highly educated Europeans is small in comparison to other immigrant groups in Canada, the numbers are in fact high considering the total number of those with advanced degrees in Europe, and thus it is important to recognize the relativity aspect of demographics within this specific context. Quantifying the loss of scientists is further investigated in Chapter Three.

**Research Questions and Scope**

Considering the significance of the loss of scientists for the European Union, as reflected by the policy responses, many questions arise. Why are European scientists choosing to go and remain abroad? What are the push and pull factors influencing their migration decisions? To what extent can the loss of European scientists be attributed to the institutional set-up of the European research sector? Given the EU’s stated efforts to attract them back, what do the scientists who are targeted by these efforts think of EU research policy?

The project examines the transatlantic migration of European scientists. My concern is not only with the specific movements of ‘star’ European researchers, but also with the broader implications of the global competition for a highly skilled workforce. It is important to acknowledge that highly skilled migrants can encompass a wide array of professions, industries,
and sectors. This study, however, will focus on European scientists within the academic research sector (as opposed to those employed in the social sciences or humanities). The scientific research community is relatively cohesive, highly internationalized, and affords an arguably significant level of mobility for successful contributors. In addition, EU legislation and policy dealing with the brain drain directly targets the science and technology research sector.

This is not a ‘big picture’ statistical study of the loss of the highly skilled and the corresponding immigrant stocks and flows. Rather, the project takes a micro-scale approach by examining the individual motivations and concerns underpinning migration decisions made by European scientists working in Canada. The project is framed around one critical question. I ask:

Why are European scientists emigrating to North America, specifically Canada, and why do they remain there, despite the variety of policies and programs that have been implemented at both the EU and national levels to attract and retain the highly skilled workforce in the European Union?

In order to answer the question at hand, the study investigates the differences inherent in Canadian as compared to European research institutions. It is under this idea that these differences influence the decision to pursue scientific research abroad. Twenty European scientists working at the University of British Columbia participated in in-depth interviews to help discern their motivations and reasoning behind their decision to migrate to Canada for scientific research. Questions of funding, structure, and research environment were posed to the participants. Such
an on-the-ground approach helped to elucidate the more intricate factors influencing the decision to go, and stay, abroad.

Broadly, the project is concerned with the loss of scientists from Europe to Canada and the corresponding policies that have emerged as a counteractive measure to this 'brain drain'. I identify a disconnect between European policy aimed at encouraging return migration, formulated at the state and supranational levels, and the highly subjective nature migration decisions, as formulated at the micro-level. There exists one inherent flaw within the theoretical assumptions underlining EU re-attraction and retention policies and initiatives aimed at counteracting the loss of scientists to North America. The policies and initiatives created in response to the migration of scientists operate on the fundamental assumptions of neoclassical economic migration theory. This is largely steeped in the belief that monetary incentives motivate people to move. However, such policies fail to recognize the significance of the social, political, and often times personal factors fueling migration decisions to move or stay. Thus, these measures to counteract the loss of scientists to Canada and encourage return migration have not succeeded, in part due to factors beyond economic motivations.

It is the aim of this project to provide a more nuanced approach to understanding the individual decisions that motivate highly skilled migration within the scientific research context. The thesis seeks to highlight the pressing concerns for the European Union regarding the loss of

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1 For the sake of clarity, it is necessary to define the terms used in the thesis. When using the term ‘European’, I am referring to those who are members of the European Union. This is in large part due to the European Research Area falling under the scope of the European Union. There is one exception, however. Switzerland and those of Swiss nationality have also been included in the study, as they are involved with EU research programs. In addition, when referring to scientists, both the terms ‘scientist’ and ‘researcher’ are used. There is no actual distinction between these terms, as all participants in the study hold a faculty position at a research institution. Thus, the term European and EU, as well as scientist and researcher, are used interchangeably throughout the thesis.
highly skilled individuals, especially those in research and development, to competitive ‘centers of excellence’ across the globe. At the same time, an empirical analysis aims to show how outdated macro-scale assumptions that are favored by policy initiatives largely ignore the micro-scale individual decisions that influence the decision to move or stay. To begin, a methodological review of the thesis is provided below.

**Methodology at a Glance**

Almost forty years ago, Laura Nader (1974) called for a ‘critical repatriation’ of anthropology in which cultures of both the powerful and the powerless should be studied to bring to light the processes of domination. Social science research has left ‘the upper reaches of the social system largely in the shade’ (Gusterson, 1997: 115). Nader appealed for studies on the ‘institutions at the heart of capitalist processes of production and stratification’ (Gusterson, 1997: 115). This project is based on what Nader terms ‘studying up’, and is not simply concerned with those institutions, but rather the actors that produce these scientific ‘knowledge economies’ – the highly skilled migrants themselves. The key here was to select a small group of individuals and focus on their personal insights and experiences. Selecting the sample population goes hand in hand with gaining access—which becomes inherently problematic when studying up (Gusterson, 1997). Rather than simply plugging numbers into an existing model, the goal was to gain insight into their own personal migration stories.

My approach to clarifying the puzzling questions at hand was to directly ask the researchers themselves – those who have found success in the North American research sector and constitute the target group of EU research policy. Statistical analyses and number-crunching can provide only one side of the brain drain story – a macro-level focus on the questions of who
and how many. This project, however, is more concerned with the question of why, which lends itself to a more detailed, on-the-ground approach based in individual interviews.

From a research perspective, it is necessary to first define who is, in fact, a highly skilled migrant. However, there is no agreement between states and policy regarding the definition of what qualifies as highly skilled (Salt, 1997). There is a general assumption that highly skilled is defined by the achievement of a tertiary education or higher (Salt, 1997). The OECD (2005), goes one step further to include experience, defining highly skilled migrants as those possessing a ‘tertiary-level education or its equivalent in experience’. As this project explicitly focuses on scientific migrants, specifically those that are employed in academic institutions, the project draws only from those holding a doctoral degree or higher. I required that the research subject must have obtained at least their master’s degree from a EU institution. By receiving a degree in the EU, economic and human capital has been invested by the home institution and country into the researcher, which is then lost when the scholar migrates. In addition to the level and geographic location of their education, the researchers must hold EU citizenship, which is generally a requirement for the reintegration programs targeting the researchers. Finally, participants were required to be employed as full-time researchers. The policies that provide the basis for this study target those who have left permanently, rather than those who already have plans to return. As such, sessionals and visiting lecturers or professors were excluded from the study.

Due to the tendency of scientists to ‘cluster’, and the magnitude of the project, the study focuses on the Vancouver metro area, which is a hub of research institutions of higher learning and home to prestigious science departments. In particular, the study draws from one prominent university located within the Vancouver region – the University of British Columbia. The
University of British Columbia is classified as one of the top research institutions across the globe, having recently been awarded the 22nd ranking of universities worldwide (Times Higher Education, 2011). Participants for the study were recruited from the natural sciences, in both the Faculty of Arts and Sciences at UBC.

Participants that met the criteria outlined above were asked to partake in one interview. From October 2010 to July 2011, I conducted 20 in-depth interviews to discern the perspectives of the migrants themselves: the so-called ‘star scientists’ targeted by Canadian and European universities. The aim of the interviews was to produce a more ‘peopled’ or agent-centered approach to answering the research question at hand. The questions were framed around producing the migration stories of the selected participants. Thus, the questions asked to the participants were broad and open-ended, leaving room for the participant to elaborate and discuss what they consider pertinent. All participants were professionals interviewed for their individual perspectives on research policy, as well as their corresponding career and migration decisions. I restricted my questions to the participant’s role in the public and the professional realm, however at times the participants chose to elaborate on personal matters where they saw fit. I avoided all questions of a personal nature. Within my thesis, I have taken steps necessary to minimize the potential for a breach of confidentiality; names are never given and instead the term ‘scientist’ or ‘researcher’ is used when referring to a participant.

From the interview questions, broad themes to emerged—research environment, department structure, access to funding—as major factors that influence migration decisions of science researchers. The questions aimed to produce a ‘migration story’ from the participant. In addition, the questions helped to highlight what the scientist’s themselves considers of personal importance. I was curious as to the extent of which economic factors are an influencing factor
affecting migration decisions, as highly skilled policies are based on neoclassical economic migration theories, which are discussed in length in Chapter Two. Thoughts on funding, salary, and job security helped discern how economic factors influence highly skilled migration decisions. In addition, I was curious as to what were the perceived differences between research programs in the home country and Canada, such as structural shortcomings of the scientific academic sectors in Europe or Canada. In terms of return migration, I wondered if the scientists were aware of research incentive and reintegration programs, and whether they would consider returning to Europe in the future. The interviews were designed to be open ended, to leave room for interpretation, and to give answers as the participant saw fit. The semi-structured nature of the interviews allowed what is important to the participant to come to light from the questions asked, reflecting the highly subjective nature of migration choices.

By examining the personal factors that influence the choice to remain abroad for scientists from the EU, the study aims to build theory around ideas of return migration and the brain drain. This research project will deepen our understanding of the various push and pull factors influencing highly skilled migration decisions and the brain drain within the transatlantic context. By examining highly skilled European science expatriates who choose to remain abroad, the project seeks to answer why EU initiatives aimed at re-attracting those that have left have largely failed to work. It is important to highlight the context specific nature of this study, as it cannot be generalized across all highly skilled migration theory. Rather, it applies to the unique movement of science researchers within the ‘Global North’.
Structure of Thesis

The thesis is divided into five main chapters, that aim to develop better insight into this unique case of highly skilled migration. The first chapter, thus, has provided an introduction to the issue at hand—the transatlantic migration of scientists and the corresponding concerns of brain drain. The structure of the thesis is based on the rationale that in order to develop a better understanding, one must be familiar with highly skilled migration as a theoretical concept. As migration scholars have pointed out, there does not exist just one, all encompassing theoretical lens for migration studies. Rather, a multitude of theoretical ideas exist to help us understand the complex and intricate ways in which people move. Hence, Chapter Two addresses the diverse and wide-ranging literature of works that inform the project. In this chapter, I take a top down approach to review what has been written on the concept of highly skilled migration. The chapter begins by examining what has been said about the nature of migration decisions and processes, within a broader body of literature on economic migration. I then conduct a review specifically of highly skilled migration literature and the extensive work on the movement of those possessing high human capital. Finally, I put forth what has been said about scientific researchers who migrate. Chapter Three takes on a more contextual approach to the topic at hand. The chapter begins by addressing both the quality and quantity of highly skilled migration flows, and how both help to inform policy. I then turn directly to the European Union policies themselves, at both the state and supranational level, that are a consequence of the brain drain and loss of scientific talent. Despite the various policy initiatives and schemes put forth by both the European Union and member-states, economic incentives to re-attract and retain top scientific talent are simply not working as directed. The policy failures are then discussed in depth. Chapter Four takes on a micro-scale approach to evaluate why such policies are not
working, through an empirical study conducted with the migrants themselves – the European scientists working in Canada. Finally, Chapter Five works to draw conclusions as to how and why EU policy is failing and examine possible solutions as to how to alleviate the so-called brain drain for Europe.
2 Understanding Highly Skilled Migration

Within scholarly literature, there exists no single, all-encompassing theory of migration. Rather, fragmented sets of theories are used to explain the complex and intricate ways in which people move about the world (Massey et al, 1993). Often times these theories are developed within individual disciplines, in isolation of each other (Massey et al, 1993). Utilizing a single theoretical model can be detrimental, however, to understanding the multifaceted nature of migration. In addition, it is dangerous to purport sweeping generalizations about the ways in which people navigate the world, due to the often highly personal and subjective ways in which individual actors move and are managed by the state.

Limitations arise from the positivist epistemology that underpins migration studies. Eleonore Kofman (2000b) puts forth a call to move beyond reductionist analyses within migration literature. Rational-choice economic frameworks are criticized ‘for failing to consider adequately the structural context of movement’, while at the same time, ‘neo-marxist, dependency school accounts have been criticised for only weakly theorizing agency’ (Bailey, 2001: 420). Douglas Massey (1990) argues that post-structural readings hold greater relevance for migration scholars as it provides a joint theorization of structure and agency. What becomes clear is that there exists a multitude of theoretical lenses through which to view migratory processes. There is no one, single theory agreed upon by scholars that can address the highly diverse ways in which people move. While neoclassical economic migration theories take the position of the individual as a rational actor, they also have the tendency to ignore the role of the state. At the same time, theory that solely addresses the role of policy and the state has the potential to overlook the agency of the migrant themselves. Thus, it is important for an in-depth
approach to ‘incorporate a variety of perspectives, levels, and assumptions’, not simply ‘relying on the tools of one discipline alone, or by focusing on a single level of analysis’ (Massey et al, 1993: 432).

This chapter discerns various theories within the geographic, economic, and sociological disciplines, that provide the basis for understanding voluntary economic migration, as well as informing the project itself. No one single theoretical ‘lens’ holds the answer to understanding the issue at hand. Rather, it is my aim to provide an overview of the wide array of literature that is pertinent to understanding the various theoretical underpinnings of the project, ranging from neoclassical economic frameworks to post-structural ideas of transnationalism. The first section includes a discussion of the various theoretical models used to develop our understanding of the choices individuals make in regards to out-migration, return migration, and finally, the choice to stay. Next, I situate labor migration within the context of the highly skilled, providing an overview of brain drain specific literature. Finally, I review the more context-specific literature on the mobility of academics and scientists, and the unique ways in which they navigate labor market migration.

An important nuance here is that the following discussion of relevant migration literature is specific to voluntary, economic migration, as opposed to various other subcategories, such as forced migration, exiles, sojourners, permanent settlers, and refugees (Salt, 1992; Castles and Miller, 1998). Migration theory spans a wide variety of subgroups, but in order to remain relevant to the scope of this project, only literature that addresses economic or labour market migration will be discussed. Drawing such classifications presents a problem unto itself. These typologies are set forth by the state, through a rigid classification system that assumes individuals retain fixed connections to territory (Baily, 2001). However, for the sake of clarity,
when addressing the literature, I am speaking specifically in the context of voluntary labor market migrants.

**Economic Migration**

Many of the theoretical models that have been developed to explain the processes of economic migration, in this case brain drain, rely on differential rationalizations (Lewis, 1954; Harris and Todaro, 1970; Todaro, 1976). An economic standpoint is helpful in understanding the foundations of highly skilled movement. In addition, economic and labour market explanations can also be helpful in understanding the theoretical basis of highly skilled migration policies, which will be examined more in depth in Chapter Three. Falling under the umbrella of economic migration, the following theories will be discussed to provide a more detailed understanding of highly skilled migration, including: neoclassical economic migration theory, dual labor market theory, transnational theory, return migration theory, and retention theory.

Focusing on the agency of the individual actor, neoclassical economic migration theories suggest that wage differentials and employment conditions between states are the primary motivators behind migration decisions (Massey et al, 1993). Neoclassical macroeconomic migration theory regards income maximization as the main instigator for individual migration decisions (Massey et al, 1993). There exist geographical disparities in the supply and demand for labour, which result in the movement of workers to labour-abundant countries (Lewis, 1954; Todaro, 1969). Neoclassical macroeconomic migration theory has become the foundation for many national immigration policies, based on the following set of assumptions. First, labour markets are the driving force behind international flows of human capital. Second, labour migration is caused by wage differentials between countries. Third, eliminating wage
differentials would halt the international movement of labour. Finally, governments can manage migration flows by regulating or influencing labour markets in either the sending or receiving states (Massey et al, 1993). Public opinion has been heavily influenced by the simplistic nature of neoclassical macroeconomic migration theory, while at the same time such theory has provided the intellectual foundation for many immigration policies.

In a similar vein, neoclassical microeconomic migration theory places value on individual choice. This model views individuals as rational actors who make the decision to migrate based on a cost-benefit calculation, which assumes a positive net return from movement (Massey et al, 1993). People choose to migrate based on where their skills will be best utilized and they will be most productive, regarding migration an investment in human capital. Neoclassical microeconomic migration theory operates on the assumption that potential migrants move to places where expected net returns are believed to be greatest. Following this, the theory understands that movement will continue to occur until earnings and employment rates have equalized internationally (Massey et al, 1993). As a counter measure to the loss of human capital, governments in sending countries will seek to control out-migration through policy specifically aimed at raising incomes in the area of origin.

While neoclassical economic migration theory focuses on the micro-scale decisions made in regards to international migration, dual labor market theory moves away from the individual to a more macro-scale focused approach (Pioere, 1979; Massey et al, 1993). Dual labor market theory argues that migration is a product from labor market demands inherent of modern industrial societies. As such, international migration is an outcome of the ‘permanent demand for immigrant labor that is inherent to the economic structure of developed nations’ (Massey et al, 1993: 440). It is not actually the push factors of the sending country that initiate migration,
but rather the pull factors within the receiving country, deemed as a ‘chronic and unavoidable need for foreign workers’ (Massey et al, 1993: 440-41). Thus, international labor migration is initiated by the recruitment of those who can fill market niches by both employers and governments.

Ideas of transnationalism view the immigrant as in flux, never permanently situated within a space (Saxenian, 2005; Ley and Kobayashi, 2009; Vertovec, 2009). Rather than conceptualizing migration as unidirectional, transnationalism sees migration as a ‘manifold process linking together countries of origin, destination, and onward migration’ (Faist, 2008: 27). Transnationalism is not limited simply to the movement of the individual, but also encompasses the different social relationships held between the migrant and the those in other countries (Harvey, 2009). It is posited that migrants sustain strong ties with family, friends, and professionals within their home country, as well as with expatriates in their local community (Harvey, 2009; Vertovec, 2002; Iredale et al, 2003, Kobayashi and Preston, 2007, Hardwick, 2003). Governments are in fact recognizing the importance of transnational social networks, and thus have begun to formalize such processes through forging and maintaining contact with expatriates who live abroad (Harvey, 2009; Larner, 2007).

Ley and Kobayashi (2009) assert that conventional migration wisdom overlooks return migration as an appendage to the traditional emigration/immigration ‘narrative’ of departure, arrival, and integration. Assimilation narratives often obscure the significance of return migration (Ley and Kobayashi, 2009). There remains a theoretical gap within in migration literature addressing the nature and impact of return migration, especially within the context of the highly skilled (Cassarino, 2004; Harvey, 2009). This is partly due to the fact there remains a lack in reliable data on the return of migrants to their country of origin (Constant and Massey,
The unreliability of data has meant that researchers are less clear on the characteristics of those who have departed (Constant and Massey, 2002). I return to this issue of return migration in Chapter Five, specifically within the context of the project, as it one of the underlying critical questions posed to the research subjects. However, it is important here to note that there remains conflicting and often underdeveloped studies on the nature of return migration, due in large part to data limitations, which only works to highlight the complex and often times contradictory ways in which individuals make migration decisions.

Williams, Balaz, and Wallace (2004: 38) theorize human mobility to be ‘temporally and spatially ‘stickier’ than most other forms of mobility’, which leads migrants to become ‘locked into’ places or cultivate ‘place attachments’ that work to inhibit future movement. Williams et al (2004) and Ackers and Gill (2008) contend that the concept of ‘stickiness’ and becoming ‘locked in’ to a place remains inherently underdeveloped. Ley and Kobayashi (2005) have found that the various stages of a one’s life cycle help dictate whether a migrant will migrate or remain in a country. Termed ‘stay rates’, some scholars have found correlations between the location of educational attainment and the choice to remain abroad (Zhang, 2003; Finn, 2005). Similar to return migration literature, however, there is no conclusive evidence on the rate of retention of migrants (Saxenian, 2006). Despite often times contradictory reports on the loss or retention of economic migrants, the movement of economic migrants is of persisting concern within both migration discourse and policy. It is here that I turn to brain drain specific literature, to locate the processes of migration within the specific context of highly skilled migration.
The Brain Drain

Literature on brain drain first entered into migration studies in the late 1960s, following the British report on the loss of scientists to the United States. As a theoretical idea, brain drain is a normative concept that assesses complex labor market relations between different regions (Rhode, 1993). The term is inherently permanent, implying an irreversible loss of human capital (Wolburg, 2001). The focus of early brain drain literature honed in on the movement of those who possess high levels of human capital, from lesser developed to more developed regions. More contemporary work focuses on circulationist perspectives and ideas on the transfer of knowledge. There is persisting concern within migration discourse regarding the loss of human capital for the sending site. However, to characterize the outcome of highly skilled migration as simply positive or negative is deceptive (Skeldon, 2008). Yet, there is a continued persistence within much of the brain drain literature to draw such dichotomies (Beine et al, 2001; Mountford, 1998; Portes, 1976; Bhagwati and Hamada, 1974). It is important to recognize, however, that highly skilled migration is a unique and complex process that cannot be reduced to such simplistic binaries.

Earlier work in brain drain literature argued that highly skilled migration flows ‘seem to always go from less developed ‘hemophiliac regions’ to more competitive places’ (Meyer et al, 2001). In a similar vein, Williams et al (2004: 38) have identified a near unanimity within migration literature, where ‘sending countries experience human capital losses and [the] social investment embedded in individuals’, while ‘the net winners… are the destination spaces’. Traditionally, highly skilled migration has been conceptualized as a zero-sum game, categorized by the reverse transfer of technology (Ackers and Gill, 2008; Salt, 2007). Eminent economist Jagdish Bhagwati (1976) called for national policy to put a stop to the exodus of highly skilled
professionals to prevent such imbalances that favor countries within the so-called developed world. This traditionalist view on brain drain relies on alarmist tactics, emphasizing the negative effects produced by skilled migration flows.

The concept of brain drain is intrinsically tied to education and knowledge. Education is often asserted to be an important determinant of long-term economic growth; hence, the migration of those with high levels of human capital is detrimental to the country of origin. In addition to the loss of human capital, the sending country suffers from ‘the loss in productivity of other persons working with the highly educated, the direct loss from the employment of the departed workers… and more generally, their influence in social policies and institutions’ (Glytsos, 2009: 1). The receiving country acquires the benefits of increased human capital, while the sending country incurs the cost of education. Consequently, brain drain is steeped within two central ideas: education is a public cost and the strengthening of economic potential lies in the investment in human capital and hence, education and experience (Rhode, 1993).

In this traditionalist view, fault is placed on receiving country. It is the developed countries that are luring highly skilled migrants away from their homes, without considering the impact on countries of origin. The United States, Canada, and Europe have all opened channels for skilled migration, while limiting the entry of the less skilled (Skeldon, 2009). This traditionalist school of thought blames the dominant labor markets that attract skilled migrants, especially from so-called ‘lesser developed countries’ (LDC). It is presumed that the emigration of skilled workers will leave the sending country in a poverty trap, where the ‘siphoning off’ of highly educated and skilled workers will stunt the level of human capital. Thus, the receiving country will increase productivity at the expense of the LDC (Mountford, 1997). Brain drain is simply another example of dominant core economies extracting resources and surpluses from the
periphery (Portes, 1976). This conventional viewpoint that brain drain has a negative impact on sending countries is challenged by the more recent arguments in migration studies, which highlights the complex and continuous ways in which migration patterns occur, which have been argued to produce more positive effects.

More current debates on brain drain take on a more mutable perspective. This new paradigm imagines migration to be temporary, multi-directional, and not solely impacting ‘developing’ regions (Meyer, 2001; Vertovec, 2002). In addition, contemporary literature focuses on the more positive impacts of highly skilled migration, highlighting the ways in which brain drain can in fact increase educational attainment and the acquisition of skills within the sending country.

More contemporary ideas of the brain drain argue that it has a more positive impact on the sending country than was previously posited by the traditional viewpoint. So-called developing economies have limited growth potential, thus there is little chance of the return of human capital (or reverse brain drain). This in turn creates an incentive to obtain an education. By allowing the migration of ‘the best and the brightest,’ a lesser developed country may create a market for educated individuals by increasing the incentive to acquire an education. Given that only a small fraction of these educated individuals will actually emigrate, the actual level of education of the residual population would increase (Adams, 2003). Essentially, the possibility of migration to a country with higher wages increases human capital formation, outweighing the negative effects of brain drain (Mountford, 1997). This revisionist approach can be termed ‘brain gain’, in which emigration of skilled individuals generates a demand for higher levels of education. In sum, the possibility of migration encourages individuals to acquire a higher education (Skeldon, 2009).
Very little has been written on the movement of the highly skilled within the so-called developed world, or ‘global North’. As reviewed, much of the brain drain literature focuses on ‘developing’ to ‘developed’ regions, from east to west and south to north. There remains a significant gap within the literature addressing the migration of highly skilled individuals among the so-called developed world. Despite the lack of literature on the topic, there has been persisting concern for all states to participate in the global competition for those possessing high human capital while at the same time retaining their own nationals to fill the highly skilled labor market. This is evidenced by various state policies and initiatives aimed at re-attracting and retaining the highly skilled, which will be examined more in depth in the following chapter. But first, I provide an overview of what is being said of the highly skilled migrants themselves, and the unique ways in which they access international mobility.

The Highly Skilled

The 1980s saw a decidedly focused turn away from the study of unidirectional labor migration towards a more diversified approach, involving the study of the previously overlooked movement of highly skilled and so-called ‘elites’. This is attributed to three developments within the field of migration studies (Koser and Salt, 1997). First, the growing recognition that international migration is of a heterogeneous nature, and must be reconceptualized to include shorter periods of movement leading to more permanent settlement (Koser and Salt, 1997). Second, there emerged a rising interest in selective migration policy that placed emphasis on labour and skill quality by states (Koser and Salt, 1997). Thirdly, increasing economic globalization and the materialization of transnational corporations opened both internal and external labor markets to those possessing high education and skill levels (Koser and Salt, 1997).
Consequently, historical developments in the 1990s led to the emergence of new themes in the field of migration research within the context of the highly skilled. Political upheavals in Eastern Europe and the former Soviet bloc brought fears of the mass exodus of the highly skilled from East to West, and the potential for extensive brain drain to the forefront of migration literature (Koser and Salt, 1997). In addition, new policies aimed at encouraging the movement of the highly skilled became extremely attractive to states but were called into question by academics (Borjas, 1990). Highly skilled migration has since become a ‘burgeoning and ever-developing field of research’ (Vertovec, 2002: 2).

While no single, accepted definition of who qualifies as highly skilled exists, there has been extensive efforts to conceptualize the highly skilled within the theoretical literature (Salt, 1997; Koser and Salt, 1997; Iredale, 1999, 2001; Mahroum, 2000; Kofman and Raghuram, 2005, Harvey, 2008). While some scholars define highly skilled as possessing a post-secondary or tertiary education, others define highly skilled as those having extensive work experience in a specialized field (Vertovec, 2002). The Organisation for Economic Co-Operation and Development (OECD) states that the highly skilled do not compromise a homogenous group, and may broadly be described as technical, professional, and managerial specialists (Salt, 1997).

Within his research on British and Indian expatriates in Boston, Harvey (2008) takes the definition a step further by offering a working definition of highly skilled migrants on the basis of three characteristics. First, they must have been born outside their country of residence. Second, they must have obtained at least a university bachelor’s degree or are employed in a position where the a bachelor’s education is normally required. And third, they must have worked for three years since their university degree or comparable employment. Koser and Salt (1997: 287) point out that ‘being a graduate is not in itself sufficient to be regarded as highly
skilled in labour market terms, since many graduates are not employed in jobs requiring high-level expertise’. Thus, experience and skills are also a significant factor in determining who in fact qualifies as highly skilled.

Due to the unprecedented nature of highly skilled migration, many academics have proposed alternative labels for the unique phenomenon, including ‘professional transients’ (Appleyard, 1991); ‘migration of expertise’ (Salt and Singleton, 1995); and ‘skilled international labour circulation’ (Cormode, 1994). It is important to note that many scholars use the terms ‘skilled’ and ‘highly skilled’ interchangeably, without providing a distinction between the two. At the same time, some academics argue that migration not be the most accurate term, but movement or mobility (Vertovec, 2002). It is at this point in the literature review that I turn to a more honed examination of what has been written about the mobility of a specific group of highly skilled migrants who comprise the focus of this study: academic scientists.

Scientists employed at research universities comprise just one niche of a highly diverse field of careers that fall within the spectrum of highly skilled employment. In order to provide a more grounded perspective on this transatlantic brain drain phenomenon, it is necessary to examine context-specific literature on the nature of scientific mobility. Governments consider academic scientists to be instrumental to bolstering the research and development sector. Consequently, a global competition for scientific talent among research institutions has emerged among states and within universities. It should also be noted that competition also exists for academic scientists not only among academic institutions but also within enterprise and industry (Mahroum, 2000). There exist a limited number of studies on this niche of highly skilled immigration patterns, of which are reviewed in the following section.
Ackers and Gill (2008) argue that scientific research in academia demands high levels of mobility to provide international experience that is essential for career progression. The universality of science affords higher mobility for researchers, whose skills can more easily translate across labor markets. Academic research careers are unique in that they place high value on international activity and concepts of excellence (Ackers and Gill 2008). Mobility of scientists reinforces their credibility in new environments, while at the same time strengthening the credibility of the hosting site (Mahroum, 2000). ‘Scientific nomadism’ and ‘diverse temporalities’ are used to describe the nature of academic mobility, which includes fellowships, short-term visits, and longer-term migration, all in the name of career progression (Meyer et al., 2001; Williams et al., 2004). Scientific mobility is a means of networking and is thereby an extension of professional socialization (Mahroum, 2000). Thus, international mobility is often associated with the early stages of academic careers as there is high pressure to gain experience outside the home country (Ackers and Gill, 2008). Ackers and Gill (2008: 5) argue that the nature of migration processes differs for academics, in that migration is driven through ‘networks, individual motivation, and risk’.

In addition to higher economic working and living conditions, academics migrants seek centers of scientific excellence that provide access to the best scientific equipment and resources (Ackers and Gill, 2008). Mahroum (1998) and King (2002) identify scientific curiosity as one of the many non-economic motivation that influences high-skilled migration of scientists. Dickson (2003) concludes that scientists emigrate from their home nations not because of better economic opportunities but to seek environments that offer more support and enthusiasm. On the other hand, Morando-Foadi (2005) argues that mobility is more of a question of necessity for scientific progression rather than a choice, due in part to lack of job opportunities as well as the high
demand for international movement. Thus, research scientists tend to ‘cluster’ where resources are plentiful and specialized centers and institutes are available (Ackers and Gill, 2008). These clusters have magnetic and multiplying effects, attracting ‘star scientists’ and the ‘best and the brightest’ talent (Athey et al, 2008; Meyer, 2003).

**Conclusions**

The vast majority of brain drain literature focuses on patterns of economic migration from east to west, ‘developing’ to ‘developed regions’. There remains a significant gap in the literature addressing the loss of human capital among the global North. As Laura Nader stated in 1974, much of the ‘upper reaches’ of society have largely been left in the shadows by scholarly research. This project aims to bring to light the migration processes of these so-called elites and their effect on state policies and programs, as well as their influence on the future of scientific research around the globe.

In the context of the migration of scientists, it is important to view the issue at hand not through a single theoretical lens, but from the multitude of theories that understand the diverse and often nonlinear trajectory of migration. Individual motivations, migration processes, and the subjective nature of the decision to migrate cannot be neatly wrapped into one theoretical box. The various theoretical devices informing highly skilled migration literature are useful in providing a basic understanding of the nature of transatlantic scientific migration, but it is both the policy and empirics that provides an glimpse into the ontological construct of these theories. As Chapter Three will discuss, many of the highly skilled migration policies aimed at return migration take only an economic approach to the movement of scientists. This largely overlooks the varied and diverse factors that influence migration decisions. As Will Harvey (2009: 52)
argues, while economic migration theories are important in context, ‘they also overlook important factors such as culture and lifestyle considerations which influence the return migration of skilled workers to their home countries’. Chapter Four then takes an alternate approach, by directly asking the scientists themselves what motivates them to not only pursue research abroad, but choose to remain abroad for their career.
3 The Transatlantic Brain Drain: Policy and Response

There exist two major shortcomings within the majority of the research on highly skilled migration. First, much of what has been said on the global brain drain phenomenon has been written within a vacuum, making generalizations across labor markets and failing to embed discussions on the highly skilled within a specific context (Ackers and Gill, 2008; ). Second, many approaches to conceptualizing the brain drain are conducted solely at the macro-level scale, analyzing immigrant stocks without taking into account the role of the individual in migration processes. The following chapter aims to counteract the first limitation inherent within highly skilled migration research, through an extensive review of the transatlantic movement of scientists and corresponding policies and responses. Chapter Four then follows up with a micro-scale approach to the issue at hand with an analysis of empirical findings as a means to remedy the often-taken approach of macro-scale studies and number crunching of highly skilled migration flows.

The following chapter takes a contextual look at the transatlantic brain drain of scientists and corresponding responses and policies within this specific typology of highly skilled migration. The chapter is divided into two main sections. First, I situate the migration of European academic scientists within a quantitative context. Quantifying the movement of academic scientists between Europe and North America is useful in highlighting how the issue has become a pressing concern for states, and the pressure for policy responses to the brain drain. Quantitative data, however, only tells one side of the story. The second part of the chapter provides a review of the corresponding policies and responses within the specific context of the loss of scientists from Europe and Canada. The section examines how states perceives migration
decisions and the following political responses to such processes. This section takes into account both departure and return migration literature, as well as the specific policies aimed at either recruiting scientists or alternatively, counteracting the brain drain.

**Quantifying and Qualifying the Brain Drain**

Measuring the brain drain is no simple task. Systematic records of international migration are rarely kept by sending countries, instead relying on data collection compiled at the receiving end (Skeldon, 2005). Population censuses can be used to provide only estimates. In addition, migration data is rarely classified by education and skill level. Measuring the brain drain is greatly hampered by the poor availability of data. At the same time, ‘quality’ of the migrant themselves must be taken into consideration as well, which is a difficult assessment to make. It is important to both sending and receiving states, however, to have a general idea of immigrant stocks and flows in order to determine the extent of the loss or gain within labor markets and develop corresponding policy aimed at either attracting or retaining those possessing high levels human of capital.

In 2003, migration sociologist Wendy Hansen attempted to quantify worldwide emigration flows of qualified European scientists (Hansen, 2003a). Her report is based on available data from the Census conducted by Statistics Canada. In 1986, under the level of qualification, the Canadian Census introduced a question regarding field of specialization. This allows for the examination of science migrants based on qualification (i.e. those holding doctoral degrees) or based on occupation (i.e. physicists, biologists, et cetera). The Census allows for us to ‘produce a portrait of the contribution of European HRST [human resources in science and technology] to Canada’s labour force’ (Hansen, 2003a: 1). Canada has a long history of
depending upon foreign talent to supply research positions. In 1996, 12,335 (14 percent) of 87,850 labor force holding a Doctorate in Canada were reported as EU-born (Hansen, 2003a). This is up from the 11,025 reported in 1986. In 1996, 24.6 percent of the EU-born doctoral degree holders reported a specialization in the fields of physical science and mathematics. Between 1995 and 2002, the EU supplied Canadian universities with 340 European-born professors (Hansen, 2003a).

While the immigrant stocks of European scientists appear low, researchers have noted that the loss of scientists from Europe to North America is ‘not singularly a question of volume of but quality of flows that shapes the impact of HSM [highly skilled migration], with movements of the ‘brightest and best’ having the greatest impact’ (Ackers and Gill, 2008: 109). Even small pools of European science migrants have potentially severe negative impacts on sending countries and institutions (Salt, 1997; Mahroum, 1998). Salt (1997: 22), goes as far to argue that ‘the departure of a few top-level specialists in certain sectors of basic research could lead to the collapse of national scientific schools’. This loss of university professors and researchers is noteworthy as it indicates ‘not only a reduction in the researcher pool but can also potentially impact the education system of the providing country’ (Hansen, 2003a: 21). Indeed, both media and policy have picked up on this potential disastrous effect of the transatlantic brain drain and have focused predominantly on the migration of established and well-known scientific researchers (Ackers and Gill, 2008).

The idea of ‘quality’ of researchers requires unpacking (Ackers and Gill, 2008). It is necessary to draw a distinction between the loss of experienced or senior scientists and the loss of those with the most potential, which is deemed ‘poaching’ or ‘skimming’ (Ackers and Gill, 2008; Wood, 2004). The issue of quality because difficult to assess, as there exist different
conceptions of what constitutes and how to measure excellence. Both Van de Sande et al (2005) and Ackers and Gill (2008) warn that it is important to exercise caution in assuming that migration and employment work on meritocratic principles. In many cases, networks and connections can work to subvert meritocratic processes (Van de Sande et al, 2005). In a similar vein, it is important to consider the ‘geography of investment in human capital’ (Ackers and Gill, 2008: 110). Certain economies will experience more significant effects following the loss of scientific talent as expensive higher education costs are incurred by the state and country essentially loses their investment (Tomiuc, 2003). Most brain drain data fails to take into account where and when skills have been developed (Meyer, 2001). ‘Temporality and the significance of return’ are important factors linked to the investment in individuals (Ackers and Gill, 2008: 110).

**Policy Response**

Both the number as well as the quality of scientists lost to North America has prompted serious concerns for the future of scientific research in Europe. In Europe, policy responses are both direct and indirect, and operate at the national and the supranational (EU) levels. Both the EU and member-states have responded to the loss of researchers through a variety of schemes and policies aimed at bolstering research in Europe, as well as counteracting the brain drain. A variety of schemes, initiatives, and grants have been implemented in order to strengthen research in Europe. The following section provides an overview of what is being done at both the state and EU level to counteract this loss of scientific talent to North America, and further abroad.

One of the first major indirect responses to the loss of researchers from the EU was the founding of the European Research Area (ERA) in 2000. The central purpose of the ERA is to
develop a more comprehensive framework for research and development in Europe (Morando-Foadi, 2005). The idea behind the ERA is to overcome the structural shortcomings of uncoordinated research in Europe by working to create an internal European market for research — an area where science, technology, and knowledge circulate freely. The ERA focuses on establishing mobility for competent researchers, integrated infrastructures, competitive research institutions, knowledge sharing, and coordinated research programs between both the EU and the world (Commission of the European Communities, 2007). In addition, the Commission offers EU-level research grants that are designed to facilitate intra-European networks and researcher mobility.

The ERA is established on three main principles (European Commission, 2000b.) First, the ERA creates an internal research market, mimicking one of the basic tenets of EU law – the four freedoms (free of movement of goods, capital, persons, and services). The aim of the first principle is to increase cooperation, stimulate competition, and attain better allocation of resources (Morando-Foadi, 2005; European Commission, 2000b). Second, the ERA works to restructure the nature of European research. This is done through ‘improved coordination of national research activities and policies, which account for most of the research carried out and financed in Europe’ (Morando-Foadi, 2005: 138). Finally, the ERA works to create a comprehensive European research policy. Developing a European research policy addresses various issues such as funding of research, as well as relevant features of both member-state and EU policies.

In the early 2000s, the Lisbon Declaration was drafted to outline the aim of the future of EU higher education and research (European University Association, 2007). The Lisbon Declaration reaffirms the European Union’s goal to become ‘the most competitive and dynamic
knowledge-based economy in the world, capable of sustainable economic growth with more and
to better jobs and greater social cohesion’ (European Commission, 2000c). At the same time, the
Barcelona Declaration intended to raise research investment from 1.9 percent to 3 percent of
GDP while increasing the amount of researchers from 700,000 to 1.2 million by 2010 (European
Commission, 2000c). Such steps have been taken to position the European Research Area as a
challenging yet rewarding place to conduct research (Morando-Foadi, 2005: 140).

The majority of research operates under the EU Framework Programs (FP) (Eurunion, 2011). The Framework Programs are the main instrument through which funding is allocated
across the European Research Area. At the same time, there are several Directorate Generals
(DG) that are directly connected to research in Europe as well (Eurunion, 2011). Currently,
research in Europe is begun guided under the Seventh Research Framework Program (FP7)
(Eurunion, 2011). FP7 is designated from 2007 until 2013, with a total budget of over 50 billion
euros (European Commission, 2007). As compared to the previous Framework Program (FP6),
there is an increase of over 63 percent in budget, which indicates a growing interest in research for
the EU (European Commission, 2007). The European Union has positioned research at the
center of European society, stating that research is:

‘one of the basic driving forces behind economic and social progress and a key
factor in business competitiveness, employment and the quality of life. Science
and technology are also central to the policy-making process.’

(European Commission, 2000)

In addition, the EU stresses the importance of maintaining a competitive edge in the research
sector, to ‘maintain leadership in the global knowledge economy’ (European Commission,
2007). Money from FP7 goes directly to grants in science, technology, and development
(European Commission, 2007). There is also a ‘European added value’ contingent of FP7
funding. The aim is to increase the transnationality of research and encourage mobility
Thus, there are two main objectives of the Seventh Framework Program: bolster science and technology in Europe; and advance international competitiveness, while at the same time encouraging research in support of EU policy (European Commission, 2007).

For the European Commission (EC), brain drain is attributed to fragmentation. Bureaucratic barriers block mobility of researchers and funding is uncoordinated between the regional and national levels (Commission of the European Communities, 2007). These internal structural issues result in the inability to attract and retain valued researchers. The Commission indeed regards this as the key challenge to the research sector. Thus, as a response to the movement of researchers away from Europe, the European Union has implemented a variety of programs and initiatives that are designed to directly counteract such losses. These initiatives are founded on three central principles: re-attraction, retention, and reintegration.

One direct response to the issue of brain drain is the designation of funding specifically for Europeans who have left member-state institutions for employment abroad. Such a scheme boosts funding and support for human resources and mobility among researchers. Essentially, this initiative works to provide funds and support through fellowships and grants to European scientists to conduct research abroad and consequently bring knowledge back to Europe.

In the 1990s, the European Commission adopted a variety of grant initiatives aimed at encouraging the development of researchers through mobility and training (Morando-Foadi, 2005). Under the Commission’s Fourth Framework Research Programme (FP4) (1994-1998), the Training and Mobility of Researchers (TMR) Programme was established (Morando-Foadi, 2005). This included the Marie Curie Outgoing International Fellowships program, designed to allow researchers to expand their international research experience (EC, 2006). Under the Sixth
Framework Program for Research and Technological Development (FP6), Marie Curie Actions outlined a coherent approach to financing research for academics abroad (Morando-Foadi, 2005). The Marie Curie Fellowships were designed as grant schemes provided to doctoral, postdoctoral, and established researchers who would like to conduct training or research outside their country of nationality (European Commission, 2006). The fellowship was set up so that researchers may go abroad for one to three years to conduct research, followed by a compulsory return phase to be completed in Europe (European Commission, 2006). Marie Curie Actions were aimed at developing and transferring research competencies, consolidating and widening research career prospects, and promoting excellence in the European Research Area (Ackers, 2005: 304). Such a program was essentially designed to meet the demands of researcher mobility while contracting scientists to return to Europe following a research period abroad, operating on the assumption that monetary incentives with the promise of employment upon return will work to re-attract and retain top scientists.

In the current Seventh Framework Program, Marie Curie Actions have been redesignated under the ‘People’ Program. This new program has a budget of over 4.7 billion euros allocated over a seven year period; a 50 percent increase annually from FP6 (European Commission 2011). The People Program turns attention to human resources. The ‘rationale’ of the program is as follows:

‘Abundant and highly trained qualified researchers are a necessary condition to advance science and underpin innovation, but also an important factor to attract and sustain investments in research by public and private entities. Against the background of growing competition at world level, the development of an open European labour market for researchers free from all forms of discrimination and the diversification of skills and career paths of researchers are crucial to support a
beneficial circulation of researchers and their knowledge, both within European and in a global setting. Special measures to encourage young researchers and support early stages of scientific career, as well as measures to reduce the ‘brain drain’, such as reintegration grants, will be introduced.’ (Emphasis added) (European Commission, 2011)

The main goal of the People Program is to make Europe a more attractive place for researchers. The following is listed as the official program objective:

‘Strengthening, qualitatively and quantitatively, the human potential in research and technology in Europe, by stimulating people to enter into the profession of researcher, encouraging European researchers to stay in Europe, and attracting to Europe researchers from around the world, making Europe more attractive to the best researchers.’ (Emphasis added) (European Commission, 2011)

It becomes evident that the People Program positions the loss of researchers as one the central concerns of the future of the European research sector. In order to counteract this loss, two different Marie Curie Actions have been implemented under the People Program to that work to remedy this loss. Each Action utilizes economic incentives to encourage return migration to Europe. For those whose proposals have been accepted, a grant allocation is dependent on the stipulation that one must return to the EU for a specified period of time to conduct research at a European institution.2

The first and most direct of the two Marie Curie Actions that encourages return migration is the reintegration grants. These grants work to provide direct funding between 15 to 30 thousand euros per year over the course of two to four years for researchers who are willing to return to Europe after spending a minimum of three years abroad (European Commission, 2010).

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2 It is important to note here that these grants fund individuals, rather than groups or universities. There do exist a variety of Actions that encourage mobility (and the return to Europe) for research bodies and entire groups. However, the nature of this project focuses solely on the individual actor, rather than collective decisions.
The Commission claims:

‘As Europe’s knowledge-based economy develops and grows, top-level European researchers who have been working in other parts of the world now see bright new career prospects back home. Their return is a good move for them and good news for Europe. But they sometimes require a little help to get back on the European career ladder. Marie Curie’s International Reintegration Grants (IRGs) meet that need.’

(European Commission)

Hence, the EU believes that with significant monetary incentives, researchers who have essentially emigrated from Europe will be re-attracted to this newly established hub of research excellence, as the ERA has reframed itself. Upon accepting an International Reintegration Grant, researchers will thus make the long term commitment to reintegrate into European society. According to the stipulations, those awarded the grants will be retained by European society for a period of two to four years to complete their research.

Similar to the International Reintegration Grants, the International Outgoing Fellowships for Career Development (IOF), offer comparable incentives. As the second major Marie Curie Action for reintegration, the International Outgoing Fellowships focus more on professional development as opposed to the building of actual groups and projects. According to the Commission,

‘European researchers can learn a lot from conducting high-level research in other parts of the world. The knowledge that they acquire in Third Countries can then be brought back and used in Europe. To encourage European researchers to venture further afield (and then to come back), Marie Curie actions offer International Outgoing Fellowships for Career Development.’

(European Commission, 2010)

The IOF Action operates under the idea that a researcher will go abroad for one to two years to gain further advanced training, only to bring that training back to Europe in the end with the required reintegration period.
A variety of initiatives and schemes similar to that of Marie Curie Actions exist on a state-level basis. These programs are dependent on the structure of research and academia within specific countries, as well as the value placed on researcher mobility. Domestic, social, and cultural environments impact the mobility element of researchers (Morando-Foadi, 2005). Domestic research market conditions, including ‘employment opportunities, short-term contracts, infrastructures and funding’ play significant roles in influencing the mobility of researchers from specific countries (Morando-Foadi, 2005: 146). Push factors that increase mobility and the drive to leave include: under-investment in research, failure to secure permanent positions for science researchers, and failure to attract scientists from abroad (Morando-Foadi, 2005).

There are many generalizations made in the literature regarding the nature of research according to geographic region in Europe. For the southern part of Europe, loss of scientists in various regions can be attributed to:

‘Poor research infrastructures; poor career perspectives; both in the private sector (no innovation tradition and no investment in R&D) and in the public sector (very few vacant places in state laboratories and universities); and poor social security benefits.’

(Morando-Foadi, 2005: 146)

Portugal has witnessed an enlarging scientific labor market, but is comparatively small and concentrated to other research hubs (Morando-Foadi, 2005). Austria presents many similarities to southern European countries, as it holds only a small amount of universities and a limited science research market apart from academia. The United Kingdom, on the other hand, experiences greater inflows than outflows, thanks in large part due to plentiful fixed-term contracts and postdoc positions available. The UK, however, still suffers from a scarcity of permanent positions which poses difficulty to career progression for those in the early stages of
their career cycle. Competition remains high among science researchers within the UK. Mobility, on the other hand, is a common element for Italian scientists. This can be attributed to two issues inherent to Italy’s government: first, scientific research is not adequately funded by the government, and second, there is a scarcity of scientific employment opportunity (Morando-Foadi, 2005). What becomes clear is that scientific research is highly dependent on the structure and nature of academia within states. Thus, many member-states have also taken their own approach to remedying the loss of scientists.

As a result of the various scientific research environment, many European countries have developed grant schemes aimed at increasing mobility of researchers while contracting labor back to the country of origin based on the research needs and conditions of individual states. Casey et al (2001) have identified a variety of programs that seek to reach a balance between the necessity of mobility within scientific research and reintegration into the home country. These programs include the Erwin Schroedinger Scholarship of Austria, the Academy of Finland reintegration grants, the Welcome trust of the United Kingdom, Italy’s Telethon Foundation Career Project and Ministry of Universities’ grants, the Ministry of Development in Greece, and the Ministry of Education ‘reintegration grant’s in Spain. These programs utilize monetary incentives by providing significant funding to researchers who hold European citizenship and who are willing to return to Europe. A reintegration program at the end of each scheme provides a means by which a country can bring back those who have emigrated (Kelo and Wächter, 2004).

Both the EU and member-states have developed these schemes aimed to counteract the brain drain based on the principle of reintegration. These grants and fellowships operate on the assumption that economic incentives and high levels of funding will entice researchers to return
to Europe. However, the availability of funding and grants, under the condition of reintegration into European society, does not necessarily equate to high levels of return migration.

Over the past decade, it has become apparent that, as part of a more general problem, sending countries are not seeing a high enough return of expatriates, despite these programs aimed at encouraging return migration (Ley and Kobayashi, 2009). The area of return migration, especially within the context of return of scientists from North America to Europe, remains largely in the dark. Part of this can be attributed to the fact that there exists no instrument to measure return migration. The census provides data on the arrival of immigrants based on birthplace, however there remains no available data on the return or onward migration of these migrants (Skeldon, 2005).

Since the early 1990s, the EU has implemented increasingly more aggressive programs aimed at re-attracting and reintegrating European scientists who have left for opportunities abroad. This indicates a progressing concern for the EU regarding the position of Europe in the global knowledge economy. To remain competitive, the EU has attempted to remedy this loss through such reintegration Actions. However, the EU’s ever-growing concern regarding the loss of researchers indicates that such schemes have not yet worked to alleviate the issue at hand. This issue of return migration will be addressed more extensively in the following chapter within the context of empirical findings. But here it is important to highlight that the European Union is simply not seeing high enough returns of science researchers to their home states despite the variety of programs and initiatives aimed at re-attracting and retaining scientific talent.
Conclusions

All these initiatives notwithstanding, the European Commission and member-states are increasingly alarmed by the growing shortage of scientists and the long-term effects on the advancement of a European knowledge society. Decreasing enrollment in scientific disciplines coupled with an aging workforce population and the emigration of EU researchers to North America is an alarming threat to the European research community (Moguerou, 2006). What becomes clear from this response to the movement of researchers away from Europe, is that both the quantity and quality of scientists leaving has created a snowball effect for the scientific research sector in Europe. As scientific talent departs European research institutions for North America, European states not only lose advantage in the global competition for scientific talent, but also suffer losses of those who would potentially educate future generations of scientific researchers. Thus, the urgent need for such re-attraction and reintegration schemes arises.

EU initiatives, legislation, and policy created over the last twenty years aimed at re-attracting European science migrants have largely failed. This is evidenced by the continuing redesign of schemes and initiatives aimed at counteracting the loss of European scientists abroad and the continuing pressure the EU has placed on encouraging the return of scientists over the last two decades. Deemed a structural issue by the European Union, the migration of the highly skilled from Europe continues to occur despite schemes to counteract the loss. This becomes a critical issue to the long-term survival of a competitive European Research Area.

EU policies and initiatives aimed at enticing researchers to return to Europe are founded on the assumption of basic neoclassical economic migration principles addressed in Chapter 2: that monetary incentives motivate people to move. The promise of greater funding, higher levels of coordination, and greater investment in research is thought to be enough to encourage
researchers who have left to return to their country of origin. Following the theoretical path of neoclassical economic migration theory that such EU reintegration policies are based on, one could assume that the promise of monetary gains would encourage these scientists to return to Europe. However, the reasons for remaining abroad extend far beyond simply economic benefits. This is where the disconnect between EU policy and the individual actors lie: in the assumption that utility-maximization is the main motivation underpinning international migration. However, what becomes clear from talking with the individual migrants themselves is that economic maximization is just a small concern that is weighted against many factors that influence the decision to go, and more importantly remain, abroad. The question persists, why are ‘star’ scientists choosing to remain abroad?
4   The Nature of the Scientific Research Sector: A Micro-Scale Approach

Upon pressing a button on a panel on the outside of an unassuming building on the University of British Columbia campus, a buzzer sounds and a disembodied voice instructs me to enter and proceed to the administrative desk. There I sign a sheet stating the purpose of my visit as well as the date and time of entry. I am then presented with a key card, which I am instructed to return promptly upon my departure. I follow a maze of industrial staircases and hallways (each requiring a swipe of said key card) through a scientific research center, whose sparkling concrete and glass interior and modern design not-so-subtly denote seemingly uncapped levels of funding. Unlike the bustling hallways of my own department, this one is oddly quiet, lacking the din of students chatting in the hallways and the drone of lectures coming from classrooms. I sneak a peek inside one of the rooms with a door ajar and observe a group of people in conventional white lab coats milling about a laboratory. Save for the occasional phone ringing or a person walking intently down the hall, the building is eerily desolate. I tentatively knock on an office door, and a friendly voice with just a slight hint of an accent invites me in. I take notice of the clean and sparse office; neatly arranged papers stacked on the desk; a state of the art computer system; a vast white board marked with equations, algorithms, and symbols that are a foreign language to me. The scientist waves a hand at the chair across from their desk, and looks at me inquisitively.
Methodology Revisited

In all cases, interviews began by stating the purpose of my visit—that I am curious about the nature of research in Europe versus Canada and the corresponding transatlantic movement of scientists. I made sure the participant was aware that their experiences and opinion on the matter would help me better understand the intricacies of highly skilled migration and the decision to move, or in their case, stay abroad. Interviews were conducted one-on-one, over the course of 30 to 60 minutes depending on the length of answers given.

I informed all interviewees that their identity would be kept confidential. All documents identifying the participants are either kept in a locked filing cabinet within a locked office or on a password protected computer. The only persons having access to the identities are the Principal Investigator and myself. In all documents, numbered pseudonyms are given to all participants. At this point in the interview process, I asked the participant to give consent, either verbal or written, to participate in the study. I provide the interviewee the project’s consent form, which had also been e-mailed to them prior. Of the twenty participants, approximately half hastily scribbled their signatures and gave the consent form straight back to me. A few took time to thoroughly go through the consent forms, however, and wanted to know more about the study in general before signing. Those who were more cautious preferred to wait until the end of the interview to actually sign the form itself. A minority of participants, however, were concerned with putting their names on paper for the project, and instead asked to give verbal consent alone.

Accordingly, this brings up the issue of gaining access and obtaining credible data from the interviews. Gaining access is more than simply having a potential participant agree to an interview. It is about creating rapport with the participant, allowing them to feel at ease in discussing the matter at hand in order to ascertain more substantive and less filtered data. As
detailed in the introduction, power dynamics, establishing rapport, and gaining access are inherently intertwined in the interview process. I approached the interviews in a professional but friendly demeanor. Prior to the interview, I read the *curriculum vitae* of the participant if available on their department homepage. I came to the interviews having a general idea of the participants postgraduate education and migration trajectories, demonstrating a genuine interest in their own life histories. In addition, I had done preliminary investigations on the nature of scientific research within their home country. This allowed me to have informed conversations with the participants about the structure and politics of scientific research within their scope of knowledge.

All but one interview was held in the office of the participant. Although it could be argued that meeting in the office of the interviewee would shift the power balance to the research subject, I actually found it beneficial to the dynamic of the interview itself. Participants were at ease in their office. Some would occasionally pull up their C.V. to reference a certain time frame in their research careers. At times a participant would reference their contacts to suggest a colleague they thought might be helpful to the study.

Such attempts to build rapport and gain access with the participant worked to the advantage of the project. For the majority of interviews, the participant would openly bring up important, and often times personal concerns, without prompting. Rather than giving one dimensional answers, many times the participants provided more candid and introspective discussion on the matter at hand. After concluding the interview, it became clear that the majority of research subjects had developed a personal interest and investment in the project. Nearly all participants asked to be sent the final product, and occasionally followed up with questions about the progress or additional thoughts they forgot to mention in the interview itself.
Extensive preparation for the interviews not withstanding, there were certainly interviews that fell short, particularly in two manners. First, it could almost be predicted when an interview would not meet expectations based on the reaction of the participant to the consent form, as discussed previously. This was especially true of those who exhibited signs of skepticism or possible suspicion. Whenever these participants would make a harsh comment or take a critical eye to their research field or current department, they would back track and attempt to right the negative with a positive. At times, some even exclaimed, ‘I probably shouldn’t have said that!’ after making a particularly strong statement. The most extreme case of this was one researcher who requested we meet in an open and noisy location within a communal hall on the UBC campus for the interview. This participant was most guarded with answers, and refrained from elaborating too much. The participant’s answers were short and gave an air of false optimism. The participant asked more than once if participating in the interview would in fact jeopardize his position. This participant wanted to verify whatever was said in the interview would not get back to the department head. This case, however, was an outlier compared to the rest of the participants.

Second, the level of seniority and eminence of the participant directly affected the quality of the interview. Approximately 75 percent of the participants were at the mid range of their career track. Those at the mid level of their career discussed at length the process of achieving their level of stature as well as their hopes for career progression. On the other hand, the remaining participants were at the tail end of their career and near retirement, having achieved significant recognition in their field of science. Those considered eminent scientists tended to keep answers short and to the point, opting not to elaborate or hypothesize about the nature of research in their home country versus Canada. Some participants would continually glance at
the clock, others made it clear that they did think it was necessary for the interview to go over a 30 minute allotment. Despite planning for this as a possible barrier to gaining access, it quickly became apparent in an interview that some scientists had more pressing concerns than answering questions about their migration history.

For the most part, the interviews occurred in a similar manner. I exchanged e-mails with the participant to set up a one hour time slot for the interview, at their convenience. Despite busy research, teaching, and travel schedules, most were very accommodating and happy to participate in the project. In the end, of the approximately 35 potential interviewees I was put in contact with, 20 were able to find the time to speak with me. All but one interviews took place in the office of the participant. As detailed above, the majority of offices were located within science buildings on the UBC campus. While the level of security varied to some degree, most offices were impressively modern. Save for the few theoretical scientists, the majority of participants I spoke with work within applied science, and thus have expansive laboratories for their research.

**Framing the Interview**

What becomes clear from both literature and policy reviews, is that while neoclassical economic migration theories provide the foundations highly skilled migration policy, they cannot account for the complex ways in which highly skilled migration decisions are made. Those decisions are not determined by a simple cost-benefit analysis. Many non-economic factors play an important role in the decision to migrate, especially from regions that have similarly developed labour infrastructure.
The interviews were semi-structured and comprised of six questions, which were intentionally open-ended to leave room for elaboration. The questions were designed to allow room for the participant to provide their own opinions and draw on personal stories, as well as hypothesize on unfamiliar subjects. The aim of the interview questions was threefold. The first part of the interview helped develop the migration history of the research subject and detail their decision to leave their home country to pursue a scientific career abroad. Two questions were asked: one about how participants first made the decision to come to North America and another about what factors helped push them from their home country and consequently pull them to Canada. The second part of the interview focused more on the structure of research in Canada versus their home country and Europe in general. Again, two questions were posed to the participant: how do research institutions in Canada versus their home country compare, and how do they think their ability to produce scientific knowledge differs between these geographic locations. Finally, the third part of the interview focused on re-attraction and reintegration schemes aimed at bringing Europeans back to the EU. The final two questions asked the researcher if they were aware of or considered participating in such schemes, and what could the EU do to potentially entice them to return.

The nature of the interview questions were framed to produce a detailed account of the career, and corresponding migration, trajectory of the participant. In addition, the interview questions aimed to develop a deeper understanding of the structure and function of scientific research within both North America and Canada. While the questions referred only to the professional realm experienced by the participants, many chose to include personal facets of their lives when answering. It became evident that the professional and personal are inextricably linked.
From the interviews, several key themes surfaced in the responses. While access to funding and income levels indeed emerged as contributing factor for migration decisions, economic factors was not deemed the most central issue at hand when making the decision to move and remain abroad. The rest of the chapter will discuss the themes that emerged in three parts. First, the issue of going abroad as a career move and the push and pull mechanisms that brought the researchers to North America will be examined in depth. Second, the difference in the nature of scientific research and institutions in Canada versus Europe will be discussed from the viewpoint of the researchers, as opposed to the policymakers. Thirdly, both the professional and personal reasons for staying in Canada, as opposed to returning to Europe, will be discussed in depth below.

**Funding, Scientific Curiosity, and Career Progression**

When posed with the question ‘How did you make the decision to move to Canada?’, answers were short and to the point. “What got me over the Atlantic? My postdoc university,” one researcher put it simply. This was echoed by about half of the scientists: “I had a position as a postdoc, so I knew I was going to Canada” and “I wanted to do my postdoc in Canada”. Having just completed doctorate degrees, many of the scientists found positions as postdoctoral fellows at research institutions in North America.

For others, especially those who were past their postdoctoral phase and seeking a tenure track position, the choice to move to Canada was a bit more complex. About one quarter of the scientists had been recruited by either the University of British Columbia or another Canadian institution. As one researcher stated, “it was an active search more from the UBC side”, which was echoed by other participants as well. In such cases where a career had already been
established in Europe, the decision to come to Canada was much more multifaceted as compared to those just out of graduate school.

“There was previous contact, particularly with UBC. I collaborated with two professors here. Through them, I was in contact with the system and knew their research… Through discussions, it came up that there was a faculty position here and so, as I was at that point of looking for something more long term, I was definitely interested in the opportunity.”

Whether at the start of a their career or already established within their field, each scientist immediately highlighted professional motivations as the driving factor behind their choice to go abroad. However, it quickly became evident as the interviews progressed that a job offer was not simply the only factor influencing the decision to migrate.

It is at this point that it is important to note that while a job opportunity got these scientists across the Atlantic, it was not necessarily first to Canada. For approximately 50 percent of the participants, the first transatlantic move was from Europe to the United States. Various academic institutions in the United States were marked as the most cutting edge research centers in the world. This of course helped draw two of the researchers first to the U.S. According to one scientist, “In my field, there is only one place to go [a highly ranked university in the United States]. That attracted me. This was pretty much the only place I was keen on going after completing my PhD. I was very lucky to get in there. So that made me jump to Northern America”. Another scientist states, “It was less the U.S., but more the research center. I only applied to two research institutions in the U.S.”. When asked what brought one researcher to the U.S. originally, yet another stated,

“It was a combination of research curiosity that was based on my PhD studies. Generally, it was encouraged by [my home country’s] system to do postdoctoral studies abroad—to broaden horizons, improve language skills, generally see other types of research. Often this was with the expectation that you would knowledge and experience back to Europe and have it benefit the [home country’s] system.”
What becomes apparent, however, is that it is not a question of geographic location, but rather of intellectual curiosity and the competitiveness of academic institutions. It was not so much the United States that was the draw, but the opportunity to “broaden horizons, improve language skills, and generally see other types of research”.

Some researchers, who had initially conducted research in the United States and then proceeded to move to Canada, were staunchly anti-American. For those who had taken the first step to Canada through American soil, strong opinions about the nature of scientific research in the U.S. emerged. One scientist in particular was very vocal about his experience at a very competitive American academic institution:

“The U.S. is a much more aggressive environment. I felt it was based on competition at a much earlier stage of your career, and the competition is still present and stays there although you might be very established. That puts young people at the position of being competitive, and unfortunately the senior people in the position of losing their edge if their research is not up to standard.”

The researcher went on to state:

“I do not like the American system because I felt it was too aggressive and too strong. At top places in the U.S., like [a top university], competition is so high people do not interact. Collaborating with people is very hard because people see that as a weakness. Even if you are doing good stuff when you are collaborating, people see that as a weakness instead of a strength.”

None of the scientists were optimistic about employment and research in the United States. For some, it was not simply a matter of competitive environments, but also political and cultural factors that influenced their decision to choose Canada over the U.S. As one scientist explained, “9/11 had just happened and Canada seemed like a nice place. I did apply to both the U.S. and Canada, and got offers from various places. Vancouver was the best.” When posed the question ‘Why Canada and not the U.S.?’, one scientist drifted off in thought, mumbling “9/11, Bush, my anti-American thing…” Another put it simply: “The U.S. as a place just did not sound
appealing.” Almost all the scientists admitted to applying for at least one position in the United States, or taking the time to travel there.

“I like to go visit my friends and colleagues in the U.S., but I do not think I could live there. What would make me unhappy there? It is not the research system itself, it is more a personal side of things. I do not like the idea of a society run entirely by money and business. I just do not like it. That is my impression of the U.S.”

There arose a bit of a quandary when discussing Canada versus the United States for career moves. While only some of the participants had in fact worked in the United States (and only at the postdoctoral level), all had strong opinions about the nature of research and politics within in the U.S. As the majority of the scientists I spoke with are just now entering their mid career stage, many had completed their graduate studies and were entering the workforce around the time of September 11th. This has only helped emphasize the fact that Canada has emerged as key player in the global competition for scientific talent in a post-9/11 era.

On a more sociopolitical level, almost three quarters of scientists brought up the notion that Canada is figuratively “is somewhere halfway between the United States and Europe”. One scientist characterizes the move to Vancouver following a stint at an academic institution in the U.S.

“It felt a little like going back to Europe. It is not the same, but I felt it was a good compromise socially between the U.S. and Europe. From the science point of view, I could not judge [at the time]. But now I could tell you that yes, it [Canada] is a thing in between. A bit more conservative than the U.S., much more aggressive than in Europe.”

Canada was consistently characterized as culturally ‘in between’ the United States and Europe within both the professional and personal realms. For one particularly outspoken researcher,

“It was a cultural thing, that was of course playing a role. There was a complete lack of sense of community and a complete lack of atmosphere [in the U.S.], which is a combination of culture, emotions, art. That was something I missed. It
was a big drive to go back to Europe. Then of course, Canada came up as a third place.”

When asked how specifically Canada is more like Europe, many of the participants pointed to key cultural signifiers such as access to public transit, population density, and general quality of life. Some even told anecdotal stories to account for such cultural discrepancies; tall tales about nearly starving their first winter in the U.S. because the scientist did not realize there were no grocery stores within reasonable walking distance and a car is in fact necessary in American culture. To some, Canada is, in their mind, geographically closer to Europe. According to one scientist,

“The fact that Canada is in the commonwealth, you felt that there was more of a direct connection. That would have certainly played a part in making this an attractive place to consider in the first place, without knowing what Vancouver was like. The very fact that it was part of a country that we knew something about, that certainly made a difference.”

For those who had experience living and working in the eastern parts of Canada, cultural differences were highlighted. One scientist found that

“the east and west of Canada are very different. I think the east—Toronto—is more Europeanized. I spent some time in the U.S. as well, and I find the east part of Canada is some mix of Europe and the U.S. from a cultural point of view.”

This idea that Canada is in fact more ‘European’ than the United States helps develop an underlying sense of place belonging and attachment. Where these scientists stated feeling out of place and, at times, disapproving of American society, they also correspondingly verbalized feeling more at home within both Canadian research institutions and society in general. As one researcher summed up, “you just want to be happy where you live.”

When asked how one made the decision to come to Canada, the initial responses remained on the surface: there was a job offer in hand. When asked why Canada and not the U.S., again the answers were a bit vague: Canada more closely matches Europe than the U.S.
However, when probed further about the push and pull mechanisms driving these scientists from their home country to North America, it became evident that there existed an intricate web of subsurface factors, all inherently linked, driving the decision to go, and then remain, abroad.

Upon taking the time to mull over push and pull mechanisms driving their own transatlantic migration, approximately half the interviewees cited scientific curiosity as a main contributing factor for their choice to move. In some cases, the job opportunity was the ideal fit to progress their scientific career, while for others it was a chance to develop scientific networks outside of European research centers. As one researcher stated,

“\[I\] have to confess that really the underlying motivation was purely scientific, and it was a perfect match. I mean, I could have almost written the job advert myself. It was exactly what I was trained in.”

According to much of the literature on the nature of scientific research, as discussed in Chapter Two, intellectual curiosity drives the desire to go to where ‘good science’ is being produced.

While science drives the decision to go abroad for most of the researchers, many felt they were blindly entering the Canadian labor market. Few moved with the intention to stay in Canada for a significant period of time. Many saw it as just another step in their career progression:

“My sense of geography was not as good as it should have been. It was purely a purely scientific decision as much as anything. In fairness, as an academic you really do have only a probationary contract to begin with. I genuinely had no way of knowing if it would work out or not [in Canada]. Would I actually be able to do the job? You can be confident but you do not know for sure that you are cut out to do that. There was uncertainty on that level.”

This thread of uncertainty wove itself into many of the researchers’ migration stories, however any doubts about a transatlantic move did not outweigh the perceived benefit of going abroad.
Many scientists had strong feelings on the nature of science and employment in the research sector in Europe. From academic freedom to salary, every interviewee contended that the European system was encroaching on their research capacity in some way or another. For some, it was the lack of secure faculty positions that drove them abroad. When asked what factors help push them from their home country, one researcher responded “Certainly being a junior professor and not having a tenure track.” Another scientist explained,

“The prospect of having a tenure track position which, with reasonable likelihood leads to stable employment where you have access to students and can do research, that prospect did not seem to exist in a comparable way in [my home country]. It seemed somehow easier out here [in Canada].”

This sentiment was echoed time and time again, especially from those who had been employed in a wealthy, Western European nations:

“Finding a position at a [European] university just seemed impossible. At the time, people were recommending you do a postdoc abroad because you might be more employable in [your home country]. But that is a dangerous thing to do, right? Because you’re sending people off and they settle down somewhere and they are lost.”

Many scientists attributed this absence of tenure track positions in European systems to hierarchical structures in place in academic departments (which will be examined at length in the following section). As one scientist explained, it was the general case that European universities:

“did not have the tenure track system. I had one of these assistant professor positions, which are not tenure track. They are five years. The bad thing about this is, eventually you need to leave. It also has another implication, which is that part of the reason why these assistant professorships are not tenured is because they belong to a professor who can make these decisions. That makes the professor positions very attractive, because they can hire whoever they want. Which means that it is very competitive.”

Many believed these hierarchies impeded their ability to progress in their discipline. Simply having just the possibility of tenure in Canadian institutions was a huge draw for many.
“Professionally, this position [at UBC] offered the opportunity of a tenure track and developing an independent research program, while in [Europe] I was in the position that was still dependent on reporting to a director.”

In a similar vein, greater academic opportunity for early career scientists encouraged many to pursue research abroad.

“If you ask what was the pull factor to bring me to Canada, it was probably the opportunity to have more academic freedom. You can shape your own research and potentially get an award for what your group is doing, versus the European system which does not have this flexibility at my age.”

It became quickly apparent that the scientists believed they would find greater academic freedom and opportunity within North American research institutions as compared to Europe. The simple existence of tenure track positions was encouragement enough to act as a strong pull mechanism to make the leap across the Atlantic.

For those who had already begun to establish themselves within their academic discipline in Europe, salary and funding were both strong factors influencing their initial decision to migrate. Disparate pay between not only Europe and North America, but among European countries as well, contributed as a major push and pull factor influencing migration. For one researcher,

“Salary [in Europe] was a misery. I was actually earning less than I was as a postdoc in Canada, even though I had a permanent position. In terms of research support, it was completely lacking. When I decided to move to Canada, at that time there was no way to get money to support your research [in Europe]. I could not see any way of getting money to fund my research, except a national thing which is a few thousand euros per year. That is nothing.”

Such economic factors were especially relevant to the time and location of employment, as academic funding is provided mainly at the governmental level. As one researcher stated, “Bottom line was that when we left, it was the Margaret Thatcher era.” The scientist went on to explain,
“I was not under as extreme pressure to move as people might have been, because I had a moderately secure position as a research associate. The research environment was superb. But the real determining factor was that the federal government at the time decided that universities were over-funded, and that their funding should be reduced. It was on the order of 15 percent nationally. So that was a huge hit to the university budgets. The only way the universities could sustain that reduction in funding was to really severely cut back on hiring. So they did that, almost exclusively by attrition. People were retiring or leaving for a whole range of reasons. And that was the position I was in. I was looking for an independent position as an academic. The chances were next to zero in the foreseeable future anyway. Right around that time, there were two positions advertised here at UBC. So I applied for one of those.”

One scientist drew parallels between the academic situation in Europe during the Thatcher-era and current economic climate, which have both led to scientists at all career levels to leave the country for better opportunity.

“There was a national campaign called Save Our Science (SOS) and there were a few leading academics who were beating drums and trying to draw awareness to this situation. There were certainly some celebrated cases of people who left at the time. It would only be senior people who got the attention of course. For a senior person at Oxford or Cambridge, it’s going to make the front page of The Times probably. There were a number of cases like that.”

This is certainly reminiscent of articles published in the Globe and Mail declaring Canada had “poached” academic talent from the United Kingdom by luring top scientists to the Canada Excellence Research Chairs Program.

When posed with the question of how one made the decision to come to North America, initial responses were both unsurprising and remained on a superficial level. Of all the scientists who were interviewed, each had either a post-doctorate or faculty position lined up at a research institution in either the U.S. or Canada. However, when probed further, it became quickly apparent that it was more than just a job opportunity that prompted these scientists to make the transatlantic move. Job opportunities, centers of excellence, tenure track positions, and funding emerged as both push and pull mechanisms that provided the causation for these scientists to
emigrate from Europe to Canada. Canadian research institutions have thus emerged as chief players in the global search for scientific talent, especially in competition with the United States. Consequently, it is necessary to provide a more in depth look at the nature and structure of research in Europe versus Canada, and what acts to attract the highly skilled migrants themselves. It is necessary to look past the initial motivations as to why these scientists move, and instead examine the more nuanced ways in which they have experienced both the Canadian and European research sectors.

**Structure and Nature of Research Environments**

In order to develop a more rigorous understanding of the nature of scientific research in Canada versus Europe, the scientists were asked to elaborate on their opinion on the similarities or differences of research institutions in Canada versus their home country. While Canadian institutions do rank high in the global scale of academic and research performance, they are for the most part ranked below their European counterparts, as discussed in Chapter One. While the data used to rank universities is supposedly objective, it does not necessarily reflect the opinions and attitudes of the researchers themselves. Hence, the scientists were posited with a question asking for their view on the caliber of research institutions in Canada as compared to their home country.

Many of the scientists were very up front with the historical precedence European institutions have over Canadian ones. As one scientist put it, “in terms of quality, you cannot argue with hundreds of years of tradition, Nobel prizes, and the rest of it that comes out of European countries”. However, it is impossible as well as dangerous to generalize about the quality of research produced across departments, or even entire universities. Thus, it is
important to remember that the scientists are speaking from only their own experiences and personal viewpoints on the quality of research produced.

Instead of relying simply on research output, approximately half of the scientists brought up the quality of students as a measure of the quality of a research institution. One professor asserted, “We have got nothing to be ashamed of here [in Canada]. The quality of students, the faculty, the trainees, and the staff would stand up anywhere. I do not see any fundamental differences.” Yet another elaborates on a similar idea:

“One of the things that consolidated my case in staying here within a very short time of arriving was that I got the very distinct impression that young students here were less encumbered, that their horizons were much broader, and they believed they could go out and do things. There was a much more sanguine view within the student body as a whole I would say. That is a very broad brushstroke I know, but that was the distinct sense that I got. The students here are much more upbeat and optimistic about their hopes for the future. I could find that very inspiring as a concept really. It is still the case.”

It is an interesting concept to measure the caliber of a research institution based on the quality of the student body. One scientist hypothesized that the quality of students in Canada is much more balanced and spread out across universities, largely due to the absence of an ‘Ivy League’, or elite privatized universities. Thus, top tier students actually attend large public schools for postsecondary education across Canada, creating a more balanced study body in terms of academic performance. In a similar vein, the faculty to student ratio was used by a few scientists to assess the quality of research institutions in Canada versus Europe. According to one researcher, their home country:

“has very high standards and lots of funding available for doing research… As you look at university rankings, you will see that [the] universities are highly ranked and some of the top places in Europe. But there are few faculty positions. I once did the calculation between UBC versus my home university, how many faculty members are serving the number of undergrad students. I was surprised that UBC has three times more faculty members per undergrad student compared to my home university.”
Following this idea, having a smaller professor to student ratio indicates there is more access to and collaboration with faculty members. This in turn provides a higher quality of education to students, and thus producing future generations of star scientists. Many of the scientists believed that the quality of research institution is embedded in the quality of education provided, and thus the students themselves. Approximately half of the scientists had negative opinions about the teaching environment at European universities, which will be looked at more in depth later in the chapter when similarities and differences of research institutions in Europe versus Canada.

It is easy to assume that the reputation of a department or university rests on the combined output of scientific research, discoveries, and awards. The caliber of a science department is often measured as a collective whole. This, however, is not the case according to many of the scientists. According to one researcher, “In the end, if you really look at how research is successful, it goes back to the shoulders of a few individuals. And so that is what matters. Where those individuals are.” It is those individuals, the Nobel laureate-stature scientists, that carry the reputation of the department or university. One scientist details the case of a colleague, who went on to win a Nobel prize following his position at UBC. He was “one of the scientific leaders. He did not actually get his Nobel prize while he was here, but he did a lot of that foundational work while he was here in the department. Good things can happen here.” It is these few individuals who carry the reputation, and thus weight, of the university and influence perceptions of caliber.

For most scientists, there exist no “fundamental differences” in the caliber of research institutions between Canada and Europe. While European universities have the rich tradition of scientific excellence and corresponding access to funding and technology, many Canadian institutions balance this with both exceptional faculty and students. In the end, it is the few
individuals who are considered star scientists who really drive the reputation of institution. Meanwhile, this is entirely dependent on is their geographic location, which can easily change due the nature of scientific migration. So while both European and Canadian universities employ these Nobel laureate stature scientists, creating a general caliber equilibrium, what are the actual differences between Canadian and EU research institutions that drive some to permanently pursue academic endeavors abroad?

The first major factor in academic research that helps elucidate the differences between scientific research in Canada versus the EU is funding. Funding for research, as discussed at length in Chapter Three, is sourced mainly from the state level. Thus, there are comparative advantages living in a country which allocates generous amounts to scientific research. However, as is often the case, securing funding can also be inhibited by various political and bureaucratic barriers. When asked what differences exist between funding by Canadian institutions as opposed European ones, a wide variety of answers emerged. As with measuring caliber of academic institutions, the scientists spoke on a personal level based on their experience within their own departments and universities. It is difficult again to generalize across all research institutions in Canada versus their home country, but their ideas help shed light on the differences in the process of securing funding as a scientific researcher.

Many scientists commented about the level of funding funneled into research at a general level in Canada and their home country. For many scientists, funding levels were extremely high at their home universities in Europe. Almost all scientists brought up the belief that they would have significantly greater amounts of funding available to them in Europe. One scientist went so far as to offer actual numbers: “I have a friend at the ETH [in Switzerland] and it is just incredible the amount of money he has on an annual basis from the university. It is more than
half a million.” Laughing, he added, “I think I get five hundred bucks here.” In the case of specific European countries, levels of funding are well known to be significantly higher than those in Canada. As one scientist described,

“For most Scandinavian countries, Switzerland, and several other European countries, their levels of funding are extremely strong and always have been. It was always the rule that every university professor in Sweden, for example, was provided with a basic research operating grant and technical support. The expectation was that the profs would research, and they were given the resources to do it. That meant they had a certain level of unencumbered activity. They could follow their own intuition and ideas.”

It is important to differentiate, however, funding that is allocated to a research group as opposed to an individual. The way in which research is structured in wealthy European countries is that groups are funded over individuals. So while many scientists believed they would have greater access to funding if they were in Europe, they would be part of a larger research group, and thus have less autonomy than if they were funded for individual projects. Not all European countries, or even institutions within a country for that matter, provide equal access to funding.

Equitable access to funding varied greatly from their experience in Canada, where scientific research is funded at far less levels than institutions in Europe. Most researchers were well informed on this matter. As one scientist explained,

“If you look at the support for research and development as a fraction of gross domestic product, for example, the numbers would probably be in the range of 2.5 to 3.5 percent. Historically that is what it has been in the U.S.; they have been the leaders. Europe has not been far behind, but Canada has been substantially behind. Although growth in support has grown in relative terms, it has been significantly lower on a GDP basis than it has been in European countries.”

Many echoed this sentiment, that Canada is lagging behind on funding research as compared to European countries:

“Although the pendulum may be swinging somewhat in the balance between Canada and Europe, my suspicion is that we are still significantly behind in real
research support. I think that it would be easy to gloss over some of the deficiencies.”

It was generally accepted by all researchers that funding for sciences is on a decline in Canada: “Research funding goes in waves, it goes in ups and downs, and I think we are in a down now. I have known better days in funding research in Canada.”

In terms of securing research funding in Canada in comparison to in the EU, many of the scientists had wide and varied views based on their personal experiences. There were many polar extremes, attributed to factors such as money sources, application processes, theoretical versus applied science, career stage, individual versus group research, and government politics. One scientist said, “I am not totally happy, but I function very well because I have other sources of funding. It is interesting, I have funding from [a Canadian body] and from Europe as well.” In many cases, researchers who found the Canadian level of funding limited, had secured funding from bodies in both Europe and the United States.

Access to and satisfaction with funding varied based on career stage. For more junior professors, many believed that the Canadian system works to their advantage:

“I think on the whole, the initial funding for junior researchers starting out is very good here [in Canada]. The funding for infrastructure, for all the hardware that you need to do the work, and the likelihood of getting opening grants to do research, those are both very positive here.”

Another scientist, who works on the more theoretical side of research, held a similar stance on funding in Canada. The researcher questioned, “How much funding does one really need? Theorists do not need much. I do not want to complain. I think my funding is well off in Canada.” Many researchers expressed content with the nature of funding upon their arrival in Canada. It is not until reaching a mid-career phase that opinions on the nature of scientific funding shift. As one scientist explains,
“There is really good support early on. The really top bracket scientists are well supported, where they should be. But I think there is a considerable cohort which has grown, which are doing excellent to outstanding science, and yet their funding is becoming marginalized. That to me is a big problem.”

Those who fall into the mid-career stage were not so optimistic about levels of funding in the Canadian system. One scientist argued:

“Where I think we need to pay more attention is in the mid-career phase. This comes back to the point that the funding from the federal government for the core activities of the Canadians institutes for [scientific] research, for example the core operating grants for work that is so-called investigative rather than programmatic or specified, that funding has become very marginal.”

This sentiment was echoed by one researcher who serves on a board that works to allocate funding. This scientist provided a deeper insight into how it is decided what projects are in fact funded:

“We are at a point where we are getting around 2,000 applications, and less than 400 will be funded. Now in years gone by there was quite a spectrum of applications from extremely good to extremely poor. You could almost triage a good number of applications in the past. But that is no longer the case. The poor applications have disappeared, so all of the applications that go unfunded are at least good applications, and some are outstandingly good. But it is almost a lottery in order to be able to decide on a rational basis to establish a realistic cutoff line.”

This issue of denying funding to deserving projects clearly weighed on this scientist. They went on to elaborate:

“Unless that problem is addressed, I think it is a sleeping time bomb because there has been a significant expansion in start up support. Expectations are high in early career and those expectations are going to tank in years to come. Then, I think you are going to have grounds for real discontent. Nobody seems to really accept that it is a problem apart from mid-career scientists.”

It is these mid-career scientists who face the brunt of funding decline. And this emerges as a problem only after establishing a career abroad. While those who were dissatisfied with funding levels at the mid-career phase attributed this to career level, it is important to recall that when
most entered the scientific research labor market in Canada, research funding was on the upswing. However, with the current economic climate, much of the funding has been cut, or funneled into very specific projects designed to directly benefit society. This temporal element was largely overlooked by the scientists.

This leads into the tendency of the Canadian government to direct funding at specific fields to encourage scientific output. The politicization of science is very much reflected in the allocation of funding. Funding is distributed to areas that the government deems of high importance. According to one scientist,

“There has been considerably more politicization of the process in recent years because of the constraints on funding. The whole idea of having something like [high profile research programs funded by the federal government]—you are making a political statement that that area of work has got special attention. Instead of allowing scientist to decide by their own choices which directions to go and which are the emerging areas, somebody has decided this is what is important and this is what we are going to support. It is extremely arrogant for a start, because these people figure they know better than anyone else what will be important in five or ten years. It is counterproductive.”

To some scientists, this politicization of funding produces a snowball effect in which the government determines what is in fact important in the field of scientific research, allocates resources to those specific areas, and thus denies funding to other fields of scientific study. To many, this is a limiting factor on their freedom to produce scientific knowledge. One scientist argues that:

“Trying to direct money at [science] assumes you have some influence on how these discoveries are made and you can probably increase the amount of incremental advancements in a given field by giving money to it. But those are not breakthroughs that bring science forward. That’s a funding problem in any country. Just look at how science funding is trying to be changed here in that you somehow have to have proof that there is some direct immediate benefit to Canadians or the economy. Science—research—should not necessarily be directed for immediate benefit because most of the findings did not have it initially.”
The researcher has strong feelings about government approved funding:

“I am usually a big dismayed at the whole attempt of directing funding to certain themes and research questions. It is very difficult to ask an important question and if you throw money at it, it will just get solved. Most important findings in science were not done because there was too much money thrown at them.”

Both the concept of politicized scientific research as well as the lack of support for mid-career scientists were viewed as negative factors impacting scientific funding for researchers in Canada. That is not to say, however, that the structure of funding in European countries is any less frustrating for scientists.

This issue of selective funding is very real at European institutions as well, but in a different manner. Hierarchical structures in place at many European universities inhibit equitable allocation of funds. Thus, it is more common to apply as a group for funding, rather than as an individual. Many scientists cited this as cause for aggravation. This is in contrast the Canadian system of funding, which gives money to the individual. Almost all scientists indicated that, despite the politicization of scientific research, they preferred the Canadian system of allocating funds to individual projects, thus eliminating the need for hierarchical structures. As one scientist puts it clearly, “I was very attracted by the way research is funded and supported here [in Canada]. NSERC [National Sciences and Engineering Research Council of Canada] is funding individuals.”

At the same time however, some scientists were disgruntled with the format of NSERC funding. Although the program is now defunct, one scientist found value in an alternative funding program at UBC called Special Research Opportunity (SRO). According to that scientist, SRO differed from NSERC in that it funded

“research projects and not individuals. The problem with the current format for funding research with NSERC is funding individuals. 'In the next five years, I want to do this, this and that, so here if your money.' But you know, five years is
a long time for research. If you end up being involved in a project or you have a
good idea in the middle of the five years, you can not apply to anything to get
money for it. It is just terrible. Special Research Opportunity was specially
designed for that. You could apply any time, any year, any time of the year, and
say ‘look I have this great idea, I need money to study it, get things going’.”

What becomes evident is that both allocating and winning funding is a tedious process in any
country, and not every researcher will be satisfied. The scientists had drawn their own
conclusions about the nature of funding in Canada versus their home country based on their
experiences. As one could assume, those who had secured decent or significant sources of
funding in Canada were quite happy compared to their European counterparts. For those who
had not had as much success, they were more critical of the process as a whole. It is nearly
impossible to satisfy every researcher.

The second major factor that influences the nature of research in both Canada and
European countries is the structure of scientific departments and institutions. The structure of
departments and institutions is inherently linked to the level of academic freedom and
responsibility of the researchers themselves. Thus, many of the scientists took a critical eye to
what they believed were structural components that hinder or infringe on their research. A very
clear distinction was drawn between Canadian and European institutions: the structure of
academic departments in European countries tends to be very hierarchical, whereas the structure
of Canadian departments is more autonomous.

For many researchers, this hierarchy is attributed as one of the central factors driving
them away from European institutions. As one researcher explains, “There is a very strict
hierarchy [in Europe]. In theory you are independent, but in fact you have senior people who are
very well connected and they get all the money.” Not only is research and faculty affected by this
system, but students are managed in similar ways. The hierarchical structures in Europe filter all
the way down to the student level. Another scientist goes into more detail about their experience at a Swiss institution:

“Being a faculty member, your group size is significantly larger, probably 20 people. You do not give all your lectures alone. I recall my professor, even when I was a grad student, called in the morning and said you have to give this lecture. There is a lot of delegation. Being a faculty member in [a wealthy country in continental Europe] is very often more a purely management job. There is no time for research. Research is done at the level below the professors, mostly by research associates. It is much more hierarchical, this system, compared to Vancouver. Those groups are reasonably small compared to Europe, which makes them more dynamic and maybe more effective. I have day-to-day contact with my grad students. I saw my primary supervisor probably two or three times for a meeting during my PhD.”

Such experience with delegation down the line of faculty members was reiterated by most of the scientists. This also affects the ways in which decisions are made within departments. A scientist explains why they prefer the structure of Canadian departments as opposed to European ones:

“One thing that strikes me as a bit particular is how decisions are being made. There is the department meeting and when decisions are made it is by vote. Every department member has a vote. If hires are made, even the students can make statements. It is very democratic. I like that. Decisions are not made in a similar fashion [in European departments].”

On a general level, almost all scientists expressed dissatisfaction with how European research departments are run as compared to their Canadian counterparts. As the researchers experienced, the structure of departments in Canada are much more conducive to career progression, networks, and collaboration.

For most scientists, career progression emerged as one of the limiting factors within European departments. Hierarchical structures ensure that only a very small number of scientists ever actually reach top level career status. Entry level research positions following doctoral
studies tend to be longer than those in North America. For many, longer postdoctoral fellowships mean slower progression in their field. According to a researcher,

“One of the main points which I think is not very stimulating, in the [European] system, is the time limitation of your appointment at the postdoctoral level. Having a position as a postdoctoral researcher, I had a five year contract. But the downside is, after five years, I cannot continue or extend this position at any point, not even within a different university. There is no system that gives you incentive to be more productive.”

For another scientist, if they had stayed in Europe and hope to advance in their field of study, it would have been a game of a patience and connections:

“The only hope to progress is to stay there and wait. Here [in Canada], I’m responsible for what I am doing. If I am not successful, I can only blame myself, that is it. In [Europe], research is hierarchy based.”

Hiring or progressing in a field of science is not necessarily based on merit. In many cases, it is these hierarchical networks at play that determine who will in fact fill a position. One scientist details the hiring process at their previous department in Europe:

“Some professor was retiring and that professor was part of the recruitment committee and would follow up on the position. Essentially, the job description was very clear that it matched the profile of only one person in the world, and that person was working in his lab. This is really the case and it has happened a lot. People are hired just because they have been in that lab for a long time and met the right people. They’re being ‘loyal’.”

What becomes evident from these scientists’ personal experiences, is that career advancement is not simply a matter of producing good research and following a timeline of progression as laid out by the concept of tenure. Rather, connections and networks work to either push one forward in their career track, or in some cases inhibit their progress, in European institutions where hierarchy is the norm. One scientist explains that “it is very paternalistic. You have to get support from other people who are very connected in the system” Another elaborates,

“You have to be good at what you are doing, but you also have to get a lot of support from all the people who are very well connected in the system. It is like
incest, I think. When you get a position, there is this idea that ‘now you are a researcher, but you still have to work for me, because I helped you’. I did not want to do that at all.”

This idea of somehow meriting individual success to personal connections with those in higher positions and relying on hierarchical networks has worked to create feelings of discontent. One scientist summarizes this phenomenon perfectly, “You are not necessarily hiring the best person, you are hiring your best friend. That is not going to help the science world”.

These hierarchical networks in the European system also work to create extreme levels of competition within the departments. As one scientist experienced,

“There is a lot of internal competition at the level of the faculty members. If your colleague gets a position, you are not getting the position. If your colleague gets an internal grant from the university, you are not getting the grant. If your colleague gets a lab, you are not getting it, and so on. There are many cases in which the energy of the faculty members was much more put into defending their little kingdoms than doing research. And this of course is not a very efficient use of their time and energy.”

Inhospitable work environments arise as a direct product of hierarchical networks. Many of the scientists spoke at length about this issue, which worked to drive many abroad. One scientist even spoke of this competitive atmosphere overflowing into teaching:

“Even in my undergrad lectures, in a class of undergrad students, [professors] would say that their colleague was not doing ‘real science’, and just talking bad about other people. This was going on all the time. This is not a nice work environment.”

It was actually when these scientists chose to leave their home universities to pursue research abroad that they experienced truly hostile backlash. One scientist explained,

“The fact that I left only a few years after getting a position was not well received. It was even worse than that. After I left, three other young researchers left—two to the U.S. and one somewhere else in Europe. I was responsible for starting a big wave.”
Another scientist simply stated, “when I left, I actually made lots enemies there”. Many scientists echoed this aftermath of leaving their research position. Two said explained that they were no longer supported by their previous supervisors. One even stated that despite producing quality research, they feared that their supervisor might not write a letter for recommendation for another position as the department did not want to lose them to another university. The scientist compared this to their experience of leaving a Canadian department for another:

“When you have a position in North American and you find a better position somewhere else, people are happy for you. Of course they try to keep you, but if they cannot, it is fair game. But not in Europe. You are like a traitor.”

Despite the field of science encouraging mobility for knowledge development, many scientists felt that in reality, this was opposite of true at their home institutions in Europe. One scientist elaborates:

“Talking about politics and scientific landscape in a small country, traditionally it has been the case that it is often perceived as negative if you go do a postdoc abroad. It reduces your chances of finding a job at [your home] university.”

Essentially, going abroad to develop one’s scientific knowledge in fact backfires, as you lose your connections to both the home university and networks. This works to inhibit many researchers from returning. One scientist summarizes that “it is like you are a betrayer; you went abroad. What do you need to come back for? You know what, I do not even want to come back if that is the atmosphere.” It is exactly this sentiment that has worked to push many researchers from Europe.

Many researchers put the European system of hierarchy and networks in stark contrast to Canadian departments, in which individual career achievements, progression, and collaboration are not only encouraged but celebrated. One researcher elaborated:
“At UBC, there is competition as well. There are internal politics. But there is still a lot of respect and collaboration around, and does not drain my time as much as it would probably do at a German or Swiss institution.”

Yet another felt similarly about collaborative work environments typical of Canadian institutions.

“In terms of the work environment here [in Canada], I realized that there is a significant difference. I was very excited coming back from the interview [at UBC], saying ‘Oh, everyone is so friendly!’ It was really exciting to meet different people. They thought about what could be a collaboration with their research and it was not just a ploy to attract me. In the end, it turned out that those people really started to collaborate with me, doing research projects together.”

All scientists felt that their Canadian departments are much more conducive to individual research output as compared to their European counterparts. This comes back to what many believe is a cultural phenomenon, wherein North Americans tend to be much more optimistic, which is reflected in faculty and students. While many acknowledge that there is no actual scientific basis for this cultural attitude, drawing from their own experiences they seemed to fully believe that many differences stem from society itself, rather than the politics of research institutions. This idea comes up time and time again, when asked if they would consider moving back to Europe at some point in the future.

**Return to Europe**

European countries have implemented a variety of schemes at both state and supranational levels to re-attract and retain top scientists who have left Europe for employment abroad. As detailed in Chapter Three, monetary incentives such as grants and multiyear funding packages are used to lure those who have left back to the European labor market. However, these reintegration grants have largely remained unsuccessful. This policy failure can be
attributed two main factors: lack of information available about such incentives as well as the career and life stages of the targeted scientists.

When asked if they were aware of such reintegration programs funded by either the European Union or their home country, all but six scientists had never even heard of such programs. Quite simply, there is a general lack of public awareness of such funding schemes. As one scientist put it, “Problem one is that I, and my colleagues, do not know about them.” For one scientist who had heard of the programs, when asked if they had considered applying, their answer was straightforward: “No, because this is where I really want to live, in Canada. I am aware. I did not consider it for myself.” Of the six scientists who were aware of such initiatives, all but one admitted to having never looked into them. Most knew of a distant colleague who had taken a grant for research abroad, but did not know the details of the colleague’s experience. None of the scientists were in regular contact with anyone who had accepted such reintegration grants. There was an exception, however; one scientist had indeed participated in a fellowship that was designed to allow them to pursue research abroad. The only caveat—the grant did not require a mandatory return or reintegration period to their home country.

Besides the problem of not being aware of such programs, the scientists were asked to hypothesize why such reintegration grants were largely failing. One scientist viewed these grants as a potential issue for their department, as they had recruited a number of researchers from Europe already. However, the scientist was optimistic that the grants would not succeed in winning the researchers back to Europe, largely due to the career stage of the recruited researchers. As the scientist explained:

“I think I am beyond that stage. This is money for five years. This does not lead to a position. This is not of any interest for me anymore at this stage. The only thing that attracts me is a position with good conditions. And I think those
fellowships are for people who have one postdoc behind them. That does not attract me.”

Career stage is very much a determining factor in the choice to pursue employment back in one’s home country, especially through reintegration schemes. The grants only succeed in offering funding for a specified amount of years, without the promise of a full faculty position. Another scientist pointed out that these schemes are much more of a draw for those in the early stages of their career:

“It really depends on career stage. I can well imagine that there is going to be a cohort of young scientists who are reaching the point I did in the early 1980s, and they are going to be pretty mobile people. When it comes down to it, as a young scientist you have a pretty narrow window of opportunity. It is a competitive process. You have to consider options wherever they come up really. Science is an international activity. To actually travel to work is not such a foreign concept to young scientists.”

However, the idea of uprooting oneself at the mid-career phase for scientific curiosity was met with much more resistance. The concept of having a tenure track position in Canada was much more of a draw than “having money thrown at you for five years”.

Another issue that arose that works against such reintegration schemes is the life stage of targeted scientists. Many who qualified for such programs designed to bring researchers back to Europe had in fact already established connections to Vancouver. One scientist saw this as being an advantage for Canadian departments, as this meant it was less likely they would lose researchers back to their home country. The researcher elaborates,

“In our department, we have recruited someone from Switzerland, Belgium, and France in recent years. So I am aware of this as a concept [reintegration schemes]. It is like my own experience, I am sure these are young people, getting families, settling down. Time is on our side, because they will not want to jump into a move willy-nilly. It is going to be more of an issue for them to move family. But nevertheless, if you ignore it as a potential problem, then it will become a problem. So we have to try to make sure that does not happen.”
The loss of researchers back to their home country is definitely a real-time problem for many departments. It becomes clear that by employing scientists who are closer to the mid-career, and thus mid-life, stage, it is the assumption that both tenure track as well as place attachments will help to keep them at their research department and have it be less likely that they will be lured away by re-attraction schemes.

That is not to say, of course, that all researchers stay put after reaching a certain point in their careers. In one scientist’s experience,

“We lost an extremely good person back to his home country a few years ago. He certainly had a lucrative offer to go back, although it probably pre-dated that sort of scheme. It was more of a question of people dropping the ball. It would not have taken much to sweet the pot to keep him here [at UBC]. That is where I think we have to be a little more alert.

The possibility of losing researchers back to their home country is viewed as a very real issue within Canadian departments. Even if the scientists are not taking reintegration grants from the EU, the rare lucrative job offer does indeed work to incentivize return. However, as emphasized by the scientists, it is not always a case of monetary incentives. Scientific curiosity does indeed work to encourage the movement of some. Many of the researchers acknowledged that this is simply the nature of science itself. As one scientist explained,

“Some people come, some people go, some people will stand in to fill the void. You would not want it to become a static business either. On the other hand, when you have someone who is really contributing well, you do not necessarily want to lose them either.”

Another put it simply: “This is how science is done. The most successful people will not go back [to Europe]. They will go to the most appealing thing.” Scientific research is most certainly not static, and the drive to pursue research in geographic areas of excellence indeed encourages movement for the sake of career.
When posed with the question of if a move back to Europe is foreseeable in the future, 75 percent of the scientists responded in a similar manner.

“Permanently? No.”

“Me specifically? There is no point.”

“Right now, I would not go back.”

When probed further as to why a return to Europe is undesirable, answers were twofold. On the professional side of things, scientists reiterated previous statements about lack of faculty positions, career stability, and a general dissatisfaction with the structure of scientific departments in Europe. For most scientists, having tenure or a tenure track position meant a commitment to stay at their current department. As one explained, “I’m in the latter part of my career now. I feel an obligation, I have been given an opportunity, and I have taken advantage of it.” On the other hand, more personal reasons also emerged as a reason to stay in Canada. Many of these personal reasons cited social and cultural differences in Canada versus Europe as a motivator to stay abroad. One scientist put it simply, “I cannot see myself moving back for many, many reasons. The first? Quality of life.” The concept of quality of life was echoed time and time again by the researchers. Many characterized this as a difference in cultural attitudes. One scientist elaborated,

“There is a cultural attitude of looking at things more positively [in Canada]. It is not so much a scientific thing. It is a general cultural thing; being optimistic, looking forward, looking at the positive things in life. Compared to Europe, where you basically look at the problem cases. I recall coming back on a plane to Europe and listening to people at the train station complaining that a train is thirty seconds late, but not being happy that there is a train coming to the airport and you do not have to use your car. I think that is a problem that is more of due to cultural setting and the psychology of an entire society. My wife would say it is one of the reasons she probably would not move back.”
This also brings up the issue of family. Almost every scientist had established a family in Canada, hence creating place attachments and putting roots down in Vancouver. As one stated,

“The likelihood of going back progressively decreases. In part, once the kids get settled in school and they are off and running, that is one of the big concerns. If that is settled, they are becoming more familiar, generating friendships, that makes you feel more comfortable here [in Canada].”

Both professional and personal reasons work to tie these scientists to Canada. For some even, the two are even inextricably linked. One scientist explained,

“Building a research group takes time. And time is precious for me. I have a family. Time is a commodity. So I have built [a group] and now I want to use it. I do not want to just kick it. Therefore, my focus is on working in my group.”

Having put time and effort into establishing a research group means a move back to Europe, and the concept of starting over, would take away from the scientist’s personal life. It is this idea of finding balance that seems to be appealing in the Canadian system, where work and life are not in as much competition for time.

For the remaining quarter of scientist who stated they could possibly return to Europe in the future, the question remained as to what would attract them. For most, the answer was again the same.

“What could potentially attract me? A faculty position with good conditions.”

“Right now, if somebody offered me a full position, it would be different. I would think about it.”

“A secure position, where I could have a reasonable guarantee of access to students, and some resources, would pretty much do it.”

Put simply, a secure, full faculty position was the highest draw for most scientists. This, however, is not to be conflated with salary. Simply offering scientists a slightly higher salary to return was not considered a draw. As one scientist explained, “I have a salary here [in Canada]. Why would a similar salary there bring me back?” Some scientists discussed possibility of
retirement, but were not making plans just yet. Being closer to extended family and old friends also plays a role, but not a large enough one to entice them to come back in the near future. It became clear that while many would contemplate the idea of moving back, few would actually act on it. One scientist summarizes,

“It is a very twisted political procedure [in Europe]. Tenure track is missing. I still do not see a tenure track concept. And without that, I will not go back to Europe. I would not have gone back to Europe, and certainly I would still not go back. Yes, you are crazy for research, but [in Canada] if you have a family, if you have a life, a stable profession, anything, it plays a big role.”

In the end, it comes down to a secure job, hospitable work environment, and personal ties. It becomes evident that having one without another is not enough to prompt a move back to Europe. It must be an ideal combination of these factors, in addition to the right timing within career and life stages, that would convince these scientists to pursue a research opportunity in their home country.

**Conclusions**

When discussing the nature and motivations behind highly skilled migration, it is important to take an agent-centered approach to gain a better understanding of the intricacies of migration decisions. From speaking with the scientists themselves, it becomes clear that the decision to leave extends beyond a simple economic cost-benefit analysis. The complex nature of scientific research and departments, coupled with personal motivations, work to influence the ways in which migration decisions are being made by scientists. For many of the researchers, the structure of scientific research in Europe can be inhibiting, due in large part to hierarchical structures and barriers to career progression. Job security, long term career progression, and
collaborative research environments, on the other hand, work to make Canadian institutions more favorable.

As evidenced by responses, the European Union’s policies aimed at re-attracting and retaining scientists who have left through reintegration grants have largely been unsuccessful. It is not simply the lack of information about these initiatives, but also the failure to take into account that economic incentives do not the main motivator when making migration decisions for these scientists. While scientific curiosity and job opportunities are two surface-level factors including the decision to come to Canada, research environment and personal ties are what help to keep scientists abroad.
5 Assisting the Impact of the Migration of European Scientists to Canada: Research, Academic, and Policy Implications

The increasing loss of scientific talent from Europe to North America, especially to Canada in recent years, has sparked escalating concern at the European level. The EU’s response to this loss of scientific talent has been to hastily throw money at the problem, under the notion that capital investment is ‘the way forward’ (European Commission, 2004: 15). Operating on the assumptions of neoclassical economic migration theory, the EU has attempted to remedy this loss through a variety of member-state and supranational policy schemes aimed at re-attracting and retaining scientists in the European Research Area. This macro-level approach to the issue of the transatlantic brain drain, however, largely ignores the role of the individual in the process of migration decisions.

It is critical to take into account the primary actors within migration processes: the immigrants themselves. By utilizing a micro-scale approach, an on-the-ground empirical analysis helps elucidate the individual motivations underpinning the migration of highly skilled scientists. It becomes clear that the factors that influence migration decisions are intricately woven into both the professional and personal aspects of individuals’ lives. With equal but competitive access to funding in both sending and receiving countries, what becomes apparent is that the economic-maximization rationale does not stand up within this context. Under the assumption of similar pay, a researcher’s salary in Europe is no different than a salary in Canada. What is different, however, is the institutional structures of academic departments. There was an overwhelming agreement among the scientists interviewed for this project that both professional and personal opportunities were just as, if not more, important than access to funding and
monetary support. Thus, it remains no surprise that EU initiatives to re-attract and retain highly skilled scientific researchers in the European Union have largely failed to meet their goals. It will take a critical overhaul of the structure of academic institutions to meet the demands of those who have left. And even then, there is no promise of return simply on restructuring alone – the scientists as individuals develop personal, and often times lasting, bonds with their receiving country, making it increasingly difficult to return simply for professional advantages.

This disconnect between policy and the subjectivity of individual choice is slowly coming to light by policy analysts in Europe. However, rather than remedying the issue through a restructuring of the research institutions, many policy makers are suggesting the alternative solution of recruiting scientific talent from abroad, especially from countries that directly supply scientific talent to North America. As one policy brief notes, the EU needs to focus not on an inward-looking perspective, but on building openness to researchers from outside Europe (Veugelers, 2011). This concept has slowly been developing in Europe, with the creation of various external recruitment schemes. For one, there was the implementation of the Blue Card, which is comparative to the U.S. Green Card. The Commission approved a Council Directive in 2009 that allows for the entry of highly qualified non-EU nationals to live and work within member-states (Directive 2009/50/EC). The Blue Card system works to attract highly skilled migrants from outside the EU to fill labor shortages. However, the Blue Card is inherently restrictive and temporary, as it does not offer highly skilled migrants permanent residency or the possibility of citizenship. These restrictions reflect the innate anti-immigrant paradigm of the European Union. Even if non-EU nationals take the research positions left open by the EU citizens, the long-term loss of highly skilled European researchers to the North America is still
considered problematic. At the moment, the Blue Card program only acts as a temporary fix to a much wider issue at hand.

The European Commission and member-states are alarmed by the growing shortage of scientists and the long-term effects on the advancement of a European knowledge society. Decreasing enrollment in scientific disciplines coupled with an aging workforce population and the emigration of EU researchers to the United States is an alarming threat to the European research community (Moguerou, 2006). Hence, policy analysts are suggesting that the EU stop ‘navel-gazing’ and instead place focus on recruiting scientific talent from sources outside Europe.

This European competition for scientific talent is merely a reflection of the current global research and development climate, in which the top competitors are constantly attempting to stay one step ahead in the game. Be it through ‘superstar’ recruitments or encouraging mobility for postdoctoral fellows, there is a heavy emphasis placed on the need for international experience to remain competitive. It remains to be seen, however, if the European Union will shift focus away from inter-European retention and reintegration, and instead put more economic emphasis on the prospect of external attraction.
References


