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**Labor Market Outcomes of PhD Graduates in Canada and
the Policy Implications:**

An Analysis of the National Graduate Survey in 1997

Lanlin Zhang ©

**A thesis submitted to the Faculty of Education in partial fulfillment
of the requirements for the degree of**

Master of Education

FACULTY OF EDUCATION

LAKEHEAD UNIVERSITY

THUNDER BAY, ONTARIO

August 2001



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0-612-60927-8

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Abstract

The emergence of knowledge-based economy has sparked the demand for people who have advanced education and training. The looming faculty shortages in Canadian and other developed countries make a study of the PhD graduates especially urgent.

By using 1997 National Graduate Survey (NGS), the thesis aims to analyze the school to work transitions of the PhD graduates in the mid 1990s. An individual's choice of a field of study (FOS) is treated as a personal agency variable, and gender, visible minority status are considered as the paramount social structure variables when the graduate is trying to initially establish himself or herself in the labor market two years after graduation. Criteria of successful transitions include the graduate's income, job continuity and job satisfaction.

Findings in this study reveal that PhD graduates were facing a tough labor market during the mid 1990s, when their unemployment rate was not far away from bachelor graduates, and even higher than master's graduates. However, those PhD graduates who can find jobs make a relatively higher income, and are more satisfied with their jobs than those graduates at lower levels.

Contrary to the conventional wisdom, this research finds that overall PhD graduates who have worked in academic jobs have relatively higher income than those who have worked in non-academic jobs. Professors also tend to be more satisfied with their jobs than those non-professors.

Women were still under represented at the doctoral level. However, this study shows that they are increasingly present in the academic world where men have dominated for many years. In addition, women PhD graduates have no income gaps with

their men counterpart. It is observed that visible minority PhD graduates in the 1997 NGS had a lower annual income than the non-visible minority PhD graduates. It appears that women's status shows improvement at PhD level, but not those who have visible minority status. Vocational graduates usually earn more than that of the liberal graduates.

This study suggests that the crisis of faculty shortage may be exaggerated. First, the major indicators of labor market outcomes for PhD graduates working in academic jobs are better than those working in non-academic jobs. This finding is directly at odds with one major worry about faculty shortage, which argues that non-academic labor market provides better incentives for PhD graduates. The labor market outcome advantages will attract future PhD graduates to enter the academic labor market. In addition, about eight in ten 1995 PhD graduates have worked in the non-academic labor market, and they may provide additional resources to address the faculty shortage problems. If the supply of PhD graduates is not scarce, then the faculty shortage may not be as severe as predicted. Second, over two in ten master graduates, and almost eight in one hundred bachelor graduates demonstrate that they intend to pursue a PhD in the future, which suggests that PhD candidates may be plentiful in the future. Third, the faculty shortage is not equally distributed across different disciplines. The present research suggests that applied sciences demonstrate more serious shortage than the areas of liberal arts. Lastly, unlike the periods between 1950's and 1960's, the last three decades have witnessed the expansion of mass university education in Canada (Lin, 1999), which has greatly enhanced the university system's capacity to produce PhDs. Therefore, the problem of faculty shortage could be addressed faster than many people now believe.

Acknowledgements

I am greatly indebted to Dr Zeng Lin and Dr Robert Sweet for their supervision and co-supervision and extensive guidance throughout this study. My thanks are also due to all other teaching staff of the Faculty of Education, Lakehead University for their advice and constructive criticism during the course. I am grateful to my friend Paul Berger for the editing jobs of the many drafts of the thesis. I would like also to extend my hearty thanks to my wife Qingxia Gu and my son Mengyu Zhang for their great spiritual and emotional support, without which I would not have had the courage to finish the whole project.

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Chapter 1

INTRODUCTION

1.1 Introduction

Although it assumes different names in different countries, the term PhD (Doctor of Philosophy) is most comprehensively used in the academic world with the following definition: an academic university qualification that requires a research thesis above the master degree level (Noble, 1994). Doctoral degrees have become part of higher education ever since the first degree was conferred in Paris in 1150. Historically, however, approximately 100 years later, the doctorate *Philosophie Doctor* was recorded at the University of Paris (Green, 1977). It was not until the nineteenth century in German-speaking parts of Europe (Germany did not come into existence until 1871 after the Franco-Prussian war) that the modern Doctor of Philosophy degree gained prominence.

Historically the doctorate has represented an elite award, reserved for students who were selected for further study by graduate faculty because they were thought to offer the greatest academic promise. PhD study by its very nature is arduous and time-consuming because it reflects a student's acquisition of expertise in a significant body of research theory and practice. To a considerable extent, the PhD is an institution's "stamp of approval" of the student's ability to conduct original research in at least one academic discipline. It is recognized as "the union card" for obtaining an assistant professorship in most colleges and universities (Smith, 1990). Because it validates a student's advanced research abilities, the PhD is a possession prized by most who hold it and a symbol of an

as-yet unattained academic recognition by both those who are currently pursuing and those who have withdrawn from formal doctoral study. It is, at its best, both a personal reflection of an individual's intellectual development and growth and an external recognition of that same individual's research capabilities.

The degree also provides social returns in advanced economies, such as Canada, where highly specialized labor forces are in high demand. The emergence of the so-called "Knowledge Based Economy" (KBE) requires more individuals with advanced

Field of Study	Sex	1993-94	1994-95	1995-96	1996-97	1997-98	Difference
Agriculture and biological sciences	Men	2,954	2,910	2,869	2,829	2,743	-7%
	Women	2,305	2,429	2,545	2,601	2,665	16%
Education	Men	2,282	2,122	2,080	2,094	2,027	-11%
	Women	4,323	4,332	4,367	4,458	4,440	3%
Engineering and applied sciences	Men	8,119	7,536	7,144	6,929	6,650	-18%
	Women	1,668	1,685	1,658	1,757	1,838	10%
Fine and applied arts	Men	649	642	646	634	621	-4%
	Women	907	917	930	927	969	7%
Health professions	Men	7,153	7,551	7,616	7,804	7,803	9%
	Women	6,018	6,405	6,793	7,142	7,205	20%
Humanities	Men	4,642	4,675	4,560	4,499	4,356	-6%
	Women	5,147	5,259	5,234	5,191	5,263	2%
Mathematics and physical sciences	Men	5,550	5,466	5,273	4,965	4,783	-14%
	Women	1,762	1,800	1,827	1,757	1,883	7%
Social sciences	Men	10,810	10,583	10,250	10,345	10,500	-3%
	Women	9,614	9,734	9,921	10,123	10,824	13%
Arts/science, general	Men	150	296	362	384	326	117%
	Women	290	384	465	478	462	59%
Not reported	Men	226	232	219	335	318	41%
	Women	196	255	246	347	351	79%
Total	Men	42,535	42,013	41,019	40,818	40,127	-6%
	Women	32,230	33,200	33,986	34,781	35,900	11%

Note: *This is the percentage difference between 1993-1994 and 1997-1998.
Source: Education in Canada, 1999

education and training in both the academic and non-academic labor markets. In addition, the academic labor market sometimes requires its participants to have some training beyond the PhD level, which explains why post-doctoral programs have also grown in Canada.

Table 1.1 summarizes the statistical report on graduate studies in 55 Canadian universities (Canadian Association for Graduate Studies, CAGS). It shows that overall enrolments in graduate programs have increased from 74,765 in 1993-1994 to 76,027 in 1997-1998. However, female enrolment increased 11% and male enrollment went in the opposite direction dropping 6%. Specifically, outside of general arts and sciences, the biggest increase of female presence is observed in health related fields (20%). As a positive sign, it can be observed that more women have entered traditional male dominated areas, such as engineering and applied sciences (up 10%), and mathematics and physics (up 7%).

	White Male (C/F)		Asian Male (C/F)		Non-Res. (C/F)		Non-Res. (C/F)	
	1991	1996	1991	1996	1991	1996	1991	1996
Education	7.6	7.4	5.2	5.1	9.8	9.2	8.6	8.4
Fine arts and Humanities	11.3	11.5	10.0	10.3	11.5	11.7	14.3	13.8
Social Sciences	13.3	14.9	8.3	8.8	9.6	10.7	9.4	10.1
Business and Commerce	24.7	25.3	27.0	26.6	22.6	23.4	18.7	18.7
Agricultural and Biological Sciences	5.2	6.1	4.8	4.6	4.6	4.8	5.3	5.7
Engineering	21.2	19.0	25.6	25.1	27.6	26.7	29.4	28.5
Health, Nursing and Applied Sciences	11.6	11.0	11.5	11.2	11.5	10.6	10.1	9.9
Mathematics, and Physical Sciences	5.0	4.9	7.7	8.2	2.9	2.8	4.2	5.0

Source: 1996 Census, Public Use Micro data file

Like the American graduate system, Canada also trains graduate students with different backgrounds. In 1996, the CAGS annual meeting held in Calgary was devoted to the theme of international students. The meeting revealed that at the graduate level, some programs literally rely upon international students to maintain a critical mass of researchers in labs and projects. In other words, the absence of international students in Canadian graduate programs would eliminate a critical dimension of the learning experience, resulting in a significant loss of academic quality. Canada and Canadians benefit enormously from the presence of highly qualified international students on our campuses (CAGS, 1996). Table 1.2 shows the percentages of well-educated Canadians by racial groups and fields of study. First, visible minorities whether born in (CB) or out of (FB) Canada occupy a significant percentage of the population. Second, they are present in almost all fields of study, but concentrated in the areas of business and commerce, engineering, mathematics and physics. This significant presence provides a rationale for exploring the labor market outcomes for PhD graduates who are from visible minority background.

Despite the obvious contribution of post-graduate education to the stock of highly skilled labor forces in Canada, post-doctoral programs have suffered under government financial cutbacks to post-secondary funding. At the same time, shortages of trained PhDs are anticipated for both the academic and non-academic labor markets. Canadian universities face increasing enrollments yet their faculties are rapidly aging and large numbers of retirements are expected over the next few years. According to Statistics Canada, in 1997, there were almost eight percent fewer assistant professors, five percent fewer associate professors, and six percent fewer full professors than in 1992. But the

demographic pressure will soon be impossible to ignore. Beyond the retirements of the large numbers of faculty hired during the boom of the 1960s and 1970s, enrolment is increasing. The AUCC projects a 20% increase in enrolment by 2010, driven by the combined effect of the so-called "echo-boom" (children of the baby boomers) reaching university age and an expected increase in the proportion of them who seek university degrees (AUCC, 2000).

The combination of enrollments and retirements will undoubtedly give rise to a significant demand for new faculty. One can also expect that shortages will be more acute in some fields of study than others. An analysis of transitions to the academic labor market as experienced by PhD graduates in the 1990s will provide important insights into the current state of the academic labor market. It will also provide some sense of the impact of looming faculty shortages, at least in specific fields of study. More importantly, perhaps, such an analysis will increase our general understanding of factors that influence pathways from advanced university education to the workplace.

Holdaway (1994) points out that no publication with a national focus exists in Canada that synthesizes graduate student statistics along with policies, opinions, and discussions of critical issues facing graduate studies. Cude (1987) notes a serious lack of solid, dependable statistics on doctoral education across the nation, and urges institutions to make more efforts at gathering and maintaining data on the progress and dropout of graduate students. There is a need for information that describes the entire post-doctoral experience from entry to graduation and the school-to-work transition. The initial transition to the labor market (academic and non-academic) especially requires

examination, given the importance of the beginning work experience to subsequent career development (Finnie, 2000).

1.2 Field of Study (FOS) and Labor Market Outcomes (LMO)

With respect to initial labor market transitions, the most useful report currently available for the study of post-graduates is the National Graduate Survey (NGS), conducted by Statistics Canada in partnership with Human Resources Development Canada. The NGS is specifically designed to obtain information on the relationships between education, training and labor market activities, the initial (and medium-term) labor market experiences of graduates—specifically, the employment, earnings and occupations of graduates and their additional educational experiences and qualifications. Research based on NGS data that focuses on doctoral graduates nevertheless remains limited. Most of the relevant studies assess the labor market transition of baccalaureate graduates (Finnie, 1998; Lin, Sweet, Anisef and Schuetze, 2000). Similar assessments of the initial labor market experiences of graduates have been produced using other data sets. For example, Cote and Sweetman (1997) employed the General Social Survey to examine the relationship between fields of study and earnings at graduation.

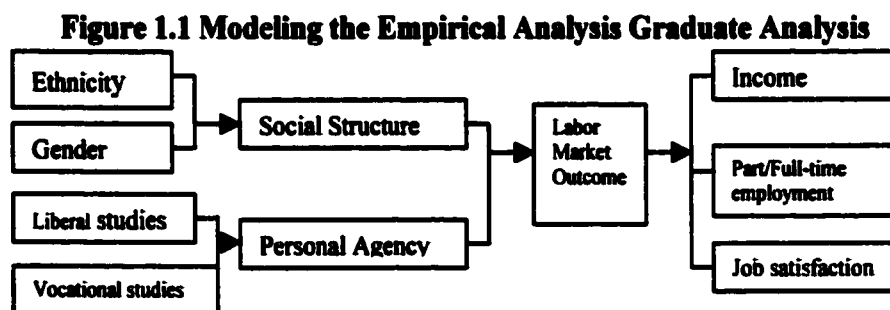
Based on the 1997 NGS, Finnie (2000) briefly explored the labor market outcomes of PhD graduates. His examination of graduate transitions was, however, limited to comparisons of labor market outcomes across all levels of graduates from post-secondary education. To better gauge the transition success of PhD graduates, a more detailed analysis, which explores the factors that influence the progression from the university classroom to the workplace, is needed.

While social structural factors such as ethnicity and gender are expected to play a significant role in determining transition success among PhD graduates, so too do personal choices and actions. In this regard, selection of field of study (FOS) or discipline is also expected to play an important role. Within the academic community especially, one's FOS choice defines one's employment scope. Liberal, or knowledge-based studies, and vocational or skill-intensified studies, characterize the basic educational orientations in Canadian university education. The term, "knowledge-based", refers to general skills including academic capability, personal management, and teamwork. "Skill-intensified" refers to specific techniques, including "know-how" and job-specific skills (Lin, Sweet, Anisef, and Schuetz, 2000). These two characteristics have quickly emerged as central in discussions over the relationship between education and labor market outcomes, as well as in the debate about the value of a liberal (knowledge based) versus vocational (skill-intensified) education. Although the research conducted by Lin, Sweet, Anisef, and Schuetz (2000) dealt with the baccalaureate degree, a similar approach at the doctoral level is possible with even more obvious predicted differences in labor market outcomes (LMO). There is also a clear academic and non-academic labor market for this level of graduates. At this level also, as an expression of personal agency, FOS choice is not entirely free of the influence of social structural factors.

Relationships between PhD education and work are complex and difficult to predict, especially in the emerging "post-industrial" economy where human resources, technology, and work organization forms change rapidly and combine in a multitude of novel ways. Analysis of PhD students' labor market outcomes will involve many elements prior to and after the choice of FOS. Social structural factors like gender, age,

parents' education, ethnicity and the provinces and territories the students come from, together with personal agency factors like the individual's strategies to cope with risks, contribute to the PhD student's choice of FOS. When they graduate from the arduous and time-consuming years of study and enter the labor market, outcomes, including economic ones such as unemployment rate, income, job stability, and job continuity, and the non-economic ones, such as job satisfaction and education-job relationship will be manifested. The transition to work of the highly educated will be of considerable interest to a range of professionals from social workers to educators and public policy analysts and planners.

The conceptual model of this transition process can be found in Figure 1.1, which shows the relationships of social structure (gender and ethnicity) and personal agency (FOS choice dichotomized into liberal and vocational fields). Both are antecedent to the school-to-work transition but both are assumed to influence the initial success of graduates in the workplace. The initial success of the graduates' labor market outcomes are measured by income, job continuity (i.e., whether they work full-time or part-time), and job satisfaction. A satisfactory job with a good income could mean many things, including opportunities to improve one's career or increased responsibilities: it also implies a strong connection between skills learned at school and the skills used on the job.



Unfortunately, not all PhD graduates can secure a full-time, satisfactory job. In the universities where PhD graduates traditionally seek employment, part-time faculty positions have increased in most provinces. According to Statistics Canada, while the number of full-time faculty decreased 9.6% from 1992/93 to 1997/98, the number of part-time faculty increased in most provinces. In Atlantic Canada, the number of part-time faculty increased 13.8%. In Western Canada, the number of part-time faculty increased 13.5% during the same period (Statistics Canada, 2000). Part-timers are usually underpaid and less respected within as well as outside the university community (CAUT, 1999). The majority of full-time professors are men and the majority of part-time professors are women. Part-time U of O professor Diane Huberman-Arnold said that part-time university teaching is “another female ghetto” and asserted, “there is nothing inherent in teaching part-time that precludes decent and equitable treatment and respect within the work environment” (p3, Heartfield, K, 1999).

1.3 Purpose

Although schoolwork transitions have been studied at the baccalaureate level, PhD graduates remain an under-researched group. An analysis of the PhD transition would add to the current transitions literature. An account of current PhD transitions would inform policy makers concerned with the impending shortage of recruitment to the highly skilled labor force both in academic and non-academic areas. A parallel concern involves employer’s ability to meet equity requirements in future hiring at this level.

In exploring the transitions of PhD’s from the university to the workplace, it is important to document structure and agency effects. The individual’s choice of a field of

study and his or her gender and visible minority status may be expected to significantly affect the success with which a graduate manages to establish himself or herself in the labor market. PhD graduates with more traditional degrees (such as in the liberal arts) may make less successful transitions especially to the commercial sector of an increasingly high-tech economy. On the other hand, they may make equally successful transitions within the academic labor market. One of the foci of the present study is to compare the transition patterns between PhD graduates who enter the academic and non-academic labor markets.

The FOS distinction between liberal and vocational studies is useful in further differentiating the academic and non-academic labor markets that employ PhD graduates. Categorizing FOS in terms of their liberal or vocational orientation has proven useful in school-to-work transitions research on baccalaureate and master degree graduates. That research may not provide an exact parallel with the PhD labor markets. The latter may operate quite differently. There exists, for example, an academic labor market for doctoral graduates that is usually not available to other graduates with baccalaureate or master degrees. On the other hand, skills at the PhD level are less likely generalizable across occupational categories in the commercial and professional sectors.

Given differences in the FOS participation patterns of males and females, gender is an important factor to consider in meeting looming shortages of highly qualified personnel. Ethnicity, in the meantime, also plays a key role in influencing the labor market outcomes of the PhD graduates.

The 1995 National Graduate Survey is employed in exploring the effects of structure and agency on PhD labor market outcomes. The initial step in this task involves

assessing the initial school-to-work transitions for men and women PhD graduates drawn from various FOS. Ethnicity is also considered in this analysis. Criteria of successful transitions include both monetary and non-monetary outcomes. Examining variation in labor market outcomes for PhD graduates of liberally and vocationally oriented FOS will provide an account of the transitions process along pathways that are unique to that qualification. The analysis of gender, ethnicity, and FOS effects on PhD labor market outcomes will be applied also in contrasting the academic and non-academic labor markets. These profiles of the relative value of FOS choices by women and visible minorities not only allows us to gauge the effects of structure and agency on currently employed PhD graduates, but also suggests the pathways that will be followed by future graduates and the rewards they may expect depending on their FOS choices, their gender and their ethnic heritage.

1.4 Organization

The thesis is organized as follows: Chapter 2 will be focused on the post-secondary context and the theoretical and empirical literature on structure-agency approaches to transitions; Chapter 3 is about the methodology used in the analysis; Chapter 4 is the results of the findings of the relevant 1997 NGS; Chapter 5 is the conclusions that are drawn and the implications of those conclusions in terms of theory, policy and methodology.

1.5 Definitions

Liberal education: a pedagogy that provides a broad, balanced, flexible, and human-centered education. The main functions of a liberal education are to advance and

disseminate knowledge and to facilitate personal growth and development among the students that enroll.

Vocational education: a pedagogy that aims to provide specific skills for certain professions. Skill training occupies a central place in providing an education.

NGS: the National Graduates Survey is a survey conducted by Statistics Canada in partnership with Human Resources Development Canada, specifically designed to obtain information on the relationships between education, training and labor market activities, the long term labor market experiences of graduates, the employment, earnings and occupations of the key group, and graduates' additional educational experiences and qualifications.

PhD: the Doctor of Philosophy is the most common doctoral degree. Although PhD stands for Doctor of Philosophy, the degree is granted in most academic subjects: engineering, humanities, life sciences, physical sciences and social sciences. It is primarily designed to develop research skills, unlike the M.D, for example, which is designed to develop the skills needed by a practitioner. Doctoral degrees are the highest given in academic subjects, although further study beyond the PhD, called post-doctoral study, is becoming important in some fields.

Visible Minority: as defined by the Federal Employment Equity Act, visible minorities are "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in color." The following groups are specified by the Act as visible minorities: Chinese, South Asians, Blacks, Arabs and West Asians, Filipinos, Southeast Asians, Latin Americans, Japanese, Koreans and Pacific Islanders.

Chapter 2

LITERATURE REVIEW

This review of the literature consists of two sections. The first section develops the post-secondary context by briefly outlining the development of doctoral studies and a detailed examination of issues surrounding faculty shortages in Canadian universities. The second section reviews the theoretical and empirical literature on structure-agency approaches to school-work transitions. Gender and ethnicity are considered as particular structural factors; the indicator of agency is examined by using the choice of a field of study.

2.1 The Post-Secondary Context

2.1.1 An Historical View of PhD Study

Although it assumes different titles in different countries, the term PhD (Doctor of Philosophy) is most comprehensively used in the academic world with the following definition: an academic university qualification that requires a research thesis above the master degree level (Noble, 1994). Note that this definition does not include medical degrees held by physicians, but it does include the medical science doctorate, based on original research and a thesis or published work, conferred after a basic medical degree or its equivalent. It also includes other degrees such as Doctor of Science, Doctor of Education, Doctor of Business Administration and a variety of doctoral degrees from foreign universities.

Doctoral degrees have been part of higher education ever since the first was conferred in Paris in 1150. Historically, however, approximately 100 years later, the doctorate *Philosophie Doctor* was recorded at the University of Paris (Green, 1977). It

was not until the nineteenth century in German-speaking parts of Europe (Germany did not come into existence until 1871 after the Franco-Prussian War) that the modern Doctor of Philosophy degree gained prominence.

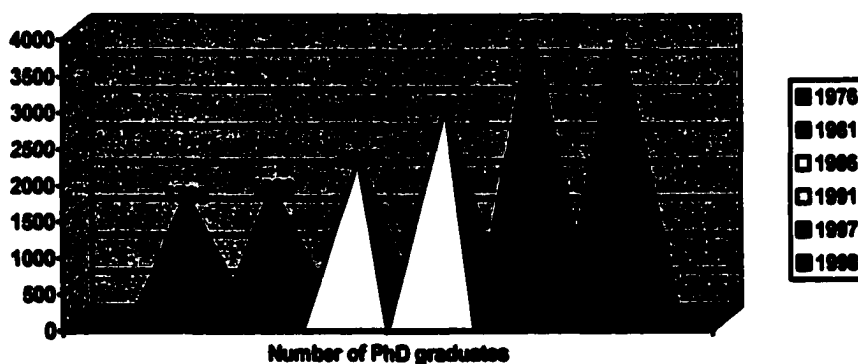
By the middle of the nineteenth century the Doctor of Philosophy degree had been introduced to the United States by American graduates returning from Europe. Canadian professors encouraged their more able students to migrate to the United States for graduate work when no such programs were available at home.

Slowly, educational nationalism became a rallying cry in Canada. In his book A History of Higher Education in Canada 1663-1960, Harris noted that the 1890-91 Calendars of three Canadian universities, Mount Allison, New Brunswick and Queen's, outlined a program for the Ph.D. The Mount Allison calendar recorded two doctoral degrees being granted, but it appeared that both recipients, staff professors, received the degrees as honorary titles. Drawing on these developments and following the establishment of Johns Hopkins University in 1876, and the University of Chicago in 1891, educational reformers at the University of Toronto began to push for the adoption of a doctoral degree. In 1894, James Loudon, then president of the University of Toronto, succeeded in having the D Paed (Doctor of Paedagogiae) offered at Toronto, and after much lobbying the university senate finally approved the doctor of philosophy degree in 1897 (Ross, 1975).

The assessment pattern at Queen's University laid the foundation for the first Canadian PhDs. The requirements included the passing of examinations, the submitting of a thesis, and the passage of four years from the obtaining of the B.A. The degree was offered in nine disciplines: classics, modern language and literature, philosophy, and any

combination of two of English, history, political science and one modern language. The requirements for the PhD and D.Sc degree outlined in the 1890-99 Calendar at Queen's continued to be listed for the ensuing 30 years, the only significant change being the addition of Old and New Testament language and literature to the list of subjects in which the PhD could be obtained. Between 1904 and 1910, there were three PhDs awarded, all in philosophy; in 1921 there was one in history, and in 1925, one in physics. By 1906, the requirements for the doctor of philosophy in Canadian universities had been standardized. The requirements were three years of full-time study beyond the baccalaureate degree; a major and two minor subjects; one outside project; a reading knowledge of French and German; a comprehensive examination in the major field; plus a dissertation. In 1920, twenty-four people were granted PhDs, in 1930; the number grew to 36 and in 1940 to 75 (Harris, 1976).

Chart 2.1 PhD Graduates from Canadian Universities 1976-1998



(Source: Chart generated by author using data from Statistics Canada, 2000).

In Canada, there was little demand for doctoral degree holders during the First World War, the Great Depression, and the Second World War. It was only after the Second World War that great progress was made. During the 1950s, Canadian universities yielded 200 to 300 PhDs annually. In some years, these universities awarded

more honorary than earned doctorates. Since 1960, the number of doctoral degrees increased from 306 to 3976 in 1998 (see Chart 2.1).

During the 1950s, there was little expansion, and fewer than 300 PhDs were granted each year, most of them in the areas of natural sciences. The 1960s have witnessed a dramatic increase in the number of doctoral programs offered in Canada. According to the Handbook of the Association of Universities and Colleges, in 1970, 851 different doctoral programs were in operation at 30 universities. Every province, except Prince Edward Island, developed its own programs, without national planning or co-ordination. Since the 1970s the number dropped a little and by 1992, the doctoral degree was granted in 31 universities throughout Canada (Archer, 1992).

2.1.2 Debate Over the Value of PhD Studies

The Canadian PhD system was born with different voices heard all the time. In the beginning, it was an instinctive reaction against the great ideological influence from south of the border. Canadians have viewed their enterprising neighbor's influence with admiration, mingled with apprehension. As early as in 1915, Macallum, reacting to the powerful attraction of American graduate schools for Canadians warned:

It would be disastrous to Canadian unity if the Faculty of the younger universities of this Dominion, and especially of those of Western Canada, were, either wholly or in greater part, recruited from graduates of the American universities (Ross, 1975. p.130).

This fear about the cross-border cousins extended and strengthened in the 1950s and 1960s when Canada faced a great shortage of faculty due to the expansion of universities and an increase in student enrollment. Thus, more and more graduate students and professors crossed the border to Canada. Actually, the low productivity of

Canada's universities was the main reason why professors and lecturers from the United States were encouraged to come to Canada to teach. A two-year tax holiday and an extensive advertising campaign helped Canadian universities raise their level of scholarship with the help of U.S talent.

The American invasion to a certain degree produced an irony for Canadian graduates. When graduating from Canadian universities they found many of the positions they would like to have filled by American citizens. Outspoken Canadians from all levels of society decried that situation and blamed it for contributing to both the work shortages faced by Canadian PhDs and the undermining of national identity. In an interview for the journal Change, Robert S. Mackay, who was then dean of law at the University of Western Ontario in London, Ontario spoke out:

We badly need the American educators, and to their credit, they have stayed on. Now they are turning out a Canadian product that is good enough to replace them... I realize there are course content problems in sensitive areas like sociology and history. There is no doubt that great care must be taken to maintain a Canadian viewpoint. But a quota is a form of tariff, and while tariffs may be temporary necessary evils in the industrial community, they have no place in the academic community (Arnett, 1973. p.2).

They cried: Yankees go home! This opinion had gained ground especially when cutbacks in university budgets and staff were conducted during the 1970s.

The different voices came also from some original authors with critical thinking about the PhD system per se. They contended that social prestige, financial security, and institutional pride had all combined to make this single piece of paper a professional requirement more formidable than anything in history since the rule of the mandarins in Imperial China (Cude, 1987). The PhD program had become "inflexible, cumbersome,

restrictive, and deplorably wasteful” (Cude, 1987). Several reasons contribute to make the PhD degree fallible.

First of all, too many competent and highly qualified candidates were not finishing their studies, and far too many competent and highly qualified candidates were taking too long to earn their degrees and commence their careers. Five years after graduating from a baccalaureate program is a minimum in history, for instance. Six to seven years is not infrequent, and ten or fifteen years is by no means unknown.

According to research conducted by Ms Amalia Gonzalez from the University of Toronto, nine years after starting their doctoral programs, between 64.0% and 66.7% of the students of the entering cohort had obtained their doctoral degrees. Moreover, between 1.9% and 2.3% of the students were still enrolled in their programs, and between 4.5% and 6.3% had migrated to other levels and earned another degree, diploma or certificate and left the higher education system. Between 26.2% and 28.1% of a doctoral earning cohort had abandoned the system without acquiring graduate degrees, diplomas or certificates (Gonzalez, 1996).

Researchers also find that completion rates and times to completion vary fundamentally by field of study. The scientific fields - agriculture and biological science, engineering, health professions, and mathematics and physical science -show higher graduation rates and shorter time to completion than the non-scientific fields—education, fine and applied arts, humanities, and social sciences. The humanities and most of the disciplines included in the social sciences show remarkably low graduation rates and long times to completion (Gonzalez, 1996). Some people argued that when six years is enough

to train a new doctor of medicine, there is no academic or professional justification for taking almost twice as long to train a new doctor of philosophy in subjects like English literature, history, sociology or economics (Bonneau and Corry, 1972).

Secondly, some people have long doubted the necessity and the quality of the doctoral program. One of the first to express doubts about the new approach to higher learning was William James, educator, philosopher, and brother to novelist Henry James. In his article entitled “The PhD Octopus” in the Harvard Monthly of March 1903, James deplored the increasing emphasis on the doctorate as certification for undergraduate teaching. Insisting that recognized scholarly accomplishment is the only significant academic distinction in either teaching or research, he denounced the demand for certificates as the “Mandarin disease” (James, 1903). The training for the doctorate is highly specialized, he argued, and could have only a limited application to the acquisition of the generalized knowledge required in undergraduate teaching. And because the training for the doctorate is directed towards research, he went on, it could have nothing to do with the development of the cultural, ethical and professional skills so necessary in undergraduate teaching.

Authors like Wilfrid Cude doubted the significance of the dissertation. He pointed out that it is highly unlikely that most doctoral candidates are capable of producing a real scholarly innovation anyhow, let alone at the outset of their careers; and it is even more unlikely that their faculty advisors would recognize the accomplishment if they did. To place such an emphasis on innovation in the doctoral program, therefore, is to involve all concerned in hypocrisy, heartbreak and hopeless pretension (Cude, 1987). Page Smith called the pursuit of the doctorate “an unabating passion”. Not only is the

PhD dissertation constrained by the requirement that it be original (in the sense of dealing with material never dealt with before) and dull; it must also conform to the prejudices of the examiners (Smith, 1990).

The dissertation, supposedly a book-length demonstration of the candidate's ability to contribute original work to the field, will encounter a doomed failure if it is really original. First, many scholars tend to resist significant advances in their fields, merely because such an advance almost inevitably means their hard-won expertise is suddenly out of date. Secondly, even the inventive and imaginative few—those demonstrably capable of real originality—very often display jealousy concerning the assignment of credit for that originality (Cude, 1987). Cude thinks that scholars tend to be very conservative intellectually. He therefore concludes that the PhD program is a waste of time, money (on the part of the government and individuals), and resources and is destructive for the development of the individual's personality.

2.1.3 Projections of Faculty Shortages in Canadian Universities

Over the 113 years between 1807 and 1902, Canada yielded only 18,735 graduates (Harris, 1976) from all universities that existed during that period of time. The demand for faculty, therefore, was certainly not strong, especially when American professors were always ready to fill vacancies. It was only after the Second World War that great need occurred.

The Second World War had disrupted families and so a postwar boom in marriage and children was expected. The baby boom, however, only took hold in the 1950s. Canadian troops returned home slowly in the latter part of the 1940s, and it took some

time for life to return to normal. Many veterans took advantage of government sponsorship to complete their schooling and therefore many people delayed marriage.

Furthermore, immediately following the war many Canadians still harbored fears of a return to the economic ravages of the Great Depression of the 1930s, and so many families delayed having children. Provincial and federal governments began campaigns to enhance family value, a tactic designed at least in part to encourage women to leave factory work (so returning veterans could find jobs) and begin families. Fuelled by world demand for Canadian exports, the economy was extremely buoyant in the 1950s and memories of the Depression soon faded. Canadian immigration numbers also increased in the 1950s. In combination, these changes gradually encouraged increasing numbers of Canadians to raise families that were relatively large by today's standards.

This led to 459,275 births in 1959 (Guppy and Davies, 1998), the peak of the baby boom. Despite a small echo baby boom in the 1990s, the 1959 birth total still has not been surpassed. The steep population growth of the post-war baby boom led to the number of students enrolled in elementary and secondary education in Canada changing dramatically. In the 1960s, birth rates declined. Following steady growth to a peak of nearly 6 million in 1970, enrolments fell to less than 5 million by 1985. Modest annual increases since then have brought enrolments to the 5,363,000 level in 1993, double the 2,625,000 who attended elementary and secondary schools in 1951.

While the number of elementary/secondary students has doubled, the number of full-time postsecondary students in Canada has increased tenfold over the last four decades, growing from 91,000 in 1951 to 950,000 in 1993. Enrolments in colleges and universities grew rapidly in the 1960s and 1970s. Despite the decline in the 18 to 24 years

old population, postsecondary enrolments, especially at the university level, grew significantly through the 1980s. College enrollments, which leveled off in the 1980s, have increased annually since 1990 to over 395,000. Full-time university enrolment rose to 585,000 by 1993 (Nobert and McDowell).

With the great changes that took place, teaching positions in Canadian schools, especially at the college and university level underwent a corresponding increase. Canada's teaching environment is constantly changing, especially since the demand for teachers fluctuates with demographic shifts. During the 1970s, student population reached an all-time high level; when there were not enough teachers at the university, more and more professors and PhDs came to Canada from the United States and other parts of the world.

Early in the Cold War years of the 1960s, at the launching of the Sputnik satellite, an even more intense Cold War academic rivalry was also launched. Canadian universities vied for more academics with doctoral degrees. American universities, spilling out hordes of certified professionals, were the most convenient places to seek the necessary additional academic staff. When Canadian universities plunged into the frantic international rush to intellectual aggrandizement, the resulting pace bordered on the exhaustive.

The 1960s and 1970s were also periods of expansion of Canadian universities and colleges. More and more universities were set up and existing universities expanded to accommodate the student population, which was becoming larger and larger. An increasing number of universities with doctoral programs is an example, as in 1944-45, only five universities had doctoral programs, while in 1970, 851 different doctoral

programs were in operation in 30 universities. This led to the teaching positions in Canadian universities increasing dramatically. Between the academic year 1956-57 and 1974-75, the full-time teaching staff at Canadian universities multiplied six-fold, from 4,973 to 29,710 (Zur-Muehlen, 1977).

As a result, the age of professors hired at that time had a very young mean and small standard deviation. Historically, more than half of all PhDs have been employed as university professors. In an article written in 1995, K. Edward Renner and Lorraine Mwenifumbo reported on a similar study that supports the projections of Dr. Max von Zur-Muehlen. They found that 52% of the faculties in Canadian universities were hired between 1963 and 1977 to accommodate the large number of baby boomers attending universities and the increasing enrolment of women and students from a broad range of countries and social classes. The age distribution of faculty revealed an average of 48, a median of 50 and a mode of 51 reflecting the well-known faculty "age-bulge". The professors had spent on average 80% of their academic careers at their current institutions with even fewer prospects for future mobility than in the past. Thus, the average proportion of time at the same institution will most likely continue to increase between that time (1997) and the year 2007 when the typical faculty member is due to retire.

Another study done by Tema Frank (2000) suggests that by 2010, universities will need to find some 32,000 full-time professors. This is a staggering figure, in light of the fact that there are only 33,000 professors teaching today at all universities across the country.

According to Statistics Canada, in 1997, there were almost eight percent fewer assistant professors, five percent fewer associate professors, and six percent fewer full

professors than in 1992. But the demographic pressures will soon be impossible to ignore. Beyond the retirements of the large numbers of faculty hired during the boom of the 1960s and 1970s, enrolment is increasing. AUCC projects a 20% increase in enrolment by 2010, driven by the combined effects of the so-called “echo-boom” (children of the baby boomers) reaching university age and an expected increase in the proportion of them who seek university degrees.

In addition, due to the financial cutback in public funds on the part of the federal government, Canadian faculty members are undergoing one of the severest erosions in history. According to a report by the Canadian Association of University Teachers (CAUT), since 1992, per capita spending on postsecondary education has fallen by more than 12%. It is estimated that federal cash transfers for postsecondary education have fallen by more than 40% over the same period. The number of full-time faculty in Canadian universities declined from 37,422 in 1991 to 33,327 in 1998. This represents a loss of 12.3% over a period of 7 years.

Research done by CAUT shows that because of severe government funding cuts in the 1990s, there has been a marked decline in faculty positions and average salaries at Canada’s large research universities—generally the best paid faculty members in the country. The data in Table 2.1 include the thirteen largest universities: Alberta, Calgary, Dalhousie, Manitoba, McGill, McMaster, Memorial, Ottawa, Queen’s, Toronto, UNB, UBC, and Western Ontario.

Table 2.1 Declines in number and salary of university teachers in 13 large Canadian universities						
	Full Prof		Associate Prof		Assistant Prof	
	N	Salary	N	Salary	N	Salary
1996-97	5,058	\$89,628	3,855	\$69,502	1,992	\$54,442
1990-91	5,309	\$92,577	4,152	\$72,083	2,712	\$54,932
Change	-251	-\$2,949	-297	-\$2,581	-720	-\$490
Percentage Change	-4.7%	-3.2%	-7.2%	-3.6%	-26.5%	-0.9%
Source: CAUT Education Review, vol.1 No 2, 1999						

As illustrated above, between 1990 and 1996 this group of universities lost almost 550 full-time faculty members from the top two professional ranks, and a further 720 from the assistant rank. The complement of full professors declined by 4.7%, associate professors declined by 7.2%, and assistant professors fell by almost 27%. The large declines at the assistant level indicate that faculty members are not being replaced as they move up into higher levels or leave.

The analysis clearly indicates that on the one side, a significant number of current university teachers will retire in the next decade, on the other side, a serious brain-drain is continuing to occur because of the lack of faculty positions available in Canadian universities due to the federal and provincial financial cutbacks.

2.2 Structure-Agency Approaches to Transitions

2.2.1 The Changing Canadian Economy

The Canadian economy has undergone a significant change in the past century. Globalization and the so-called “information age” have combined to make it more difficult to find a “secure” job with a good income in the post-industrial era. In other words, employment has become more highly risks. To cope with the risks and new opportunities brought through economic and social changes, Canadians have increasingly invested in their education and training.

The change can first be seen from the occupational changes that took place in the past century. In 1911, 34% of the total labor force worked in agricultural occupations; by 1986, only 4% of workers were employed in this sector (Statistics Canada, 1993). More slowly than agriculture, occupations in the mining, fishing, and forestry industries have also experienced varying degrees of downsizing. In contrast to the decline in employment in primary industries, opportunities in the service sector have steadily increased over a long period (Lin, 2000).

With the gradual collapse of the old foundations of the industrial society, the ability to deal with the resulting fear and insecurity becomes an essential cultural qualification; thus, cultivating such ability becomes an essential mission of pedagogical institutions in the risk society (Beck, 1992). It is understood that “ education and attentiveness to information open up new possibilities of dealing with and avoiding risks” (Beck, 1992).

2.2.2 Beck's Theory of Risk

There is no consensus among sociologists about how social structure and personal agency shape individuals' life courses. One view emphasizes the importance of human agency, and asserts that human beings are active 'agents' whose behavior and thoughts make society possible. People are seen to be relatively free to make sense of the world in such a way as to make decisions that guide their lives and conduct. The world, according to this approach, is socially constructed--such as language, culture, and institutions-- are created, maintained, and changed through human activity.

In contrast, the structuralist view emphasizes that individuals are social products. Social structures, or relatively enduring patterns within society and social life, give rise to our personalities and thoughts, to the choices we face, and to the courses we take in our lives. When we are born, existing social structures determine limitations and opportunities dependent on such factors as gender, race, the wealth and status of our parents, and so on. Our freedom, in other words, tends to be highly constrained by social rules and expectations.

Most sociologists and other social thinkers take a position somewhere between the two extremes of individual agency and structural determination. As Karl Marx (1963, p301) observed, people "make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past." A more contemporary sociologist, Anthony Giddens (1987) has expressed the same point through

what he calls “the double involvement of individuals and institution” in which “we create society at the same time as we are created by it”(p. 154).

Rudd and Evans (1998) further used the term ‘structured individualization’ (SI) to describe life course transitions as outcomes of both individual choice and activity, and structural influences. In their SI model, structure continues to demonstrate its influence with traditional meanings (e.g., social class, gender, ethnicity, and region), but reserves an important role to be played by agency. As a consequence, structure interacts with agency in which structure constrains the effects of agency on the one hand, and the constraints imposed by structure are at an increasing speed overcome by agency on the other, especially at the life stage of university learning.

The derivative notion of SI and the difficulties encountered in dealing with this construct are discussed by Lowe and Krahn (1995) who indicated that agency and structure are embedded in each other. Therefore, the relationship between structure and agency (individualism) is best understood by encapsulating structure-agency dynamics in a particular place and time. Anisef, Sweet, Carl, and Lin (1999) asserted that structure and agency have a “combined” influence on decisions and actions in life course.

The theory of a risk society, developed by German sociologist Ulrich Beck, is gaining momentum in North America. It stems from the emergence of the environmental movement in the 1970s (Beck, 1995), but as a theoretical statement broke the boundaries of the environment movement into the areas that include almost all social arenas. The core concept of the theory is “reflexive modernization, which is a characteristic of the new risk society” (Lash and Wynne, 1992. p 152).

Reflexive modernization means the possibility of a creative destruction for an entire epoch, in particular that of industrial society. For Beck, creative self-destruction refers to the process where the more modernized a society becomes, the more the foundations of the industrial society are dissolved, consumed, changed and threatened (Beck, 1994). With the gradual collapse of the old foundations of the industrial society, the ability to deal with the resulting fear and insecurity becomes an essential cultural qualification; thus, cultivating such ability becomes an essential mission of pedagogical institutions in the risk society (Beck, 1992).

The achievements of modern technology and organization have made us far safer from natural catastrophes today than at any other time (Lubbe, 1993). The human achievement of safety against natural disasters, however, does not prevent us from an increase in risk consciousness. The reason is that as human society increases its awareness of risks, it simultaneously decreases its willingness to accept and deal with vital risks. Although in some areas we are much safer than people who lived in previous eras, in other areas we experience greater risks. In connection with the issues discussed in this thesis, we now encounter a rise of similar consciousness in relation to labor market outcomes (LMO) among PhD graduates in their initial working stage in Canada while exploring the transition from school to work associated with FOS choice.

2.2.3 Structure and Ethnicity

a) Gender

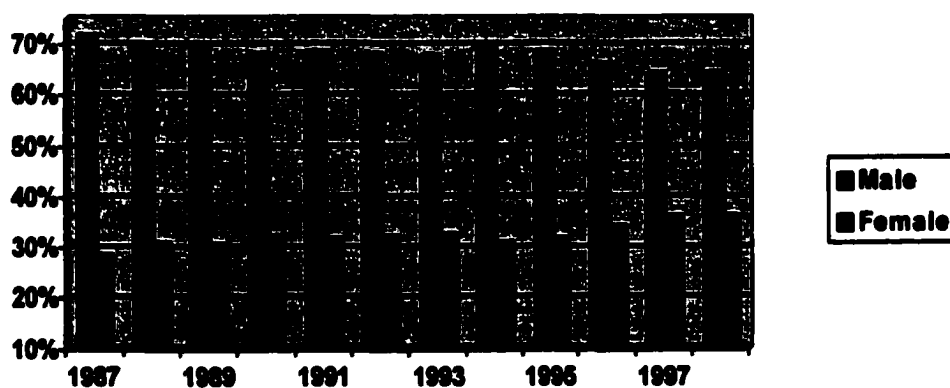
Although many factors will influence the labor market outcomes of PhD graduates, gender has long been one of the major indicators of the analysis of the FOS

choice and subsequent LMO. This variable is particularly sensitive to changes in women's educational attainments and to changes in their positions in the labor market.

Canadian women have made tremendous strides in their educational attainment in the past decades. In 1996, 12% of all women aged 15 and over had a university degree—double the figure in 1981 (6%). Women, however, are still somewhat less likely than men to have a university degree among the entire Canadian population (Statistics Canada, 2000).

The overall difference in the proportions of women and men with a university degree is likely to narrow further in the future, since women currently make up the majority of full-time students in universities. However, women's share of full-time university enrolment declines at higher levels of study, especially at the PhD level.

Chart 2.2 Gender and Percentage of PhD Degrees Granted in Canadian Universities: 1987-98



(Source: Chart generated by author using data from AUCC, 1999).

Chart 2.2 shows that at the same time the total number of doctoral recipients kept rising from 2,375 in 1987 to 3,976 in 1998. Female recipients increased from 677 in 1987 to 1,436 in 1998. In terms of percentage change, female PhD graduates were only 30.6%

in 1987; they increased to 36.1% in 1997. The increase of female recipients is more conspicuous if we look back at the history of PhDs in Canada, when women have traditionally been underrepresented.

In terms of fields of study, female PhD students follow a similar pattern to that in the United States. According to Canadian Social Trends, in 1992-93, at the doctoral level, education was the only major program in which women accounted for the majority of full-time students (60%). In mathematics and physical sciences, only 19% of students enrolled in the PhD programs were female, and only 11% in engineering and applied sciences. The figures are comparatively higher in health professions (43%), fine and applied arts (46%), humanities (46%), agricultural and biological sciences (33%), and social sciences (45%).

It is claimed that the female experience of obtaining a doctoral degree is dissimilar to that of males. This results from parental pressures, early school influences and cultural expectations (Centra and Kuykendall, 1974). Discrimination within the university, based on gender (Levy, 1982) and compounded by racial origin (McLean, 1981), is alleged to occur. Recently, the National Research Council reported that in the last decade the total number of doctorates granted was virtually unchanged while the percentage of women receiving these degrees increased. The increased representation of women among new doctorates is a relatively new phenomenon that has had several implications for the structure and operation of labor market (Heath and Tuckman, 1989). Heath and Tuckman found that relative growth in the number of new women doctorates has taken place in most FOS. This has been accompanied by an increase in the participation rate of new doctorates and a decrease in the unemployment rate. Other findings were reported:

- **Although the labor market for doctorates appears to have successfully absorbed the increase in female doctorates, the female unemployment rate remains high relative to the male rate in many fields. Gender based differences in the unemployment rate exist, and these are persistently high in the agriculture, humanities, and mathematics fields.**
- **Despite the fact that there is an apparent increase of women in some fields, more fields had low female growth rate than had high ones. Thus although the relative growth in the number of women was pervasive among fields, it did not hold forth the promise of widespread parity in most.**
- **In a majority of fields, the growth of female part-timers exceeded the growth of new female doctorates. Because this growth was not accompanied by an increase in the percentage of women seeking full-time work, it appears that much of the growth in part time positions may be a result of voluntary decisions on the part of the new female doctorates.**

Ross Finnie, a researcher of business and labor market analysis at Queen's University, found that the difference in annual earnings between colleges and bachelor's graduates ranges from \$6,000 to \$10,200, averaging approximately \$8,300 for men and \$8,700 for women according to the NGS of 1982, 1986, and 1990 cohorts. The differences between bachelor and master graduates were generally greater ranging from \$10,000 to \$14,000 averaging \$12,700 for men and \$11,300 for women. Finally, at the doctoral level, men's earnings dipped slightly when compared with master graduates mean earnings, except in 1995, when earnings were basically equal. In contrast, women's mean earnings rose at the doctoral level compared with bachelor and master levels.

Taking into account the overall lower earnings levels of women, these absolute dollar patterns indicate greater rates of return from obtaining a bachelor's degree (relative to a college diploma) or a doctoral degree (relative to a master's degree) for women than for men (Finnie, 2000). Under-representation of women in PhD programs and special patterns of labor market outcomes for female graduates invite us to further explore gender issues in the process of transition from school to work in the chapter of empirical analysis.

b) Ethnicity

Historically, Canada is a country built by immigrants and it still is one of the largest recipients of immigrants. During the past decade, some 1.4 million people immigrated to this country, contributed to by one of the highest immigration flows in the 1940s (Canadian Social Trends, 2000). Ethnicity is one of the main factors influencing the labor market outcomes of the graduates from Canadian universities.

According to the American Council on Education (ACE) analysis of the 10-year trends from 1982 to 1992, the number of minority doctorates granted by US universities grew by 27 percent while the overall number of US doctorates grew by only 6 percent (Ottinger, Sikula, and Washington, 1993). In 1996, a record number of Americans who are members of minority groups earned doctorates from US universities, continuing a decade-long rise (Magner, 1997). Similar studies in Canada show that visible minorities, regardless of age, were more likely to be enrolled in a post-secondary institution on a full-time basis (Anisef, Sweet, James, and Lin, 1999). In a report prepared for the Canadian Race Relations Foundation, researchers Kunz, Milan and Schetagne concluded

that visible minorities generally have higher education levels than either non-racialized groups or Aboriginals. The same study also shows, however, that in spite of their higher educational attainment, visible minorities still trail behind non-racialized groups with regard to employment and income. Compared with non-racialized groups, visible minority and Aboriginals with university education are less likely to hold managerial/professional jobs; when racial minorities have attained a university level education, they are still less likely than non-racialized groups to be in the top income quintile.

Not surprisingly, racial minorities' disadvantage in their employment experiences was also reflected in their earnings. Many researchers point to income disparities between white and non-white groups (e.g. Pendakur and Pendakur, 1996; Li, 1998; Frank, 1997; Hou and Balakrishnan, 1996; Baker and Benjamin, 1995). Aboriginal peoples and visible minorities generally earn less than white Canadians. Visible minorities earn much lower average annual incomes than non-visible minorities in all educational categories (Anisef, Sweet, James, and Lin, 1999). For example, among university graduates, visible minorities earned approximately \$7,000 less than non-visible minorities. The earnings differentials between racial and non-racialized groups that remain after accounting for other factors, such as educational levels, is often taken to be a proxy for discrimination. "Social inequality is primarily manifested in income inequalities" state Hou and Balakrishnan, (1996 p.38). Unfortunately, again, there is paucity in the literature on the earnings of PhD graduates in Canada.

The FOS choice of minority students and immigrants also varies but generally speaking, racial minority students showed particular interest in the mathematics and

physical sciences, increasing their enrolments in these fields from 15.7% to 26% between 1986 and 1996. The latter figure is more than double the proportion (11.5%) of racial minority Canadians (Anisef, Axelrod and Lin 1999). Other studies show that immigrants tend to have relatively high educational and career aspirations with the specific expectation that their education will enable them to attain their occupational and career goals, fully participate in society, and eventually gain upward social mobility (James, 1990; Lam, 1994; Simmons and Plaza, 1998). The literature review demonstrates that racial minorities have a high rate of participation in post-secondary education. However, their disadvantaged labor market outcomes have not been changed as much as female PhD graduates in the last decade or so. In this regard, ethnicity should be one of the interesting variables explored in this thesis.

2.2.4 Agency: Field of Study Choice

From the perspective of personal agency, life can be seen as a chain of choices, and different choices, to a large extent, will produce different outcomes. A strong connection between education and work is aided by various personal initiatives, among which the FOS choice is especially important, as university graduates in Canada are clearly stratified by fields of study in terms of income, employment stability and continuity, and job satisfaction (Minister of Human Resources Development Canada, 1996). Different LMO, then, suggest that FOS choice has a significant impact on one's future economic prospects and general well being. The results of choosing well highlight the importance of this relationship and the gravity of the risks associated with FOS decisions (Lin, 2000).

The occupational structure of Canada has been undergoing dramatic change in recent years. Two key features of the changing Canadian economy are reflected in the distinction currently being made between knowledge-based and skills-intensified characteristics. These two characteristics of the new economy have quickly emerged as central in the discussion over the relationship between education and labor market outcomes, as well as the debate around the value of a liberal (knowledge-based) and vocational (skills-intensified) education. The question of FOS choice, then, can be seen as the choice between liberal or vocational studies.

In the last twenty years, knowledge has gradually supplemented the importance of capital as the foundation of competition among nations. The Canadian post-secondary education system is under increasing pressure to be accountable to its stakeholders: government funding agencies, taxpayers, students, parents, professional associations and employers. They seek congruence between social values associated with or implied by their activities and the values in the larger social environment of which they are a part. But the different aspects of the outcomes of higher education, in terms of liberal and vocational education is still contentious.

Liberal education, though frequently challenged and significantly modified over time, has occupied a prominent place in western universities for most of the past millennium. But in the face of economic, social and intellectual pressures, the future of liberal arts (the humanities, the social sciences and the fine arts) is highly uncertain (Paul, 1999). According to recent surveys, students are especially concerned with the investment value of university training. Facing an uncertain economic climate, they want to ensure that their university experience will provide a gateway to secure and lucrative

careers (Levine, and Riedel 1987). PhD graduates are not exceptional. They also want to make the correct decisions in terms of their FOS choice, because PhD studies are notably arduous and time-consuming.

2.3 Summary of Literature Review

The transition of PhD graduates from school to work is complex and difficult to predict, especially in the emerging “post-industrial” economy where human resources, technology, and work organization forms change rapidly and combine in a multitude of novel ways. Analysis of PhD students’ labor market outcomes will involve a lot of elements prior to and after the choice of FOS. Literature shows that social structures like gender and ethnicity together with the personal agency (field of study) have greatly contributed to the labor market outcomes such as income, job continuity and job satisfaction. One of the assumptions is that the labor market outcomes of 1995 PhD graduates will influence the future participation of the PhD studies. To address the question of faculty shortage in Canada, it seems reasonable to divide the labor market outcomes into academic and non-academic segments in the empirical analysis.

Chapter 3

METHODOLOGY

In this methodology chapter, the objectives of the study will be briefly discussed. After introducing the National Graduate Survey (NGS), the working sample through case selection will be discussed, and the selected social structure and personal agency variables will be defined. Discussion of the basic statistical methods used in this thesis will also be included.

3.1 Objectives of the Study

The present study has the following objectives:

- 1. To describe the participation rates and labor market outcomes of three levels of university graduates—baccalaureate, master, and PhD.**
- 2. To profile the labor market outcomes of PhD graduates in relation to their FOS choices and their gender and visible minority status.**
- 3. To compare the labor market outcomes of PhD graduates employed in the academic and non-academic labor markets in relation to their FOS choices, gender and visible minority status.**
- 4. To assess the level of interest in future PhD study among baccalaureate and master graduates.**

3.2 The National Graduates Survey and the Working Samples

On behalf of Human Resources Development Canada, Statistics Canada conducted the National Graduates Survey to learn about graduates' labor market experiences after

graduation. In June 1997, the survey was conducted to examine the labor market experiences of 1995 graduates from universities, community colleges and trade/vocational programs since graduation. The survey collects a broad range of information on the links between education/training and labor market outcomes, including:

- 1 Characteristics of programs of study;**
- 2 Reasons for enrolling in post-secondary education;**
- 3 Satisfaction with education;**
- 4 Additional training after graduation;**
- 5 Activities before completing studies;**
- 6 Jobs held since graduation;**
- 7 Marketable skills;**
- 8 Finances and loans;**
- 9 Socio-economic background.**

In 1997, 21,824 randomly selected 1995 graduates were interviewed by telephone two years after graduation, which represented 157,226 university students who graduated in 1995 (weighted). For the purpose of this study, 1,970 graduates who obtained PhD degrees were selected, which represented 2,626 students with earned doctoral degrees as the working sample (weighted).

3.3 Variables Employed in the Analysis

Table 3.1 lists the variables selected as indicators of graduates' labor market outcomes. Specifically, gender (gndn), field of study 2 (fos2), field of study 5 (fos5), job full-time or part-time (jobc197), ethnicity (ethnicity2), income (q21), and job satisfaction (c36) will be employed in the analysis.

Table 3.1 Variables used in the analysis		
Class of '95	Questions	
Structural Variables	Gender (gndn)	Respondent's gender
	Ethnicity (Eth2)	Derived variable indicating the respondent's ethnicity as either white or visible minority
Agency Variables	Field of Study (2) (fos2)	Derived variable indicating the two categories of liberal or vocational studies
	Field of Study (5) (fos5)	Derived variable indicating the five categories of liberal arts/social sciences; liberal sciences; education; applied arts/social sciences; applied sciences
Labor Market Outcomes	Income (q21)	What were your total earnings from wages, salaries and self-employment income before taxes and deduction for all jobs that you had during the last 12 months?
	Part/Full-Time (jobc 197)	Is this job full-time or part-time?
	Job satisfaction (c36)	Considering all aspects of the job you had last week, how satisfied were you with the job?
<p>Note: Variables fos2 and fos5 are computed from the various fields of study in Appendix A. The derived ethnicity eth2 refers the white and the visible minority where the white refers to people with ethnic or cultural background from British, French, German, Italian, Canadian and other European. Visible minority refer to the people with ethnic or cultural background from Chinese, Japanese, Korean, Filipino, Indian, Black, N.A Indian, Metis, Inuit, West Asian, S.E Asian, North African, and Latin American.</p>		

3.4 Selections of Cases and Classification of Field of Study

The academic and non-academic PhD labor markets are defined in this research as follows: those who are employed in universities and colleges or other academic institutions are treated as belonging to the academic labor market; those who are

employed by the government or by private factors are treated as belonging to the non-academic labor market.

As described in the previous sections, only PhD graduates in the NGS are analyzed in this research. Hence, selecting cases from NGS is the first step towards conducting the data analysis. To select the study sample, the first variable used as a criterion for case selection is “level of certification”. The result is that only graduates with a doctor degree are selected.

Table 3.2 Variables used for data selection	
1995	Variable
Certlev	Level of certification, taking into account respondent corrections from a04 to data supplied by institutions
A06H11	Major field of study code for studies completed, as reported by respondents at the time of interview.

In the second step, we selected the variable “Major field of study code for the studies completed” as a secondary criterion for filtering the data and selecting cases. As a result, liberal or vocational fields of study are specifically linked to university programs.

It should be noted that most researchers directly use the variable “Field of Study” from Statistics Canada, where FOS usually is classified as Education, Fine arts, Humanities, Social Sciences, Commerce, Agriculture/Biology, Engineering, Nursing, Other Health, Math/Physical Sciences. However, that variable doesn’t reflect programs that are oriented to the liberal/vocational dichotomy. In other words, under the category of “fine arts and humanities”, the fields “fine arts”, “applied arts”, “English literature”, and “translation” are all included. Conventional wisdom would classify these fields as liberal education. However, “applied arts” and “translation” are actually vocational fields.

To avoid the confusion, the new variable, field of study, was created. Based on the University Student Information System (USIS) Field of Study Codes, Appendix A lists the five major categories of fields of study as:

- 1.Liberal Arts and Social Sciences.**
- 2.Liberal Sciences.**
- 3.Education.**
- 4.Applied Arts and Social Sciences.**
- 5. Applied Sciences.**

To address how PhD graduates have responded to the changing economy through selecting fields of study, either in liberal or vocational areas, the five fields of study are regrouped, so that 1 and 2 are merged as liberal, and 3, 4, and 5 are combined as vocational (see Appendix A). The SPSS (Statistical Package for Social Sciences) was employed for the current analysis. Descriptive statistics and cross-tabulation analysis were used in this Master's thesis.

Chapter 4

EMPIRICAL FINDINGS

Chapter 4 aims to fulfill the following objectives: to describe the participation rates and labor market outcomes of three levels of university graduates—baccalaureate, master, and PhDs, to profile the labor market outcomes of PhD graduates in relation to their FOS choices and gender and visible minority status, to compare the labor market outcomes of PhD graduates employed in the academic and non-academic labor markets in relation to their FOS choices and gender and visible minority status, and finally to assess the level of interest in future PhD study among baccalaureate and master graduates. The following analyses are conducted accordingly: 1) the participation rates and the relative income returns for the three degree levels: baccalaureate, master and PhD. 2) the LMO returns of those who have achieved a PhD degree with respect to their gender, minority status, and FOS ; 3) the relative labor market returns to those who entered the academia and compared to those who did not; 4) the level of interest in future PhD study by analyzing the answers to the question, “Do you plan to pursue a PhD in the future?” in the 1995 National Graduates Survey.

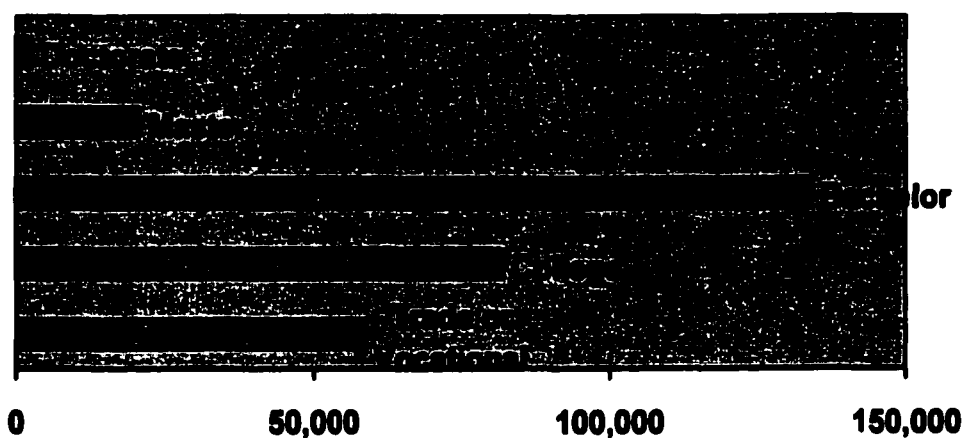
4.1 1995 University Graduates Profile

4.1.1 Distribution of Postsecondary Graduates

In 1995, close to 300,000 students graduated from Canadian postsecondary educational institutions (see Chart 4.11). Over half (53%) of these graduated from Canadian universities, while 28% graduated from community colleges and 20%

graduated from trade/vocational institutions.

Chart 4.11 Number of 1995 Graduates



Source: Chart generated by author using data from 1997 NGS

4.1.2 Distribution of University Graduates by Field of Study

At the university level, the fields of social sciences, education, commerce and the

Field of study	Program		
	Bachelor's	Master's	Doctorate
	%	%	%
Agriculture and biology	6	4	12
Commerce, management and admin	14	21	2
Education	18	19	10
Engineering and applied science	7	9	15
Fine arts	3	2	--
General arts and science	2	0*	--
Health	7	8	12
Humanities	12	12	12
Mathematics and physical sciences	5	6	17
Social sciences	25	18	19

Note: an asterisk (*) indicates that estimates have a relatively high sampling variability. A double dash (--) indicates that the data are not reliable enough to release. Out of a total of 134,000 for Bachelors and 20,500 for Masters and 2,600 for Doctorates.

Source: Table generated by author using data from 1997 NGS.

humanities accounted for 70% of all bachelor and master degrees in 1995. About one half (49%) of all doctorates were awarded in the social sciences, mathematics and engineering fields (see Table 4.1.1). The field of business, comprised of commerce, management, and administration, represents a large share of the 1995 graduates at all levels except the doctoral (see Table 4.1.1).

4.1.3 Distribution of PhD Graduates by Gender

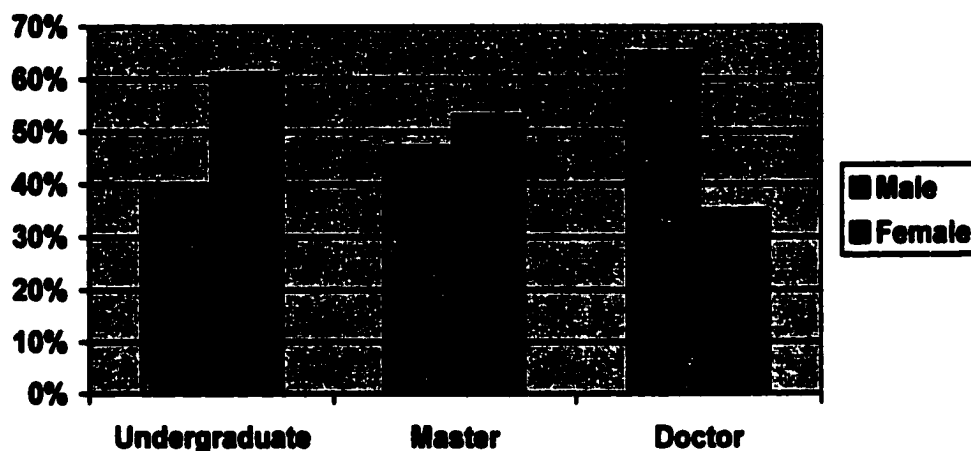
In this study, the university graduates, especially the PhD graduates in 1995, are the focus. Of all the university graduates in 1995, 40.7% (63,899) were male and 59.3% (93,165) were female (Table 4.1.2). Although female graduates outnumbered males (57% to 43%) at all levels of study, important differences existed by level of study. For instance, more women than men graduated from the undergraduate level (88.8% of 93,165 versus 83.9% of 63,899), but more men than women graduated at the doctoral level (2.7% of 63,899 versus 1.0% of 93,165).

Table 4.1.2 Gender and Level of Certificate, 1995 University Graduates in Canada			
Sex of respondent	Male	Female	Total
Undergrad	83.9%	88.8%	86.8%
Masters	13.5%	10.2%	11.5%
PhD	2.7%	1.0%	1.7%
Total N	63899	93165	157064
Total %	40.7%	59.3%	100.0%
$X^2=1102.5, df=2, p<.01$			
Source: Table generated by author using data from 1997 NGS			

Chart 4.12 shows that at the undergraduate level, approximately 39% of all the graduates were male, while the majority, 61% were female. At the master level, both genders had similar percentages of graduates, with slightly more female graduates (53%)

than the male (47%). At the doctoral level, significantly more male than female (65% versus 35%) graduates got their PhD and entered the labor market (see Chart 4.12).

Chart 4.12 Gender distributions among levels of graduates in Canada in 1995



Source: Chart generated by author from NGS (1997) data

4.1.4 Labor Market Outcomes of University Graduates

University graduates working full-time had median earnings of about \$33,800 in 1997 constant dollars. More specifically, bachelor's graduates earned a mean of \$30,652, master graduates \$44,975 and doctoral graduates \$47,075. This income disparity partly reflects the investment of time and money in different levels of education. The pattern of rising income corresponds to the job satisfaction scores reported by graduates from different levels of studies (Table 4.1.3).

Comparing the job satisfaction rates of the university graduates, we find that, on average, the higher the degree one had, the more likely one would be satisfied with the job one held. Over four in ten of the bachelor graduates, almost half (48.8%) of the master graduates, and 52.4% of doctoral graduates were very satisfied with the job they

held at the time of survey (see Table 4.1.3). However, when the unemployment rate of the university graduates is compared, we find something inconsistent with the previous income and job satisfaction patterns. Although bachelor graduates had the highest degree of unemployment with a rate of 9.2%, PhD graduates had the second highest degree of unemployment with a rate of 8.2%, compared with 6.5% of master graduates (see Table 4.1.3). These high rates of unemployment of PhD graduates indicate a tight labor market in the middle of the 1990s. The high level of unemployment necessitates a closer look at the PhD labor market. This takes place in the ensuing sections.

Table 4.1.3 Labor market outcomes of 1995 university graduates			
University Graduates	Job Satisfaction Rate (%)	Unemployment Rate (%)	Income Average (\$)
Bachelor's	42.8	9.2	30,652
Master	48.8	6.5	44,975
Doctoral	52.4	8.2	47,075

Source: Table generated by author using data from 1997 NGS

It would appear that many of the PhD graduates in 1995 had a hard time establishing themselves in the labor market and that females were still underrepresented at the highest degree level.

4.2 1995 PhD Graduates in Canada

4.2.1. PhD Graduate Growth: 1982-1995

In 1995, 2,626 PhD candidates graduated from Canadian universities, continuing a trend in growth from 922 in 1982 (Table 4.2.1). The proportions of PhD graduates at all university levels have risen significantly from 0.6% in 1982 to 1.7% in 1995, an increase of nearly three times. Between the last two surveys of the Class of '90 and Class of '95,

an increase of only 0.1% has taken place, indicating a slowdown of the increase. On the other side, compared with the increase of the PhD graduates, master graduates had an increase of -0.8% (Table 4.2.1).

Class	Class 82		Class 86		Class 90		Class 95	
	Freq	%	Freq	%	Freq	%	Freq	%
Bachelor or below	137355	91.7	105663	88.1	105201	86.1	136442	86.8
Master	11425	7.6	12996	10.8	15095	12.3	18122	11.5
PhD	922	.6	1287	1.1	1990	1.6	2626	1.7
Variable	lunctr82		cert lvl		certlev		certlev	

Source: Table generated by author using NGS data various years.

4.2.2 Demographic Features of PhD Graduates: 1995

Of the 2,626 PhD graduates who responded to the 1995 survey, 1,698 were male (64.7%), and 916 were female (34.9%, see Table 4.2.2). In terms of their ethnicity, 635 PhD graduates (24.2%) reported themselves as belonging to the category of Visible

Demographic Features		Freq	%	Valid %	Cumulating %
Gender	Male	1,698	64.7	65.0	65.0
	Female	916	34.9	35.0	100.0
	Missing	12	.4		
Visible Minority	Yes	635	24.2	28.8	28.8
	No	1,573	59.9	71.2	100.0
	Missing	418	15.9		
Five strata field of study	Liberal arts/soc sciences	758	28.9	28.9	28.9
	Liberal sciences	659	25.1	25.2	54.1
	Education	254	9.7	9.7	63.7
	Applied arts/soc sciences	152	5.8	5.8	69.5
	Applied sciences	799	30.4	30.5	100.0
	Missing	4	.2		

Source: Table generated by author from NGS (1997) data.

Minority, 2,208 graduates (59.9%) reported themselves as not belonging to the category of Visible Minority, while 418 graduates (15.9%) either said they did not know or simply did not answer the question (see Table 4.2.2).

Table 4.2.2 also demonstrates that if we apply the five strata categories (Liberal Arts/Social Sciences, Liberal Sciences, Education, Applied Arts/Social Sciences, and Applied Sciences), the distribution among them is found to be uneven. Slightly more PhD graduates (54.1%) came from liberal studies (see Table 4.2.2), which include the areas of Liberal Arts/Social Sciences and Liberal Sciences than came from Vocational studies (46%). In the Vocational studies group, which includes the areas of Education, Applied Arts/Social Sciences, and Applied Sciences, Applied Sciences had the highest participation rate (30.4%), followed closely by Liberal Arts/Social Sciences (28.9%).

4.2.3 Labor Market Outcomes of the 1995 PhD Graduates

According to Rudd and Evans (1998), structure continues to demonstrate its influence with traditional meanings, e.g., gender, ethnicity, but reserves an important role to be played by agency, such as choice of field of study. As a consequence, structure interacts with agency constraining the effects of agency on the one hand. On the other hand, the constraints imposed by structure are increasingly overcome by agency, especially at the life stage of university learning. Lowe and Krahn (1995) indicated that agency and structure are embedded in each other. Anisef, Sweet, Carl, and Lin (1999) also asserted that structure and agency have a “combined” influence on decisions and actions in life course. According to the literature, then, it should be meaningful to compare labor market outcomes like income, job continuity, and job satisfaction rates of

the PhD graduates in terms of structural factors like gender, ethnicity, and agency factors such as the choice of FOS.

Income

In June 1997, 1,906 PhD graduates from the class of '95, including 1,268 males and 637 females, reported their annual incomes. Two years after graduation, the average income of the females (\$42,014) was slightly higher than that of the males (\$41,602) (Table 4.2.3). This finding supports Ross Finnie's research (2000) which indicated that the income differences between bachelor and master graduates were generally greater for men than for women, and that only at the doctoral level did men's earnings dip slightly when compared with master graduates mean earnings. In contrast, women's mean earnings rose at the doctoral level compared with the master level. Taking into account the overall lower earnings levels of women, these absolute dollar patterns indicate greater rates of return from obtaining a bachelor's degree (relative to a college diploma) or a doctoral degree (relative to a master degree) for women than for men.

Table 4.2.3 Distribution of Income by Gender, 1995 PhD Graduates in Canada			
Sex of respondent	Mean	N	Std. Deviation
Male	\$41602	1268	18973
Female	\$42014	637	22801
Total	\$41740	1906	20329

F=.17, df=1, p>.05
Source: Table generated by author using data from 1997 NGS

In terms of the Visible Minority status of the 1995 PhD graduates, 464 of the respondents reported themselves as belonging to a Visible Minority, and 1,145 of them reported being a non-Visible Minority person when they answered the questions

concerning their annual incomes. The non-visible minority PhD graduates had a mean annual income of \$42,235, higher than that of the visible minority graduates (Table 4.2.4). This is consistent with previous findings (Anisef, Sweet, James, and Lin, 1999; Baker and Benjamin, 1995; Frank, 1997; Hou and Balakrishnan, 1996; Li, 1998; Pendakur and Pendakur, 1996). If “social inequality is primarily manifested in income inequalities” (Hou and Balakrishnan, 1996), then social inequality exists among the 1995 PhD graduates. Female PhD graduates made a small income gain over male graduates, whereas the visible minority graduates did not.

Table 4.2.4 Distribution of Income by Visible Minority Status, 1995 PhD Graduates in Canada			
Visible Minority Status	Mean	N	Std. Deviation
Visible Minority	\$40432	464	18335
Non-Visible Minority	\$42235	1145	21279
Total	\$41715	1609	20484

F=2.56, df=1, p>.01
 Source: Table generated by author using data from 1997 NGS

When the income distribution of the 1995 PhD graduates is considered in the five categories of Liberal Arts/ Social Sciences, Liberal Sciences, Education, Applied Arts/Social Sciences, and Applied Sciences, we find that graduates from vocational studies including Education, Applied Arts/ Social Sciences and Applied Sciences all had comparatively higher incomes than the students who had graduated from liberal studies such as Liberal Arts/ Social Sciences and Liberal Sciences. Specifically, Applied Arts and Applied Social Sciences PhD graduates had an annual income of \$51,198, standing as the top tier income, while Education (\$48,845) and Applied Science (\$44,271) belonged to the second tier, and Liberal Arts/ Social Sciences (\$39,840) and Liberal

Sciences (\$35,982) fell behind as the lowest income tier in this analysis (Table 4.2.5). The finding seems to support the conclusions of the research by Zeng Lin et al. (2000), which was mainly concerned with the undergraduate level of Canadian university graduates, and which indicated that vocational graduates enjoy significantly greater labor market returns than liberal education graduates.

Table 4.2.5 Distribution of Income by Fields of Study, 1995 PhD Graduates in Canada			
FOS	Mean	N	Std. Deviation
Liberal arts/soc sciences	\$39839.94	497	22177.47
Liberal sciences	\$35982.77	508	15447.17
Education	\$48845.06	175	20135.18
Applied arts/soc sciences	\$51198.11	114	24315.38
Applied science	\$44271.26	622	19897.90
Total	\$41750.13	1916	20306.79
F=26.57, df=1, p<.01			
Source: Table generated by author using data from 1997 NGS			

Job Continuity

The 1997 National Survey of 1995 Graduates adopted the description of “30 hours and more per week” to define graduates as working on full-time jobs. Graduates who worked “29 hours and less per week” were described as part-timers.

More female graduates (10.8%) than male graduates (4.7%) were working as part-timers (see Table 4.2.6). Both genders of the PhD graduates had very high percentages of being full-time workers in comparison with the other degree levels of university graduates. Some 95.3% of the 1,474 male respondents reported themselves to be working full-time whereas 89.2% of the 759 female PhD graduates reported working at full-time

jobs. Overall, the majority of PhD graduates (93.2%) were working full-time two years after graduation (Table 4.2.6).

Sex of respondent	Male	Female	Total
Full-time	95.3%	89.2%	93.2%
Part Time	4.7%	10.8%	6.8%
Total N	1474	759	2233
Total %	66.0%	34.0%	100.0%

$X^2=29.8$, $df=1$, $p<.01$
 Source: Table generated by author using data from 1997 NGS

In terms of the visible minority group, 28.1% of the respondents identified themselves as visible minority graduates. The percentages of visible minority graduates who were working full-time and the percentage of non-visible minority graduates were almost identical (93.8% versus 93.2%, see Table 4.2.7). The part time jobholders amongst visible minority respondents and non-visible minority respondents also had a similar percentage among the 1995 PhD graduates in 1997 (6.2% versus 6.8%, see Table 4.2.7).

Visible Minority Status	Visible Minority	Non-Visible Minority	Total
Full-time	93.8%	93.2%	93.4%
Part Time	6.2%	6.8%	6.6%
Total N	532	1364	1896
Total %	28.1%	71.9%	100.0%

$X^2=.23$, $df=1$, $p>.05$
 Source: Table generated by author using data from 1997 NGS

In the income distribution among the five categories of Liberal Arts/ Social Sciences, Liberal Sciences, Education, Applied Arts/Social Sciences and Applied

Sciences, it was found that vocational graduates earned more than liberal graduates (Table 4.2.5). The same pattern that was found with the income and job satisfaction rates did not occur for the job continuity status. Most graduates from Applied Sciences (97.7%) and Liberal Sciences (96.4%) were working full-time two years after graduation (see Table 4.2.8). Applied Arts and Social Sciences (93.8%) and Education PhD graduates (91.8%) were next most likely to have full-time jobs, whereas graduates of Liberal arts and social sciences (86.0%) had the lowest rate of working full-time two years after graduation (see Table 4.2.8). Also, significantly more graduates in Liberal arts and social sciences are working as part-timers (14%). This is very high when compared with the other fields of study (Table 4.2.8). In their research, Lin, Sweet, Anisef, and Schuetze (2000) noticed that graduates in the Applied Arts/Social Sciences and Applied Sciences were more likely to find full-time/permanent employment than graduates in other fields (p.14). The current research shows similar but not identical results for the PhD graduates in comparison with the undergraduate level.

Table 4.2.8 Fields of Study and Job Continuity, 1995 PhD Graduates in Canada						
FOS	Liberal arts/soc sciences	Liberal sciences	Education	Applied arts/soc sciences	Applied sciences	Total
Full-time	86.0%	96.4%	91.8%	93.8%	97.7%	93.3%
Part-time	14.0%	3.6%	8.2%	6.2%	2.3%	6.7%
Total N	629	563	220	129	700	2241
Total %	28.1%	25.1%	9.8%	5.8%	31.2%	100.0%
$\chi^2=85.1$ $df=4$, $p<.01$						
Source: Table generated by author using data from 1997 NGS						

Job Satisfaction

In the 1997 National Survey of 1995 Graduates, 2,032 PhD graduates responded to the job satisfaction rating survey item. The majority of the respondents (94.2% of the

males and 92.8% of the females) said that they were either satisfied or very satisfied with the job in which they were currently engaged (see Table 4.2.9). Despite the similar satisfaction rate, there did exist a slight difference between male and female graduates, although the difference was not statistically significant. About 5.1% of the female and 4.6% of the male graduates said they were dissatisfied with the job, while 2.1% of the female and 1.2% of the male graduates said they were very dissatisfied with the job they were currently holding (Table 4.2.9). Again, the differences were not statistically significant.

Table 4.2.9 Gender and Job Satisfaction, 1995 PhD Graduates in Canada			
Job satisfaction	Male	Female	Total
Very satisfied	52.5%	52.5%	52.5%
Satisfied	41.7%	40.3%	41.2%
Dissatisfied	4.6%	5.1%	4.8%
Very dissatisfied	1.2%	2.1%	1.5%
Total n	1369	663	2032
Total %	67.4%	32.6%	100.0%
$\chi^2=3.2, df=3, p>.05$			
Source: Table generated by author using data from 1997 NGS			

In terms of the visible minority status, more Non-visible Minority PhD graduates than Visible Minority graduates (57.3% versus 39.2%) said they were “very satisfied” with the job they were holding (see Table 4.2.10). However, more Visible Minority graduates than Non-visible Minority graduates (56.6% versus 35.5%) believed they were “satisfied”. More Non-visible Minority graduates than Visible minority graduates (7.3% versus 4.2%) said they were either dissatisfied or very dissatisfied with their jobs (see Table 4.2.10). In this case the differences are statistically significant. Although it may seem difficult to interpret the findings that Visible Minority graduates had lower rates of being “very satisfied”, as well as lower rates of being “dissatisfied” and “very

dissatisfied”, but a higher rate of being “satisfied”, they may be interpreted as follows. Studies have shown that visible minorities tend to have relatively high educational and career aspirations with the specific expectation that their education will enable them to attain their occupational and career goals, fully participate in society, and eventually gain upward social mobility (James, 1990; Lam, 1994; Simmons and Plaza, 1998). Their aspirations have led them to PhD studies and they are usually satisfied with their current job. However, because of the existence of a possible structural discrimination in the labor market (their income is lower in comparison with the Non-Visible Minority graduates, for example), Visible Minority PhD graduates are less likely to be “very satisfied”. This interpretation is consistent with the findings of Hou and Balakrishnan (1996).

Table 4.2.10 Visible Minority Status and Job Satisfaction, 1995 PhD Graduates in Canada			
Visible Minority Status	Visible Minority	Non-Visible Minority	Total
Very satisfied	39.2%	57.3%	52.0%
Satisfied	56.6%	35.5%	41.6%
Dissatisfied	3.6%	5.4%	4.9%
Very dissatisfied	.6%	1.9%	1.5%
Total n	505	1224	1729
Total %	29.2%	70.8%	100.0%
X²=67.3, df=3, p<.01			
Source: Table generated by author using data from 1997 NGS			

Despite the income differences, more than half of the PhD graduates from the five FOS categories all stated that they were very satisfied with their jobs (54.7% of the Applied arts and social sciences, 53.7% of the Liberal sciences, 52.9% of the Liberal arts and social sciences, and 50.8% of the applied sciences, see Table 4.2.11). Applied sciences and Liberal sciences, the two categories with the lowest unemployment rates, also had the lowest rates of being “dissatisfied” and “very dissatisfied” (2.4% and 5.9%

respectively). Applied Arts and Social Sciences (7.7%) and Liberal Arts and Social Sciences (7.9%) had the highest rate of dissatisfaction with their jobs (see Table 4.2.11). These differences are statistically significant. It is apparent that arts and social sciences students, be they liberal or applied, had higher rates of dissatisfaction with their jobs. This finding is consistent with the findings of David Bentley (2000), which indicated that arts and social sciences education are “besieged” and “undermined” as a consequence of “reduced funds, declining enrolments, decimated faculty and staff complements, and mounting government and public skepticism” (p17).

Job satisfaction	Liberal arts/soc sciences	Liberal sciences	Education	Applied arts/soc sciences	Applied science	Total
Very satisfied	52.9%	53.7%	51.0%	54.7%	50.8%	52.4%
Satisfied	37.0%	40.3%	42.0%	35.0%	46.9%	41.3%
Dissatisfied	7.9%	4.8%	3.5%	7.7%	1.9%	4.8%
Very dissatisfied	2.3%	1.1%	3.5%	2.6%	.5%	1.6%
Total n	560	523	200	117	640	2040
Total %	27.5%	25.6%	9.8%	5.7%	31.4%	100.0%

$\chi^2=47.7$ df=12, $p<.01$
 Source: Table generated by author using data from 1997 NGS

In summary, the 1995 PhD graduates faced a tight labor market two years after graduation. Although the number of graduates had increased, compared with previous surveys, the growth rate had slowed. The unemployment rate of the PhD graduates was higher than that of the master graduates. Female PhD graduates who were full-time employed earned more than their male counterparts, but more female graduates were working part-time. Visible Minority PhD graduates continued to earn less than Non-visible Minority graduates. Although the job continuity status rates were similar, more

Visible Minority graduates were either “dissatisfied” or “very dissatisfied” with the job they were holding. Liberal graduates earned less than vocational graduates, were less likely to be working full-time, and were less satisfied with their jobs. Though more needs to be done to improve women’s participation in PhD programs, the labor market outcomes for female PhDs in the 1995 cohort demonstrate an improvement of women’s status. However, this is not the case for visible minority PhD graduates in the same cohort.

4.3 Academic and Non-academic Labor Markets Outcomes

The looming faculty shortage invites us to further investigate if there is a different LMO for PhD graduates who entered academic and non-academic labor markets. The term “academic” is used to refer to the graduates who were working as university professors or college professors at the time of the survey, and “non-academic” is used to refer to the graduates who were working in other areas, such as government agencies or the private sector.

Table 4.3.1 Academic and Non-academic Occupations and Gender of 1995 PhD Graduates in Canada			
Occupation	Male	Female	Total
University Prof	16.0%	18.3%	16.8%
College Prof	3.2%	2.9%	3.1%
Non-academic	80.7%	78.7%	80.0%
Total n	1698	916	2614
Total %	65.0%	35.0%	100.0%

$X^2=2.37, df=2, p>.05$
 Source: Table generated by author using data from 1997 NGS

There were more females than males (21.2% versus 19.2%) working in the academic world as university professors or college professors (see Table 4.3.1), whereas in the non-academic world, there were more male than female graduates. Statistics also show that in colleges, more males than females (3.2% versus 2.9%) were working as professors (see Table 4.3.1). Although “women faculty members represent a small percentage of the faculty cohort” (Tack, 1992), more women than men are entering the academic world. Despite a statistically non-insignificant difference between male and female participating in academic labor market, it represents a beginning of the historical reversal in the academic world where men have historically dominated.

In the academic world, the Non-visible Minority graduates have a bigger percentage of participation than the Visible Minority graduates (22.4% versus 12.5%) at the time of the survey, both at the university level and college level (Table 4.3.2). Visible minority PhD graduates had a larger percentage (87.6%) in the non-academic world. Visible Minority graduates are under-represented in the academic world, despite their effort to “attain their occupational and career goals, fully participate in society, and eventually gain upward social mobility” (James, 1990; Lam, 1994; Simmons and Plaza, 1998).

Table 4.3.2 Academic and Non-academic Occupations and Visible minority Status of 1995 PhD Graduates in Canada			
Occupation	Visible Minority	Non-visible Minority	Total
University Prof	10.6%	18.8%	16.4%
College Prof	1.9%	3.6%	3.1%
Non-academic	87.6%	77.6%	80.5%
Total n	635	1574	2209
Total %	28.7%	71.3%	100.0%
$X^2=28.4$, $df=2$, $p<.01$			
Source: Table generated by author using data from 1997 NGS			

In terms of the distribution among the five strata of FOS that were employed to analyze the graduates' labor market outcomes, Applied Sciences and Liberal Sciences, the two categories with the lowest unemployment rate and lowest dissatisfaction rate, also had the lowest percentages (10.4% and 8.5% respectively) of participation in the academic labor market (Table 4.3.3). Fully 91.5% of the full-time employed PhD graduates from Liberal Sciences and 89.6% of the Applied Sciences PhD graduates were working in the non-academic world. A comparatively large portion of the PhD graduates from Education was working in colleges (7.5%, Table 4.3.3).

Table 4.3.3 Academic and Non-academic Occupations by Fields of Study of the 1995 PhD Graduates in Canada

	Liberal arts/social sciences	Liberal sciences	Education	Applied arts/social sciences	Applied science	Total
University Prof	29.5%	6.5%	21.3%	32.7%	9.0%	16.9%
College Prof	4.8%	2.0%	7.5%	2.6%	1.4%	3.2%
Non-academic	65.8%	91.5%	71.1%	64.7%	89.6%	80.0%
Total n	757	660	253	153	799	2622
Total %	28.9%	25.2%	9.6%	5.8%	30.5%	100%

$X^2=246.7$, $df=8$, $p<.01$
Source: Table generated by author using data from 1997 NGS

Table 4.3.4 suggests that PhD graduates who have become university professors and college professors earned slightly more than those who worked in non-academic occupations (\$45,157 for university professors and \$44,376 for college professors versus \$40,923 for those in non-academic occupations). At the same time, however, there were still few PhD graduates in the academic world, two years after graduation (only 20% of the 1,916 PhD graduates who responded to the question). The income difference suggests that the academic labor market is more competitive as well as more attractive than the

non-academic labor market on the supply side given that there were few faculty positions available at that time.

Table 4.3.4 Income Distribution by Academic and Non-academic, 1995 PhD Graduates in Canada			
Academic or Non-academic	Mean	N	Std. Deviation
University Professor	\$45157.45	323	20578.60
College Professor	\$44375.92	62	18161.56
Non-Academic Occupation	\$40923.25	1530	20259.36
Total	\$41750.13	1916	20306.79
F=6.37, df=2, p<.01			
Source: Table generated by author using data from 1997 NGS			

Looking at the job continuity of the PhD graduates who worked in and out of the academic world, it appears that more people from the academic world were working on part-time jobs (9.7% of the university professors and 16.3% of the college professors were working 29 hours or less per week). Some 94.5% of the 1,731 PhD graduates who worked in non-academic occupations were working at a full-time job (Table 4.3.5). There is a significant difference between academic and non-academic jobs in terms of job continuity among 1995 PhD graduates.

Table 4.3.5 Job Continuity by Academic and Non-academic Occupations of the 1995 PhD Graduates in Canada				
Job continuity	University Prof	College Prof	Non-Academic Job	Total
Full-time	90.3%	83.8%	94.5%	93.3%
Part Time	9.7%	16.3%	5.5%	6.7%
Total n	431	80	1731	2242
Total %	19.2%	3.6%	77.2%	100.0%
X²=22.16, df=2, p<.01				
Source: Table generated by author using data from 1997 NGS				

Table 4.3.6 reveals that only 49.9% of the graduates who were working in non-academic occupations said they were "very satisfied" with the jobs they were holding (Table 4.3.6). The data show that graduates with academic jobs have higher levels of job

satisfaction than graduates with non-academic jobs. It also appears that an academic job is the goal of PhD graduates.

Job satisfaction	University Prof	College Prof	Non-Academic Job	Total
Very satisfied	60.9%	53.8%	49.9%	52.4%
Satisfied	32.6%	40.0%	43.8%	41.3%
Dissatisfied	5.3%	5.0%	4.6%	4.8%
Very dissatisfied	1.2%	1.3%	1.6%	1.5%
Total n	432	80	1528	2040
Total %	21.2%	3.9%	74.9%	100.0%

$X^2=18.75, df=6, p<.01$
 Source: Table generated by author using data from 1997 NGS

In brief, the analysis in this section shows that female PhD graduates were gaining ground in the universities in Canada, but that they were more likely to work part-time. Visible Minority graduates were still underrepresented in participating in the academic world. Arts and social sciences graduates were most likely of all groups to be working in the academic world. Because there were still few positions available during the mid-1990s, more graduates in the academic world were working at part-time jobs than graduates in the non-academic world. However, graduates entering the non-academic world had less positive job satisfaction rates.

4.4 Prospect of PhD Candidates

Facing the looming shortages of faculty in Canadian universities as described in chapter 2, the question of who wants to become PhD candidates in the future is important to explore since it is commonly acknowledged that future professors come from current or future PhD graduates. Although the NGS questionnaire items referring to PhDs give no indication of their interest in the academic labor market, it is believed that by analyzing the replies to the question, "Do you plan to pursue a PhD degree?" and

comparing the labor market outcomes of the PhD graduates working in and out of the academic world, we could track the employment tendencies of the young adults and shed some light on the looming faculty shortages.

Table 4.4.1 shows that 9.4% of the 1995 university graduates answered "Yes" to the question of pursuing PhD in the future. This includes answers from two different levels of graduates. In this regard, it is more meaningful to split the answer into undergraduate and master level, and the answer will be further cross-tabulated by five strata of FOS.

Table 4.4.1 Frequency Distribution of "Do you plan to pursue a PhD degree?"					
Respondent's Answer	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid 1 Yes	14744	9.4	25.3	25.3	
3 No	43534	27.7	74.7	100.0	
Total	58278	37.1	100.0		
Missing 6 valid skip	89534	57.0			
7 don't know	9044	5.8			
8 refused	9	.0			
9 not stated	325	.2			
Total	98912	62.9			
Total	157190	100.0			

Source: Table generated by author using data from 1997 NGS

Table 4.4.2 demonstrates that 7.9% of the undergraduate graduates and 22.1% of the Master graduates reported that they would like to pursue the PhD degree. If the percentage is converted into a number at the Master's level, it represents 3,161 possible PhD candidates in the near future. These numbers paint a bright picture for the academic world provided that a significant proportion of the PhD graduates choose to work in the academic world. This phenomenon could also be seen as the result of the tight

Do you plan to pursue a PhD?	Undergrad	Masters	Total
Yes	7.9%	22.1%	9.5%
No	24.4%	57.1%	8.1%
Total N	43973	14304	58278
Total %	32.3%	79.2%	37.7%

$X^2=66.4$, $df=1$, $p<.01$
Source: Table generated by author using data from 1997 NGS

labor market during the mid 1990s. Table 4.4.2 also suggests that almost eighty percent (79.2%) of the master graduates were interested in replying to this question, because they were the people who had just acquired the prerequisite degree for a possible PhD study.

Exploring the answers among the five strata of FOS used in this study, it can be seen that more graduates from liberal arts and social sciences studies answered "Yes" to the question, at the under graduate level (Table 4.4.3). At the master level, in

Do you plan to pursue a PhD?	Liberal arts/social sciences	Liberal sciences	Edu	Applied arts/ social sciences	Applied science	Total
Undergraduate						
Yes	3.7%	1.1%	1.2%	1.0%	0.9%	7.9%
No	8.4%	2.0%	4.1%	6.3%	3.5%	24.3%
Total N	16538	4317	7180	9945	5942	43922
Total %	12.1%	3.2%	5.3%	7.3%	4.4%	32.2%
$X^2=1316.2$, $df=6$, $p<.01$						
Masters						
Yes	5.6%	2.0%	4.6%	5.5%	4.4%	22.0%
No	10.8%	3.7%	8.6%	22.5%	11.5%	57.1%
Total N	2960	1015	2383	5052	2866	14276
Total %	16.4%	5.6%	13.2%	28.0%	15.9%	79.0%
$X^2=312.5$, $df=6$, $p<.01$ Source: Table generated by author using data from 1997 NGS						

addition to the liberal arts and social sciences, applied arts and social sciences also had a significantly higher percentage of affirmative answers (at the under graduate level, 3.7% from Liberal Arts and Social Sciences; at the master level, 5.6% from the Liberal Arts

and Social Sciences, and 5.5% from the Liberal Sciences, see Table 4.4.3). Graduates from applied arts and social sciences at the under graduate level, and liberal sciences graduates at the master level, were the least willing to pursue a PhD degree (Table 4.4.3).

Of all the graduates who replied to the question “ Do you plan to pursue a PhD degree?”, the master graduates’ replies carry more weight, because they have acquired the prerequisite degree for PhD study, and, more than the baccalaureate graduates have an informed sense of the limitations and possibilities of a career based on the PhD degree. Once again, NGS did not specifically ask them about university teaching as a career, so it is assumed that the areas with the more graduates that expressed their willingness to pursue a PhD degree would be the areas that could generate a larger portion of PhD graduates willing to teach in Canadian universities.

By 2010, universities will need to find some 32,000 full-time professors, since many professors are due to retire (Frank, 2000). Student enrolment at universities will increase 25% in the next five years, while 1/3 of the current professors will retire in the coming decade (OCUPFA, 2001). According to OCCUFA (2001), current PhD graduates will be able to supply 1/3 of the necessary candidates, since 60-70% of the PhD graduates currently go to the non-academic world. What is worse, the dire financial situation in Canadian universities has driven many people elsewhere, either out of the academic world or beyond Canada’s border (CAUT, 2000). Given this situation, and the aforementioned analysis results, there is reason to notify the government and public that more PhD graduates need to be produced from Canadian universities. However, the faculty shortage may be somewhat exaggerated based on the findings of this study. First, the labor market outcomes for PhD graduates who work in academic jobs are better than

those who work in non-academic jobs in general, which provide incentives for them to enter the academic labor market. The academic labor market situation may well explain why 80% of the 1995 PhD graduates worked in non-academic labor market. If the supply of PhD graduates currently in the non-academic world could be tapped, then the faculty shortage would not be as severe as predicted. Second, 22.1% of the master graduates, and 7.9% of the bachelor graduates have an intention to pursue PhD in the future, insuring a stable and large PhD candidate pool for selection. Third, the faculty shortage is not equally distributed across different disciplines; applied sciences demonstrate more serious shortage than the areas of liberal arts. Lastly, unlike the periods between 1950's and 60's, the mass university education in Canada (Lin, 1999) greatly enhances university capacity to produce PhDs hence, the faculty shortage could be addressed quicker than originally anticipated.

4.5 Summary of the Results

This chapter started by describing the participation rates and labor market outcomes of three levels of university graduate-- baccalaureate, master and PhD. Based on the comparison of three levels of graduates, the chapter focused on the labor market outcomes of PhD graduates in relation to their FOS choices. Gender and visible minority status served as predicting variables in relation to LMO. To address the faculty shortage issues, the labor market outcomes are split as the academic and non-academic segments. Finally, to explore future PhD candidates, we briefly assessed the intention of pursuing a PhD among baccalaureate and master graduates.

Among three levels of graduates, we observe a linear relationship between income and educational attainment: the higher one's education is, the more one's income will be. However, the income gap is much bigger between master and bachelor graduates, than between master and PhD graduates. Master graduates have the lowest unemployment rate (6.5%), nevertheless, PhD graduates are not immune to the unemployment (8.2%), only one percent lower than bachelor graduates (9.2%).

Findings support previous studies that part-timers are underpaid and less respected within and without the university community, and that the majority of part-time professors are women (CAUT, 1999). It is also found that more female PhD graduates were entering the academic world two years after graduation and they earned slightly more than male graduates. Visible minority graduates still earned less than non-visible minority graduates at the doctoral level, which is consistent with previous researches (Pendakur and Pendakur, 1996; Li, 1998; Frank, 1997; Hou and Balakrishnan, 1996; Baker and Benjamin, 1995; Anisef, Sweet, James, and Lin, 1999). A simple comparison between gender and ethnicity suggests that women's status in academic community has slightly improved over the last decade or so, but not the status of visible minority graduates. In general, liberal studies graduates earned less than vocational studies graduates, a finding similar to one in a recent study of the undergraduates (Lin, Sweet, Anisef, and Schetze, 2000), though the latter study also found arts and social sciences graduates from either liberal or vocational fields had lower rates of job continuity and job satisfaction than those with other FOS backgrounds.

Current study also showed that visible minority PhD graduates had a significantly lower rate of working in universities and colleges. Although it is often thought that liberal

studies graduates are more likely to be working in the academic world, this study showed that a significant percentage of graduates from applied arts and social sciences had entered the universities. The study also showed that PhD study was attractive in the middle 1990s to many including the under-graduates and master graduates, albeit in the vocational studies area applied arts and applied social sciences graduates seemed to be least willing to pursue a PhD degree. The study of the LMO returns should provide a guideline for the students who plan to be on the PhD study track.

In general, the findings showed a pattern of LMO for the PhD graduates similar to the rest of the university graduates. It showed that labor market outcomes (income, employment continuity, and job satisfaction) differed between academic and non-academic fields, and the FOS-LMO relationship (within the academic labor market) was qualified by gender and ethnicity.

Chapter 5

CONCLUSIONS

5.1 Summary

An analysis of transitions to the labor market as experienced by PhD graduates in the 1990s provides important insights into the current state of the academic labor market. It also provides some sense of the impact of looming faculty shortages (at least in specific fields of study), although NGS does not indicate the respondent's intention in future work in the academia. More importantly, perhaps, such an analysis increases our general understanding of factors that influence pathways from advanced university education to the workplace. It also serves as a guideline as to the likely destinations of and returns to those interested in future PhD study.

Findings support the following arguments:

Female PhD graduates were making progress in both income and representation in the academic world in universities and colleges, but visible minority graduates were still doing poorly in these areas, as they earned less and were underrepresented. Gender and ethnicity still influenced pathways from advanced university education to the workplace.

Vocational graduates in general enjoyed significantly greater labor market returns than liberal education graduates, but graduates from arts and social sciences, from both liberal and vocational education, suffered the worst LMO in the middle 1990s.

PhD study in the middle 1990s was an attractive goal for most graduates, especially in the vocational study area because of the tight labor market.

Further arguments are supported by the following findings from the present analysis:

PhD graduates were facing a tight labor market in the mid-1990s and their unemployment rate was higher than that of the master graduates. It was also noticed that more PhD graduates in the academic world were working as part-timers than PhD graduates in the non-academic world.

The proportions of the graduates from various Canadian postsecondary educational institutions have not changed, although the absolute numbers have increased in each level of the postsecondary system. The PhD graduates increase encountered a significant slowdown in the mid-1990s.

Many graduates were interested in pursuing a PhD degree, especially the liberal students and students at the Master level. A higher participation rate of the PhD graduates in the non-academic world was expected as a result of the tight labor market at that time. Assuming the best predictor of the future is the immediate past, the following analysis should serve as a significant reference for those PhD enthusiasts. The LMO returns to the PhD graduates were analyzed in terms of their gender, ethnicity and the five-strata FOS.

Women were still under-represented at the PhD level, although more female than male students graduated at the undergraduate and master level. Female graduates who were fully employed did not have a lower income at the doctoral level, but more females were working on a part-time basis, and more females were either dissatisfied or very dissatisfied with the jobs they were currently holding.

Visible Minority respondents had a lower annual income than the Non-Visible Minority PhD graduates, although the job continuity status did not show significant

difference. Many Visible Minority respondents seemed to be content with their jobs. However, more Non-Visible Minority graduates than Visible Minority graduates were working in the academic world.

In terms of liberal and vocational studies, PhD graduates from Vocational studies had a significantly higher income than PhD graduates from Liberal studies. Applied arts and social sciences graduates had the highest annual income, followed by Education and Applied sciences. Liberal arts and social sciences graduates, together with Liberal sciences graduates had the lowest income rate during the initial school-to-work transition period. However, the broad terms of liberal or vocational cannot be employed to describe the labor market outcome differences in terms of the 1995 PhD graduates' unemployment rate and the job satisfaction rate because the present study showed that Liberal Sciences and Applied Sciences had the lowest incidence of working part-time, and a lower job dissatisfaction rate.

5.2 Implications

The analysis of labor market data for the Class of '95 demonstrates the utility of employing a structured individualization approach to describe the labor market outcomes of PhD graduates, outcomes that result from individual choices and experience (field of study) and are influenced by demographic, cultural and structural influences. Rudd and Evans (1998) used the term "Structured Individualization" (SI) to describe the school to work transitions as outcomes of both individual choice and activity, and structure influences. Lowe and Krahn (1995) further discussed the notion of SI by indicating that agency and structure are embedded in each other and therefore the relationship between

structure-agency is always dynamic even at a particular time and place. Anisef, Axelrod, and Lin (1999) asserted that structure and agency have a “combined” influence on decisions and actions in life course.

The findings in this study reaffirmed that structure and agency are closely related in contributing to the school-to-work transition and initial labor market outcomes. The specific time of June 1997, and the specific place, Canada, was chosen for the research. At that time the labor market outcomes during the initial school to work transition period were closely interlinked with the individual’s agentic and structural factors. More specifically, it was found that gender, ethnicity, and field of study all significantly contribute to our understanding of variations in labor market outcomes. It was also found, however, that the concept that Lin, Sweet, Anisef, and Schuetze (2000) developed, which indicated that vocational graduates enjoyed significantly greater labor market returns than liberal education graduates, did not completely fit at the doctoral level. Although vocational graduates usually had a higher income, they did not all have a higher degree of job satisfaction and job continuity.

Cude (1991) noted a serious lack of solid, dependable statistics on doctoral education across the nation. Finnie (2000) thought that the initial transition to the labor market (academic and non-academic) especially required examination, given the importance of the beginning work experience to subsequent career development. This study has, at least partly, furthered the job of examining the initial school-to-work transition period of PhD graduates and made a contribution to the theory of Structured Individualization.

The empirical findings revealed in this study suggest several policy considerations that pertain to improving upon school-to-work transitions for PhD graduates, as well as some implications when we tackle the looming faculty shortages at Canadian universities and colleges. First, more efforts should be made to improve the working conditions of females, especially in the academic world. Our findings show that women faculty members are more likely to work part-time, and more likely to be dissatisfied with their jobs. This is consistent with the findings of Heath and Tuckman (1989) and McLean (1981). Second, we still have a long way to go in Canada to achieve ethnic equity, characteristic of our proud multiculturalism. The empirical findings demonstrated the recurrent problem of Visible Minority graduates earning less than the non-Visible Minority graduates, both in and out of the academic world. This is consistent with the findings of a recent study conducted by Lin, Anisef, and Sweet (2001).

Methodologically, NGS has provided a unique databank to work with in comparing the labor market outcomes of the PhD graduates. Using the all-level university graduates as a context, the labor market outcomes of the PhD graduates were compared in terms of gender, ethnicity, and field of study, cross tabulating with their income, job continuity, and job satisfaction. We especially focused on the area of academic versus non-academic areas and found that more female PhD graduates were working in the academic world, as university professors or college professors, but that they were more likely to be employed on a part-time basis. It was found that visible minority graduates did not have enough representation in the universities and colleges in Canada.

5.3 Future Research

This research has several limitations. The initial school-to-work transition was only examined two years after graduation. More research could be conducted, using the latest five-year survey in the year 2000. Also, by comparing the two-year and five-year survey results, significant differences should appear to make the research more meaningful and complete. More longitudinal studies could also be conducted to compare the labor market outcomes of various years.

PhD graduates should continue to be a focus of study in the coming years; yet, we do not have sufficient research about PhD students while they are undertaking their studies. The attrition rate, the long and harsh years of study, and other concerns should all be included in our further higher education research.

Also, similar research could be conducted using the information collected from universities and colleges across Canada. Canada seems to lack a mechanism in which PhD graduates could be tracked from the time they are admitted to the system to the time they have settled down in their careers. The impact of economic change requires longitudinal studies with a broader set of intention/ questionnaires.

The answers to the question, "Do you plan to pursue a PhD degree?" depended on personal replies at that moment. When more under-graduates from various FOS realize that there is a bigger need for people with a PhD degree, the participation rate should continue to rise. When the economy generates a better prospect, more PhD graduates could turn to other better paid areas including government offices and the private sectors. It would be fruitful to initiate similar studies, using the latest information Statistics Canada and other organizations can supply.

The research has been conducted under the presumption that there exists a looming faculty shortage, although some scholars have different concerns that could have some implications for the findings of this research. For example, Ronald Melchers (2001), in the CAUT bulletin, thinks “we appear to many to be headed towards an American style expanded college system occupying a broad-based lower tier in a hierarchical postsecondary education system. This sector will be hiring teachers below the fully qualified PhD level.” (p.8). The author also thinks that the enrolment increase will only be a localized phenomenon and most universities and most provinces will not experience any enrolment increases over the next decade and many will continue to experience declines. The article also suggests that with very few exceptions, most universities will see their largest number of retirements occur just as the current demographic enrolment surge ends by 2012. According to this study, however, the crisis of faculty shortage may be exaggerated. First, the major indicators of labor market outcomes for PhD graduates working in academic jobs are better than those working in non-academic jobs. This finding is directly in odds with one major worry about faculty shortage that argues that non-academic labor market provides better incentives for PhD graduates. The current labor market outcome advantages will attract future PhD graduates to enter the academic labor market. In addition, about eight in ten 1995 PhD graduates have worked in non-academic labor market; as a group they provide an additional resource to address the faculty shortage problems. If the supply of PhD graduates were not scarce, then the faculty shortage would not be severe as predicted. Second, over two in ten master graduates, and almost eight in one hundred bachelor graduates demonstrate that they intend to pursue PhD in the future, which suggests that the PhD candidates will

be in good supply in the future. Third, the faculty shortage is not equally distributed across different disciplines. The present research suggests that applied sciences demonstrate more serious shortages than the areas of liberal arts. Lastly, unlike the periods between 1950's and 60's, the last three decades have witnessed the expansion of mass university education in Canada (Lin, 1999), which has greatly enhanced university capacity to produce PhDs. Therefore, the problem of faculty shortage could be addressed faster than many people now believe is possible. This research has shown the existence of a number of potential sources of supplying that can be tapped based on variants explored such as gender, ethnicity, FOS, economic incentives, job satisfaction, and labor market structure, factors with both structural and human agency dimensions.

The data also show a potential for "growing" PhDs for universities and colleges in Canada, such as by attracting more under-graduates to pursue graduate studies, attracting more women to some fields, attracting and encouraging and removing barriers for visible minority students, but especially diverting PhDs going into non-academic employment back into academic employment. Environmental factors such as greater financial support for universities and colleges is needed so that these schools can help finance graduate studies through bursaries, fellowships, teaching assistantships, and other subsidies; this will help keep up graduate school enrolments.

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Appendix A Classification of Liberal and Vocational Education (USIS)

Liberal		Vocational
I. Liberal Arts /Social Sciences	III. Education	V. Applied Sciences
8 Fine Arts	1 Teaching	48 Veterinary Medicine
9 Music	2 Education Support	49 Science
14 Classics, Classical and Dead Languages	3 Physical Education and Recreation	52 Architecture
15 History	5 Counselling Services	53 Aeronautical and Aerospace Engineering
18 English Language and Literature	IV. Applied Arts /Social Sciences	54 Chemical Engineering
19 French Language and Literature	10 Performing Arts	55 Civil Engineering
20 Other Languages and Literature	12 Graphic Arts, Audio/ visual Arts and Design	56 Design \Systems Engineering
21 Philosophy	16 Library and Records Science	57 Electronic and Electrical Engineering
22 Religious Studies	17 Mass Media Studies	58 Industrial Engineering
23 Other Humanities	27 Area Studies (non-languages or literatures)	59 Mechanical Engineering
25 Anthropology	30 Law and Jurisprudence	60 Mining and Metallurgical Engineering
28 Economics	31 Man \ Environment Studies	61 Engineering - Other
29 Geography	35 Social Work and Social Services	62 Engineering Science
32 Political Science	37 Specialized Administration Studies	63 Forestry, Fisheries and Wildlife Management
33 Psychology	38 Commerce \Business	64 Landscape Architecture
34 Sociology	39 Secretarial Science - General Fields	76 Dentistry
36 Other Social Sciences	47 Household Science and Related Fields	77 Medicine – General
100 Arts, N.E.C.		
II. Liberal Sciences		
26 Archaeology		78 Medicine - Basic Medical Science
40 Agricultural Science		79 Medical Specialities (non-surgical)
43 Biochemistry		80 Para clinical Sciences
44 Biology		82 Nursing
45 Biophysics		84 Optometry
46 Botany		85 Pharmacy and Pharmaceutical Sciences
49 Zoology		86 Public Health
92 Chemistry		87 Rehabilitation Medicine and Therapy
93 Geology		88 Medical Laboratory and Treatment Tech
94 Math, Actuarial Science		90 Other Health Professions, Sciences and Tech
98 Physics		91 Computer Science
101 Sciences, N.E.C.		96 Meteorology
99 Arts and Sciences, N.E.C.		97 Oceanography

