Revisiting the Labour Market Outcomes Associated with Postsecondary Education: An Analysis of the 2009/2010 Cohort of Canadian University Graduates by Program

by

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ABSTRACT

REVISITING THE LABOUR MARKET OUTCOMES ASSOCIATED WITH POSTSECONDARY EDUCATION: AN ANALYSIS OF THE 2009/2010 COHORT OF CANADIAN UNIVERSITY GRADUATES BY PROGRAM

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Drawing on data from the 2009/2010 National Graduate Surveys, this doctoral research builds upon past research comparing the outcomes of university graduates of various postsecondary programs across earnings, objective and subjective work-to-education match, and job satisfaction. This research consists of four areas of study. Statistical analyses first compare fields of study using disaggregated categories of liberal arts and STEM (science, technology, mathematics, and engineering) programs, to determine the extent to which the labour market outcomes vary for graduates of university programs that are traditionally aggregated in the wider literature. The next stage of research analyzes the outcomes of postsecondary graduates of traditional versus non-traditional (distance education) programs. Comparisons of outcomes of university graduates who specialized in bilingual versus technical (i.e., science, technology, engineering, or mathematics) pursuits comprise the third area of study. Finally, statistical models include sociodemographic variables to assess whether traditional dimensions of disadvantage have remained salient in the outcomes of university graduates from the most recent wave of the National Graduate Surveys. Statistical analyses are comprised of descriptive statistics, ordinary least squares (OLS) regression, binary logistic regression, and graphical displays of predicted probabilities. This dissertation revisits the debate regarding the viability of human capital, credentialist, and labour market segmentation approaches. The policy implications of the results are also discussed.
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Chapter 1: Introduction

The expansion of postsecondary education enrollment within Canada has reached unprecedented levels as governments and international organizations have increasingly called for higher education to expand to maintain a healthy economy. The emphasis on intellectual capabilities over physical inputs that is characteristic of an economy increasingly reliant upon intangible capital has led many scholars to argue that for most people in postindustrial society, higher education has become the central means of status attainment (Powell and Snellman 2004; Baker 2011). Proliferation of Information and Communication Technologies (ICT) has reinforced the perception that postsecondary education is a necessary step for the successful entry into an increasingly knowledge-based labour market (Chen 2008; Cudmore 2005). This economic shift towards knowledge-intensive activities has resulted in unprecedented technical and scientific advancement (Powell and Snellman 2004), which in turn has emphasized the role of postsecondary education as an institution responsible for preparing graduates for entry into an increasingly specialized labour market (Baker 2011).

Postsecondary education has become the primary means of acquiring the types of skills that are necessary to enter the workforce (Baker 2011; Powell and Snellman 2004; Becker 1993). In the West particularly, the erosion of apprenticeships and on-the-job training has led to the taken for granted assumption that investment in a postsecondary education is a necessary step before entry into the labour market (Hansen 2011; Baker 2011). This is further complicated by the fact that the West typically values university education as a signal for productivity, while vocational pursuits are often negatively associated with occupational status (Hansen 2011). This perception has helped establish
the support of mass higher education in Canada, fueling university enrolment rates (Schofer and Meyer 2005). This is consistent with estimates that global participation in postsecondary education has reached nearly “one-third of the age cohort” (Marginson 2016:413-14). An important question in light of this education expansion is therefore: to what extent do Canadian university programs assist in securing favourable labour market outcomes for those who have pursued higher education?

Human capital theorists posit that the investments made in one’s self-capital (through education) will yield greater returns in the labour market (Meer 2011; Adamuti-Trache 2006; Davenport 2002; Graham 2002; Becker 1993,1964; Schultz 1961). Under this assumption the social and private returns on a university degree justify the costs associated with higher education (Meer 2011). This perspective has been the subject of debate within the sociology of education, however, as there is often significant variation in graduates’ experiences within the labour market (Rivera 2011; Hansen 2011; Bol and Van de Werfhorst 2011). It has been widely acknowledged that students of technical or applied fields such as engineering, mathematics and applied sciences have traditionally had better success transitioning into the labour market than those who pursue a liberal arts focus (Davies and Hammack 2004; Guppy and Davies 1998; Lin, Sweet, Anisef, and Schuetze 2000; Finnie 2001; Statistics Canada 2003; Allen, Harris, and Butlin 2001; Tumen and Shulruf 2008; Schwartz and Finnie 2002; Finnie and Frenette 2003; Walters 2004). It has been equally well documented that these technical degrees tend to secure more lucrative earnings on average than programs in the liberal arts (Charles and Bradley 2009; Andres and Adamuti-Trache 2007; Schwartz and Finnie 2002; Delisle, Guay, Senecal and Larose 2009; Schaeffer 2000).
More recent research has furthered this conversation to question whether outcome gaps also exist among generalist fields. Evidence suggests that it may be empirically valuable to further disaggregate liberal arts programs in quantitative analyses (Smith 2015). Though the literature on this area of study is limited, researchers have pointed to variation in the labour market returns for graduates of various liberal arts specializations (see Smith 2015). Axelrod, Anisef and Zeng (2001:16-17) have noted outcome variation across fine arts, humanities, and social sciences, particularly for younger graduates entering either professional or managerial occupations. More recently, it would appear that the labour market returns of fine arts graduates may be more precarious when considered separately from graduates in communications fields (Smith 2015), though more research is necessary to further elucidate these differences.  

The variation among programs is especially important when considering the increasing skepticism regarding the value of Bachelor of Arts degrees. It is possible that not all liberal degree holders are equally in demand, particularly as greater proportions of students complete postsecondary education and enter the labour market irrespective of actual employers’ needs (Brown 2003). Recent research has compared the outcomes of humanities graduates against the graduates of other degree programs (Fenesi and Sana 2015), though little attention has been given to determining the individual experiences of liberal arts fields such as sociology, psychology, anthropology, political science, fine arts and communications programs etc. This is an important area of study, as isolating which

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1 It is worth noting that it can be difficult to disaggregate fields of study within the NGS due to the smaller sample sizes associated with some disciplines. Regardless of this, the NGS survey tends to rely on theoretically problematic field of study distinctions and would greatly benefit from even modest disaggregation. Analyses will therefore rely on aggregated fields where analytically necessary, while attempting to maintain as diverse a coding structure as possible.
degree programs provide the most optimal labour market outcomes is of interest to both policy makers and future students navigating higher education. Thus, this research will interrogate which BA fields are still paying dividends in the labour market.

One possible explanation for the variation among postsecondary degrees may be that labour market returns are still inherently dependent upon skill development. Contemporary supporters of human capital theory have claimed that the effect of a Bachelor’s degree on wages and earnings is less a factor of credentialing and more the value of coursework and investment in developing the cognitive skills that are highly regarded by employers (Ishikawa and Ryan 2002; Kane and Rouse 1993). There is some speculation that the differences among bachelor graduates of various fields is in part due to the rising demand for basic skills—particularly the importance of numeracy and technical ability (Rosenbaum and Kariya 1991). The benefits of mathematical ability on wage returns have been well documented (McIntosh and Vignoles 2001; Tyler et al. 1999; Rosenbaum and Kariya 1991; Grogger and Ide 1995; Murnane et al 1995; Willis and Rosen 1979; Kenny et al., 1979). Moreover, it would appear that development in technical proficiency is an increasingly salient determinant of labour market outcomes (McIntosh and Vignoles 2001; Murnane et al. 1995; Grogger and Eide 1995).

Others have claimed that the reduced demand for manual labour, alongside the ongoing emphasis on ICT and information-based production has drastically increased the need for language development (Isphording 2014). It has been argued that the ongoing globalization of markets has led to increased demand for foreign language proficiency (Isphording 2014). In order to reduce the costs associated with recruitment, and bridge cultural and linguistic barriers in the trade of services, goods, and tourism, employers will
often pay significant wage premiums for employees with scarce language skills (Isophording 2014). This is also true for persons specialized in a country’s dominant languages (Isophording 2014). In Canada, bilingualism in both English and French has been associated with positive labour market returns (Mady 2011). This link is far from clear; there appears to be significant variation by region in respect to the importance of bilingualism on employment opportunity (Adsett and Morin 2004).

Therefore, it is important to understand the significance of both language and technical skill acquisition in the labour market outcomes of recent Canadian postsecondary graduates. The available literature has been inconclusive; part of the problem is that the majority of past comparative research has been concentrated on literacy efficacy rather than language specialization. Of the few relevant studies available on the topic, one study by McIntosh and Vignoles (2001) attempted to understand whether there was a greater labor market premium for literacy or math in the UK. The authors observed that numeracy skills were slightly more important for earnings, while literacy skills were more likely to influence the probability of being employed (McIntosh and Vignoles 2001:475). Using data from the National Child Development Study (NCDS) and International Adult Literacy Survey (IALS), the authors focused mainly on the wider working age population (McIntosh and Vignoles 2001: 461-462). Additional attention, however, is needed to determine how language pursuits, rather than literacy efficacy, influence the labour market returns of Canadian university graduates. The postsecondary graduate data within the National Graduate Surveys are particularly useful for this purpose, as the NGS contains variables that allow analyses to
capture bilingualism because the respondents were asked if they were fluent in both official languages at the time of graduation.

While specialization is an important consideration to determine the returns on human capital investment, much of the discussion within the sociology of higher education has questioned whether postsecondary attainment is a vital resource to build self-capital and a means to remain competitive within an increasingly credentialed labour market. There are some who are cynical of higher education, claiming that education institutions have become lucrative enterprises more concerned with maintaining enrolment rates than ensuring graduates have a place within the labour market (Hansen 2011). Scholars of the credentialist perspective argue that higher education arbitrarily raises employers’ expectations when hiring for lower and entry level positions, leading to over-qualification and under-employment in the contemporary labor market (Hansen 2011; Bills 2011; Walters 2004; Livingstone 1998; Athey and Hautaluoma 1994; Collins 1979).

Hansen (2011) posits that an educational system that is highly dependent on credentials as the key signal of productivity to employers can pressure students to over-invest in education in order to remain competitive within the labour market. He argues, “all but the most advantaged are in no position to evaluate the quality of a bewildering variety of institutions or to understand the vast disparities among them and the value of their degrees” (2011:49). This, in turn, can lead to significant dissatisfaction among recent graduates when the expected pecuniary returns of education do not match the realities of the labour market (Hansen 2011; Frenette 2004).
Along a similar vein, Chillas (2010:158) argues that credential inflation occurs when the jobs that previously required less than postsecondary education “become ‘gradatimized’ or colonized by postsecondary graduates with little change in work content”. In this way, employers’ expectations of productivity become linked to level of education, leading to increased employment requirements (Chillas 2010). A significant part of the problem is that this occurs irrespective of the actual skill demand of the job, a phenomena typically referred to as “the sheepskin effect” of higher education (Baker 2011; Bills 2004). It is most common when there is an excess supply of available graduates—a fact that creates a downward spiral of credentialism as future generations pursue postsecondary education to remain competitive (Collins 1979).

More recently, the growing popularity of online universities has served to increase the number of baccalaureates in Canada while creating uncertainty about the academic integrity of those programs (Cote and Allahar 2011; Barron and Crooks 2004). This is a particularly important issue, as scholars have cautioned that this may compromise the value of a university degree (Bills 2004; Barron and Crooks 2004). As greater numbers of graduates enter the labour market with degrees from institutions that are not easily recognized or verified for their academic integrity, employers may become distrustful of the skills signified by a university degree, which leads to arbitrary increases in hiring expectations (Chillas 2010). Others believe that the increased availability of online study has led to greater enrollment rates for those who would otherwise be unable to pursue higher education (Sturgis 2012). To this end, access to online course offerings has been

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2 While the authors do not speak directly to online education, Hoxby (2009) and Hansen (2011) also discuss the implications of for-profit and non-traditional education institutions on the overall value of a university degree.
seen as the future of education, and has been described as “Automatic Educational Machines” capable of providing round-the-clock opportunities to invest in learning (Yu-Feng and Nguyen 2007:31). Recent governmental policy shifts in the US, for example, have supported online education as a way to provide opportunities that are not typically available for students from disadvantaged backgrounds (Sturgis 2012).

The labour market outcomes of traditionally disadvantaged groups are particularly important to the study of labour segmentation. Scholars who adopt the labour segmentation perspective note that certain groups tend to become “segmented” into lower paying areas of the labour market. Low socioeconomic status (SES) students, for example, are more represented in less lucrative liberal arts fields. They also borrow more than do students in technical degree programs while facing significantly higher burdens in their school-to-work transition (Davies and Hammack 2004).

Analyses of gender have also noted differences in career attainment that is characteristic of labour segmentation. Men are significantly more likely to move into technical specializations while women tend to graduate with liberal arts credentials and are more likely to occupy lower paying positions in the labour market (Franzway et al 2009, Charles and Bradley 2009, Andres and Adamuti-Trache 2007, Schwartz and Finnie 2002, Finnie 2001). Even within fields, Andres and Adamuti-Trache (2004) found that women and men are often segregated into subfields along lines of masculine and feminine work characteristics, leading women to experience a “glass ceiling” to career mobility (Budig 2002, Maume 1999, Williams 1990). Labour segmentation can also be an important analytical tool to help understand systemic inequalities for visible minorities.

One possible explanation is that systemic inequality is a product of opportunity hoarding practiced among dominant groups (Tilly 1998). A common theme among credentialist and labour segmentation scholars is the belief that the social elite exercises social closure by determining the value of employee characteristics and credentials (Brown 2001; Tilly 1998; Bourdieu 1986). Credentialists are critical of degree awarding institutions, arguing that the academic elite decides what forms of cultural and social capital are valued and rewarded, and informs employer expectations of graduating cohorts’ abilities (Brown 2001). Along similar lines, they argue the professional elite regulate group access by staunchly differentiating occupational boundaries to maintain privilege, particularly as mass higher education erodes traditional level of education advantages (Lucas 2001).

A large part of success in the labour market is therefore dependent upon the ability to emulate the status quo (Brown 2001). Segmentation theory expands on the conceptualization of social closure beyond the occupational structures emphasized in credentialism. For example, Bauder (2001) argues that boundaries are defined through broader contexts of social disadvantage. “Social closure is achieved when class, gender and ethnic groups control access to labour market segments, and when segmented workers reproduce their position in society” Bauder (2001:40). Therefore, analyses may provide support for credentialist and/or labour segmentation explanations of disadvantage, should significant variation exist among postsecondary graduates from different socioeconomic or sociodemographic backgrounds.
1.1 Purpose of Research

This dissertation will build upon past research comparing the outcomes of university graduates of various postsecondary programs across earnings, objective and subjective work-to-education mismatch, and job satisfaction. These outcomes have been chosen to capture the theoretical perspectives outlined in this chapter. Earnings outcomes, for example, measure the returns of human capital investment in higher education. At the same time, the variables related to work-mismatch tap into credentialism, and whether graduates are securing appropriate work given their postsecondary pursuits. Including subjective accounts of employment alongside socioeconomic and sociodemographic variables accounts for the differences in labour market experiences between graduates that may point to labour market segmentation of certain groups.

This dissertation will draw on data from the 2013 wave of Statistics Canada’s National Graduate Survey (NGS). Collected via telephone interview, the NGS is a federally sponsored survey that has been actively carried out by Statistics Canada since 1984. Recent revisions to the survey have made the latest 2013 wave of NGS incompatible with previous versions, however. Although comparisons to past survey years are incompatible, the additional time between graduation and survey period allows for a different understanding of the transitional experiences of this cohort than previously covered in past versions of the NGS.

The main objective of the NGS is to observe the transition of Canadian postsecondary graduates from school to work, and document their various labour market

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3 While interviews were previously conducted two years after graduation, this latest release of data surveys graduates three years after completing their programs.
outcomes. By recording this information, we are able to study a number of the outcomes associated with postsecondary education, particularly with respect to program type, field of study, and the types of skills held by graduates. The data provide a wealth of information on the labour market experiences of more than 14,000 university graduates (a roughly 49% response rate of graduates) from all provinces and territories in Canada. Despite the survey’s limitations, the NGS is still the best resource for looking at the labour market transitions of recent Canadian postsecondary graduates.

The analyses in this dissertation will consist of ordinary least squares (OLS) and binary logistic regressions. Nesting will be used to enter variables into the models in a series of stages. The first stage of analysis will look at baseline measures of dependent and independent variables. The second stage will introduce traditional sociodemographic controls into the models, while the third will account for the effect of income.

The research will address graduates’ labour market outcomes across four particular areas of study. Analyses will first compare fields of study using disaggregated liberal arts and STEM programs to determine which fields of study provide the greatest returns within the labour market. The next stage of research will analyze outcomes between graduates of traditional versus non-traditional (online and distance education) university programs. Comparisons of outcomes for graduates who are bilingual, and graduates with technical (i.e., STEM-based) skills will comprise the third area of study. Finally, sociodemographic characteristics will be a component of each of the other three analyses, to assess whether traditionally disadvantaged statuses have remained salient in the outcomes of university graduates from the most recent wave of the National Graduate Surveys.
The analyses in this doctoral research will also contribute to the literature on human capital, credentialist, and labour segmentation perspectives. If, for example, analyses show that university graduates have equally favourable labour market outcomes irrespective of fields of study, then the investment assumptions made by human capitalists may be supported. On the other hand, if the concerns of credentialist scholars are salient, the less favourable employment outcomes of graduates from traditional academic fields may be indicative of credentialing processes (Adamuti-Trache 2006; Brown et al 2003; Walters 2004). Alternatively, if differences exist between graduates along sociodemographic lines, it may support the position of a segregated labour market.

As changes to higher education widen access to university degrees, scholars have warned that an increasingly educated workforce may devalue the worth of postsecondary certification (Brown et al. 2003). It is therefore important to understand the experiences of the recent cohort of university graduates across school-to-work match, earnings, and job satisfaction to understand how education is valued and rewarded in Canada’s present economy. Given that recent cohorts of graduates have not been sufficiently analyzed, there is a dearth of information on the labour market outcomes of recent Canadian postsecondary graduates. Particularly, the goal of this study is to revisit the literature on school-to-work transition using the latest release of the National Graduate Survey (NGS).

Much of the research on the labour market outcomes of postsecondary graduates in Canada is now dated. Even among recent studies utilizing the NGS, researchers have relied on data that are nearly a decade old (Fenesei and Sana 2015; Lemieux 2014; Frank and Walters 2012; Zarifa 2012; Zarifa and Walters 2008). The release of the 2013 NGS provides an opportunity to tap into the experiences of graduates who obtained their
degrees within this decade, allowing researchers to fill substantial gaps in our knowledge of the current labour market in Canada.

The variables contained in the latest release of graduate data also allow for analyses that can inform the literature on traditional and non-traditional university programs. As institutions offering online programs become an increasingly popular option for those seeking postsecondary education, empirical analysis of recent data is necessary to determine how these degrees translate within the labour market. Anecdotally, media reports position online institutions as the future of postsecondary education, advertising flexible learning schedules, and boasting high enrollment rates of students from traditionally disadvantaged sociodemographic backgrounds (Habib 2014). Some have argued, however, that while online programs are designed to accommodate large proportions of new applicants, these applicants may struggle to complete their degrees, or experience difficulties transitioning into the labour market upon graduation (Lee and Nguyen 2007). In light of this debate, further empirical analysis is necessary to determine the real returns of online education investment and more specifically, whether employers are receptive to non-traditional university credentials.

There is a similar need to account for the skills graduates acquire that can influence their labour market outcomes. Past research has traced labour market differences along lines of skill specialization (Isophording 2014; McIntosh and Vignoles 2001; Ishikawa and Ryan 2002; Kane and Rouse 1993), though additional analysis is required to determine the extent to which these skills mediate the outcomes of university graduates specifically.4 Studying skill acquisition in this way will inform the conversation on the

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4 It is important to note that while this subset of analyses is a comparison of graduates’ skills, bilingualism may be obtained outside of university. Therefore these analyses account for the effect of these skills on
employability of graduates with general and technical backgrounds that has been a central focus of higher education literature (Charles and Bradley 2009; Andres and Adamuti-Trache 2007; Delisle, Guay, Senecal and Larose 2009; Davies and Hammack 2004; Guppy and Davies 1998; Lin, Sweet, Anisef, and Schuetze 2000; Finnie 2001; Statistics Canada 2003; Allen, Harris, and Butlin 2001; Tumen and Shulruf 2008; Schwartz and Finnie 2002; Finnie and Frenette 2003; Walters 2004; Schaeffer 2000).

While the outcomes of postsecondary graduates is by no means an understudied area of higher education research, there is still some question as to whether previous findings are consistent with Canada’s latest postsecondary cohorts. Have the gaps in outcomes among graduates of particular programs remained salient in the labour market? Do the subjective and objective measures of skill match demonstrate that university programs are satisfying employers’ hiring needs? Are graduates finding satisfactory occupations? To what extent have the inequalities experienced by traditionally disadvantaged groups persisted for the latest wave of surveyed graduates? These are important questions that deserve further attention.

1.2 Questions guiding the research

This study will employ a number of measures of labour market outcomes to answer questions related to the transition experiences of postsecondary graduates. The following questions will guide this doctoral research:

1. Which university programs provide the best skill matches to the early labour market outcomes of their graduates?

2. Which university programs are most likely to produce graduates that are overqualified for their early labour market careers?

graduates’ earnings and underemployment, but not necessarily on the returns of bilingualism as a university pursuit.
3. Which university programs provide the most favourable earnings outcomes for graduates?

4. Do graduates of traditional and distance education programs share similar labour market outcomes?

5. To what extent do early career outcomes of postsecondary graduates differ depending on the investment in bilingualism and technical skills?

6. For each of the five questions above, do the observed outcomes differ among graduates with traditionally disadvantaged backgrounds?

In sum, this dissertation is intended to help us understand which university pursuits are associated with the greatest employment advantages, while identifying the groups that face the most precarious labour market outcomes. This research will be important for policy makers, parents, and students of future cohorts who navigate educational tracks and employment opportunities. Knowing which careers will yield lucrative outcomes is necessary to effectively fulfill the demands of the labour economy and to ensure the qualifications earned by incumbents are properly rewarded. Moreover, knowing which educational investments provide the greatest returns can inform policy around training, and would provide valuable information for identifying and responding to employment gaps among working Canadians.

The next chapter will offer a discussion of human capital, credentialism, and labour segmentation to provide relevant theoretical insights into the experiences of recent postsecondary graduates. These theories will be used to frame the labour market outcomes experiences of university graduates. After establishing the theoretical foundation for the dissertation, the literature review will then discuss the existing research on the key empirical issues that are relevant to each of the research questions above. This section of the chapter will discuss what research has been done in the
sociology of education literature that is relevant to this dissertation, and help to situate the dissertation within the wider literature.

Chapter three will elaborate on the data and methodology that will be employed in this study. An explanation of the variables used in the analyses, along with a discussion of the coding of these variables will be provided in this chapter. This chapter will also present an overview of the statistical procedures that will be used throughout the dissertation. Chapters four and five will present the results of the statistical analyses. Chapter four consists of three sections. The first section will present the descriptive statistics of graduates sampled in the analyses. Next, the second section of the chapter will present the descriptive results of disaggregated liberal arts fields across a number of labour market measures: subjective and objective education-to-work match, job satisfaction, and earnings. The final section of the chapter will then present regression results capturing the effect of disaggregated fields of study across underemployment and earnings. Chapter five is comprised of two sections, and covers two different dynamics of postsecondary education. The first section will focus on the statistical analysis of the earnings and the chances of underemployment among graduates from traditional and non-traditional (distance education) programs. The second section will assess the influence of bilingualism and technical skills on the earnings and chances of underemployment of postsecondary graduates.

The last chapter of this dissertation, chapter six, will attempt to situate this research into the wider theoretical discussion. This chapter will provide a discussion of the results in light of the existing literature, identify the policy implications of the results, address the limitations of the study, and provide suggestions for future research.
Chapter 2: Review of the Existing Literature

2.1 Chapter Outline

The purpose of this chapter is to discuss the relevant literature on the school-to-work transitions of university graduates. The first section of this chapter will address the relevant theoretical perspectives associated with education and work, and offer context for the issues that are central to this dissertation. It will offer a discussion of the human capital, crendentialist, and labour segmentation explanations for differences in the labour market outcomes among postsecondary graduates. The next section of this chapter will address the relationship between postsecondary education and the labour market, and how changing trends within Canadian higher education have shaped our conceptual landscape of the relationship between school and work. The third section will narrow the focus to look at the disadvantage associated with certain backgrounds; particularly, this section will offer a discussion of the ways in which gender, race, disability, and socioeconomic status have informed the labour market outcomes of graduates. The final section will offer a discussion of the labour market outcomes that will be central to this dissertation, and address the relevant issues graduates face when making the transition into the workforce.

This dissertation will offer a number of key contributions to the literature. As postsecondary education has continued to expand in Canada, postsecondary institutions have likewise evolved, creating opportunities for an unprecedented number of young Canadians. Changes within the conceptualization of work can create substantial division
in postsecondary graduates outcomes, particularly as departures from standard work arrangements become more common. It is therefore important to understand how field of study decisions, sociodemographic backgrounds, program types, and differences in skills mediate the job satisfaction, school-to-work match, and earnings of these graduates. Utilizing data on the most recent cohort of graduates captured in the National Graduate Surveys, this dissertation will offer further insight into topics that often lean too heavily on data from the U.S., in order to contribute to the discussion of higher education outcomes from a Canadian perspective.

2.2 Theoretical Perspectives

The following section will address the relevant theoretical perspectives within the sociology of school and work. Human capital theory will be covered first, followed by a review of the literature related to credentialism. A discussion of labour segmentation will comprise the final pages of this subsection.

2.2.1 Human Capital Theory

Early 20th century structural functionalist scholars assumed educational expansion to be a natural byproduct of technical sophistication (Bell 1973). According to functionalist thought, greater investment in schooling is a necessary response to the increased employment demands of a knowledge-based economy brought on by post-World War II industrialization (Becker 1964; Schultz 1974). Schultz emphasized educational advancement as: “a product of deliberate investment, that has grown in Western societies at a much faster rate than conventional (nonhuman) capital, and that its growth may well be the most distinctive feature of the economic system” (Schultz 1961:1). As knowledge-based employment supplanted manual labour, education quickly
became the primary institution for social mobility and “new knowledge” attainment (Walters 2004:23).

Microeconomic theory acknowledged the investment in “human capital” as a means to explain differences in labour market outcomes (Schultz 1961; Becker 1964). Becker (1964:2) believed higher education to be intrinsically connected to labour market success, arguing that: “more highly educated and skilled persons almost always tend to earn more than others” therefore, “inequality in the distribution of earnings and income is generally positively related to inequality in education and other training”. According to Brown (2001), the human capital approach views outcome inequalities as a product of insufficient productive capacities brought on by a lack of investment in skill acquisition.

Conceptualizations of human capital dominated sociological analysis in the first half of the 20th century, with much of the emphasis on status attainment research—that is, how the rational choices of actors’ educational pursuits came to inform large-scale social stratification (Davis and Moore 1945; Wrong 1959; Tumin 1953). While early human capital theorists were primarily focused on individual-level explanations of graduates’ outcomes, they became a major target of criticism when scholars began investigating the embeddedness of political struggles within the labour market (see Granovetter 1985). Furthermore, critics of human capital theory questioned the extent to which postsecondary education matched employers’ hiring needs; academics that were skeptical of human capital theory claimed individual-level analysis alone could not account for macro-level differences in hiring practices (Brown 2001).

In response to these criticisms, human capital has undergone a number of revisions among economists seeking to reconcile the disconnection between skill
attainment and employers’ measurement of productive capacities. Some scholars have developed “signaling” theories, which argue that graduates use degrees to signal their competencies to prospective employers (Spence 1974). Signaling theory also refers to employer-side dynamics; particularly that employers “filter” pools of applicants via postsecondary attainment as a means of narrowing pools of applicants down to only those who have demonstrated their ability to learn (Arrow 1973; Thurow 1975). In this way, human capital revisionists view postsecondary education investment as a proximal measure of the productive capacities of prospective employees.

Although theorists have used signaling and degree posturing to respond to criticisms of education-employment mismatch, human capital explanations have still largely failed to address the underlying sociopolitical forces that influence social structure. As a result, some human capital scholars have overestimated the capabilities of postsecondary education to provide meritocratic outcomes. Meritocratic explanations of human capital are firmly rooted in the position that all postsecondary attainment is productive (Chillas 2010). Coined first as a dark satire within Michael Young’s (1994) *The Rise of Meritocracy*, meritocracy has come to represent the movement of modern society towards a system where educational achievement is instrumental in explaining social stratification (Bills 2004). Meritocratic explanations of stratification acknowledge social inequalities between prospective workers, though scholars argue that such inequalities represent passive rather than active identities (Bradley 1996:72). The human capital argument is that qualifications overtake such identities as uncontested markers of merit (Chillas 2010). Economic success and social structure, therefore, depends more

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5 First published in 1958, Young’s book was a satirical account of social stratification, which went on to become a key component of human capital explanations of social structure.
upon the merits of educational achievement than on gender, race or socioeconomic advantage (Bills 2004; Jackson 2007; Bradley 1996). Merit, earned through human capital development, represents the means through which societies solve social problems—universities become the primary source of economic mobility (Bell 1973). Postsecondary education functions as a “passport” through which social parity is achieved (Jackson 2007).

Empirical evidence of meritocracy has been mixed in the wider literature. Bills (2004) has claimed that the U.S., for example, has become an increasingly meritocratic society. He argues that the increasingly dubious nature of “diploma mills” and the questionable integrity of certain degrees have directly challenged the assumptions of credentialism in recent years (Bills 2004). While credentials may provide access to jobs, Bills (2004) argues that merit has a greater effect on promotion as employers’ trust in credentialing institutions weakens. Similarly, some scholars have found that the effect of race and socioeconomic status on labour market outcomes disappears when controlling for postsecondary education, indicating that differences among equity groups may be largely attributable to educational attainment (Arcidiacono et al. 2012; Flores and Park 2014; Macleod 2011). This is highly contested in the literature, however, as studies have indicated that significant gaps exist for women (Franzway et al. 2009; Charles and Bradley 2009; Andres and Adamuti-Trache 2007; Budig 2002; Maume 1999; Williams 1990) and persons with disabilities (Zarifa, Walters, and Seward 2015) irrespective of educational achievement. Moreover, other studies have indicated that while some educational institutions stressed meritocratic achievement, socioeconomic privilege was the greatest determinant of successful outcome (Khan 2012; 2013). It would seem that
although the meritocratic argument claims postsecondary education increases parity for disadvantaged groups, it would appear that merit is not granted ubiquitously.

Meritocratic theorists have also struggled to establish a central metric of merit (Breen and Goldthorpe 2001). This is particularly problematic within the graduate labour market, as poorly defined skill requirements lead to even more ambiguous measures of merit (Chillas 2010). Chillas (2010:159) argues that “if employers are unwilling/unable to agree on what skills are required, then universities cannot be expected to provide them, and a causal connection between qualifications and merit is not necessarily established”.

It is therefore common for the quality of employment secured by graduates to be used as the benchmark of merit. This view assumes that those who achieve the highest forms of employment are the best deserving due to the investments in education made within their field. For supporters of human capital theory, years of schooling are what matter most in regards to education investment (Baker 2011; Bol and Van de Werfhorst 2011; van der Meer 2011). This measure can be problematic, however, as scholars have indicated that employers often have hiring criteria apart from what is provided in a university education, complicating what is considered “meritocratic” achievement among postsecondary graduates (Rivera 2011; Hansen 2011; Brown 2001).

Aside from types of employment, the amount graduates earn is another way in which merit is often identified (Chillas 2010). The common assumption is that merit is positively correlated with the level of income obtained. This presents a similar problem, as researchers have identified social forces aside from purely meritocratic achievement that interfere with the remuneration of graduates entering the labour market (Zarifa, Walters, and Seward 2015; Charles and Bradley 2009; Andres and Adamuti-Trache
One example is that the surplus of graduates within particular fields can lead to highly variable employer demands in hiring decisions (Keep and Mayhew 2004). This has led Chillas (2010:159-160) to caution that if degree education is “rewarded” by employment the risk is “borne by graduates who are not in full possession of future labour market opportunities when they select their degree”. It is therefore useful to measure outcomes by field of study. If employment is secured by merit analyses should not reveal significant variation between similarly trained graduates with different sociodemographic backgrounds. Alternatively, should analyses differ by graduates’ backgrounds then an alternative explanation may be necessary.

Accounting for the assumptions of human capital and meritocracy is necessary when studying the current cohort of postsecondary graduates. If Canada has experienced a “renaissance” of meritocratic human capital investment similar to the claims made by Bills (2004) regarding the United States, then analyses of graduates earnings and employment outcomes should also indicate parity among graduates from traditionally disadvantaged groups with those of the traditional “elite”. This could have important implications for postsecondary transition literature, particularly in response to past research that has stressed the effect of sociodemographic background on outcomes (Khan 2013; 2012; Charles and Bradley 2009; Brown 2001; Bauder 2001). Alternatively, should differences exist after controlling for university education, it would reaffirm the need to explore theoretical frameworks which depart from meritocratic explanations. Primarily, the criticisms of human capital by credentialist and labour market segmentation theorists are important to consider, as they offer alternative accounts for the disparities among postsecondary graduates’ labour market outcomes. Scholars of these
frameworks tend to view the meritocratic process as being “rigged” by the socioeconomic elite. Rather than being meritorious in achievement, dominant members of society hoard opportunities through credentialism and labour segmentation in order to maintain their advantage (Goldthorpe 2003; Brown, Hesketh, and Williams 2004; Chillas 2010).

2.2.2 Credentialism Theory

The majority of research suggests that higher levels of education are positively associated with greater labor market returns (Frank and Walters 2012; Madaus et al. 2008; Walters 2004; Allen, Harris and Butlin 2001; Land 2000). Moreover, the pursuit of higher education has become increasingly necessary, as hiring selectivity among employers has made it more challenging to secure well-paid, long-term, stable employment with each generation of graduates (Graham, Jones, & Shier 2010; DeFreitas 2008; Lehmann 2005; Land 2000; Marquardt 1999; Crompton 1996; Wannell 1989). Failing to meet the rising educational demands of employers may result in poor labour market returns, or greater susceptibility to unemployment (Tanner et al. 1995). In response to these trends, young Canadians face pressure to pursue more advanced levels of education and training to remain competitive (Land 2000). This demand to remain competitive has resulted in many individuals—even those who are already highly educated—feeling the need to continuously upgrade in order to maintain an “educational edge” (Hansen 2011; Land 2000; Lowe and Krahn 1995; Livingstone 1993).

Unfortunately, the increased demand for higher education has not been consistent with the technical requirements of employers (Land 2000). Some scholars are concerned that the skills and training provided by postsecondary institutions have become disconnected from labour market demand (Graham and Shier 2014; Baciu and Lazar
2011). Critics argue that higher education institutions provide training for positions that are no longer readily available in the labour market (Graham, Shier, and Eisenstat 2014). Some of the most cynical credentialists refer to the returns to education as “sheepskin effects”; that educational qualifications “are rewarded for reasons other than the skills learned in school” (Bol and Van de Wefhorst 2011:120). According to Baker (2011:8) “this education-as-myth model attempts to debunk schooling as an educational transforming process by arguing it only sorts and allocates individuals into the world of work based on their innate ability, family socialization, and often their family’s social statuses”.

Credentialist theorists have long cautioned that the emphasis on education for the sake of heightened credentials would have negative consequences (Graham, Shier, and Eisenstat 2014; Land 2000; Brown 2001,1995; Collins 1979; Berg 1971). Berg (1971) was among the first to identify the irrational preference for credentials on behalf of employers. Counter to the signaling theories that became popular among economists apologetic to human capital (Spence 1974), Berg (1971) argued that employers’ emphasis on credentials had little or no relationship to employees’ productivity.

Randall Collins (1979) elaborated on this further, arguing that securing employment is more dependent upon attaining specific credentials than on possessing requisite skills. Credentialist theory rejects the fundamental assumptions of human capital theory, on the grounds that they are unable to account for variables beyond individual-level analysis (Brown 2001:22). Credentialists emphasize the need to account for wider social and political forces when analyzing occupational stratification (Brown 2001:22). For Collins (1979), competition within credentialed stratification occurred
through status groups, rather than individual status attainment. Counter to human capital theory, “credentialism” is the belief that formal education “has become a tool for screening out and selecting employees for reasons which have little or nothing to do with the capabilities that are associated with specific levels of education attainment, the skills that are required on the job, or the abilities of these individuals who have completed specific numbers of years of schooling” (Land 2000:11). Instead, credentialism is characterized by a weak connection between one’s formal educational credentials and the actual skill criteria of employers (Walters 2004:102).

Collins’ contemporaries have gone so far as to argue that postsecondary institutions have failed in their intended design (Brown 2001; 1995). Brown (1995) claims postsecondary institutions have been unsuccessful in providing preparatory training for young adults to enter the labour market. He argues that higher education has primarily become a means to secure positional power in jobs through credential attainment rather than actual technical skill advancement (Brown 2001:20). In this way, credential demand has not been driven by a greater complexity of employment, but rather by factors entirely unrelated to years of schooling, or technical knowledge attained (Land 2000; Redpath 1994; Brown 2001).

2.2.2.1 The Devaluation of a University Degree

Credentialist scholars have been cautious of the increasing homogeneity of higher education—there is a serious concern that educational standardization “dilutes learning by ‘McDonaldizing’ education and…encouraging students to plod mindlessly through degree sequences in pursuit of guaranteed vocational rewards” (Brown 2001:26). A greater concern, however, is that the returns on a university education decline as the
labour market becomes increasingly saturated with equally qualified graduates (Hansen 2011; Keep and Mayhew 2004; Livingstone 1998; Land 2000).

Max Weber’s (1922/1978) seminal work *Economy and Society* offers some theoretical insight into the value of education as a tool for delineating social position. He argued that educational credentials are a form of social credit, which come to symbolically represent the capabilities of individuals on behalf of larger status groups. The worth of a status group is therefore intrinsically dependent upon the legitimacy in which it determines its members. The value of credentials is therefore dependent upon their perceived legitimacy. Credentials act as bridges of trust in business among otherwise unknown strangers (Baker 2011). As Brown (2001:26) notes, “individual malfeasance will threaten the legitimate authority of the entire credentialing body”. It is therefore of little surprise that the expansion of higher education has fortified credentialing hierarchies at the top tiers of education through licensing regulation and other forms of occupational closure (Baker 2011). Beyond the exponential growth in undergraduate enrollment rates at formal institutions, the popularity of distance education and online only accreditation has contributed to the fortification of credentialism in ways Weber could not have expected. The outcomes of university graduates are precariously situated, as the academic integrity of online only institutions has become a target of considerable criticism (Baron and Crooks 2005; Scanlon and Neumann 2002; McCabe 2003; Kennedy et al. 2000). The perception of legitimacy is imperative for the success of graduates, as distrust will ultimately lead employers to rely on more rigorously credentialed bodies of authority (Brown 2001:26; also see Hansen 2011 and Baker 2011).
Employers’ hiring standards are also determined by the availability of appropriately educated workers (Land 2000:11). If the supply of workers with a particular set of skills is limited, hiring standards will be lowered (Land 2000:11). However, as the number of graduates increases, employers can raise their educational requirements without fear of losing access to large pools of applicants (Marquardt 1998:79; Rivera 2011). In fact, Holzer (1996) found that employers responded to the oversaturation of university-educated workers by inflating their educational requirements as a strategy to reduce the number of candidates they had to screen and to minimize the costs associated with recruitment. This inflation of credential requirements can further compromise the value of a university degree (Walters 2004:104). As employers demand higher levels of education irrespective of the actual requirements of the job, credentialists predict higher levels of underemployment, as university graduates are likely to be faced with employment opportunities that under-utilize their skills and education (see Walters 2004; Land 2000).

Credentialism offers a better explanation of current underemployment and labour market inequality than is afforded by human capital theory. While supporters of human capital theory view knowledge pursuits as power and the source of innovation and policy formation (Targ 1976:474), for Collins, education serves more as a vehicle for sociability and propriety (Collins, 1979:19). Contemporary credentialist theorists argue that credentialism perpetuates “age based social inequality and exclusion by providing opportunities to young adults only for positions within the low skill/low pay segment of the labour market” (Graham, Shier, and Eisenstat 2010:201). Scholars argue that one of
the major consequences of credentialism is that formal education is used to restrict social mobility, contributing to unequal distributions of earnings and wealth (Land 2000:13).

Collins (1979) recognized the power dynamics inherent in credentialism. By controlling the accreditation of degrees, occupational status hierarchies could be maintained. Degree holders therefore maintain power over non-degree holders through formal claims of competence (Brown 2001:26). A common theme is that elite members of society protect their dominant status by controlling the educational requirements of professional programs to deny entry to individuals who are unable to acquire the proper credentials, regardless of the skills, abilities or potential they possess (Baker 2011; Land 2000; Collins 1979).

Credentialists share a theoretical camp with proponents of Maximally Maintained Inequality (MMI) and Effectively Maintained Inequality (EMI), who contend that higher education reproduces the status quo though spheres of power, and social and political biases that create credential barriers for those who are not within the appropriate social strata (Davies, Maldonado, and Zarifa 2014; Zarifa 2012; Ayalon and Shavit 2004; Lucas 2001; Raftery and Hout 1993). On the one hand, those who adhere to MMI argue that as educational enrollment at any given level of education reaches saturation for the upper-class, that particular transition point will become more accessible to the working class, thereby reducing the effect of social origin (Raftery and Hout 1993). While education becomes more universal at certain levels, proponents of MMI argue that privilege is maintained through the pursuit of even more advanced levels of education (Davies et al. 2014; Zarifa 2012; Ayalon and Shavit 2004). Thus, inequality is “maximally” maintained, “as long as those in the privileged stratum can increase their
educational attendance rates as fast or faster than those in the less-privileged strata” (Ayalon and Shavit 2004:103).

Raftery and Hout (1993) predict that as the participation rates of advantaged groups rise in advanced levels of education, the influence of social background on higher education will decline in all subsequent lower tiers. The authors found that “the effect of social origins on educational success was much stronger at the first crucial transition than at subsequent transitions” (1993:60). Therefore, according to proponents of MMI, socioeconomic status should have a decreasing effect on the outcomes of university bachelor graduates, particularly as the structural expansion and proliferation of advanced postgraduate and professional degrees has widened access to undergraduate enrollment in excess of population demand (Davies et al. 2014; Zarifa 2012).

On the other hand, EMI diverges from MMI in a number of pivotal ways (Lucas 2001). According to Davies et al. (2014:25), “if MMI describes how inequality is maintained through upward movements between credential tiers, EMI describes how inequality is maintained through lateral movements within a tier”. Proponents of EMI criticize theories of MMI for believing educational systems are one-dimensional (Ayalon and Shavit 2004). That is, where MMI suggests that competition between families will not exist within any education level that is universal, theories of EMI argue that when educational access is widened, additional lines of division will be created within higher education (Zarifa 2012; Lucas 2001). In this way, EMI presents the possibility that inequality between groups of different social origins will not decrease, as those from

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6 Lucas (2001:1647) offers a particularly useful explanation of demand as “the amount of schooling expected on the basis of population level and social class background composition”.

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privileged backgrounds will continue to look for additional ways to draw social boundaries (Zarifa 2012).

In Canada, the expansion of higher education has eroded quantitative lines of advantage (characterized by the amount of schooling), resulting in increased access to higher education for students from traditionally disadvantaged backgrounds. Lucas (2001:1652) argues that as the quantitative lines of advantage disappear, socioeconomically advantaged actors will seek qualitative differences to maintain their dominant position. Examples of these qualitative advantages can include “well-positioned schools, institutions, fields of study, and programs” that provide graduates more favourable returns than other entities can offer (Davies et al. 2014:24). Therefore, as greater numbers of students from diverse backgrounds pursue higher education in Canada, holding a university degree may no longer provide a clear representation of privilege, resulting in the creation of additional lines of advantage. This calls for analytical insight into current differences between disaggregated undergraduate fields of study, bilingualism and technical skills, and the comparison between traditional and non-traditional (distance) degree programs to determine how, if at all, traditionally advantaged groups have maintained lines of division.

In essence, theories of MMI, EMI, and credentialism share a very similar conceptual space as labour segmentation theory and Bourdieu’s (1986) forms of capital, as these perspectives emphasize the reproduction of social advantage through the establishment of barriers to social location. These perspectives are fundamentally reliant upon social closure, the process by which dominant groups establish rules and positional property to protect privilege. While Bourdieu (1986) acknowledges the role of
credentials as a symbolic recreation of status, it is the interrelation of individual and structural forces that forms the social identities which influence segregated labour markets. Similarly, where labour segmentation theory shares with credentialism the same concerns for polarization based on occupational structures, it is the former’s emphasis on subordinate social groups that differentiates the theories.

2.2.3 Labour Segmentation Theory

Where credentialist and human capital scholars conceptualize inequality as a dynamic that occurs within a single integrated workforce, segmentation theorists challenge the notion of a universal market mechanism. These scholars argue that markets are divided into segments, each governed by their own processes of supply and demand (Bauder 2001:38). Though the specific number of segments varies by model (see Daw and Hardie 2012; Hudson 2007; Ryan 1981; Clairmont et al. 1983; Rumberger and Carnoy 1980; Lee and Wrench 1987; Gittleman and Howell 1995), they share a common belief that boundaries between segments rigidly moderate the opportunity available to workers. In this way, segmented workers are matched with employment outcomes independent of the supply and demand processes in other segments (Bauder 2001:38). The crux of the argument suggests that the labour market is segmented into “good” and “bad” jobs (Daw and Hardie 2012), though employment can also be stratified in upper and lower tiers of jobs within these segments (see Reich, Gordon, and Edwards 1973; Pior 1975; Osterman 1975; Bluestone 1970).

Labour segmentation is particularly suited to explanations of disadvantage. Labour segmentation theorists emphasize that workers are social actors who construct social division outside of the market, which subsequently shapes employment
relationships (Bauder 2001:40). While theoretically similar to credentialism, segmentation theory expands on notions of social closure beyond occupational structures; boundaries are defined through broader contexts of social disadvantage. While the literature has traditionally looked at class (Parkin 1974; Ashton and Maguire 1984; Loveridge 1987), other scholars have expanded the conceptualization to encompass gender and ethnicity (Kett 1977; Willis 1977; Lee and Wrench 1987; Valentine et al. 1998 in Bauder 2001). These social groups are not exhaustive, however, as persons with disabilities share many of the same qualities as other equity groups at risk of labour segmentation (Zarifa, Walters and Seward 2015), and researchers have also convincingly associated nonstandard work arrangements with the allocation of workers to labour segments (Hudson 2007).

Labour segmentation theory and credentialism both emphasize a mutually dependent relationship between status groups and the market; “social groups achieve social closure, guaranteeing the reproduction of class structure, through controlling the processes that allocate workers to jobs” (Bauder 2001:40). However, credentialism assumes qualifications are the primary vehicle for closure: credentials are socially defined constructs that reinforce structural barriers in the interest of occupational groups (Brown 2001; Bauder 2001; Collins 1979). Therefore, credentialists acknowledge social boundaries as systemic inequalities created in the pursuit of higher education.

By acknowledging social actors in addition to status groups, however, labour segmentation elaborates upon the contextualization of inequality. Labour segmentation theorists argue that segmentation is inherently connected to social stratification (Bauder 2001:40). Therefore, labour market outcomes are guided by the social identities within
supply (educational attainment and career pursuit) and demand (employer expectations and hiring criteria) processes. The social roles delineating the male breadwinner and female childcare provider are examples of gendered labour market identities that are reflected in the labour market outcomes of women and men. Other examples of segmentation on the basis of gender and racial differences have been noted in the custodial jobs held by visible minorities within cruise ship employment, where gender and racial background play pivotal roles in staffing assignments (Chin 2008).

Segmentation is complicated by the reciprocal relationship between the individual and social structure. As Bauder (2001:40) notes, “social closure is achieved when class, gender and ethnic groups control access to labour market segments, and when segmented workers reproduce their position in society”. Therefore, labour segments perpetuate the advantages of some groups by legitimizing the organizational structures that demarcate those social advantages. According to Reich et al. (1973) labour segmentation was the result of monopoly capitalists’ attempts to deliberately exploit “sex, race, and ethnic antagonisms” to undermine the interests of workers that were becoming increasingly unified (Reich et al. 1973:362). These sociodemographic divides serve two purposes: first, they exercise the strategy of “divide and conquer” that prevents workers from realizing mutual interests while competing for limited employment prospects. More importantly, however, “divisions of workers into segments legitimizes inequalities in authority and control between superiors and subordinates. For example, institutional sexism and racism reinforce the industrial authority of white male foreman” (Reich et al. 1973: 364).
It is this normalization of inequality that perpetuates differential social advantages. As Peck (1996:69) acknowledges, “one reason secondary work exists is in the prior existence of a group of workers who can be exploited in this way”. The exploitation of certain sociodemographic groups is therefore driven by pre-existing structures of inequality that perpetuate disadvantage through established patterns and beliefs regarding social position. Segmentation predefines the occupational pathways available to workers with different individual characteristics, “and to the extent that workers perceive separate segments with different criteria for access, workers limit their own aspirations for mobility” (Reich et al. 1973). As a result, labour segmentation theorists emphasize the importance of understanding social perceptions of sociodemographic differences, a dynamic that is largely absent within credentialist arguments of labour market stratification.

2.2.3.1 Cultural Differentiation in Labour Market Outcomes

Some scholars have argued that cultural differentiation creates avenues of disadvantage not attributable to credential processes. Studies of racial segmentation have identified employment inequalities that are based on employers’ cultural stereotypes of employees, rather than on those employees’ qualifications or job performance (Mattingly 1999). Similar studies of gendered labour market segregation have drawn attention to the “glass ceiling” of gendered service sector employment opportunity (Budig 2002; Maume 1999; Williams 1990). Moreover, jobs in female segments of labour have been associated with a “serving mentality” that orients workers to providing services to other people—particularly men (Reich et al. 1973).
One of the leading scholars on the subject of cultural and symbolic meaning, Pierre Bourdieu (1986) recognized the duality of the individual and structure on structural inequality. For Bourdieu, internal processes of cultural identification are intrinsically connected to opportunity and outcome. Dominant groups establish boundaries of closure through symbolic representations of identity, which reinforce inequalities in status and privilege (Bourdieu 1984). Lamont (2010; 2002) has identified that symbolic boundaries are both created and reliant upon individual identities. Symbolic boundaries are conceptual distinctions made by social actors to categorize definitions of reality, including social relations and principles of classification (Lamont 2002). Symbolic boundaries reinforce feelings of similarity and group membership, and are an essential medium through which people define status and monopolize resources (Lamont 2002). While Bourdieu (1984;1986) recognizes credentials and qualifications as one way in which boundaries are signified, individual identities can also become representations of capital which contribute to social exchange. Jackson (1991:219) argues, therefore, that cultural meanings are “defined, negotiated, and resisted; …“cultures” are situated within broader structures of dominance and subordination”.

Labour segmentation and cultural differentiation are theoretically interlocking processes (Bauder 2001:42). Mitchell (1995:104) argues that culture is “an idea meant to differentiate and to classify”. In this way, culture is a form of capital inherited through one’s lived experiences and “constitutes a repertory of symbols [that] affect the relationship between individuals, social networks and economic structures, including labor markets” (Fernández Kelly 1994: 100). Cultural capital is represented through symbolic markers that define which behaviours, norms, traits and identities are valued
within a social context (Bourdieu 1984). These symbolic markers inform educational goals and career choices, and provide the context through which workers navigate labour market segments (Bauder 2001; Zukin 1995; Fernández Kelly 1994).

As symbolic boundaries become widely identified, patterns emerge that come to form solid social boundaries—“objectified forms of social differences manifested in unequal access to, and unequal distribution of resources and social opportunities” (Lamont 2010; 2002). It is this quality of cultural differentiation that has led Bauder (2001:42) to argue that “although culture is a socially constructed idea based on symbolic meanings without necessary causal properties, the consequences of cultural differentiation are real and powerful”. Cultural differentiation is therefore an important element of labour market segmentation. Bauder (2001) argues that segmentation is reinforced through the association of labour market failure with subordinate cultural identities. “Culture-of-poverty” and “underclass” labels of disadvantaged groups legitimize discrimination within the labour market, by creating symbolic and solid barriers for members of marginalized groups (Bauder 2001; Wetherell and Potter 1992). Therefore, Lamont and Molnar (2002) believe that the identities of disadvantage created through cultural differentiation contribute significantly to labour market segmentation.

The social segmentation of labour is an important perspective in the study of university graduates’ outcomes. By incorporating a labour segmentation framework, analyses can account for differences among graduates based on sociodemographic characteristics that are largely unaccounted for in human capital and credentialist explanations. While it is difficult to account for the effect of cultural capital on labour market outcomes, it is still possible to capture the presence of labour segmentation. As
Bourdieu (1984) explains, cultural differentiation becomes embodied in social structure. While he does not specifically address labour segmentation literature, the oppositional classificatory schemes that come to represent embodied social structures follow very closely to those outlined in segmentation theory. It is therefore possible to identify the effect of labour segmentation for groups of graduates from traditionally disadvantaged backgrounds. In this way, any inequalities that exist for individuals from traditional equity groups may be attributable to segmentation, rather than deficiencies in educational investment, or credential type.

2.3 Postsecondary Education in Canada

The expansion of Canada’s knowledge economy has fuelled higher education enrollment rates as new generations attempt to remain competitive in an increasingly skilled labour market (Marginson 2016; Hansen 2011; Baker 2011; Schofer and Meyer 2005). Canadians have come to view postsecondary education as the main institution through which productivity, marketability and skill acquisition occur (Baker 2011; Becker 1993). This perception has been so pervasive that social prosperity in Canada is often associated with having obtained a university education (Hansen 2011; Bills 2011; Powell and Snellman 2004). The dogmatic acceptance of higher education is foundational to human capital theorists, positing that the investments made in one’s self-capital (through education), will yield greater returns in the labour market (Bills 2004; Jackson 2007; Bradley 1996). Acquiring advanced skills by investing in education is thought to separate an individual from the pool of applicants in any given job—thus making them more desirable to employers.
Unfortunately, university graduates can face significant challenges transitioning into the labour market. The school-to-work experiences associated with this transitional stage are largely dependent upon the employability of the graduate (Mason et al. 2009; Lindberg 2007; Adamuti-Trache 2006; Brown, Hesketh, and Williams 2004). Employability according to Brown and colleagues (2004:122) encapsulates both the “absolute dimension of employability” and the relative perspective of the chances of being employed. In this way, the authors recognize that “it is possible to be employable but not be in employment” (Brown, Hesketh and Williams 2004:122).

Graduates’ employability represents a duality between concrete skills, and the wider socio-political forces governing the labour market (Bol and Van de Werfhorst 2011; Baker 2011; Adamuti-Trache et al. 2006). Transitioning into the labour market therefore involves both the ability of graduates to meet the skill and knowledge demands of employers, but also depends upon the wider extenuating circumstances that dictate the supply and demand of employment (Brown and Bills 2011; Bills 2011; Hansen 2011; Adamuti-Trache et al. 2006). The following sections of this chapter will unpack these dynamics and discuss how postsecondary education differences among graduates can lead to substantial variation in a number of labour market outcomes.

2.3.1 Skill Specialization and Labour Market Outcomes

The skills possessed by job candidates are useful indicators of outcome within the knowledge economy (Fenesi and Sana 2015; Isphording 2014; Ishikawa and Ryan 2002; McIntosh and Vignoles 2001; Kane and Rouse 1993). Skill development is a central component of the “employability” of graduates, and has gained considerable interest

There is a general consensus that technical occupations, which rely upon domain-specific skills and competencies, are often associated with lucrative remuneration (Adamuti-Trache 2006:51). The knowledge economy rewards skills and intellectual capacities that are directly applicable to occupation requirements (Robst 2007; Powell and Snellman 2004). It is therefore of little surprise that domain-specific skills such as those related to math and science provide a greater premium on labour market outcomes than is received by generalist skills and theoretical knowledge (Fenesi and Sana 2015; Adamuti-Trache 2006). Numeracy and practical lab-based science skills have been associated with substantially fewer instances of unemployment and part-time work arrangements, and are more closely related with full-time employment (Fenesi and Sana 2015).

Alternatively, some have argued that language skills can also promote candidate employability (Davenport 2002; Graham 2002; Axelrod 2002). Graham (2002) justifies this point by arguing that what is considered a “wealth creating” skill has come to apply to “all serious intellectual inquiry” (Graham 2002:29). Armstrong (2015) presented a labour market model demonstrating that the investment in a second language was directly related to wage remuneration. The “wage premia” garnered by investment in bilingualism has been tied to both human capital and signaling theory explanations; though there is some variation in the return on investment based upon regional differences and subsequent underlying linguistic demographies (Armstrong 2015:205, also see Grenier 1985). This is consistent with Gabszewicz et al., (2011) who note that
returns to language investment depend upon an *equilibria* which consists of both the supply of workers with proficiency in a second language, and the demands of employers to utilize those skills. This has been noted in past Canadian research; researchers studying Quebec found that a wage premium existed for French-speaking workers who learned English in Quebec, while the inverse was not true (Grenier 1985).

Bilingualism may act as a “signal” for employable qualities (Armstrong 2015; Christofides and Swidinsky 2010). It has been shown that wages are higher for bilingual workers, even in cases where the employee did not utilize the second language in the workplace (Christofides and Swidinsky 2010). Chorney (1998), for example, found that hiring personnel often associate bilingualism with higher levels of competency; according to one Ontario human resource manager: “Ability to master a second language shows skills in other areas: social skills, perseverance. It’s a good sign” (Chorney 1998:204). This perception is not entirely superficial, as cognitive research has associated bilingualism “with heightened mental flexibility and creative thinking skills, enhanced metalinguistic awareness, and greater communicative sensitivity” (Lazaruk 2007:605). As the labour market increasingly relies upon knowledge-based services, Davenport (2002) predicted that Canadian employers would have a preference towards candidates with the ability to communicate effectively, work in teams and exercise leadership—skills reportedly demonstrated by bilingual candidates (Lazaruk 2007).

In a bilingual country like Canada, it is important to understand the significance of both language and technical skill acquisition in the labour market outcomes of

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7 Grenier (1985) noted that In Quebec at the time of study, there was an approximate 6 percent wage differential between French-speaking Canadians who were proficient in English as a second language and those who were not. Inversely, there was no wage differential for English-speaking Canadians who invested in French as a second language.
postsecondary graduates. Limited literature exists which compares the earnings, or school-to-work match associated with bilingualism or technical skill, however. Researchers have typically focused on the effect of basic language and numeracy skills on the labour market outcomes of working-aged respondents (Ishikawa and Ryan 2002; McIntosh and Vignoles 2001). Of the few examples that are potentially relevant to this discussion, McIntosh and Vignoles (2001) observed that numeracy skills were slightly more important for earnings in the U.K., yet literacy skills were more likely to influence the probability of being employed (McIntosh and Vignoles 2001:475). The authors came to the conclusion that “both literacy and numeracy skills are important determinants of economic outcomes” (McIntosh and Vignoles 475). Unfortunately these findings are tangential to the current discussion, as McIntosh and Vignoles did not consider the effects of bilingualism or technical skill development on outcome, nor was their study of the adult working population able to speak to the experiences of postsecondary graduates. Nevertheless, their findings present the possibility that university graduates’ skills may offer different workforce outcomes.

Further research is therefore required to determine the effects of bilingualism and technical skills on the labour market outcomes of prospective workers with higher levels of education. This dissertation will investigate whether outcome premiums exist based on these different skills. Primarily, it is expected that technical skills, which are directly applicable to occupational requirements, will have the greatest earnings premium as these

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8 Ishikawa and Ryan (2002), for example, found that the math and language skills developed early through formal education (that is, the accumulation of human capital through schooling rather than real-world learning) had the greatest wage and earnings returns in the labour market. Similarly, McIntosh and Vignoles (2001) found that schooling had a significant effect on skill acquisition, though the authors also emphasized the effects of wider socioeconomic dynamics—particularly the transference of numeracy and literacy skills through upbringing.
skills are often domain specific and therefore much easier for employers to strategically utilize. However, drawing upon Graham’s (2002) assertion that all serious intellectual pursuits have the potential to be wealth creating within the knowledge economy, there is also an expectation that bilingual investment will have more favourable labour market returns in comparison to graduates who speak only one official language.

2.3.2 Program Type and Disaggregated Liberal Education

Another indicator that has been noted to influence labour market outcomes is the chosen university field of study (Lin, Sweet, Anisef, and Schuetze 2000). It has been commonly accepted that graduates of technical fields such as engineering and the mathematic and applied sciences have a higher success rate transitioning into the labour market than those who pursue a more “generalist” liberal arts focus (Fenesi and Sana 2015; Frank and Walters 2012; Davies and Hammack 2005; Guppy and Davies 1998; Lin, Sweet, Anisef, and Schuetze 2000; Finnie 2001; Allen, Harris, and Butlin 2001; Tumen and Shulruf 2008; Schwartz and Finnie 2002; Finnie and Frenette 2003; Walters 2004). There is a similar trend in the earnings gaps for graduates of various fields; past research indicates that engineering, mathematic and applied sciences tend to be more lucrative on average than the liberal arts (Charles and Bradley 2009; Andres and Adamuti-Trache 2007; Schwartz and Finnie 2002; Delisle, Guay, Senecal and Larose 2009; Schaeffer 2000).

In their attempt to understand why liberal arts graduates experience greater difficulties transitioning into the labour market, Lin and colleagues (2003) analyzed the
skills that were acquired and utilized by liberal arts graduates, and how they translated into employment outcomes. The authors came to two possible conclusions: the first suggested that the workplace afforded liberal graduates “few opportunities to engage their skills”, while the other possibility held that “employers fail to make the best use of talents possessed by liberal graduates” (Lin et al. 2003:73).

It would seem that even within a liberal education, degree programs that develop technical competencies are associated with greater labour market rewards (Goyder 2014). Finkelstein (1994:20) argued, for example, that “sociology’s weakness as a liberal art may be overcome by combining it with a more applied and practical orientation”. Similarly, Goyder (2014) put forward a model of analysis that disaggregated liberal arts graduates among “applied” and “generic” skill measures, finding that graduates of “applied” liberal arts programs had significantly higher instances of employment and income than graduates of “generic” liberal education. A recent study by Smith (2015) identified a significant variation among liberal arts graduates’ fields of employment. In particular, the occupational pathways of fine arts and communications graduates differed greatly from humanities, business, and social and behavior sciences (Smith 2015). Therefore, disaggregating fields of study may be empirically beneficial, as the employment outcomes of individual fields can be obfuscated by aggregated program measures.

This is an important area of research that requires further attention. The importance of differentiating humanities degrees from the social sciences has been acknowledged in previous analyses (Fenesi and Sana 2015; Frank and Walters 2012; Coates and Morrison 2013, 2011; Giles and Drewes 2002), though there are very few
studies that have disaggregated liberal education further (Smith 2015; Goyder 2014). One explanation is that analysts have not recognized the analytical benefit of further disaggregation, as it would appear that “applied” and “non-applied” designations are inconsequential in science and technology fields (see Goyder 2014).

Moreover, studying disaggregated liberal arts fields may highlight skill-differences inherent within some forms of liberal education. Giles and Drews (2002) believe that liberal arts degrees provide graduates with portable skills, providing advantages within a constantly changing labour market. In fact, liberal education may provide particularly unique benefits, as purely technical skills have been thought to be a risky investment due to maturation, and rapid technological change (Goyder 2014; Livingstone 2009; Walters 2004; Axelrod et al. 2001). Goyder (2014:32) makes a similar claim:

In counterpoint to this image of the flexible-skilled liberal arts graduate, think of the applied program graduate with technical skills. Let’s pick on computer programmers: swallowed up by Bill Gates or other computer moguls when they first graduated from their computer science program, now, fifteen years down the line, they can be replaced by 21-year-old graduates who, to deliberately caricature for effect, know twice as much about modern programming and can be paid half the wage of the mid-career person.

It may be that disaggregated liberal arts fields—particularly those degrees associated with applied skill development, provide an outcome premium that would previously be lost in crude measures of liberal education. Though his analyses were not dedicated specifically to this purpose, Goyder (2014:41) identified that the differences between applied and non-applied humanities and social sciences were greater than gaps in outcomes among applied liberal education programs, STEM and business fields. More research is required, however, to determine the extent to which there are differences in
outcomes among particular fields of study within disaggregated liberal and applied education.

The National Graduate Surveys are useful in this regard; differentiating liberal arts and STEM fields will offer an opportunity to investigate more subtle differences than conservative program categories have traditionally been able to capture. One expected outcome is that the differences between STEM and liberal arts degrees are disproportionately skewed as a result of the portability of a few outlier bachelor programs. Engineering degrees at the bachelor level, for example, have been shown to be highly portable within the labour market. Alternatively, degrees in disciplines such as classical studies, history, and anthropology are typically thought to be less transferrable to the labour market at the bachelor level; these degrees are generally more commonly pursued as points of entry for postgraduate study. Therefore by disaggregating fields of study it is expected that there will be little variation in outcomes among liberal arts degrees that are closely related to labour market demands, and those STEM degrees that are often a means to an end for further graduate study (such as mathematics and science degrees). Providing a more thorough investigation of the categorization of degrees will offer a significant contribution to the existing literature, as it may help redefine the rhetoric revolving around labour market differences that has traditionally focused on comparing STEM versus non-STEM fields.

2.3.3 Online Education in Canada

The proliferation of distance education courses and online-only universities has been instrumental in the enrollment of students from traditionally disadvantaged backgrounds. Web-based teaching has been seen as a way to increase the representation
of students from diverse backgrounds. While Canadian figures are not readily available, online higher education has factored heavily into U.S. policy initiatives aimed at increasing the number of postsecondary graduates (Sturgis 2012). Supplying education through online and distance learning was central to the 2012 State of the Union presidential address, as these programs offer more options than are typically available to minority students, while at the same time reduce the financial costs associated with higher education (Sturgis 2012). While distance education has been around since the 1970’s it has become increasingly more popular among higher education institutions within the last 15 years—in 2003, approximately 90 percent of U.S. schools offered web-based services (Yu-Feng and Nyugen 2007:31). Online education further grew between 2003 and 2007, with the number of online courses offered annually increasing by as much as 36.5 percent in the U.S.—“as opposed to an annual growth of only about 1.5 percent per annum for class-room based courses” (Cote and Allahar 2011: 166). Documenting the growth of online course development, Grosjean and Sork (2007) found that at the time of their analyses, there were more than twenty-four thousand sources about how to design and deliver online courses, with much of the emphasis on the transition from face-to-face learning to virtual-only classrooms (Grosjean and Sork 2007:15).

Enrollment rates have likewise expanded—Yu-Feng and Nyugen (2007:33) estimated that in 2003, enrollment in online courses had increased an average of 40 percent per year, while in 2007, roughly one in five American students completed at least one online course (roughly four million students) (Cote and Allahar 2011:166). More
recent estimates have put the number of students who pursue at least one online or hybrid
course closer to one third (30% of American students) (Cowen and Tabarrok 2014).

While comparable Canadian figures are not readily available, Cote and Allahar
(2011) note that in Canada:

Some fifteen traditional universities offer on-line degree programs, and there
are several fully on-line universities now in Canada, including Meritus
University, owned by Apollo Group Inc., the parent company of the largest
private university in the United States—the University of Phoenix—which,
in turn, has campuses in Alberta and British Columbia (Cote and Allahar
2011:166).

Online programs have been so successful at filling enrollment demands that they
have come to be referred to as “Educational ATM’s” or “Automatic Educational
Machines” capable of providing round-the-clock access without time constraints or
boundaries (Yu-Feng and Nguyen 2007:31).

While enrollment rates have continued to inflate, attention has turned to the
academic integrity surrounding web-based education. Early reports on web-based
education were optimistic; researchers identified the cost-saving benefits of online
education for both students and educators, and most online participants felt satisfied with
their web-based educational attainment (Dumont 1996; Gubernick and Ebeling 1997;
Terry 2000). Past comparisons identified that the organization of online-only courses
allowed students to maintain a better balance between school and other responsibilities,
resulting in better performance for e-learners in comparison to traditional students
(Dumont 1996; Navarro and Shoemaker 2000). Interestingly, one study went so far as to
conclude that e-learners tended to be more independent and earned higher salaries than
traditional students (Dumont 1996). Likewise, Baker (2011) suggests that online learning
serves an important purpose in the continued education of those already in the labour
market, either as avenues of obtaining credentials necessary for promotion, or as modes of training for career transition.

Optimistic supporters of online education typically adhere to the claim that recent cohorts of students are “digital natives”—a term which refers to a distinct generation of young adults that have been steeped in technological advancement and are therefore perfectly situated to be compatible with online education (Cote and Allahar 2011:148). Tech-advocates argue that as generations of students become increasingly familiar with technological advancements, they are equally likely to become bored with traditional (that is, low-tech) teaching methods, forcing educators to remain up-to-date in order to encourage student engagement (Bennett, Maton, and Kervin 2008).

Cote and Allahar (2011:149) summarize a number of convincing arguments rebuking the digital native hypothesis, which rest on the notion that there is significant inter-generational variability in technical competency. The authors note that the digital natives claim “makes the error of homogenization, whereby all members of a given birth cohort are assumed to have the same psychological and behavioral traits” and can lead to ethnocentrism by failing to consider the differences of among birth cohorts in regards to “social class, race/ethnicity, gender, and nation of origin” (2011:149). Citing a number of different sources from developed countries, the authors conclude that the digital native hypothesis is a myth; one that overemphasizes the technical-savvy of the affluent, white, upper middle class, while ignoring the difficulties experienced by students from lower socioeconomic backgrounds. Wladis, Hachey and Conway (2015) further develop this argument, as they have found that while women were more likely to take online STEM courses than their male counterparts, Hispanic and Black STEM majors were
significantly less likely to pursue online education, even after controlling for other mediating factors such as SES, academic preparation, citizenship status, and whether or not English was a first language.

Wladis and colleagues (2015) further build upon previous research by suggesting that online learners, and those who pursue traditional face-to-face education, may have different demographic characteristics (see also Rovai 2002). They define the characteristics of “non-traditional” graduates as follows: “Delayed enrollment; No high school diploma; Part-time enrollment; Financially independent; Have dependents; Single parents status; and Working full-time while enrolled” (Wladis et al. 2015:288). The authors found that these characteristics strongly increased the likelihood of online education enrollment; more so than any other characteristic in their study, they found that the probability of online enrollment “increased steeply as the number of non-traditional factors increased”—though this effect was significantly stronger in STEM fields (as compared to non-STEM degree programs) (2015:288).

Researchers have likewise identified substantially higher rates of difficulty associated with web-based education, including substantially higher rates of dropout for e-learners (60 percent) than traditional students (11 percent) (Yu-Feng and Nguyen 2007:34). Explanations for this trend have posited that students may experience difficulties remaining on task due to family and work responsibilities, or feel isolated as a result of the solitary study requirements of online curricula (Yu-Feng and Nguyen 2007). There are also pedagogical concerns regarding quality of training, as some students struggle with understanding course material due to the lack of word-of-mouth explanations accompanying lesson plans (Yu-Feng and Nguyen 2007).
The academic integrity of online education is also an important area of discussion in the current literature, as Baron and Crooks (2005) have cautioned that even unfounded suspicions that online courses compromise academic integrity can devalue the credits and degrees earned through web-based education. Deming and colleagues (2015) have recently noted that while online education offers more affordable higher education options, “the impact of online technology on the quality of education remains uncertain” (2015:497). Skeptical academics have gone so far as to criticize the extent to which these newer, non-traditional academic institutions act as “diploma mills” and question whether the degrees conferred withstand academic rigor (Bills 2011; 2004). Cote and Allahar (2011:167) raise similar concerns, stating that for every good online course, there are questionable institutions that misdirect potential applicants using a “fever-pitched rhetoric” that capitalizes on the hyperbole that online academic programming is the future of higher education—all while being unclear on matters of their accreditation limitations. To further complicate matters some polytechnic schools and colleges have been rebranded as universities, creating greater confusion regarding the classification and content of the university degree (Powell and Snellman 2004).

Hansen (2011:49) attempts to account for the untamed expansion of higher education options by arguing that students “invest in costly higher education, in part, because all but the most advantaged are in no position to evaluate the quality of a bewildering variety of institutions or to understand the vast disparities among them and the value of their degrees”. Likewise, according to Bills (2011:3), “as the importance of education credentials as determinants of access to jobs increases, the costs of not having credentials likewise increases.” Perri (2016) argues that as online education lowers the
time cost of education for less-able individuals, over education is likely to occur for the more-able in order to maintain lines of advantage. The author proposes that while online education can theoretically help facilitate equality when education contributes only to human capital, the characteristic of higher education to act as a signal for differences in ability can generate additional lines of inequality.

It has been suggested that the expansion of postsecondary education institutions with questionable academic rigor may diminish the value of a bachelor degree as a whole (Hansen 2011; Rivera 2011; Attewell and Domina 2011). Questionable accreditation has negative repercussions for graduates of both traditional and non-traditional higher education, as scholars have suggested that public trust rests on credentials as a means to legitimize strangers in business (Baker 2011; Nock 1993). Doubt in the validity of training provided by bachelor degrees can therefore be a detriment to all university credential holders (Hansen 2011; Baron and Crooks 2005). Rivera (2011) observed that the reputation of the graduates’ educational institution has become central to U.S. employers’ hiring choices. She found that the employers in her study were typically interested in approximately five “core” schools, while graduates of nationally top-ranking schools not within that core list had significantly lower chances of obtaining an interview. Institution prestige, she argues, has become the new benchmark to define successful candidates among elite employers, regardless of the actual academic achievement of the prospective employee. (Rivera 2011). Indeed, Demining and colleagues (2014) found that holders of online degrees were less likely to receive callbacks from potential candidates.

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9 It is important to note that Rivera’s study utilized U.S. data. As the limitations of the National Graduate Surveys prevent the study of school-level analyses, similar Canadian analyses are not possible using NGS data.
employers in comparison to graduates from traditional degree programs (Demining et al. 2014).

Scholars are similarly concerned that the emphasis on credentials that has driven the popularity of non-traditional education can lead to greater instances of falsified credentials (Baker 2011; Attewell and Domina 2011; Bills 2011). It has been estimated that there is a sizable underground market dedicated to the “production of ‘fake’ degrees, as uncredentialed imposters pursue their own strategies of upward mobility” (Bills 2011:3). Even without considering intentionally illegitimate credentials, Cote and Allahar (2011:166) note that “the on-line course industry seems to be going through a ‘wild west’ phase to the extent that accreditation is ambiguous in many instances, and non-existent in others”. The authors use Kaplan University as an example. Kaplan is an American online higher education institution that received considerable criticism for not being forthright concerning the independent licensing that graduates of its law program were required to pursue.

It is difficult to determine what effect online education has had on the early labour market outcomes of graduates. Cote and Allahar (2011) note that researchers must be cautious when drawing empirical comparisons between online and traditional education, as finding comparable metrics to situate an apples to apples comparison is often difficult. As online education has gained consistently increasing traction since the late 1990’s, (at rates that far exceed traditional education expansion) researchers must continuously update their knowledge as to how employers’ have responded to this new form of accreditation. Furthermore, much of our current knowledge relies upon U.S. research, while distance education trends have received less attention in Canada. Given the
differences in postsecondary institution composition across Canada and the U.S. it is therefore necessary to further develop the Canadian literature on the subject.

This dissertation will build upon the existing literature by comparing the labour market outcomes of graduates of non-traditional degree programs in Canada to those graduates who earned their degrees through traditional avenues. The analyses will offer some indication as to how employers’ hiring expectations have responded to these different types of degrees. It is likely that the relatively recent expansion of online programs in Canada has resulted in little differentiation of degree types within the hiring process, providing graduates with accreditation from distance programs with similar outcomes to graduates with traditional degrees. On the other hand, if distance degrees provide domain-specific training for specific careers, as in the case of online MBA’s and online degrees in nursing, distance education graduates may actually receive more favourable outcomes than graduates of traditional programs, as they are likely to enjoy a much closer link between their education and field of study. Regardless of the specific explanation, it is expected that Canadian graduates who pursued their degrees primarily through distance education will have labour market experiences that are at least equivalent to those graduates who earned their degrees through traditional means.

2.4 Traditional Indicators of Disadvantage

The proliferation of online education has led some critics of mass higher education to caution that unchecked postsecondary expansion may not necessarily reduce ‘real’ inequalities for graduates from disadvantaged backgrounds (Charles and Bradley 2009; Franzway et al. 2009; Bauder 2001). While there are claims that online learning can benefit the postsecondary participation of marginalized groups, these skeptics are
concerned that the expansion of postsecondary enrollment perpetuates inequalities through enrollment patterns that disproportionately advantage some sociodemographic groups over others. These assertions fly in the face of policy initiatives aimed at increasing postsecondary access as a means to reduce systemic inequalities (Sturgis 2012). Researchers have cautioned that less privileged students may get absorbed into an expanding subordinate sector of higher education that is characterized by less lucrative employment opportunities (see Brint and Karabel 1989; Andres and Adamuti-Trache 2007). It has been noted, for example, that low socioeconomic status (SES) students tend to gravitate towards the liberal arts programs—students in these fields tend to borrow more than those in the hard sciences, while facing significantly higher repayment burdens due to poor labour market returns (Davies and Hammack 2005).

Regardless of these concerns, enrollment and graduation rates have continued to increase across all fields, with students from traditionally disadvantaged groups becoming increasingly represented in postsecondary education. The following section will therefore discuss the considerable amount of higher education literature that has investigated the relationship between sociodemographic characteristics and labour market outcomes. Particularly, this section will discuss the effects of gender, race, socioeconomic status, and disability on career attainment, as the wider literature has identified their influence on labour market transition experiences net of intermediate and macro level forces.

2.4.1 Gender

Recent literature has documented a reversal in the educational attainment gap between men and women (Legewie and DiPrete 2014; DiPrete and Buchmann 2013;
Buchmann and DiPrete 2006). It would appear that women have outpaced men in regards to postsecondary education participation, completion, and the standard-of-living returns of a bachelor degree (Buchmann and DiPrete 2006). Buchmann and DiPrete (2006) noted that (with the exception of personal earnings) women had greater labour market returns than men across every other outcome they considered in their study.

Still, researchers have argued that workforce inequality has persisted in the form of gender segmentation across occupations. It would appear, for example, that women continue to be underrepresented in science and engineering university programs (Legewie and Diprete 2014b). This has important implications for earnings differences—past analyses using National Graduate Survey data found that while men are more likely to move into engineering, mathematic, and applied science jobs, women tend to move into lower paying work involving the humanities and social sciences (Zarifa 2012; Andres and Adamuti-Trache 2007; Schwartz and Finnie 2002, Finnie 2001). Even for women who successfully secured careers within male-dominant fields, Andres and Adamuti-Trache (2007) found that gendered segregation occurred along lines of masculine and feminine work characteristics.

Explanations for why women occupy lower paying occupations are widely debated. Previously, researchers relied upon rational choice explanations, suggesting that women either select themselves out of high paying, high responsibility professions due to future child-rearing plans (Finnie and Schwartz 1996; Finnie 2001, Malpass, O'Neil, & Hocevar 1999), or have their upward mobility stunted as a result of familial obligations and requirements (Maume, Sebastian and Bardo 2010). More recently, scholars have argued that persistent labour market segregation is attributable, in part, to gender-specific
occupational orientations that develop through high school and situate young men and women into different career trajectories (Legewie and DiPrete 2014b; Morgan, Gelbiser and Weeden 2013). Attempts have been made to situate these differences on psychological grounds—that men and women are “hard-wired” differently and so respond unequally to education, thus producing differences in field of study and career choices (Sax 2006). Sociologists, on the other hand, have been attentive of the role of early school development among boys and girls, and how conceptions of masculinity and femininity may “channel” students into different educational pathways (Legewie and DiPrete 2012). Building upon this research, sociologists have developed the idea of “leaky pipelines” that lead equally prepared young men and women to pursue different fields of study after high school completion (Morgan Gelbgiser, and Weeden 2013; Legewie and DiPrete 2014a; Shapiro et al. 2015).

Another explanation for gender segmentation is that women are curtailed into lower paying jobs as an artefact of gender roles in society. The inequality experienced by women who are otherwise equally qualified as their male colleagues has been attributed to a “glass ceiling” effect regarding upward mobility (Budig 2002; Maume 1999; Williams 1990). Consistent with labour segmentation theory, glass ceilings stunt upward mobility for women, preventing them from accessing the types of career opportunities that are available to their male counterparts. These forms of segmentation often include masculine and feminine labels of employment (Charles and Bradley 2009) and the effects of gender stereotypes and status belief threat (Correll 2004). One explanation offered by segmentation theorists is that women are relegated to lower paying employment arrangements due to patriarchal cultural beliefs surrounding gendered differences in
ability (Charles and Bradley 2009; Correll 2004; Budig 2002). There is a longstanding belief among some sociologists that gendered differences in labour market outcomes are artefacts of gender-essentialist stereotyping which viewed women as naturally better at nurturance and interpersonal networking while men are seen as stronger, more analytical and better equipped to work with their hands (Williams and Best 1990; Lueptow, Garovich-Szabo, and Lueptow 2001).

Gender segmentation is an important alternative to rational choice explanations of career outcomes for women. According to Charles and Bradley (2009), as overt discrimination and exclusionary practices are delegitimized in the workforce, female-labelled service jobs have become more common. This has resulted in the persistence of equity issues with many women ushered into low-paying, low-prestige positions, consequently reproducing and perpetuating gender stereotype narratives. Zarifa (2012:342-343) found that “women are still entering traditionally ‘female’ fields of study” at disproportionate levels to their male counterparts, despite being overrepresented among bachelor graduates. This is particularly troubling given that past studies have found that female stereotypic jobs tend to be associated with low status and lower levels of qualification while male stereotypic jobs are thought to be of higher status and require higher degrees of competency (Athey and Hautaluoma 1994). More recently researchers have indicated that even in female-dominated fields such as social work, women are often devalued and their work considered inferior to that of males in the same field (Sakamoto et al. 2008).

Women’s participation in traditionally male-centric fields of study can have important implications for the quality of work experienced in these fields; Oh and Lewis
(2011) argue that as greater proportions of women pursue careers in STEM fields, gender equality in both pay and conditions will improve within these industries. The authors suggest greater policy efforts to increase the representativeness of the STEM workforce. Charles and Bradley (2009), however, caution that an increase in female involvement in these fields may not necessarily lead to equitable outcomes. The authors reject neoclassical economic accounts of educational investment, which posit that large-scale female participation in the labour market leads to more equality in male dominated fields. Instead, their research indicated that increases in female involvement were more likely to further entrench gender segmentation (2009:934). They argue that as the proportion of women in STEM fields increases, gender becomes more salient, and potentially results in greater reinforcement of gender stereotypes and barriers (Charles and Bradley 2009:931).

Regardless of whether the gap has widened or decreased, women still face significant difficulty in the labour market. Franzway and colleagues (2009) have noted, for example, that women are pressured to leave male-dominated professions at a faster rate than their male counterparts. In their cross-national study of engineers within United Kingdom, Australia, U.S., and Canada, the authors found that despite increases in female involvement in the field and efforts to increase gender equity, women still face a “persistent ignorance that obscures and perpetuates the pervasive sexual politics in the field” (Franzway et al. 2009:90).

The fact therefore remains that gender is a salient issue that can interfere with the labour market outcomes of postsecondary graduates and deserves further attention as new cohorts enter the workforce. Given that the literature indicates that women experience persistent employment inequality, it is therefore expected that gender will continue to
remain a salient issue among the 2013 NGS cohort’s labour market earnings, while being inconsequential to analyses of skill-to-work match (consistent with the findings of Legewie and DiPrete 2014, DiPrete and Buchmann 2013, and Buchmann and DiPrete 2006). If gender segmentation across fields of study is still salient for this latest cohort, then there is an expectation that the types of occupations that women secure with their degrees will provide strong education-job linkages, while the greatest inequalities will be evident in earnings analyses between men and women. Importantly, it is assumed that the inequality women experience in their earnings will be decidedly smaller than that documented in previous literature—particularly as greater proportions of women enter male-centric fields of study. The dissertation will therefore contribute to offering further insight into the extent to which women’s outcomes differ from men’s in light of the data available on new cohorts of postsecondary graduates.

2.4.2 Visible Minority Status

There is conflicting literature regarding the effect of race on labour market outcomes.¹⁰ Racial inequalities within the working population have been repeatedly noted in past literature (Lightman and Gingrich 2012; Pendakur and Pendakur 2002; Li 1992). Earnings differentials between non-visible minority Canadians and visible minorities (as well as Aboriginal Canadians) were found to narrow through the 1970s, stabilize during the 1980s, and were shown to widen beginning in the 1990s (Pendakur

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¹⁰ This section draws upon both Canadian and American literature. It is therefore necessary to note departures of racial composition between the two countries. Particularly, while the Black and Latino population are typically the most disadvantaged in American literature, Canadian literature tends to emphasize that Aboriginals experience the greatest disparities. Further, it is worth noting that Canadian literature typically confounds the effects of visible minority and immigration status. While a significant amount of Canadian literature exists regarding immigrant outcomes, this dissertation has focused primarily on the effect of visible minority status, net of immigration.
and Pendakur 2002) and worsen through the early and middle 2000s (Pendakur and Pendakur 2007; 2011). Some researchers have indicated that visible minority individuals face unequal labour market opportunities, comparable to labour market segmentation (Pendakur and Pendakur 2007; Ong 2005; Maume 1999; Ogbu 1987). Maume (1999), for example, found that black men were more likely than their white counterparts to receive low evaluations from their supervisors and suffer from blocked mobility opportunities. Similarly, in their analysis of Canadian census data Pendakur and Pendakur (2007:58) noted that South Asian-origin and Caribbean-origin workers experience poor access to good jobs—referred to as “sticky floors”, while finding evidence to suggest that glass ceilings exist for Chinese workers at the top end of earnings distributions.

Some researchers suggest that the effect of race may be mediated by level of education (Lightman and Gingrich 2012; Finnie and Schwartz 2002; Maume 1999). It has been argued, for instance, that race has very little effect on the school-to-work transition of recent graduates (Finnie and Schwartz 2002). When looking across racial categories after controlling for education, Finnie and Schwartz (2002) noticed little variation among employment rates two and four years after graduation. These findings echo human capital theorists’ conclusions that race would have a “declining significance” on labour market outcomes (Wilson 1989). Past Canadian research has identified near-parity in the earnings of minority and non-minority postsecondary graduates (Maximova and Krahn 2005).

In her study on perceived disadvantage, O’Connor (1999) documented the effect of education on racial minority students’ ability to cope with barriers. She found that
while nearly every group understood that race could influence career trajectory, the
higher achieving students were more likely than their lower-achieving counterparts to
identify race and gender as barriers to success (1999:153). This led her to challenge
Ogbu’s (1987) seminal hypothesis that barriers to racial minority success in the labour
market creates oppositional cultures that devalue academic pursuits (O’Connor
1999:153). This is consistent with more recent research examining the coping strategies
employed by Latino postsecondary students faced with academic adversity. While
perceptions of hostile learning climates were found to significantly undermine Latino
students’ sense of belonging and morale, Hurtado and Ponjuan (2005) found that self-
efficacy in analytical skills were not directly affected. Counter to existing theories
assuming disadvantaged minority students falter in academic pursuits when encountering
barriers, the authors found that many postsecondary students of colour formed diverse
support networks and went on to achieve academic and career success.

Still, racial inequality has been found within occupations requiring very high
levels of education. Li (2012) found that visible minority university professors in Canada
earned less than their white counterparts. Ramos (2012) similarly found that visible
minorities in the professoriate have become increasingly underrepresented over time. Li
(2012) studied professors at both the early and late stages of their careers and found that
the wage differentials persisted at both stages, suggesting that racial effects were still
salient even after accounting for work patterns. This led the author to conclude that it
was difficult to dismiss unequal racial treatment among persons with advanced levels of
education and training.
Maume (1999) has been similarly critical of past analyses of race and education, arguing that much of the literature has overestimated the proportion of graduates of colour. While his research found equality in labour market outcomes for visible minority postsecondary graduates, the number of graduates in his study represented only 10 percent of the African American population as a whole, a proportion that led him to claim that the results were insubstantial (Maume 1999:502). The author claims that while it may appear that education provides positive labour market returns for visible minority graduates, systemic inequalities can significantly restrict the number of graduates from minority backgrounds. Systemic inequalities in postsecondary education have also been shown to have an impact on the trajectories of visible minority students. The lack of a diverse campus climate, for example, has been shown to contribute to feelings of “tokenism” which can have negative effects on postsecondary performance and subsequent career choices (Johnson et al. 2007; Gurin et al. 2002). Some have claimed that online education can help to encourage minority students’ academic achievement (Sturgis 2012). It is possible that the “faceless” quality of online institutions actually provides a benefit to disadvantaged groups traditionally at risk for tokenism or stereotype threat.

Even for those students of colour who complete their postsecondary education, race may have played a role in their chosen field of study. Past literature has indicated that the majority of African American university graduates are concentrated in humanities, social science, and education degree programs (Thomas 1984). This situation has not appeared to change over time as Arcidiacono and colleagues (2012) found that while black students have stronger initial preferences for majoring in the
natural sciences, engineering, or economics fields than their white counterparts, they are significantly less likely to graduate with degrees in these majors, opting to transfer to the liberal arts and humanities at higher rates than non-minority students. Still, there is some contradiction within the literature, as Davies and Guppy (1997:1427) did not find an association between race and field of study decisions, leading the authors to reject the presumption that less favourable fields serve as “dumping grounds” for students of colour. Therefore there is some merit to Maume’s (1999) call for future research to continue to establish a profile of recent graduates of colour.

It appears that there is significant variation in the experiences of persons of colour, as Asian Americans are likely to differ greatly from other visible minority groups (Keshishian et al 2010; Xie and Goyette 2003; Simpson 2001). Keshishian and colleagues (2010), for instance, found that racial backgrounds play an important role in field of study decisions as Asian American students were more likely to choose pharmacy as a major than African American and Hispanic students. This is consistent with previous research that found that Asian Americans were more likely to major in postsecondary fields of study with high financial payoffs over non-visible minority students (Xie and Goyette 2003). These differences could therefore have significant effects on the earnings and outcomes of graduates of colour.

Another concern for social research is the issue of the “model minority” narrative. Yu (2006:325) argues that research often conflates the experiences of multiple racial groups in an attempt to misrepresent racism and other structural problems these groups experience. The author argues that aggregating the outcomes of multiple minority groups while emphasizing the meritocratic stereotype of “successful” Asian Americans
overlooks the systemic inequalities that exist in both education and the wider labour force. The reliance upon success-by-merit narratives\textsuperscript{11} as the point of comparison for disadvantaged groups is the mode through which the status quo of power relations is maintained (Yu 2006: 325). Yu (2006) argues that this effectively silences both racial minorities and disadvantaged whites. Model minority narratives are particularly problematic, as it has been shown that there is significant variation in outcomes within Asian groups based on socioeconomic standing (Louie 2004) and cultural background (Ngo and Lee 2007).

Overall, it would therefore appear that the effect of race on labour market outcomes is highly contested in the literature. While some scholars note that race may negatively influence labour market experiences, these experiences may be cushioned by the pursuit of higher education (Lightman and Gingrich 2012). This generalization is problematic, however, as systemic inequalities still remain an important consideration for postsecondary graduates of colour. The analyses of this dissertation will therefore contribute to the wider literature by offering insight into the experiences of Canada’s latest cohort of graduates surveyed in the NGS. The effect of race on postsecondary graduates’ outcomes will be measured in each of the analyses of the key independent variables to determine if visible minority status is still salient across a number of contexts.

Given the wider literature, the assumption is that visible minority status will still be a salient influence in regards to the measures of outcome, though to a lesser extent

\textsuperscript{11} “Success by merit” in the relevant literature tends to refer to success that occurs by way of strong families, hard work, and high regard for education; values which are often used to define and reinforce dimensions of privilege (Khan 2013, 2012; Lamont 2010; Yu 2006).
than other sociodemographic indicators. That is, the hypothesis asserts that visible minority status will have significant effects on earnings, job satisfaction, and the objective and subjective measure of school-to-work match. This is consistent with the wider literature; while education has a positive effect in regards to feelings of accomplishment for graduates of colour, it is likely that systemic barriers will still be influential on these graduates’ outcomes.

2.4.3 Disability Status

Similar to the study of race, the effect that the presence of a disability has on labour market outcomes is not clearly defined. The career outcomes of Canadians with disabilities are often difficult to pinpoint, leading scholars to struggle when attempting to generalize this group’s experiences. This is due, in part, to a number of factors involving measurement and study techniques.

Perhaps the greatest limitation to disability research is the fact that many researchers must work with aggregated disability classification identifiers in order to produce results that are generalizable to a wider population in Canada. The National Graduate Surveys (NGS) employs such a measure of disability, looking at those who self-identified as having any type of disability lasting longer than six months as one homogenous group. This is in part due to the fact that the NGS is not aimed specifically at persons with disabilities. Other surveys, such as the Canadian Survey on Disability, and the Participation and Activity Limitations survey are better suited to this purpose. These surveys provide significantly greater detail of disability type and severity of
Canadians with disabilities. While this does provide considerably greater insight into the day-to-day experiences of persons with disabilities, such surveys fall short when looking exclusively at postsecondary education and therefore cannot provide adequate profiles of the early labour market experiences of the entire cohort of recent graduates.

It would appear, then, that Canadian researchers are left with limited options when studying disability as there are few quantitative studies examining the employment outcomes of disabled postsecondary graduates (e.g., Zarifa, Walters, and Seward 2015; Janus 2009; Madaus et al. 2008; Dickinson and Verbeek 2002; Madaus et al. 2001; Wagner & Blackorby 1996), the majority of which have focused on the U.S. In Canada, more recent studies have typically been qualitative or descriptive in nature and have been limited in scope (e.g., Holmes and Silvestri 2011; Gillies 2012; Fichten et al. 2012; Bennett and Gallagher 2013).

Despite disability measurement constraints, researchers have made attempts to understand the labour market outcomes of postsecondary graduates with disabilities. In regard to the general working population, Cleland and Smith (2010) found that, similar to the experiences of visible minorities, education had a moderating effect on the labour market outcomes of persons with disabilities. They noted that lower educational attainment among persons with disabilities was strongly associated with lower incomes and employment opportunities, while obtaining a postsecondary school qualification significantly reduced the likelihood of being unemployed and provided higher wages on average (Cleland and Smith 2010). These findings are consistent with earlier studies that found that youth with disabilities who had obtained a high school diploma as their highest educational achievement had more difficulty securing competitive employment than their
non-disabled peers and were significantly less likely to be higher wage earners (Blackorby and Wagner 1996:405). Looking at higher education, Madaus and colleagues (2001) reported that “disabled postsecondary graduates are transitioning successfully into the world of work at rates comparable or superior to their non-disabled peers, and at rates that far exceed their peers with learning disabilities who do not receive postsecondary degrees” (Madaus et al. 2001; 145). While it is encouraging that greater proportions of persons with disabilities are entering the workforce with higher education, more recent research has called into question the extent to which graduates with disabilities have reached parity in labour market outcomes (Zarifa, Walters and Seward 2015).

Part of the problem is that postsecondary graduates with disabilities are often underrepresented in the data. The barriers that exist for youth with disabilities often force them to drop out of postsecondary education, or select themselves out of the high school paths necessary for higher education (Trainor 2008; Blackorby and Wagner 1996; Lichtenstein 1992). In the U.S., Lichtenstein (1992) reports that 40 percent of students with learning disabilities drop out of high school compared to 25 percent of their non-disabled peers. Of the total drop out rate of youth 18 years and older in the United States, roughly 36 percent are students with learning disabilities while 59 percent are students with emotional/behavioral disabilities (Blackorby & Wagner 1996). Although comparable Canadian figures are not available, these findings speak to the difficulties in securing appropriate sample populations of postsecondary graduates with disabilities for social research.

Some researchers have suggested that the completion of postsecondary education may not necessarily guarantee disabled individuals lucrative labour market returns.
(Holmes and Silvestri 2011; Shier at al. 2009). Shier and colleagues (2009) note that
disabled graduates earn less, and are less likely to find permanent employment than their
able-bodied counterparts. Wannell and Caron (1994) echo this observation using
National Graduate Survey data, finding that labour force participation, earnings, and
employment rates were all significantly lower for disabled graduates across all levels of
education (1994:45). Recent studies have concluded similar results, noting that graduates
with disabilities were roughly half as likely to find full-time employment (Zarifa,
Walters, and Seward 2015).

Disabled graduates are also at a greater risk for precarious employment
arrangements. Using cross-national data from the United States and the UK, researchers
have noted that disabled workers were significantly more likely to experience involuntary
part-time employment (McMahon 2012; Fogg, Harrington and McMahon 2011; Wilkins
2007; 2006; Pagan 2007). Moreover, graduates who were able to secure full-time
employment were found to be more likely to be working jobs unrelated to their field of
study (Fichten et al. 2012) and for reduced wages than their able-bodied counterparts
(McMahon 2012; Fogg; Harrington and McMahon 2011). This is unsurprising,
considering Robert and Harlan (2006) found that disabled workers face higher incidents
of both blatant and subtle discrimination through acts of marginalization, fictionalization,
and harassment in the workplace. In fact, Madaus and colleagues (2002) found that
concerns over the possibility of employment inequality resulted in only 30 percent of the
respondents in their study disclosing their learning disability during the application stage
of employment.
These trends have caused many scholars to turn to self-deterministic and rational choice explanations of the differences between disabled and non-disabled individuals’ outcomes. Self-determination, as it is defined in special education literature, refers to the sum of the attitudes and behaviors that lead one to autonomously set goals, take action toward those goals, and self-assess progress (Madaus et al. 2008; Field & Hoffman, 1994; Sands & Wehmeyer 1996). The presence of high self-efficacy has also been associated with positive labour market outcomes for persons with disabilities (Madaus et al. 2008).

It is problematic to assume that the inequalities associated with persons with disabilities are attributable to purely rational choice. These explanations regard self-determination as a psychological construct located within the individual that determines one’s competency in the skills necessary to succeed in the labour market (decision making, self-advocacy, problem solving and goal attainment) (Abery and Stancliffe 1996; Algozzine et al. 2001).

Using this framework to explain outcomes of persons with disabilities fails to adequately address the underlying systemic inequalities that can further influence one’s social position. Specifically, familial resources are an important consideration that can influence school-to-work transition.

Therefore, this dissertation will offer an investigation of the effect of disability on the labour market outcomes of the most recent cohort of graduates surveyed in the NGS. By including disability status alongside other sociodemographic indicators in the models, analyses will tap into whether the presence of a disability has a significant effect on graduates’ outcomes when also accounting for wider social forces. Presumably, disability status will still be influential in the labour market outcome experiences of graduates. That is, after accounting for other sociodemographic indicators, persons with
disabilities will still be significantly less advantaged than persons without disabilities with respect to earnings and school-to-work match. This research will offer an important contribution, particularly as a recent study using the 2005 NGS identified considerably disadvantaged outcomes for graduates with disabilities (see Zarifa, Walters, and Seward 2015). Accounting for the experiences of graduates with disabilities in the analyses of this dissertation is invaluable to determining whether the experiences of graduates in the most recent NGS wave remain a cause for concern.

2.4.4 Socioeconomic Status

Pierre Bourdieu’s (1984; 1986) work on the forms of capital illustrates the need to consider the effects of social background. Social, cultural, and economic capital influence the education exchange between the individual and social institutions, which in turn has implications for the formation of self-determination (Bourdieu 1986, Bourdieu and Passeron 1998). For Bourdieu (1986), self-determination is simply a by-product of the identity created by the habitus. The habitus refers to the formation of socially constituted systems of disposition within which actions are generated through “pre-reflexes”—in other words, without recourse to conscious reflections on structural rules, or rational calculations of results (Weininger 2005:91). In this way, the fundamental quality of the habitus is that it escapes “both the objectivism of action understood as a mechanical reaction ‘without an agent’ and the subjectivism which portrays action as the deliberate pursuit of a conscious intention…” (Bourdieu and Wacquant 1992:121). It is the habitus that enables and constrains the dispositions that determine how (and to what effect) incumbents of particular social positions can act in the interests of themselves and the collective.
The habitus is differentially formed according to each actor’s position in social space; as such, it is empirically variable and class specific (Weininger 2005:91). It is formed by the totality of the “class condition”—the volume and composition of both the economic and cultural forms of capital emphasized by Bourdieu (1986). While Bourdieu primarily emphasizes the importance of economic and cultural capital, his contemporaries have supported the inclusion of social capital as a causal factor in habitus formation (DiMaggio 2012; Erickson 1996).

The sum of these resources is often conceptualized as socioeconomic status in the wider literature. According to Bourdieu, capital mediates the acquisition and use of power (1986). Power can be defined as the agency one has over the exchange of knowledge in education, and is a direct measure of the ability to negotiate for more advantageous positions within the workforce (Algozzine et al., 2001). Put another way, the capital resources one has access to underline the power one has while navigating educational trajectories and informs the subsequent transition into the labour market.

According to Bourdieu and Passeron (1998), dominant members of society define which types of social and cultural capital are of value through symbolic boundary creation. They believe “the convertibility of the different types of capital is the basis of the strategies aimed at ensuring the reproduction of capital” (Bourdieu and Passeron 1998:124). Therefore, social closure is practiced through boundary creation and is the vehicle through which social elites maintain their holdings of power to reproduce the status quo (Bourdieu 1984). In degree-awarding institutions, the academic elite decides what forms of cultural and social capital are valued and rewarded, which consequently informs employer expectations of graduating cohorts’ abilities (Brown 2001). Similarly,
patterns of disadvantage are established for those unable to emulate the relevant capital resources.

Socioeconomic status can significantly influence higher education outcomes (Zarifa 2012; Trainor 2008; Madaus et al. 2002). As discussed earlier in the chapter, theories of Maximally Maintained Inequality (MMI) and Effectively Maintained Inequality outline the effect that social origin can have on level of education and field of study access (Davies et al. 2014; Zarifa 2012a, 2012b; Ayalon and Shavit 2004; Lucas 2001; Raftery and Hout 1993). Family background has been shown to influence whether or not students pursue postsecondary education (Davies et al. 2014; Lehmann 2007) and in which fields they earn their accreditation (Zarifa 2012a, 2012b; Adamuti-Trache et al. 2007; Lucas 2001). Research has indicated that students from low socioeconomic backgrounds often receive lower academic returns in comparison to students from affluent backgrounds (Trainor 2008; Lehmann 2007; Devine 2004; Lareau 2002). Even at advanced levels of education, Zarifa (2012b:109) found that social origins influence the pursuit of graduate school enrolment by informing student performance, aspirations, and academic confidence.

Socioeconomic status is an important area of study with significant implications for postsecondary graduates, particularly as a determinant of career decisions. Graduates from low SES backgrounds can experience uneasiness during labour market entry (Lehmann 2004). Students who do not have highly educated parents are far more likely to view the transition from school-to-work as a risky and uncertain future than graduates with highly educated parents (Lehmann 2004). As Lehmann (2004:1) notes, “individuals
form dispositions about school-to-work transitions based upon their reflexive understanding of their position in the social structure”.

Lehmann (2007) believes that some of the difficulties experienced by low SES students may be attributable to discontinuities that can form between an individual’s old habitus that was the product of their less affluent social origins, and a new one that is formed through postsecondary education pursuit. Later research by Lehmann (2014) noted that university graduates from less affluent backgrounds are at risk of being left without a clear class identity. He argues that the pursuit of higher education can distance these individuals from the class situation in which they grew up; the transformative experience provided by university pursuit has the potential to make relationships with former networks (friends, families, former peers) more difficult. At the same time, these individuals can also feel like cultural outsiders in regards to middle-class values as adults (Lehmann 2014).

Social origins have been shown to be pivotal to building and maintaining relationships during postsecondary education (Jack 2016; Lehmann 2007; Brint 1998; Wilkinson and Marrett 1985). For example, when students lack access to the resources that are valued by the dominant members of society they may be left unequipped with the tools that are necessary to successfully participate in academia (Jack 2016; Lehmann 2007). The effects of socioeconomic inequality have been associated with barriers in the exchange between peers (Lehmann 2007) and student-professor interaction (Jack 2016; Brint 1998; Wilkinson and Marrett 1985). While parents are a common source of capital for their children through both concerted effort and unintentional conveyance (Bourdieu 1986), failure to provide a strong early literacy environment (that is, by talking/reading to
babies and involving children in various types of home activities) has been associated with lower levels of achievement later in education (Molfese et al. 2001) and adult life (Samuelsson & Lundbeerg 2003). For students from disadvantaged backgrounds, this influence can be even more pronounced as Morningstar (1997) found that families were the predominant informal influence on the development of career aspirations for adolescents with disabilities.

Therefore, it is not only whether or not a parent participates in a child’s education, but also the amount of socially relevant contributions they provide. It has been noted that parents from more affluent backgrounds are better able to equip their children with the skills that are necessary to succeed throughout their careers (Devine 2004; Lareau 2002). Developing the skills necessary for negotiation with superiors, for example, is an important skill that is underdeveloped in postsecondary education and most often attributed to socioeconomic background (Brown 2001; Bauder 2001). Jack (2016) has further elaborated on the effect of social background, as he has noted that variation exists within the working class in regards to lower income students’ willingness to engage with professors. He found that there were two categories of lower-income undergraduates: the “privileged poor” who had the cultural capital necessary to engage professors in college similar to their middle-class counterparts, and the “doubly disadvantaged” who, in addition to lacking economic resources, also did not have the cultural capital to interact with authority figures and navigate institutional structures such as office hours. Jack therefore argues that static understandings of socioeconomic backgrounds “homogenize the experiences of lower-income graduates” (2016:13).
The effect of these capital resources on exchange is an important point. Lareau and Horvat (1999) argue that higher SES families maintain values that comply with the expectations and standards of education institutions, resulting in stronger outcomes for students. Khan (2013; 2012) has repeatedly noted the effect of privilege on outcomes—finding that even though institutions stress meritocratic values, outcomes are often based upon socioeconomic privilege. Students from families who do not hold the same capital resources as the dominant group are at a disadvantage (Khan 2013).

Studying the effect of SES among postsecondary graduates is problematic, however. Some scholars have conceded that the effect of SES typically weakens upon graduates’ entry into the labour market, though it is only after permanent career decisions have been made, a process that is heavily influenced by social origin (Davies and Hammack 2005). Lehmann (2009:631) notes that working class graduates can often transcend their social background and upbringing through the construction of moral advantages that hinge upon strong work ethic, maturity, responsibility, and real life experiences to overcome structural barriers of disadvantage. In this way, some aspects of working class habitus may actually help facilitate upward mobility. Therefore, the effect of SES may be underestimated among postsecondary graduates’ economic outcomes, especially if the early decisions to pursue particular fields of study are not considered.

One explanation seems to be that the effect of SES disappears when other forms of inequality are introduced. In this way, it may be that the effect of SES is actually the result of wider social forces. This dissertation will continue to test the influence of social background using recent postsecondary graduate data. Primarily, analyses will investigate whether social background significantly influences the earnings, job
satisfaction, and the school-to-work match of graduates’ labour market outcomes three years after graduation. The effect of SES will be tested alongside the addition of other sociodemographic indicators to view whether the explanatory strength of SES holds when accounting for wider social forces. The central hypothesis asserts that SES is highly influential on the labour market outcomes of graduates, and the effect of background affluence will persist when other sociodemographic indicators are included within statistical modeling. The advantages that an affluent background provides will ultimately lead to significant differences among graduates net of other social forces. The next section will further discuss the variable effect of multiple disadvantaged statuses in the study of labour market outcomes.

2.5 The Intersection of Multiple Disadvantaged Statuses

Intersectionality refers to the inter-connected dynamic of various forms of inequality. The intersection of various equity statuses can exacerbate, alleviate, or be inconsequential in determining the level of disadvantage experienced. Segmentation theorists have noted that the inequalities that exist for women (Kenrick 1981; Ashton and Maguire 1984) visible minorities (Blair and Fichtenbaum 1992; Gordon and Sassen 1992; Morales and Bonilla 1993) and those from lower socioeconomic backgrounds (Clairmont et al. 1983; Offe and Hinrichs 1985) can often overlap (Romero 1993; Athey and Hantaluoma 1994; Massey 1994; Hiebert 1997; Mattingly 1999). Of particular interest to this research is the combined effects of socioeconomic status, gender, race, and disability—what relationships surface when multiple statuses are included in analyses?

Gender analyses appear to be particularly sensitive to the inclusion of multiple disadvantaged statuses. Maume (1999) notes that the labour market outcomes associated
with racial identity are complicated when gender is introduced. The author found that although minority status negatively influenced career promotion opportunities, black women were even less likely to advance into managerial positions than their male counterparts (Maume 1999:500). According to Maume, this compounding disadvantage is due to the fact that “women, (both black and white) are crowded into sex-typical occupations, in which their work efforts are devalued and ignored, causing their careers to lag behind white men” (1999:500). Interestingly, the author finds that because women are equally harmed by labour force segregation regardless of racial identity, race is inconsequential in determining mobility chances for women (Maume 1999). In this way, while race is a salient indicator of disadvantage for black men, it matters little for women due to the devaluation they experience as females. This led Maume to argue that a glass ceiling exists for black men, as well as for both black and white women equally (1999:501).

Continuing the complicated examination of the effects of gender and race, Ong’s (2005) look at postsecondary women of colour who pursued careers in male dominated fields similarly noted that each respondent identified gender as the more salient issue in regards to labour market inequality (2005:607). The author found that some respondents developed coping strategies to negate the effect of gender stereotypes (Ong 2005). This occurred through a subtractive process, whereby “passing” in male dominant fields was secured by giving up certain personal qualities in order to adhere to expectations of normalcy established by the status quo (2005). Referred to as “fragmentation”, Ong (2005:607) states that when faced with gender status beliefs and stereotyping in male-dominant fields, some women take on masculine attributes while downplaying elements
of their own femininity to protect their legitimacy as competent scientists. In this way, although both disadvantaged statuses were salient within the workplace, gender appeared to be the more influential barrier.

The effects of gender and race do not appear to be uniform, however. Li (2001) argues that race remains salient even after accounting for gender in analyses. After controlling for education and immigration status, the author found a clear earnings disadvantage for visible minority women, leading the author to confirm that “there is a multiple-negative effect of gender and race on the earnings of immigrant women of minority origin” (Li 2001 34).

The variability of racial effects extend beyond gender. The effect of SES and visible minority status is often debated in the literature. For minority students who reach graduation, some researchers have been quick to point out that the effect of race on labour market outcomes is negligible (Baker and Velez 1996). Such research is often based on within-field comparisons of graduates, and overlooks the impact race and SES can have on the academic decisions of students to pursue specific degrees (see Arcidiacono et al. 2012). It is therefore beneficial to understand the intersection of SES and race both during and upon completion of a postsecondary degree, as these factors may help identify possible trajectory outcomes for graduates of colour.

Louie’s (2004) study on the “acting white” response of Chinese Americans exemplifies how the intersection of race and SES come to define the trajectories—and subsequent labour market opportunities—of equity groups. According to Louie, affluent Chinese American parents, fearing unequal returns in the labour market based on racial differences, emphasized education for their children as a “credentialing mechanism to
safeguard against potential discrimination” (Louie 2004:56). In this way, higher-SES Chinese Americans buffer the effect of discrimination in the workplace by adopting conventions of dominant white culture and by utilizing education as a ladder of success to pursue degrees in “safe” occupations (professional degrees such as medicine and law). In addition to formal education pursuits, affluent families in Louie’s study also enrolled their children in the types of cultural and social capital activities that are valued by the dominant group, such as learning the piano, and joining popular organizations (2004). Moreover, Louie (2004) observed that the higher socioeconomic status Chinese students attending Ivy League colleges adopted English as the only language spoken at home, in some cases outright rejecting traditional cultural practices, including speaking Chinese in the home (2004:8). While these strategies serve to buffer the effects of discrimination for affluent graduates of colour, she found that graduates from lower SES backgrounds were unable to counteract the inequalities of either race or low capital resources (Louie 2004).

While Louie noted the effects of socioeconomic status in addition to race, Lareau (2011) argues that race has much less of an impact on outcome when the same pedagogical strategies that are employed for white families are utilized by black families. For Lareau, it is entirely a matter of the resources available to the individual, more than implications as a result of racial identity (Lareau 2011). The issue therefore arises when families are unable to emulate the capital of the dominant group, as exemplified by the negative experiences of recently immigrated families (Lareau and Horvat 1999). The additional effect of SES is important to consider. Using data from the U.S., Baker and Velez (1996) found that while race was a salient issue in preliminary analyses on the
postsecondary graduation rates of minority students, the relationship was no longer significant when socioeconomic status was included in the model.

O’Connor and Fernandez (2006) further highlight the importance of understanding the effects of multiple disadvantaged statuses, noting that the visible minority students from less affluent backgrounds in their analyses were at a greater risk of being considered as academically and behaviourally deficient than middle-class white students, consequently becoming labelled as having a learning disability and placed in special education programs. In this way, the authors argue that the intersection of both socioeconomic status and race informs the way in which schools diagnose disability (O’Connor and Fernandez 2006). The authors conclude that multiple statuses effectively perpetuate the inequality experienced by traditionally disadvantaged groups, stunting labour market returns in later life.

What is the effect of race when the intersectionality of low socioeconomic status is taken into consideration? Does it have a compounding effect, as some research suggests (O’Connor and Fernandez 2006; Louie 2004), or, according to Lareau and those proscribing to Bourdieu’s forms of capital, is race inconsequential?

Accounting for the additional effect of disability is an important and understudied topic. Blackorby and Wagner (1996) found that disabled women and racial minorities experience significantly lower rates of employment, earnings, and residential independence than disabled white males, suggesting that disability is highly susceptible to compounded disadvantage. Similarly, Trainor (2008) noted that only 49.2 percent of Latinos and 39.2 percent of African Americans with a disability earn their secondary school diplomas in the U.S., compared to 62.5 percent of white students with disabilities.
The presence of multiple statuses in addition to having a disability undoubtedly sets barriers for these individuals’ labour market outcomes. The challenge for social researchers is to understand to what extent these gaps exist.

The inclusion of multiple disadvantaged statuses has been shown to have highly variable effects. While race may be salient when looking at employment outcomes for males, for example, the effect disappears for females. When disability is additionally accounted for, however, both effects appear to be compounded, further increasing the burden experienced by these equity groups. It is worth noting that these trends do not necessarily capture the experiences of recent postsecondary graduates, as the literature on this topic is vague. This dissertation will therefore address the question: which traditionally disadvantaged backgrounds remain salient when multiple sociodemographic indicators are included in statistical models?

It is important to understand the transition experiences of graduates from a multi-dimensional perspective. Much of the conversation has involved micro level factors, such as the field of study decisions of students. Other individual-specific explanations, such as rational choice (Finnie and Schwartz 1996; Finnie 2001, Malpass, O'Neil, & Hocevar 1999) and differences in capital (in the Bourdieuan sense of social, economic, and cultural capital) (Bourdieu and Passeron 1998; Bourdieu 1986; Walters 2004) view one’s ability to obtain specific degrees and market oneself in the labour force as part of a skillset developed by an individual that is separate, yet intrinsically connected to their postsecondary career. However, attention must also be given to the influence of structural factors within the labour market and how these processes shape the educational credentialing system (Baker 2011). Although macro level processes influence the entire
workforce, the effect that wider structural factors have on recent graduates is substantial, considering the group’s vulnerable position as new workers.

2.6 Labour Market Outcome Measures

It is problematic to only attribute outcomes to sociodemographic effects. Attributing outcome differences to sociodemographic differences without considering wider structural forces shifts the burden of responsibility onto individual members of society. Considering these structural forces is therefore essential; it is important that sociologists avoid “doing violence” to the subjects they study by creating cultures of disadvantage that are reaffirmed through academic discourse (Becker 1967; Grusky and Sorensen 1998; Bauder 2001; Wetherell and Potter 1992). Academics in the sociology of work therefore emphasize that there is a connection between individual inputs and wider social structure in determining economic outcomes. Goldthorpe (2003:316) stresses that the rational choices of actors inform the “macrosocial explanada” of advantage. Alternatively, Grusky and Sorensen (1998:1198) believe that social structure is a required component for identity creation; occupations in particular play a significant role in self-definition. Granovetter bridges the gap between the two camps of thought by claiming that “the personal experience of individuals is closely bound up with larger-scale aspects of social structure, well beyond the purview or control of particular individuals. Linkage of micro and macro levels is thus no luxury but of central importance to the development of social theory” (Granovetter 1974:1377-1378). It is therefore necessary to consider effects of wider structural forces when studying the outcomes of postsecondary graduates.
Similarly, part of our understanding of economic outcomes is derived from the historically contextual characteristics of employment that define what Canadians perceive as successful (Brown and Bills 2011). The value of a particular skillset has less to do with the individualistic assumptions of its carrier or how it was acquired, than with the social settings that give it value (Hansen 2011). As Hansen posits, the sociology of education and labour relies on many concepts, such as “general skills, specific skills, professions, and even the character of education itself”, which vary significantly “from one society and timeframe to the next” (Hansen 2011: 51). This “macro-historical attentiveness,” as Brown and Bills (2011: 135) have termed it, is necessary to properly situate the experiences of recent graduates if for no other reason than to acknowledge that these experiences are temporally connected to a wider economic structure.12

Systemic changes to employment arrangements have restructured the way Canadians work, resulting in a shift in what was once considered “traditional” employment. This shift has in turn resulted in significantly high variation in what it means to secure lucrative employment in Canada. If labour market success is determined by having achieved certain levels of employment, then we must first identify what successful employment looks like in Canada’s current economic climate.

2.6.1 The Erosion of Traditional Employment

Traditional employment has typically been defined as the employment standard that emerged after the end of World War 2; characterized as having a full-time, continuous employment relationship where a worker has one employer and works on that

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12 Brown and Bills (2011) argue that time, as it is considered in the macro-historical genre of analysis, is not inherently a macro-level concept. Rather it is an important contextual element to situate school-to-work outcomes within an often-ambiguous credential literature.
employer’s premises under their direct supervision (Vosko 2007:53). Vosko describes the origins of standard employment as being “first limited to primarily male blue-collar workers, but it eventually extended to white-collar workers, also primarily men, but later included some women in the public sector (Vosko 2007:54-55). This conceptualization of work is typically in a unionized sector where employees “have access to social benefits and entitlements that complete the social wage” (Vosko 2007: 54).

Researchers have noted that workers in highly trained fields can experience the same employee-cutting measures that their blue-collar counterparts have traditionally faced (Veerasingham 1995; Danford et al. 2004). Where blue-collar workers are “laid off” as a result of downsizing and restructuring practices, white-collar workers are “de-layered”—which “is a polite way of saying the same thing” (Veerasingham 1995:1). For example, downsizing has repeatedly been shown to affect the employment opportunities of registered practical nurses in hospitals (Alameddine et al. 2009; Burke and Greenglass 2000). For example, Burke and Greenglass (2000) noted that Canadian nursing staff with the least amount of tenure that were most negatively affected by hospital restructuring and downsizing. This point is particularly important when looking at the early labour market outcomes of university graduates as researchers have argued that newly transitioned postsecondary graduates are particularly susceptible to labour-cutting measures, due to the fact that they are more likely to populate lower-level and more precarious positions (Degiuli and Kollmeyer 2007; Wright and Lund 2006).

13 It has been identified that white-collar redundancy consolidation strategies occur most often when employee compensation is high (Budros 1997) and in large firms with greater capital resources for expansion (Kalleberg and Van Buren 1996).
Precarious employment arrangements are also popular among employers as an alternative to standard employment arrangements (Livingstone et al. 2007; Vosko 2007). While some scholars have argued that precarious employment is at odds with standard employment, creating a “standard/non-standard categorization of employment in Canada (Waite 2009), others have been cautious to label precarious employment as the polar opposite of standardized employment (Vosko 2007; Yates 2003). Vosko (2007) warns that dichotomizing employment along lines of standard/non-standard work arrangements fails to consider the deterioration of full-time employment. Instead, precarious employment should be conceptualized as an employment strategy that has slowly weakened traditional employment standards (Yates 2003).14

It has been argued that precarious arrangements are attractive to employers as a means of exploiting the best work out of the cheapest workers through the promise of future full-time employment. Houseman, Kalleberg and Erickek (2003) found that many employers are attracted to the use of precarious workers as a reserve labour force in order to avoid the costs associated with “over-staffing positions with expensive, full-time, permanent workers who may not be utilized” (Kalleberg 2000:347). Employers therefore use precarious work arrangements as a way to “buffer” their core work force with no intention of hiring long term (Houseman et al. 2003).

14 One instance of this subversion of traditional employment can be seen in the rising popularity of flexible job arrangements (Degiuli and Kollmeyer 2007; Kane 1996). Using data from Italy, Degiuli and Kollmeyer (2007) noted the widespread growth of temporary agency firms and identified how these new forms of employment were marketed to workers. The authors found that agencies emphasized “a new age of choice” in career opportunities, and encouraged their workers to be flexible in job expectations. Despite these initiatives, however, the authors noted that the majority of workers still preferred full-time permanent employment and were most often forced into accepting part-time and contract work in order to find jobs (Degiuli and Kollmeyer 2007:507). Moreover, employers often use to promise of standard employment as a “reward” for accepting precarious work arrangements (Degiuli and Kollmeyer 2007).
There are some concerns that precarious employment arrangements are becoming the standard for early labour market transitions (Yates 2003). Houseman and colleagues (2003) note that employers are increasingly redirecting potential applicants to temporary work arrangements as a means of instituting a probationary period (2003:122-123). The authors hypothesize that this practice is becoming more popular because it allows the employer to lower the wages of workers during an often-poorly-defined probationary period, while leaving room for termination with none of the procedures required for full-time employees (Houseman et al. 2003:123).

Past literature has attempted to show that precarious employment is not always involuntary. Some scholars pointed to the opportunity of “job-sharing”, describing it as a part-time employment alternative where two individuals share the responsibilities of one full-time job as a method to promote better work-life balance (Kane 1996; Buchan 1991). Job-sharing was argued to have positive effects on job satisfaction (Kane 1996) and greater remuneration and career advancement (Buchan 1991) than solely part-time arrangements. Others pointed to similar full-time employment opportunities that existed in the forms of compressed workweek and “flextime” arrangements (Higgins, Duxbury and Mills 1992). These authors concluded that while flexible employment arrangements appeared to be positive for some part-time workers, there were concerns that inconsistent workweeks may actually exacerbate work/life conflict for full-time workers due to the increased daycare and life planning demands associated with de-standardized scheduling (Higgins, Duxbury and Mills 1993). More recently, scholars have made further attempts to debunk the voluntary nature of precarious work, finding that Canadian youth largely consider non-standard work arrangements to be involuntary (Mills 2006). The subjective
account of employment outcome is therefore an important piece of the story that is necessary to consider when looking at labour market outcomes. Including a subjective dimension of graduates’ labour market outcomes is therefore an interesting avenue that will be further developed in this dissertation.

The business strategies that have gained popularity in the labour market can present significant challenges for recent graduates hoping to secure reliable employment. These measures may serve to exacerbate the experiences of graduates from groups that have traditionally struggled to enter the labour market. The concern is that precarious work arrangements can lead to slack labour markets where workers are in greater supply than employers require, driving labour costs down, and pressuring workers to accept employment that is counter to standard employment terms. In light of these issues, postsecondary graduates may become pressured to accept employment that is unrelated to their field of study or level of education.

Empirical analysis of job precarity is often problematic. There seems to be great difficulty among the academic community to reach a consensus concerning what precarity ought to refer to in English literature (Waite 2009; Barbier 2004). Waite (2009:415) notes that precarity has only recently entered English parlance: “because it was coined by English speakers from the French précarité, the neologism of precarity has yet to find its way into mainstream English dictionaries.” While equivalent terms are used unequivocally in Italian, French, and Spanish literature, precarity in the English sense can, for instance, refer to a number of different employment conditions relating to income, quality of employment, and job insecurity (Barbier 2004). Waite (2009:416) offers a slightly different definition by arguing “at its most elemental level, precarity can
be understood as literally referring to those who experience precariousness. Precarity, thus, conjures life worlds that are inflected with uncertainty and instability.” Further, these dimensions can often be contradictory—a career that is considered precarious in one conceptualization may not fall within the distinction of precarity in another. Barbier (2004:7) suggests repackaging precarity as a notion related to “quality of work”, or “quality of jobs”, to potentially alleviate the conceptual quagmire of precarious employment. This dissertation will therefore operationalize precarity similar to the definitions put forward by Barbier (2004) and Waite (2009). That is, the use of precarity in this research will refer to the quality of recent postsecondary graduates’ careers by measuring a number of labour market outcomes as proxies. The analyses in this dissertation will address the quality of employment acquired by the most recent cohort of NGS graduates three years after graduation by measuring earnings, job satisfaction, and the subjective and objective reports of graduates’ education-to-career match. By using these measures, the analyses will investigate the employment outcomes associated with different fields of study, bilingualism and technical skills, and traditional/non-traditional degree programs.

Past research has indicated that precarious employment is negatively correlated with job security, job satisfaction, and organizational commitment (Stringer and Brown 2008). It is therefore reasonable to argue that the presence of multiple instances of poor outcomes is likely to indicate higher chances of precarious employment. For example, while the poor earnings associated with certain fields of study may not indicate precarious employment on its own, should those same fields also have poor school-to-work match, and lower job satisfaction, then graduates from those disciplines are likely to
face lower quality outcomes (and therefore are more likely to experience precarity) than graduates of other fields.

It is expected, given the past literature detailing the persistent inequality of graduates of certain disciplines, that the degrees associated with less-favourable outcomes in the past will continue to be an issue for graduates of this most recent cohort. Moreover, as online and distance programs have only recently become more popular in Canada, it is likely that employers have not yet had an opportunity to properly assess the employability of these graduates relative to graduates of traditional programs. This could lead to two possible scenarios: employers may develop preferences towards candidates who obtained their degrees from recognized traditional programs, or alternatively employers may otherwise fail to differentiate candidates at all. The central hypothesis contends that the latter scenario is most likely, given the relatively recent expansion of these non-traditional programs within Canadian higher education.

In regards to graduates who specialized in bilingualism and those with technical skills, this dissertation hypothesizes that graduates who do not have directly marketable skills will experience substantially more difficulty. That is, that graduates with both bilingualism and technical skills are likely to find lower instances of precarious outcomes than those without those skills. More importantly, however, is that the connection between employment opportunities and technical skills will be stronger than it is for proficiency in both official languages, as technical skills are domain specific and are more easily utilized.

Finally, sociodemographic effects will likely be an influential determinant of the precarity experienced by graduates. Consistent with prior research, the barriers to
employment faced by traditionally marginalized groups will likely also be present among graduates surveyed in the 2013 NGS. This effect is expected to be less than that reported in previous years, given the persistent focus on equity in public policy, alongside the extended three-year survey period in the NGS (over previous surveys’ two-year design) which provides graduates from marginalized groups with the additional time that may be needed to navigate careers.

2.6.2 Job Mismatch

Vosko (2007) cautions that the use of precarious employment is gaining popularity by businesses in Canada, creating significant competition for desirable employment. These trends have very real consequences for Canadian university graduates, as competition among workers can raise employers’ hiring demands in order to filter the pool of available applicants (Chillas 2010; Brown 2001). Critics of human capital theory have called into question the level of “upskilling” actually required for obtaining employment; some argue that current education trends leave individuals over-qualified for the actual requirements of employers and more susceptible to precarious work arrangements (Hansen 2011; Livingstone et al. 2007; Gingras and Roy 2000; Krahn and Lowe 1999). Job mismatch can present significant challenges for recent graduates, particularly in the case of underemployment. It has been suggested that graduates in these positions have little autonomy over decision-making in the workplace (Wright and Lund 2006) and may be more likely to experience exploitation and job dissatisfaction—key characteristics of employment precarity (Degiuli and Kollmeyer 2007).
Job mismatch can represent a number of theoretical employment possibilities when graduates’ credentials are disconnected from what is required for the job.\textsuperscript{15} Of particular interest to this research, overqualification and underemployment are two conceptually related pathways experienced by recent graduates. It is therefore helpful to disentangle both concepts when discussing job mismatch. While their meanings are often conflated in the wider literature, overqualification and underemployment can refer to two distinct strategies recent graduates use to find employment (see Athey and Hautaluoma 1994).

Overqualification can be described as a process whereby postsecondary certification is acquired in order to find employment in fields that have not traditionally required postsecondary education. This strategy is consistent with the human capital assumption that heightened credentials will separate an individual from a pool of applicants, increasing the likelihood that the individual will be selected for employment (Hansen 2011). In this way, overqualification intentionally leads to job mismatch as a strategy to increase one’s odds of being hired within a predetermined field. A result of the increased emphasis on postsecondary education, along with the widening availability of loan access, over-education can be a deliberate measure taken by students to increase their chances of securing satisfactory employment (Hansen 2011; Madaus et al. 2008). At the same time, Baker (2011) has argued that employers are passing the responsibility of training to prospective applicants, subsequently increasing the importance of obtaining

\textsuperscript{15} While job mismatch can refer to additional situations where a graduate’s employment exceeds the qualifications they have acquired, the situation for these individuals is seldom considered problematic. Individuals in these positions are significantly less likely express job dissatisfaction, and the remuneration associated with these positions is often higher than it would be otherwise. For the purposes of this dissertation, research will focus on the forms of job mismatch that lead to lower expected pecuniary returns based on education investment, job dissatisfaction, and similar unrealized expectations of recent graduates’ outcomes.
a postsecondary education. Where employers in a number of industries traditionally provided job-specific training to newly hired employees, the availability of mass higher education has allowed employers to expect applicants to have already made investments in the skills necessary for the job (Baker 2011; Keep and Mayhew 2004; Aldrige and Evetts 2003).

In contrast with overqualification, underemployment occurs when an individual’s career expectations are not realized when transitioning into the labour market (Livingstone 1998). This tends to occur most often when an individual’s skill or potential is underutilized (Athey and Hautaluoma 1994). Underemployment occurs when postsecondary graduates are unable to find employment in their chosen fields, and must accept employment in areas that do not require university credentials or do not adequately take advantage of the skills they have acquired.

There are concerns that the inflation of credential requirements for employment has led to the devaluing of a university degree; higher education may not guarantee a respectable job (see Walters 2004:104; also Hansen 2011; Rivera 2011). It has been argued that the recent educational expansion in Canada has only served to increase the underemployment levels of postsecondary graduates due to the oversaturation of university-educated workers (Walters 2004). Rather than seeing a decrease in the primary and secondary sectors that was predicted for the knowledge based economy (Bell 1973:14), these sectors have instead found new recruitment strategies through the exploitation of credential inflation (Brown 2001). Prospective workers looking to find employment in these areas can experience pressure to over-qualify in order to remain competitive within the labour market (Livingstone et al. 2007). In the US,
underemployment levels have been a concern since the 1980’s, with as many as 20 percent of graduates accepting jobs that did not require a college degree annually (Athey and Hautaluoma 1994:439). Livingstone and his colleagues (2007) have observed a similar situation in Canada, pointing out that the mismatch between Canadians’ learning achievements and the requirement of their jobs has led underemployment to become far more common than under-qualification (2007:154).

In some cases university graduates have set new hiring standards for jobs that traditionally did not require postsecondary education. Aldrige and Evetts (2003) argue that degrees in journalism became popular without any direct requirements from employers, and as a consequence graduates with this qualification became the hiring standard. Similarly, Athey and Hautaluoma (1994) found that of the workers within an electronics-manufacturing plant, those with a university education held higher positions in the company. While still underemployed, these individuals were more favored by the personnel representatives responsible for evaluating job applicants (Athey and Hautaluoma 1994). More recently, Baker (2011) discusses the regulations surrounding cosmetology, and the movement towards formal education as a licensing requirement.

There is some concern that university graduates may be targeted as a means of cheap skilled labour, particularly as the labour market becomes oversaturated with qualified workers (Chillas 2010; Keep and Mayhew 2004; Brown 2001). Evidence suggests that wage returns are significantly lower for postsecondary graduates employed in jobs that do not closely match their education (Yuen 2010). Moreover, Frenette (2004) has noted that graduates who are underemployed shortly after entering the workforce are significantly more likely to remain underemployed in the future. Where education should
be providing these individuals with lucrative employment, the competition that is characteristic of slack labour markets often pushes them to accept exploitative employment arrangements (Athey and Hautaluoma 1994). The position of these graduates in competitive labour markets is further exacerbated by the increased reliance on globalized trade, where employment can be easily outsourced to areas with significantly lower labour costs (Petras and Veltmeyer 2001).

School-to-work (mis)match is an important area of inquiry in regards to the literature on the labour market outcomes of university graduates. This dissertation will offer a significant contribution to the literature by examining the early career outcomes of Canada’s most recent cohort of graduates surveyed in the National Graduate Surveys. A number of outcomes are expected regarding the key research areas. First, it is expected that school-to-work match will continue be closest for graduates from the university fields of study that provide applied-skill training which employers can easily utilize, while education-job match will be lower for graduates from disciplines that are associated with generalized skills. Similar outcomes are expected for specialization type—graduates with technical training will report closer career matches than graduates who are bilingual, as the latter are likely to be more pliable in the labour market and therefore likely to find employment in a wider number of occupations.

It is also presumed that the school-to-work match of traditional and distance education degree programs will largely depend upon the characteristics of online degrees, and what programs have become most popular among the latest cohort of Canadians. If distance education degree programs have largely been aimed at providing training for careers in specific industries (as is the case of online MBA’s and degree programs in
nursing) then the expectation is that education-job match will be tighter for online programs than traditional degrees. Alternatively, if the majority of the expansion of online education has been concentrated as an alternative to traditional education, then graduates of these degrees are likely to report similar education-job match as graduates from traditional degree programs.

Finally, sociodemographic effects are also hypothesized to be present among the school-to-work match of graduates. If the hiring discrimination that has been reported in the past literature is still salient, then it is expected that traditionally disadvantaged groups of graduates will likely still face barriers finding equitable employment. This in turn will likely be reflected in much lower school-to-work matches among graduates of colour, those with disabilities, women, and those from less affluent backgrounds.

There are other causes for underemployment aside from education-job mismatch. Underemployment can also occur when the expected pecuniary returns on investment (that is, the salary expected based on the price paid for education) are unmet (Hansen 2011; Frenette 2004; Athey and Hautaluoma 1994). There are serious problems that can arise when the labour market outcomes do not match the pecuniary expectations of graduates. The debts accrued through educational investment can lead to considerable burdens once the transition from school-to-work is made. The income of recent graduates also plays a significant role in life decisions, with the purchase of a home, having children, and establishing retirement savings all factoring heavily into the ability to secure sufficient earnings. Hansen (2011:50) argues that it is therefore unsurprising that graduates “experience great anxiety and self-doubt as they encounter vocational obstacles of a sort their certificates and their school years have not equipped them to
understand or negotiate”. The income of postsecondary graduates is therefore an important dimension when studying the labour market transitions of graduates.

2.6.3 Earnings

The literature has indicated that there is a clear connection between job mismatch and earnings. Postsecondary graduates are most marketable when they can utilize the skills they acquired through their education. At the same time, graduates in some industries may have to compete for suitably matched employment when the supply of graduates exceeds the demands of employers. Yates (2003) argues that the competition between workers for lucrative full-time employment “limits the ability of workers to threaten capital accumulation” (2003:176). This creates what is referred to as “slack” labour markets where the surplus of labour allows employers to meet their labour requirements while at the same time maintaining antagonistic employment competition among the working population to keep wages low (Yates 2003:173-174). Although the ability to secure full-time permanent employment is the most salient indicator of earnings, there are several additional factors that have been shown to significantly influence the remuneration of university graduates.

Past research has indicated that university graduates’ employment outcomes vary significantly by program type (Tumen and Shulruf 2008; Frank and Walters 2012; Walters 2003, 2004b; Lin, Sweet & Anisef, 2003; Finnie 2001, 2002; Allen 1999; Lavoie & Finnie, 1999; Silver, Lavalee, & Pereboom, 1999; Davies & Guppy, 1997). Graduates of applied fields—engineering, computer science, mathematics, business, and commerce—appear to obtain employment more reliably, and have higher incomes on average than graduates from liberal arts programs (Frank and Walters 2012; Lin, Sweet &
Anisef, 2003; Finnie 2001). Using data from the 2005 wave of the National Graduate Survey Data, Frank and Walters (2012:107) found university graduates’ average yearly earnings ranged from $38,958 for liberal arts graduates compared to $52,141 (health), $51,671 (engineering/computer sciences), and $44,886 (business) respectively. While the authors’ findings were specific to Ontario graduates, these gaps are consistent with national trends seen in earlier NGS waves (Finnie 2001; Lin, Sweet & Anisef 2003; Walters 2004).

Although the employability of liberal arts graduates has been well documented in the literature (Adamuti-Trache et al. 2006; Davenport 2002; Graham 2002; Axelrod 2002; Allen 1999), it would not appear that the gap between “generalist” and “technical” degrees has closed (Frank and Walters 2012; Walters 2004). It is important to determine the labour market outcomes of current graduates, as what is considered “successful” in regards to school-to-work transition is often dependent on the ability to secure earnings that exceed the cost of the degree (Chillas 2010; Adamuti-Trache et al. 2006; Allen 1999). It is important to determine whether new generations of graduates are still securing earnings that justify the rising costs of education.

University graduates’ earnings are also segmented according to sociodemographic identifiers. Finnie and Wannell (2004) noted the negative effect that being female had on graduates’ earnings, finding that earnings gaps exist for women that become exaggerated over time. Similar outcomes have been witnessed for individuals with disabilities (Zarifa, Walters, and Seward 2015). Studies looking at region have pointed out the lower remuneration of graduates within the Atlantic provinces, with gaps ranging from 7-30 percent of the earnings of graduates from other provinces (APEC 2014).
There are a number of expected outcomes regarding income, given the wider literature. First, this dissertation hypothesizes that there will continue to be stark differences in the earnings of graduates from different fields of study. The analyses in this dissertation will build upon the existing literature by further disaggregating university programs; this categorization is expected to offer further insight into the labour market outcomes of graduates that has not been significantly captured by previous research. Particularly, there are expected to be income divisions among graduates based on the level of technical skill associated with each degree, though not in the same way as traditional “STEM” divisions have used in the past. Presumably, lines of division will exist along both the technical characteristic of degrees, as well as the ability of employers to utilize those skills efficiently. In this way, lines of division may not follow the typical narrative of previous research—the STEM degrees which are more commonly attributed as prerequisites for advanced post-graduate programs are likely to have less lucrative returns net of those advanced credentials. Alternatively, the liberal arts degrees that are more technically oriented and have stronger linkages to employers’ needs may provide greater earnings than non-technical degrees, and those that are a means to academic advancement.

The type of skills graduates acquire may also significantly influence earnings. If Graham’s (2002) assertion that all forms of intellectual inquiry can be a medium for wealth creation holds true, then it is possible that there may be no statistically significant advantage in regards to technical skills as compared to bilingualism. However, taking into consideration the significantly higher barrier of entry for technical skill accreditation over bilingualism, as well as the domain-specific qualities of technical skillsets, the
expected pecuniary returns for technical skills will likely be higher than it will be for those who are bilingual in Canada’s official languages.

The earnings associated with distance education degrees will likely depend upon the way in which Canadians utilize these types of programs. If distance education has become a means of receiving advanced education, then it is likely that these degrees will yield more lucrative outcomes. Alternatively, if the majority of the incumbents of online programs have pursued liberal education at the college and bachelor levels, then the earnings returns on these degrees may match (or fall below) graduates with traditional degrees. With the relatively limited focus distance education degrees have received in recent Canadian literature, this dissertation will offer a significant contribution to our knowledge regarding online programs.

Finally, income differences are likely still highly dependent upon sociodemographic indicators. The gaps that have been observed in the previous literature are hypothesized to still exist for the most recent graduates of Canadian university programs. Though, with the attentiveness towards equity in public policy it is presumed that the gaps will be less than what has been documented in previous research.

Overall, it is worth noting that because of downsizing strategies of employers and employment competition among workers, postsecondary graduates are vulnerable for precarious labour market returns. As Hansen (2011:50) notes of U.S. graduates, “young Americans tend to flounder for several years during the school-to-work transition, which they begin at a higher age, since their skills are non-specific and they have rarely given serious thought or received meaningful guidance as to how they might apply them.” Therefore, this period of uncertainty produces a subjective element to the education-to-
work transition that can help to explain the early labour market experiences of university graduates beyond what is afforded by objective measures of earnings. Aside from using job match and earnings to define labour market success, the subjective satisfaction graduates have with their early labour market occupations is another important consideration. The next section will therefore address the employment satisfaction among graduates.

2.6.4 Job Satisfaction

Employment satisfaction can be used as a marker for determining successful labour market outcomes aside from remunerative measures (Madaus et al. 2008). The literature on university graduates’ job satisfaction is conflicting. Grayson (2004), for example, concluded that the social, cultural, and human capital development that is consistent with higher education had less of an impact on job satisfaction than it did on school-to-work match and income. On the other hand, Madaus and colleagues (2008) found that graduates with disabilities had relatively high levels of employment satisfaction compared to non-postsecondary graduates with disabilities (Madaus et al. 2008:329). The authors suggest that a university education promotes self-efficacy and self-regulatory strategies that contribute significantly to perceptions of job satisfaction (Madaus et al. 2008:330-331).

It is interesting to note that the effect of field of study on the job satisfaction of graduates is not what we would expect, given the relationship field of study has with earnings. A significant proportion of the literature seems to indicate that job
dissatisfaction is often associated with highly technical fields such as medicine and health (Shapiro et al. 2005), economic related fields (Burke and McKeen 1995) and applied sciences (Lavoie and Finnie 1999). In fact, Lavoie and Finnie (1999) noted that job and earning dissatisfaction was common across all Bachelor degree holders of technical fields, even those with traditionally favourable outcomes such as engineering and computer sciences. The authors suggested this was due to the inflated expectations of students in these fields which leave them disappointed when they transition into entry-level positions and are faced with post-school responsibilities (Lavoie and Finnie 1999: 113). This is an important consideration for the study of postsecondary graduate transitions; looking at more than the traditional remunerative measures may yield greater outcome variation among postsecondary graduates.

But what does the literature say about liberal arts graduates? While traditionally the lowest earners, past researchers suggest that graduates from certain liberal arts fields experience higher than average job satisfaction returns (Land 2000; Buckley 1986). Buckley (1986) found that criminology graduates reported relatively high levels of job satisfaction, while Land’s (2000) study of sociology graduates from McMaster University noted similar results. The author analyzed job satisfaction across a number of subjective and objective measures, and found that overall the majority of sociology graduates were more satisfied than dissatisfied with their employment outcomes (Land 2000:65). The author noted that over half of graduates were satisfied with their starting salaries (Land 2000:65). Despite stark earnings gaps between fields of study, Land (2000) proposed that liberal arts graduates may have more manageable labour market expectations.
Extending the measures of labour market outcome beyond employment and earnings is empirically useful when studying postsecondary graduates. Moreover, by only conceptualizing “job satisfaction” as the response to one’s earnings, Finnie (2002) noted that field of study trends followed roughly the same narrative as income analyses have shown, and miss the underlying variation when considering broader measures of satisfaction. The author argues that “graduates’ assessments of their post-graduation experiences and overall evaluations of the programmes from which they graduated are based on more than simply adding up standard measures of labour market ‘success’, with the job satisfaction scores and - perhaps most interestingly - the overall programme evaluations often departing from what the objective measures (unemployment rates, earnings levels, etc.) might have predicted” (Finnie 2002:16-17). Moreover, with the aging literature on the topic, it is particularly important to understand how postsecondary graduates’ expectations have responded to the labour market. Finally, there are few sources of literature analyzing employment outcomes along subfields (Smith 2015; Land 2000). Therefore, analyzing job satisfaction across disaggregated STEM fields will help to parse out differences among fields traditionally considered the most dissatisfied, and will allow comparison to the job satisfaction of graduates from liberal arts degree programs.

The job satisfaction of graduates is expected to vary across field of study, specialization and degree program type, and for graduates from traditionally marginalized backgrounds. If the expectations of graduates from STEM fields have continued to exaggerate actual labour market realities, then little change is expected in the dissatisfaction among graduates of these technical fields. Similarly, with the increased
saturation of liberal arts graduates within the labour market irrespective of the actual needs of employers, favourable employment may be far more competitive for recent graduates. This may lead to greater dissatisfaction among graduates of these degree programs, particularly if the careers secured do not adequately meet expectations.

The job satisfaction differences among graduates with technical skills and those who are bilingual will largely depend on how influential these types of skills are in securing favourable employment. It is expected, given the literature on the job dissatisfaction of graduates from STEM fields, that bilingualism will have a positive net effect on job satisfaction that is greater than technical skill development.

Similarly, variation in the job satisfaction of graduates from traditional and non-traditional (distance) programs will depend on how employers have responded to graduates with these non-traditional credentials; if graduates from online programs of study have received relatively similar types of employment then job satisfaction differences will be small. If, on the other hand, distance education programs do not adequately translate to suitable careers, then the expected returns for these graduates will not match labour market realities, resulting in greater employment dissatisfaction than graduates from traditional programs. It is likely that the provision of online education in Canada has not matured to the point where employers are able to adequately differentiate graduates. Therefore, the differences in job satisfaction among graduates from traditional and non-traditional programs are expected to be small.

Finally, the job satisfaction of traditionally marginalized groups captures both the employment quality of graduates’ early labour market outcomes, as well as the day-to-day interactions within that employment. Therefore, studying job satisfaction will
provide an indirect assessment of whether persistent inequality exists in the employment outcomes of these groups. Sociodemographic indicators of disadvantage are expected to be negatively associated with job satisfaction, though the effects are presumed to be the greatest for those statuses that are most visible in the workplace—mainly gender, visible minority status, and disability.16

2.7 Conclusion

The purpose of this chapter has been to address the relevant issues within the school-to-work literature of university graduates. While there have been strategies aimed to improve transition experiences, it would appear that there are still significant outcome differences between graduates with higher levels of education. The investment in human capital may leave some bachelor graduates in precarious or vulnerable positions due to the amount of debt incurred through pursuing a university degree. This vulnerability also includes the time commitment associated with higher education pursuit; that is, the real costs associated with lost wages while in school, lost pension contributions, and potential delays in key life events (purchasing a home, beginning a family, etc.). Financial burdens are exacerbated if these individuals are unable to find acceptable and sustainable employment within a short window after graduating. If early labour market difficulties

16 Of course, disability status can be visible or non-visible. However, we hypothesize that even in the cases of persons with non-visible disabilities, these individuals are confronted with their status in a similar manner as the experiences of women and persons of colour. Therefore, while disability status may not always be visible, the effect it can have on the daily interactions of workers affords it the public quality that is akin to other visible indicators of disadvantage.
are indeed a signal of future issues experienced throughout one’s working career, then it is essential to address potential indicators of early labour market disadvantage.

This chapter has addressed a number of theoretical perspectives that represent the foundation of the sociological study of school-to-work transition. The analyses in this dissertation will contribute to the existing literature by offering an empirical analysis of the viability of human capital, credentialist, and labour segmentation theoretical frameworks to explain the experiences of the most recent cohort of graduates captured in the National Graduate Surveys. By utilizing the 2013 NGS, this research will also set a new baseline for understanding graduates’ outcomes as further waves of the National Graduate Survey are released using the new three-year survey design.

This chapter has also outlined the literature pertaining to language and technical skill pursuits, field of study choices and the types of education offered by postsecondary institutions. This dissertation will contribute to the existing literature in a number of ways. One such contribution will be to offer insight into the labour market outcomes associated with graduates’ fluency in official languages and those who pursue technical skills. There is limited existing literature that has sought to compare the returns associated with these different skillsets, especially in regards to Canadian bachelor graduates. With the increased competition among postsecondary graduates that has followed the expansion of higher education in Canada, it is becoming increasingly important to investigate any potential avenues of benefit that may further hedge graduates’ bets to secure favourable outcomes. The central hypothesis posits that technical skills, which are domain specific, are likely to be easier for graduates and employers to strategically utilize; it is therefore expected that the gap in returns between
graduates with technical skills (compared to those from non-technical disciplines) will be greater than it is for those who are bilingual (relative to graduates who only speak one official language).

Another key comparison is those graduates who have technical skills and are non-bilingual as compared to those who are bilingual and have non-technical skillsets. In this instance, it is expected that the former group will maintain advantages due to the closer application of technical skills to specific occupations. At the same time, while bilingual graduates are certainly capable of utilizing their fluency in both official languages to favourable ends, it is likely that bilingualism provides a premium only when other job requirements are satisfied first. That is to say, bilingualism is likely advantageous after employers’ other hiring requirements are met by the candidate. Therefore, a secondary hypothesis is that bilingualism will have a greater effect when the interaction between technical skill and bilingual proficiency is considered. That is, it is expected that graduates from technical skill backgrounds will have significantly more favourable returns when they also have proficiency in both official languages.

In addition to bilingual and technical pursuits, this chapter outlined the relationship between field of study decisions and labour market returns. Given that the wider literature has indicated that labour market outcomes differ by fields of study, it is expected that further disaggregation of fields will identify even more variability between degree programs—although not in the same way that traditional field of study narratives would suggest. More specifically, the central hypothesis contends that the typical field of study differences shown in the wider literature are conflated by aggregated coding structures that disproportionately skew the portability of a few outlier bachelor degrees.
That is, when considered separately from engineering graduates, the outcomes for graduates of the remaining STEM fields are not expected to greatly differ from the majority of liberal arts graduates. This relationship will likely be further pronounced by disaggregating liberal arts programs, as it is again expected that the negative experiences that have been documented for graduates of liberal education are disproportionately skewed by a small but influential number of outlier programs.\(^{17}\) Offering alternatives to the traditional coding structures of graduates’ fields of study is an important contribution to the existing literature. By collapsing fields around a small number of particularly influential programs, subtle (or great) variation is lost—leading to potentially misinformed rhetoric concerning the portability of technical/applied STEM degrees compared to liberal education. Further analysis is therefore essential to continue to test the traditional narratives on the labour market preparation of various degree programs in order to more accurately determine where differences still exist.

This doctoral work will also offer a demographic profile of the most recent cohort of NGS graduates who pursued their programs through distance education. It is possible that the expansion of distance education has served to fill the demands of specific industries, rather than act as an alternative to traditional postsecondary education as a whole. In this case, it is likely that distance education degrees could actually provide more favourable outcomes than traditional degrees to specific demographics of postsecondary graduates. Due to empirical limitations involving the sample size of graduates who earned their certification through means of distance education, it is

\(^{17}\) The presence of outlier programs is expected given the occupational variation presented by Smith (2015) that found that occupational pathways differed greatly among graduates of a number of liberal arts programs.
necessary to expand the scope of this analysis to include graduates from all levels of postsecondary education. Regardless of this limitation, significant contributions will be made to the existing literature concerning the outcomes of Canadian graduates from distance education programs. Primarily, this dissertation will offer a discussion of how the outcomes of graduates from distance education programs compare to those who pursued their degrees through traditional means in regards to their earnings, school-to-work match, and job satisfaction. Given that distance education is still a growing subsection of Canadian postsecondary education, the central hypothesis posits that employers have not yet differentiated graduates based on their postsecondary institution, or the mode in which they earned their degrees. Moreover, while postsecondary institution characteristics are highly influential in the hiring decisions of employers in the U.S., it is considerably less pronounced in Canada (Davies and Hammack 2005). It is therefore unlikely that educational pursuits from relatively new and less established online-only programs create barriers for workforce entry.

Finally, this chapter has addressed a number of traditional indicators of disadvantage within the sociological literature on education and work. While previous research has clearly indicated the relationship between sociodemographic statuses and labour market experiences, there are still many opportunities to significantly contribute to the existing literature. Particularly, this dissertation will investigate the effects of gender, race, SES, and disability status on the labour market outcomes of recent postsecondary graduates. This research will contribute to the existing literature by continuing to analyze the effects of these statuses using the most recent NGS data available. Given the history of disadvantage associated with these sociodemographic indicators, it is hypothesized
that marginalization will still be evident for these groups, though it is expected that the overall effects will be smaller than previously documented.

In accordance with past research, it is expected that visible minority status will likely have the smallest effect on outcomes in comparison to the other indicators included in analyses, as the literature has indicated that racial gaps within the labour market are relatively small when SES is also taken into account. Similar results are expected for gender after controlling for field of study decisions, as a significant proportion of the inequalities experienced by women have been attributed to differences in the programs chosen by men and women. Alternatively, while SES is expected to have a more significant effect than visible minority status and gender, the greatest outcome gaps will exist for graduates with disabilities as recent literature has shown that these graduates still face significant inequalities within the labour market. Having addressed the relevant literature, the next section will turn to a discussion of the data and methods used in this dissertation.
Chapter 3: Data and Methods

This dissertation draws on data from the 2013 wave of Statistics Canada’s National Graduate Survey (NGS). The NGS is sponsored by Human Resources Development Canada, and has been actively collected by Statistics Canada since 1984. Prior to the 2005 wave of the survey, postsecondary graduate cohorts were interviewed two and five years after graduating from their programs. This survey structure allowed researchers to track labour market outcomes over a longitudinal period. Beginning with the 2005 wave, the survey dropped the fifth year survey period. Thus the respondents were not re-interviewed five years following graduation. The latest wave of NGS data collection has again employed a cross-sectional design; however, the 2013 NGS has been revised to only survey the 2009/2010 cohort of postsecondary graduates three years after graduation (Statistics Canada 2014).
Due to the revised survey framework of the 2013 NGS, the results in the following analyses cannot be extended to include past cohorts of NGS respondents. Sadly, this new three-year survey design prevents any relevant comparison of this latest cohort to the labour market experiences of previous NGS survey respondents. Moreover, losing the five-year follow up survey also prevents researchers from being able to view changes over time in the employment situations of graduates from the 2013 cohort. Regardless, the data provide a wealth of information on the labour market experiences of recent graduates three years after completing postsecondary education. The survey has more than 30,000 respondents (a roughly 49% response rate of graduates) from all provinces and territories in Canada. Despite the above-mentioned recent survey limitations, the NGS is still the best resource for looking at the labour market transitions of recent Canadian postsecondary graduates.

Data for the NGS are collected via telephone survey; respondents are asked a variety of demographic information, as well as questions relating to their educational history and employment experiences. The main objective of this survey is to assess the transition from school to work and document the labour market returns of recent postsecondary graduates of various levels and fields. Using the NGS, this research will allow for a profile of the rate of return on investment in postsecondary education, particularly across fields of study and program type.

3.1 NGS Sampling Information

The NGS uses a stratified simple random sampling design. Graduates within strata were selected without replacement and a systematic method of selection was used. Data are stratified across three variables (Statistics Canada 2014):

1. Geographical location of institution
2. Level of certification
3. Field of study

Geographical location is comprised of the 10 provinces and three northern territories. Level of certification has been segmented into five groups:

1. Trade/vocational certificate or diploma Quebec only
2. College diploma
3. Bachelor’s degree
4. Master’s degree
5. Doctoral degree

Field of study has been divided into 12 categories consistent with the primary groupings of the Classification of Instructional Programs (CIP):

00. Personal Improvement and Leisure
01. Education
02. Visual and Performing Arts, and Communications Technologies
03. Humanities
04. Social and Behavioural Sciences and Law
05. Business, Management and Public Administration
06. Physical and Life Sciences and Technologies
07. Mathematics, Computer and Information Sciences
08. Architecture, Engineering, and Related Technologies
09. Agriculture, Natural Resources and Conservation
10. Health and Related Fields
11. Personal, Protective and Transportation Services
12. Other

Though the combination of these three variables makes for a possibility of a total of 636 strata, the lack of graduates within certain areas results in a final count of 434 strata used in data collection (Statistics Canada 2014). Data collection for the 2013 reference period took place between April and September 2013. Survey participation is voluntary and data have been collected directly from respondents.

3.2 Selection Criteria for Analyses

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18 The “trade/vocational” level in Quebec pertains to programs typically offered outside of the postsecondary sector.
The target population of the survey is all graduates from Canadian public postsecondary education institutions who have graduated or completed the requirements of their program during the calendar year for which the survey was carried out. University programs, the focal level of education used in analyses for this dissertation, consist of both three-year general and four-year honor bachelor programs at government recognized Canadian postsecondary institutions. Graduates of private postsecondary education institutions and those living outside of Canada or the United States are excluded from analysis.

With the exception of distance education models, the analyses in this dissertation will limit the scope to only those graduates who have obtained a bachelor degree as their highest level of education. Graduates who had obtained additional qualifications within the three years following graduation were excluded from analysis as their highest level of school would be different than what they had reported in the survey, therefore they would no longer be representative of this cohort. Those graduates working part time at the time of interview, and graduates who were continuing education were also excluded from analyses. Removing these respondents is necessary to provide an accurate analysis of the labour market experiences of graduates who had a bachelor degree as their highest level of certification at the time of interview, while removing respondents who might conflate outcome measures. For analyses involving earnings, underemployment, job satisfaction, and job-to-education fit, only those who were full-time, full-year workers at the time of interview are included in the analyses. Previous work with the NGS has restricted

Due to sample size limitations, distance education analyses will include graduates of all programs of study and levels of education. This is to provide estimates that are robust enough to generalize to the wider population of students pursuing online education.
analyses to only those graduates who are permanent full-time workers, particularly when looking at earnings (Zarifa, Walters, and Seward 2015). Respondents who chose not to respond to any of the questions used in this study were also removed from all analyses.

3.3 Dependent Variables

The 2013 National Graduate Survey contains a number of useful measures of labour market outcomes. The present study uses four of these measures as focal dependent variables: objective underemployment, subjective education-to-job fit, job satisfaction, and earnings. The variables capturing underemployment and earnings are used in both descriptive and regression analyses as they provide an account of the economic and non-financial returns on postsecondary investment. Alternatively, job satisfaction and the subjective account of education-to-job fit are used primarily in descriptive analyses. These two variables offer an opportunity to further examine the non-financial returns associated with disaggregated fields of study in order to determine if nuances exist between university programs that are traditionally collapsed in school-to-work outcome research. The next section of this chapter will elaborate on these labour market outcome measures.

3.3.1 Underemployment and Education-Job Fit

This section will discuss the variables related to skill utilization and school-to-work fit. Skill utilization and school-to-work fit have been defined using measures in the

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20 The choice of using the selection requirement of full-time, full-year, employment was made so that analyses were representative of graduates in the best possible position within the labour market. While it is possible that due to this selection, proportions of graduates from certain fields may be excluded. This did not appear to be the case within the current sample, however, as additional analyses not presented in this dissertation indicated that, with a few small exceptions, including part time and non-permanent workers did not significantly change the results presented here. In fact, with respect to the descriptive analyses, including part time and non-permanent workers only further pronounced the field of study differences presented in the following chapters.
NGS which capture education-to-work (mis)match, job satisfaction, and underemployment. Analyses therefore use the following three variables: job relation to degree, satisfaction with the job held by the respondent, and the amount of education required to get the job compared against the highest level of education earned by the respondent. For all analyses pertaining to employment, those who were unemployed and those not seeking employment were excluded from the sample, as the experiences of these individuals are inconsistent with those actively participating in the labor market.

Job/education fit is captured in the question “how closely is/was your job with your employer related to your degree?” and is coded as 1) closely related, 2) somewhat related, and 3) not at all related. The response options are collapsed into categories that indicate close/somewhat related school to work match as category 1) Yes, while the third category, “not at all related” represents response 2) No.

Similarly, job satisfaction is recoded from a Likert scale to a dichotomous category. The Likert codes for job satisfaction originally contained in the NGS are: 1) Very satisfied, 2) Satisfied, 3) Dissatisfied, 4) Very Dissatisfied, 5) Neither satisfied or dissatisfied. Due to the low response rates in categories three to five, this variable is recoded so that analyses will focus only on those graduates who had answered 1) Very satisfied, or 2) Satisfied.21

To capture an objective measure of skill utilization among graduates’ outcomes, a derived variable is used that looks at the highest level of education completed by the

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21 Two additional coding structures of job satisfaction were tested. First, job satisfaction was kept as a Likert scale and analyzed with OLS regression. Second, job satisfaction was collapsed to compare graduates who were “Satisfied” to those who were “Dissatisfied”. Neither coding structure offered significantly greater insight into the job satisfaction differences among postsecondary graduates than the coding structure that is presented in this dissertation.
graduate, along with the level of education that is required for the graduate’s current job. If the respondent’s actual level of education attained exceeds what is required for the position they hold at the time of interview, the individual is coded as being underemployed. Therefore, the variable created for the analysis is coded as follows: 1) the respondent holds more education than is required for their current job, and 2) the respondent holds the same or less education than their current job requires.

Walters (2004) has identified limitations with the objective measurement of underemployment that is provided in the NGS. He notes that the measure contained in the NGS can only be proximally objective; education-job match is based on employers’ expectations of candidates’ educational certification matched with the actual level of a respondent’s attained education. Using previous versions of the NGS, Walters (2004:92-93) cautioned that the job characteristics that form part of the objective analyses are assessed using evaluation scales that rely on external assessment of job conditions and characteristics. These assessments cannot be wholly objective; researchers have struggled to find objective measures that enable a correspondence between skill demands in employment and the skills obtained through postsecondary education attainment (Walters 2004:93). Instead, objectivity in this analysis will refer to data collection that does not rely on the subjective opinions of respondents. This measure is consistent with similar studies using previous NGS data (Seward, Zarifa and Walters 2015; Walters 2004).

3.3.2 Earnings

The earnings variable in the analyses is captured using the survey question: “Working your usual hours, approximately what would be your annual earnings before
taxes and deductions at that job?” Though the measure provides only an approximation of what the respondent earns on an annual basis if the job were to last the full year, this measure of income has been widely considered suitable in past research using the NGS (see Zarifa, Walters, and Seward 2015; Walters 2004; Finnie 2000). Studying income in this way also accounts for irregularities in work patterns. When income is a dependent variable the natural log of income is used rather than actual income to normalize the distribution of the response variable for regression models.

3.4 Independent Variables

The independent variables have been selected to best reflect the central research questions of this study. Therefore, there are key independent variables that capture disaggregated field of study, program type (distance and traditional education), and bilingual and technical skill proficiencies. Control variables have also been included to account for a number of sociodemographic dimensions that have been associated with disadvantage in prior literature.

3.4.1 Education

Field of study, type of program (distance and traditional), and bilingualism/technical skill proficiency are the key independent variables used in analyses. Field of study represents the discipline of the degree earned by the graduate. Originally coded using the Classification of Instructional Program (CIP) system employed by Statistics Canada, this dissertation will disaggregate field of study into the following 23 categories:

1. Visual arts
2. Communications
3. Language study
4. History
5. Anthropology, Cultural studies
6. General humanities  
7. Sociology  
8. Family, nutrition, and social work  
9. Criminology and legal studies  
10. Psychology  
11. Economics, accounting, and finance  
12. Geography and philosophy  
13. Political science and public administration  
14. Business and business management  
15. Biology  
16. Physics and chemistry  
17. Mathematics  
18. Agriculture, natural resources and conservation  
19. Health, recreation, and fitness  
20. Education  
21. Engineering and technology  
22. Computer and information sciences  
23. Other

Due to the complexity of this coding structure, this variable will be used primarily in descriptive comparisons of labour market outcomes. Past literature that has utilized the NGS has typically relied on aggregated field of study categories formed around “hard” and “soft” skills; this structure served as the traditional point of comparison among postsecondary graduates (Frank and Walters 2012; Zarifa and Walters 2008; Finnie and Frennette 2003; Allen, Harris, and Butlin 2001). There are two problems with aggregated measures of fields of study that justify disaggregating disciplines, however. First, the native coding of field of study within the NGS conflates bachelor graduates with those who obtained professional degrees lower than a Masters degree. This is particularly problematic, as graduates with professional degrees are likely to have more favourable outcomes than typical bachelor degree holders.22

22 In order to provide a parsimonious analysis of fields of study, professional degrees have been removed from analysis. For example, analyses remove professional law degrees (LLB, JD, BCL), dentistry (DDS) and medical degrees (MD), nursing (MSc, PhD), veterinary medicine (DVM), and teaching degrees. In some cases, the NGS collapsed disciplines across degree types (i.e., architecture/landscape architecture, and city/urban planning collapses bachelor graduates with those who obtained further professional designation). In these circumstances, the disciplines have been removed from analyses, as they cannot accurately capture the experience of undergraduates and would therefore conflate results.
Second, while liberal arts/humanities degrees have been associated with the weakest returns in the labour market, less is known regarding the variability in outcomes among these degree holders. Some scholars have speculated that the poor returns on a liberal education are the result of the mismatch between the skills learned in the degree and the needs of employers (Hansen 2011; Lin et al 2003). If this is the case, then it may be that some liberal arts programs are better suited to fulfill demands in the labour market than others, leading to significant variation among liberal degrees with respect to employment outcomes. Such details are lost in aggregated measures of fields of study.

Aside from the descriptive models indicated above, the regression analyses of field of study use a coding structure that relies upon an intermediate level of disaggregation. This coding structure disaggregates STEM fields in order to maximize cell sizes while at the same time providing the most detail possible concerning university programs. These elaborated fields are categorized as follows:

1. Fine Arts/Humanities
2. Social Sciences
3. Business/Economics/Accounting/Finance related degrees
4. Biology
5. Physics/Chemistry
6. Mathematics
7. Agricultural Sciences, Sciences related to Natural Resource Conservation
8. Engineering and Technology
9. Computer and Information Sciences
10. Health, Recreation, and Fitness
11. Education
12. Other

3.4.2 Program Type (Traditional and Distance Education Programs)

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23 A separate control variable for field of study is used for analyses with distance education as a key independent variable. As the analyses for distance education look at postsecondary graduates from all levels of education, the original field of study variable provided within the NGS is used to control for discipline. This variable is most compatible with the categorization of fields at multiple levels of education.
This dissertation will address the labour market returns associated with pursuing degrees through distance and traditional education. Respondents were asked whether their degree had been taken through correspondence or distance education; their responses are coded into the following categories:

1. None of the respondent's program was taken through distance education
2. Less than half of the respondent's program was taken through distance education
3. About half of the degree taken through distance education
4. More than half of the degree taken through distance education
5. All of the degree taken through distance education

Due to sample size issues, categories one and two are coded as 1) Less than half of the degree taken through distance education, while categories three, four, and five correspond to 2) Half or more of the degree taken through distance education.

3.4.3 Bilingualism and Technical Degrees

The final set of analyses in this dissertation examines the labour market outcomes associated with bilingualism and technical skill proficiencies among university graduates, where the earnings and employment outcomes of being bilingual versus graduating from STEM-related fields are compared. The first of these indicators emphasizes the returns to language investment by looking at the effect of being bilingual on employment outcomes, and is captured by using the variable “language spoken at the time of graduation” as a proxy. Graduates who spoke either English or French exclusively at the time of graduation are considered non-bilingual. Alternatively, if the graduates indicated fluency in both English and French at the time of graduation, then they are considered to be bilingual in the analyses. This variable is therefore coded to represent whether the respondent was fluent in both official languages at the time of graduation and is coded as: 1) No, and 2) Yes.
The second subset of analyses looks at the role that technical specialization has on career outcomes by assessing the employment returns for graduates who pursued degrees that provide more technical/applied skills (that is, fields involving science, technology, engineering, and mathematics), compared to those who obtained their degrees in non-technical/general programs. The variable is coded as:

1. Non-technical degrees
2. Science related degrees
3. Mathematics
4. Engineering and technology
5. Computer and information sciences

3.5 Control Variables

The key sociodemographic control variables that are used in all analyses include gender, visible minority status, disability, age, whether the respondent is married, or has dependent children, immigration status, whether the respondent has at least one parent with a university degree, and the region of respondent at the time of interview. The remaining control variables that are included in all analyses capture the types of funding a student may have received prior to graduation, and include: grants; government loans; scholarships; or whether the student had borrowed from lenders other than the government. These controls have been used in previous studies using the NGS and have been shown to have an influence on the labour market outcomes of graduates (Seward, Walters, and Zarifa 2016; Zarifa, Walters, and Seward 2015; Zarifa, 2012a; Zarifa & Walters 2008; Walters & Zarifa 2008). Finally, in models where distance education is the focal independent variable, controls are included for years worked full-time before graduation, level of education, and the field of study variable offered by Statistics Canada within the NGS.
Gender, visible minority status, disability, and parental education capture the dimensions of disadvantage that are most common in the wider literature. Gender is coded as 1) male and 2) female. Visible minority status is similarly coded as: 1) respondent identified as a member of a visible minority group; 2) respondent did not identify as a member of a visible minority group. The disability measure that is used in analyses is derived from the question “do you have any long-term disabilities or handicaps, that is, ones that have lasted or are expected to last six months or more?” The response options for this question are: 1) Yes and 2) No.

Unfortunately the NGS does not contain ideal measures of parental socioeconomic status/economic background of the respondent. However, there are measures for the highest level of education of the respondents’ mother and father that have been used as a proxy for socioeconomic status in previous research using the NGS (Seward, Walters, and Zarifa 2016; Zarifa, Walters, and Seward 2015; Frank and Walters 2012). These two variables ask the question “what is the highest certificate, diploma, or degree that your (father/mother—or substitute male/female guardian) has completed?” and is coded as followed:

1. Less than high school diploma or its equivalent
2. High school diploma or a high school equivalency certificate
3. Trade certificate or diploma
4. College, CEGEP or other non-university certificate or diploma
5. University Certificate or diploma below the bachelor’s level
6. Bachelor’s degree (e.g., B.A., B.Sc., LLB.)
7. University certificate, diploma, degree above the BA level

These questions are recoded to assess whether at least one parent has a university degree, and is coded as follows: 1) No (neither parent has attained a university education), and 2) Yes (at least one parent has obtained a bachelor degree or higher).
The additional sociodemographic controls that are also included in all models are: age, region of residence at the time of interview, language, immigration status, marital status, the presence of dependent children, and variables related to the types of student funding graduates receive prior to graduation.

Age is captured as a quantitative variable (in years) at the time of graduation. A variable indicating where the respondent was living at the time of interview is also available in the NGS, and is coded as:

1. Atlantic Provinces, including Newfoundland, New Brunswick, Nova Scotia, and PEI
2. Quebec
3. Ontario
4. Western Provinces, including British Columbia, Alberta, Saskatchewan, Manitoba and Nunavut, Yukon, and the Northwest Territories.
5. Outside Canada

Immigration status is captured with the variable: “Respondent’s status in Canada at the time of interview”. The variable is coded to distinguish between respondents that are: 1) a Canadian citizen by birth or naturalization, and 2) a landed immigrant. Foreign students who attended Canadian institutions on a visa (aside from the U.S.) are excluded from analyses.

Both marital status and the presence of dependent children are also included as control variables. Marital status is recoded from the original variable to represent the following categories: 1) Married, and 2) Not Married. Whether the respondent has dependent children has also been recoded from the original categories: 0) no dependent children, 1) one child, 2) two children and 3) three or more. The recoded measure simplifies this distinction to indicate whether the respondent had dependent children at

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24 Category 1 in the original marital status variable became 1) Yes, while categories 2 and 3 became 2) No.
the time of interview, and is coded as 1) Yes and 2) No. The presence of dependent children is noteworthy, as past literature has identified that the effect that dependent children has on women’s postsecondary and early labour market outcomes is disproportionately more negative than it is on men’s outcomes (Wolfinger, Mason, and Goulden 2005; Budig 2003).

The final control variables that are in all analyses pertain to the types of funding available to students prior to graduation. Four variables are used to represent grants/bursaries, government-provided loans, scholarship awards, and loans from sources other than the government. The grants/bursaries variable is coded as 1) Yes, the respondent received academic funding, while 2) indicates that the respondent did not receive bursaries or grants. This is consistent with the coding for the variable capturing graduates who had received scholarship funding. Again, graduates who had received an award are grouped in the “Yes,” category, while those who had not received a scholarship during their degree are coded as “No.”

In regards to government-provided loans, the variable has been coded to ask the following question: Did the respondent borrow government-sponsored student loans? Category 1) corresponds to “Yes”, while category 2) represents “No”. Similarly, the variable capturing whether the respondent had loans other than government-sponsored loans is coded the same way. That is, category 1) includes those graduates who had borrowed from outside sources while category 2) consisted of those who had never borrowed from outside sources.25

25 These sources include borrowing from parents, spouse/partner, family or friends that they have to pay back, and money borrowed from a bank or line of credit, or from a credit card to fund their postsecondary education.
The analyses where distance education is a focal independent variable will also control for the months the graduate worked before completing their education. This is to account for demographic differences between graduates who pursue correspondence education. This helps ensure that the differences between graduates will not be confounded by pre-education work opportunities. If distance education is a means of pursuing further education among already-qualified professionals, then including prior work experience as a control within models will account for much of this effect.

Unfortunately due to the relatively limited number of graduates who had pursued their education through correspondence in 2009/2010, analyses where distance education is the focal variable will compare graduates across all programs and levels of education. It would appear that distance education is still an under-utilized pathway among Canadian incumbents of postsecondary education. Expanding analyses to include graduates of all levels of education will therefore generate models that are robust enough to make adequate comparisons to graduates who pursued traditional higher education. For distance education analyses, the level of education variable includes the following categories and will be included as a control variable in the model:

1. Vocational diploma or certification, Quebec trades
2. College of CEGEP diploma or certification
3. University diploma or certificate below a Bachelors degree
4. Bachelors degree or first professional designation
5. University diploma/certificate above Bachelors degree
6. Masters degree
7. Doctorate

As mentioned earlier, an additional control variable capturing field of study is used in analyses where distance education is a focal variable in order to account for fields at all
levels of education. The analyses use the native coding structure in the NGS due to the incompatibility of the disaggregated field of study variables across education levels:

1. Education
2. Liberal Arts
3. Business related degrees
4. Science/Mathematics/Computer Science/Engineering
5. Health
6. Other

3.6 Analyses

The analyses for this dissertation will consist of descriptive statistics, binary logistic regression and OLS regression, and will also incorporate graphical displays of plotted predicted probabilities. Descriptive statistics present the demographic background of respondents surveyed in the 2013 NGS. Descriptive information is also provided when more robust statistical techniques are not possible due to limited cell counts within disaggregated liberal arts categories. In these cases, frequency analyses will focus on the effect of disaggregated liberal arts programs across a number of key labour market outcomes. More specifically, these analyses will summarize the relationship between field of study and earnings, job satisfaction, underemployment, and job/education fit.

OLS and binary logistic regressions are used to assess the effect of the key independent variables on graduates’ earnings and risk of underemployment, while controlling for the other variables in the model. Regression modeling provides an opportunity to account for wider social forces that cannot be captured in summary statistics. Therefore, these analyses will test whether relationships exist between the focal variables independent of background effects.

The analyses in this dissertation have been organized as follows:

Results Chapter 5a: *Descriptive Statistics of disaggregated fields of study*
1. The relationship between disaggregated field of study and income
2. The relationship between disaggregated field of study and the subjective perception of degree-to-career match
3. The relationship between disaggregated field of study and the objective measure of underemployment
4. The relationship between disaggregated field of study and job satisfaction

This dissertation will first present the descriptive statistics of disaggregated fields of study across a number of outcome measures (Chapter 5a). The initial set of results will summarize the earnings differences among graduates of these disaggregated programs, while the next set will present whether or not respondents’ perceived a close match between their university education and their early careers. The third set of descriptive analyses will provide a tabulation of whether or not graduates from these disaggregated programs were objectively underemployed for their acquired careers three years after graduation. Finally, the last set of frequencies will compare the job satisfaction of respondents by each category of field of study.

Results Chapter 5b: Disaggregated STEM fields
1. The effect of disaggregated STEM fields on income
2. The effect of disaggregated STEM fields on underemployment

Unfortunately, the elaborated category of field of study provided in chapter 1a contains sample sizes too small for advanced statistical analyses. Thus, the second set of analyses in this dissertation (Chapter 5b) will use another measure of field of study that disaggregates only those categories relating to STEM fields. This section will offer regression analyses of these disaggregated STEM fields against outcome measures capturing earnings and underemployment. The first series of regressions in this section will compare earnings across fields, with liberal arts graduates as the reference category. The next set of regressions will capture underemployment differences between the
graduates of the multitude of STEM programs and those graduates with liberal arts degrees.

Results Chapter 6a: Distance education

1. The effect of distance education on underemployment
2. The effect of distance education on income

The next series of regressions (Chapter 6a) will compare the labour market outcomes of graduates of distance education and traditional degree programs. For these analyses, the key independent variable distinguishes whether or not the graduate had taken more than half of their degree through distance education. Two series of regression models are estimated. The first set of regressions will capture the earnings differences between graduates of traditional and distance education programs. The next set of regressions will allow us to compare the chances of underemployment in the early labour market careers of graduates from distance education and traditional programs.

Results Chapter 6b: bilingualism and technical specialization

1. The effects of bilingualism and technical specialization on income
2. The effects of bilingualism and technical specialization on underemployment

The final series of regressions (Chapter 6b) will assess the extent to which bilingualism and technical specialization are rewarded in the labour market for university graduates. Given the anecdotal importance placed on proficiency in both of Canada’s official languages, it is worth investigating whether there are real returns associated with bilingual investment, and how these returns compare to traditionally lucrative routes of postsecondary pursuit. More specifically, this analysis will compare the labour market premiums associate with being bilingual against the labour market rewards associated
with acquiring a degree in a technical field. The two dependent variables that capture labour market outcomes in these analyses are earnings and underemployment. The first set of analyses in this section will regress the effect of specialization on earnings. Then, a similar set of regressions will be used to analyze the chances of underemployment for bilingual graduates, as compared to those with technical specialization.

All regression models in this dissertation will be organized into a series of stages. The first set of models in each chapter subsection will look at the effect of the key explanatory variables on the response variables net of controls. The second set of models for each of the regressions will then introduce key sociodemographic controls. Finally, for analyses with underemployment, subjective school-to-work match, and job satisfaction as the focal dependent variables, a third set of models will be presented that include a control for the effect of income.

A different series of models will be employed in analyses with bilingualism/technical specialization as the key independent variables. These analyses will be organized as follows:

First, the independent variables bilingualism and technical specialization will be regressed individually against the dependent variable. From this, the next model will run a regression of both independent variables together on the dependent variable. Two additional models will then include both bilingual and technical variables together with control variables and interaction terms. The first of these models will introduce control variables, followed by a model with both the controls, as well as interaction effects for each of the independent variables to determine if the effects are contingent on one another.
Chapter 4: Descriptive Statistics and Disaggregated Fields of Study

The results of the statistical analyses are presented in this chapter and the next one. The first of these chapters will present the descriptive statistics of the variables used across both chapters, as well as provide analyses regarding the effect of disaggregated fields on the early labour market outcomes of graduates. The next chapter, Chapter 5, investigates the labour market outcomes of pursuing distance education, as well as the returns associated with bilingualism and specializing in programs that provide technical skills.

The current chapter has been organized into three sections. The first section will present the descriptive statistics of the entire sample. The second section will again utilize frequency analyses to examine disaggregated liberal arts fields across the
dimensions of earnings, job satisfaction and subjective and objective measures of school-to-work match. The third section of this chapter will employ regression analyses to examine differences among disaggregated STEM fields across perceived job (mis)match, underemployment, job satisfaction, and earnings.

4.1 Descriptive Statistics

This section will discuss the descriptive statistics presented in Table 1. Frequencies are conducted using a filter, which includes only those graduates who are working full-time and full-year in their occupations at the time of survey.26 Listwise deletion is used for missing data. The majority of variables in the following analyses are treated as categorical, with the exception of age and income. The focal variable frequencies are presented first, followed by the descriptive results for the controls included in the models.

4.1.1 Focal Variables

The average earnings of respondents in the sample at the time of interview—three years after completing their postsecondary degrees—is approximately $54,842. There are two focal variables included in the analyses that capture education-to-job match and skill-utilization. Looking at subjective education-to-job match, roughly 64 percent of respondents in the sample reported that their jobs closely related to their education, leaving just over 36 percent of respondents who felt their education is not closely related to their academic pursuits. The other variable in analyses captured the objective measure

26 The choice to restrict analyses to those graduates working full-time and full-year was an attempt to investigate the labour market outcomes among those graduates in the best possible position within the labour market. While it is possible that a selection bias may exist whereby graduates of some fields may not have the same opportunities for full-time, full-year employment as others, the present analyses are concerned with the earnings, and objective and subjective measures of job match of those graduates who have successfully transitioned into permanent full time employment.
of skill-utilization; roughly 49 percent of graduates are underemployed for their occupations three years after graduation. Alternatively, 51 percent of graduates have the same or less education than is required. The analyses also include an indicator of respondent satisfaction with employment held at the time of interview. Overall, 46 percent of graduates are very satisfied with their employment, in comparison to the 54 percent of graduates who report that they are only satisfied with the jobs they hold three years after graduation.27

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage/Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Education/Employment Mismatch</td>
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<tr>
<td>Closely Related</td>
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</tr>
<tr>
<td>Not Closely Related</td>
<td>36</td>
</tr>
<tr>
<td>Underemployed for Current Job</td>
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<td>Yes</td>
<td>49</td>
</tr>
<tr>
<td>No</td>
<td>51</td>
</tr>
<tr>
<td>Job Satisfaction</td>
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<tr>
<td>Very Satisfied</td>
<td>46</td>
</tr>
<tr>
<td>Satisfied</td>
<td>54</td>
</tr>
<tr>
<td>Distance Education</td>
<td></td>
</tr>
<tr>
<td>Little to no distance education required</td>
<td>94</td>
</tr>
<tr>
<td>Half or more of the degree taken through DE</td>
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<tr>
<td>Bilingual</td>
<td></td>
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<tr>
<td>No</td>
<td>67</td>
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</table>

27 Recall from Chapter 3 that job satisfaction captures the differences between graduates who responded that they were “satisfied” or “very satisfied” due to relatively low levels of response in the “neither satisfied or dissatisfied”, “dissatisfied”, and “very dissatisfied” categories.
<table>
<thead>
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<tr>
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<tr>
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<td>Non-Minority</td>
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<td>At Least One Parent with Post-Secondary</td>
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<td>Bursaries/Grants</td>
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<td>Government Loans</td>
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<td></td>
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<td>Ontario</td>
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<td>Field of Study (Control Variable in DE Analyses)</td>
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<tr>
<td>---------------------------------------------------------------------</td>
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<tr>
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<td>Liberal Arts</td>
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<tr>
<td>Business Related Degrees</td>
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<tr>
<td>Sciences/Mathematics/Computer Science/Engineering</td>
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<td></td>
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<tr>
<td>Health</td>
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<td>Other</td>
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<table>
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<tr>
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<td>Communications</td>
<td>3</td>
</tr>
<tr>
<td>Language Study</td>
<td>4</td>
</tr>
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<td>History</td>
<td>3</td>
</tr>
<tr>
<td>Anthropology and Cultural Studies</td>
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<td>General Humanities</td>
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<tr>
<td>Sociology</td>
<td>3</td>
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<tr>
<td>Family, Nutrition, and Social Work</td>
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</tr>
<tr>
<td>Legal Studies and Criminology</td>
<td>2</td>
</tr>
<tr>
<td>Psychology</td>
<td>4</td>
</tr>
<tr>
<td>Economics, Accounting, and Finance</td>
<td>9</td>
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<tr>
<td>Geography and Philosophy</td>
<td>2</td>
</tr>
<tr>
<td>Political Science and Public Admin</td>
<td>3</td>
</tr>
<tr>
<td>Business and Business Management</td>
<td>22</td>
</tr>
<tr>
<td>Biology</td>
<td>6</td>
</tr>
<tr>
<td>Physics/Chemistry</td>
<td>1</td>
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<tr>
<td>Mathematics</td>
<td>1</td>
</tr>
<tr>
<td>Agriculture, Natural Resources, and Conservation</td>
<td>2</td>
</tr>
<tr>
<td>Health, Recreation, and Fitness</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>3</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>11</td>
</tr>
<tr>
<td>Computer, and Information Sciences</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Field of Study with Disaggregated STEM Fields
Fields of study are assessed in a number of ways throughout the following two chapters. Different coding structures for field of study are utilized depending on the nature of the analysis in each section. For the first section of this chapter, descriptive analyses are used to compare the labour market outcomes of graduates across 23 categories of disaggregated fields (see Table 1). The fields of study, and the corresponding sample proportions of graduates by each field are:

1. Visual arts (four percent of the sample)
2. Communications (three percent)
3. Language study (four percent)
4. History (three percent)
5. Anthropology and Cultural Studies (one percent)
6. General humanities (five percent)
7. Sociology (three percent)
8. Family, nutrition, social work (three percent)
9. Legal studies and criminology (two percent)
10. Psychology (four percent)
11. Economics, accounting, finance (nine percent)
12. Geography and philosophy (two percent)
13. Political science and public admin (three percent)
14. Business and business management (22 percent)
15. Biology (six percent)
16. Physics and chemistry (one percent)
17. Mathematics (one percent)
18. Agriculture, natural resources and conservation (two percent)
19. Health, recreation, and fitness (six percent)
20. Education (three percent)
21. Engineering and technology (11 percent)
22. Computer and information sciences (two percent)
23. Other (two percent)

Due to the limited cell sizes within the categories above, a second field of study variable is used in the regression models for analyses of disaggregated fields. This variable is primarily used to elucidate outcome differences between science, technology, engineering, and mathematics-related programs as the experiences of graduates in these fields are often conflated in the wider literature. The majority of respondents are from business related programs (31 percent), followed by fine arts/humanities graduates (21 percent of the respondents in the sample), and graduates from the social sciences (16 percent). Of the STEM fields, those from engineering and technology programs are the largest proportion of graduates (11 percent). Biology graduates are the next largest category—just under six percent of the sample—followed by computer and information science graduates (two percent). Agricultural science graduates represent fewer than two percent of the respondents in the sample while physics and chemistry graduates represent just over one percent of the sample. Finally, mathematics graduates are just shy of one percent of the sample of graduates. The last three categories are health related fields.

28 As a result, liberal arts graduates have been collapsed in regression analyses, as the central focus of these secondary analyses is to investigate whether the outcomes associated with STEM-related fields significantly differ from the average outcomes of graduate of liberal arts programs.
29 Although mathematics graduates represent the smallest proportion in these analyses, there are still a sufficient number of graduates within this category to justify including them as a separate category.
(five percent of the sample), education (three percent), and a category for other fields which did not logically fit within the other categories (one percent).

The descriptive statistics for the variables used in Chapter 5 are also presented here. Chapter 5 introduces three additional key independent variables: Whether or not the program was pursued via distance education, as well as proxies for language (whether the respondent was fluent in both official languages or not) and technical specialization (a conceptualization of field of study that focuses on programs that provide technical/non-technical skills). For the distance education variable, six percent of the graduates reported that they pursued half or more of their degree through correspondence, while the remaining 94 percent had taken little to no distance education to obtain their degrees.

For analyses comparing the returns of bilingual investment to those with technical specializations, a variable has been created to capture the difference between degrees that provide non-technical skills to those that provide skillsets in specific technical fields. Graduates with non-technical degrees represent 78 percent of the sample, followed by engineering and technology graduates (11 percent), graduates of the natural sciences (nine percent), computer and information science graduates (two percent) and finally, graduates of mathematics fields (one percent). With respect to the language variable, 67 percent of graduates speak either English or French exclusively while the remaining 33 percent of respondents are bilingual.

4.1.2 Control variables

Approximately 45 percent of the respondents in the analyses are men, while women represent the remaining 55 percent. The average age of respondents at the time of interview is approximately 31 years old. The majority of respondents are white (just
under 79 percent) while visible minority respondents represent roughly 21 percent of the sample. Similarly, only four percent of the respondents in analyses are graduates who report a disability or impairment lasting longer than six months. Thus, the remaining 96 percent of respondents are graduates without disabilities. Graduates who immigrated to Canada prior to graduation represent 15 percent of the sample in the analyses, while 85 percent of respondents are Canadian-born, or have obtained Canadian status by the time of interview.

With respect to region of residence, graduates from Quebec represent the largest proportion of respondents in analyses (34 percent) followed closely by graduates living in Ontario at the time of interview (33 percent). Graduates in the Western provinces make up 26 percent of the total number of respondents. Graduates living in the Atlantic provinces at the time of interview, and those graduates who have left Canada to live in the United States three years after graduation are the overall minority of respondents in the sample (approximately six percent and one percent, respectively).

Of the familial background indicators, 40 percent of graduates have at least one parent with a university education (the proxy for socioeconomic status), while 60 percent of respondents do not. Graduates who are married represent 51 percent of the sample, compared to 49 percent of unmarried respondents. Only a quarter of respondents have dependent children.

As mentioned previously, level of education is included as a control variable for distance education analyses. Roughly 41 percent of the graduates in the sample held a bachelor degree, followed by college diplomas (31 percent). Interestingly, there are slightly more master’s graduates than respondents with vocational certification (10
percent and nine percent respectively). Graduates with a university diploma lower than a bachelor degree represent five percent of the sample, followed by diplomas higher than a bachelor degree (two percent) and those who have obtained a doctorate (two percent).

Similarly, a separate control for field of study is also included in distance education analyses. As the scope of this set of analyses includes postsecondary graduates of all levels of education, the disaggregated field of study measures noted above are not applicable to graduates of non-university programs due to the incompatibility of fields across levels. Therefore, the original field of study variable provided in the NGS is used. In these analyses, 27 percent of the sample is made of graduates from business related fields, followed by liberal arts graduates, and those from STEM fields (both 22 percent). Graduates of health fields comprise 15 percent of the sample. Education graduates represent six percent of the sample. A category exists for other fields that do not fit within the categories above, and consists of seven percent of the sample.

The last group of control variables are indicators of student funding during the course of respondents’ postsecondary education. Only 26 percent of students borrowed from sources other than government provided loans—while 74 percent claim they have not. Moreover, 32 percent of graduates have taken on government loans to fund their education, while 68 percent of respondents did not rely on this funding avenue. Roughly 11 percent of the graduates in the survey claim that they received grants or bursaries while pursuing their degrees, while 89 percent of the sample did not. Scholarship opportunities seem to be more common, as 35 percent of graduates report receiving an academic award, compared to the remaining 65 percent of the sample that did not receive a scholarship during the course of their programs.
4.2 Disaggregated Fields of Study Frequency Analyses

The next set of descriptive analyses focus on the subjective education-job match of disaggregated fields of study, and are presented in Table 2. Due to the limited number of respondents in each of the disaggregated categories, only descriptive statistics are provided. The descriptive statistics provide a comparative profile of early labour market experiences across university programs. These results still provide meaningful estimates of the variations in early labour market outcomes across respondents with undergraduate degrees; and reveal dynamics that are overlooked when university programs are collapsed into traditional aggregated categories.
Table 2 Cross-tabulations of the Dependent Variables for Job Related to Education, Objective Measure of Job Mismatch, Job Satisfaction, and Income (2013 National Graduates Survey)

<table>
<thead>
<tr>
<th>Disaggregated Field of Study</th>
<th>Percentage Closely Related</th>
<th>Percentage Not Closely Related</th>
<th>Percentage Respondent had more education than Required</th>
<th>Percentage Respondent had same or less education than required</th>
<th>Percentage Respondent Very Satisfied with Job</th>
<th>Percentage Respondent Satisfied with Job</th>
<th>Mean Earnings (CDN dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Arts</td>
<td>50</td>
<td>50</td>
<td>61</td>
<td>39</td>
<td>38</td>
<td>62</td>
<td>41,498</td>
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<td>43</td>
<td>57</td>
<td>45,926</td>
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<tr>
<td>Language Study</td>
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<td>History</td>
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<td>Education</td>
<td>62</td>
<td>38</td>
<td>30</td>
<td>70</td>
<td>57</td>
<td>43</td>
<td>51,995</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>76</td>
<td>24</td>
<td>14</td>
<td>86</td>
<td>47</td>
<td>53</td>
<td>66,641</td>
</tr>
<tr>
<td>Computer and Information Sciences</td>
<td>72</td>
<td>28</td>
<td>34</td>
<td>66</td>
<td>47</td>
<td>53</td>
<td>62,906</td>
</tr>
<tr>
<td>Other</td>
<td>37</td>
<td>63</td>
<td>48</td>
<td>52</td>
<td>59</td>
<td>41</td>
<td>56,273</td>
</tr>
</tbody>
</table>

N = 4,660

Note: Age is measured in years and income in dollars.
Table 2 Cross-tabulations of the Dependent Variables for Disaggregated University Fields of Study (2013 National Graduates Survey)
Overall, descriptive analyses show that with the exception of mathematics, liberal arts fields are more likely to report low education-to-job match than traditionally technical/applied fields. Looking at fields more closely, however, there are considerable differences among liberal arts programs in regards to respondents’ perceptions of school-to-work match. Anthropology graduates report the lowest school-to-education match—only 17 percent of graduates report that their education is closely related to their acquired occupation. Political science and public administration graduates have the next lowest proportion of graduates who felt a close education-job match (26 percent) followed closely by those in legal studies/criminology programs (27 percent). Thirty-four percent of sociology graduates report a close relation between their education and their work, which is slightly lower than geography/philosophy graduates (36 percent) and graduates who have earned their degrees in the general humanities (37 percent). Next is language study graduates (41 percent), followed by those in history (47 percent) and visual arts (50 percent).

Some liberal arts programs do not differ greatly from traditional STEM fields such as biology (54 percent), and physics/chemistry (51 percent) in respect to graduates’ subjective reports of education-to-work match. For example, graduates of psychology (55 percent), communications (58 percent), and family, nutrition, and social work (61) report a closer match than both science categories, as well as those with a mathematics degree (38 percent). This is surprising, as these differences would not be evident when liberal education fields are collapsed as general humanities and the social sciences (political science, anthropology, sociology, and criminology)—fields that graduates associate with
the lowest education-work match (for example, see Xu 2013, or Fenesi and Sana 2015). In fact, only three “STEM” fields are substantially more likely to have graduates report a close school-to-work match: agricultural sciences (70 percent) computer and information sciences (72 percent) and engineering and technology (76 percent).

Looking at the objective measure of underemployment in Table 2 further elaborates the story. Overall, liberal arts fields are generally more likely to be underemployed than traditional STEM fields. Underemployment is highest among graduates of anthropology/cultural studies (70 percent) and those with visual arts degrees (61 percent). Sociology and legal studies/criminology graduates are the next most likely to report being underemployed (57 percent of graduates).

Graduates of engineering and technology fields are substantially less likely to be underemployed; over 85 percent of graduates claim they have the same or less education than required for their current occupation. They are followed by economics, accounting, and finance graduates, as well as those in mathematics and education fields (roughly 70 percent of respondents reported having the same or less education than required). Interestingly, graduates of biology are more likely to be underemployed for their current job (45 percent) than graduates of business (36 percent), economics, accounting, and finance (30 percent), psychology (43 percent), geography/philosophy (43 percent), and family, nutrition, and social work (31 percent). In fact, graduates of political science, general humanities, and language study fields report underemployment at similar levels (roughly 45 percent) as graduates in biology.

The variation among disaggregated fields is also apparent in job satisfaction. While the overall differences among fields with respect to job satisfaction are small, there
are a few notable exceptions. Particularly, sociology graduates have the greatest proportion of respondents who select they are only “satisfied” with their early careers (roughly 69 percent) rather than very satisfied (31 percent). This is followed by criminology/legal studies graduates (64 percent satisfied compared to 36 percent very satisfied), and graduates of anthropology and cultural studies programs (63 percent satisfied versus 37 percent very satisfied). Of the STEM fields, mathematics graduates report being the least satisfied—over 60 percent of graduates are satisfied with their early careers, as opposed to 40 percent who report being very satisfied. Alternatively, graduates of physics/chemistry programs represent the highest proportion of all fields that are very satisfied with their early career outcomes (69 percent), with only 31 percent of graduates of these science fields reporting being satisfied. They are followed by family and nutrition graduates (59 percent report being very satisfied, as opposed to 41 percent satisfied) and psychology graduates (just under 59 percent of graduates are very satisfied as compared to roughly 41 percent who report being only satisfied). The variation across liberal arts and STEM fields further illustrates the wide degree of variation that is typically lost by aggregating fields of study.

The earnings estimates illustrate similar inconsistencies, particularly among liberal arts programs. Visual arts graduates, and those with degrees in anthropology and cultural studies earn the lowest incomes of all field of study categories (roughly $41,500 a year). Social science graduates earn slightly higher annual incomes (just under $46,000

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Due to the limited number of respondents who responded they were “dissatisfied, very dissatisfied, or neither satisfied or dissatisfied” the analyses focus only on those graduates who responded being satisfied or very satisfied. Analyses of an additional coding structure comparing graduates who reported being “satisfied” and “dissatisfied” was also run. Those results do not greatly differ from the results presented here.
per year). This is contrasted sharply by graduates of general humanities and family, nutrition, and social work fields—programs earning over $50,000 dollars a year, surpassing both biology and physics/chemistry graduates in the survey ($48,923 and $52,646 respectively). In fact, history graduates, as well as those in psychology, and legal studies/criminology earn comparable incomes to those in physics/chemistry and the biological sciences. While at the same time, graduates with degrees in engineering and technology, computer and information sciences, mathematics, and economics, accounting, and finance have the most lucrative returns by a wide margin.

This inconsistency among fields of study is an important avenue to pursue. While further analysis of disaggregated liberal arts fields is beyond the limitations of the NGS due to sample size constraints, the data do allow for further disaggregation of STEM fields. Elucidating the differences among typical STEM fields provides empirical benefit, as the wider literature often draws conclusions regarding labour market outcomes based on STEM/non-STEM dichotomies (Xu 2013; Nelson, Sullivan, Zimmerman, and McCormick 2011) that may not reveal a complete picture when STEM fields are unpacked. Therefore, the next section will disaggregate these technical fields to further illustrate outcome differences among STEM programs in comparison to graduates of the social sciences. This conceptualization of field of study will be used for the remaining analyses in this chapter. Fortunately, the sample sizes for the disaggregated STEM fields are large enough to permit regression analyses.

4.3 Regression Analyses

4.3.1 Subjective Education-to-Work Match
Table 3 presents a series of regression models of disaggregated STEM fields by the subjective measure of school-to-work match. The dependent variable in this set of
Table 3 Logistic Regression of Subjective Education-Work Match by Disaggregated STEM Fields (Category 1 of the dependent variable: Job not closely related to education)

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fine Arts/Humanities</td>
<td>0.897 (0.227)</td>
<td>0.798 (0.199)</td>
<td>0.803 (0.202)</td>
</tr>
<tr>
<td>Business Related Degrees</td>
<td>0.320*** (0.085)</td>
<td>0.298*** (0.082)</td>
<td>0.324*** (0.091)</td>
</tr>
<tr>
<td>Biology</td>
<td>0.434** (0.136)</td>
<td>0.373** (0.121)</td>
<td>0.373** (0.123)</td>
</tr>
<tr>
<td>Physics/Chemistry</td>
<td>0.443 (0.236)</td>
<td>0.400 (0.221)</td>
<td>0.400 (0.220)</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1.464 (0.673)</td>
<td>1.376 (0.671)</td>
<td>1.470 (0.704)</td>
</tr>
<tr>
<td>Agricultural Sciences</td>
<td>0.231*** (0.077)</td>
<td>0.241*** (0.083)</td>
<td>0.256*** (0.090)</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>0.227*** (0.065)</td>
<td>0.214*** (0.069)</td>
<td>0.238*** (0.080)</td>
</tr>
<tr>
<td>Computer and Information Sciences</td>
<td>0.231*** (0.080)</td>
<td>0.170*** (0.067)</td>
<td>0.180*** (0.071)</td>
</tr>
<tr>
<td>Health, Recreation, and Fitness</td>
<td>0.290** (0.112)</td>
<td>0.276*** (0.104)</td>
<td>0.286** (0.109)</td>
</tr>
<tr>
<td>Education</td>
<td>0.330** (0.138)</td>
<td>0.312** (0.125)</td>
<td>0.346** (0.142)</td>
</tr>
<tr>
<td>Other</td>
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<td>0.369** (0.134)</td>
<td>0.368** (0.131)</td>
</tr>
<tr>
<td>Disability</td>
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<td>0.342* (0.146)</td>
<td>0.326* (0.142)</td>
</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
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<td></td>
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<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>0.820 (0.153)</td>
<td>0.787 (0.146)</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>0.954 (0.025)</td>
<td>0.958 (0.025)</td>
</tr>
<tr>
<td>Married</td>
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<td>0.912 (0.175)</td>
<td>0.952 (0.185)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Dependent Children</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>1.013 (0.283)</td>
<td>0.990 (0.277)</td>
</tr>
<tr>
<td>No</td>
<td></td>
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</tr>
<tr>
<td>Visible Minority Status</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
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<td>0.917 (0.206)</td>
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<td></td>
</tr>
<tr>
<td>Immigrant Status</td>
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<td></td>
</tr>
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<td></td>
<td>0.963 (0.275)</td>
<td>0.953 (0.264)</td>
</tr>
<tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>--------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Either Parent Obtained University Degree</td>
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</tr>
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<td>(0.142)</td>
<td>0.811</td>
</tr>
<tr>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Region</td>
<td>-</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>Ontario</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Atlantic Provinces</td>
<td>0.713</td>
<td>(0.166)</td>
<td>0.689</td>
</tr>
<tr>
<td>Quebec</td>
<td>0.402***</td>
<td>(0.111)</td>
<td>0.395***</td>
</tr>
<tr>
<td>Western Provinces</td>
<td>0.897</td>
<td>(0.165)</td>
<td>0.924</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>0.804</td>
<td>(0.547)</td>
<td>0.854</td>
</tr>
<tr>
<td>Bursaries/Grants</td>
<td>Yes</td>
<td>1.080</td>
<td>(0.234)</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Government Loans</td>
<td>Yes</td>
<td>0.935</td>
<td>(0.164)</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Scholarships</td>
<td>Yes</td>
<td>0.807</td>
<td>(0.135)</td>
</tr>
<tr>
<td>No</td>
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<td>-</td>
</tr>
<tr>
<td>Other Loans</td>
<td>Yes</td>
<td>1.521*</td>
<td>(0.296)</td>
</tr>
<tr>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Income (Logged)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Wald chi2(11)=71.20
- Wald chi2(27)=94.48
- Wald chi2(28)=101.40

p > chi2 = 0.000
Pseudo R2 = 0.035

Notes: * p < .05. ** p < .01. ***p < .001. Exponentiated coefficients; Standard errors in parentheses.
analyses is whether or not the respondent reported that their acquired job after graduation suitably matched their education. The pseudo $R^2$ for the first model is .055. Using social science graduates as the reference category, the results indicate that graduates of physics/chemistry and mathematics fields do not significantly differ from the social sciences with respect to whether graduates report that their education closely related to the jobs attained after graduation. Of the remaining STEM fields, only graduates of agricultural/natural sciences, engineering/technology, computer/information sciences ($p<.001$), and biology ($p<.01$) are more likely to report close education-to-job match.\(^{31}\) In regards to the other fields of study in the analyses, business, education, and health-related graduates are all significantly more likely to report close education-to-job match than graduates in the social sciences.\(^{32}\) Graduates of fine arts/humanities fields are not statistically significantly different from the reference group. Overall, this analysis points to considerable variation with respect to the reported labour market outcomes of graduates within STEM fields in relation to liberal arts graduates.

Model 2 introduces sociodemographic controls in order to test whether the effects in model one are the result of extraneous factors. Adding controls increases the pseudo $R^2$ to .095. Interestingly, even after accounting for controls, mathematics and physics/chemistry graduates remained no different than social science graduates in respect to their propensity to report job-education mismatch. The remaining STEM fields; agricultural/natural sciences, engineering/technology, computer/information sciences.

\(^{31}\) It is worth noting that although biology graduates are statistically significantly more likely to report a close relation between education and their current job than those in the social sciences, the actual effect, represented by the coefficient, is much smaller than any of the other statistically significant fields in the model ($p<.001$).

\(^{32}\) The significance levels corresponding to these graduates are $p<.001$, $p<.01$, and $p<.001$ respectively.
Agricultural/natural sciences, engineering/technology, computer/information sciences each had a significance level corresponding to (p<.001); biology remained at a p value of (p<.01).  
Possible explanations for this finding are discussed in Chapter 6.  
Wald tests are used for all categorical variables with more than two categories.  The effect of region is statistically significant using the Wald chi² test.  Hereafter, only subsequent categorical variables that produce statistically significant Wald tests will be discussed.
The third model introduces the log of income to determine if the observed relationship in reported job match is attributable to income differences among fields. Accounting for earnings increased the pseudo $R^2$ slightly to .1. The log of income is statistically significant—as expected, respondents report closer education-to-job match as earnings increase ($p<.05$). Surprisingly, even after controlling for the log of income, graduates of mathematics and physics/chemistry fields are not statistically significantly different from social science graduates in their chances of reporting close education-to-work match. The remaining STEM fields continue to be highly statistically significant; that is to say, graduates of the agricultural sciences ($p<.001$), engineering/technology ($p<.001$), computer and information sciences ($p<.001$), and biology ($p<.01$) are statistically significantly more likely to report a stronger close education/job match than graduates of social sciences. Similarly, graduates with business related credentials, and those in education and health, recreation, and fitness fields remained statistically significant at levels consistent with the previous models. As with the other models in this analysis, fine arts/humanities graduates are not statistically significantly different from the reference group.

Turning to the control variables included in the model, again, graduates with disabilities are significantly more likely to view a close relationship between school and work than graduates without disabilities, though this effect became stronger when accounting for income ($p<0.01$). The effects of the other variables remained the same as the previous model.
The predicted probabilities of subjective mismatch, along with the corresponding 95 percent confidence intervals, are plotted in Figure 1. These predicted probabilities are calculated with estimates derived from Model 3. Control variables are held at typical values, where means are used for quantitative variables (i.e., age and income), and proportions are used for categorical variables (gender, disability status, etc.).

Most notably, engineering graduates, and those in agricultural and computer information sciences are the least likely to report job mismatch (with predicted probabilities of .30, .31, and .24 respectively). Alternatively, the fields with the highest
predicted probabilities of subjective mismatch are mathematics (.72), the social sciences (.64) and fine arts (.59).

4.3.2 Objective Education-to-Work Match

Similar models are estimated for the objective measure of underemployment; these findings are presented in Table 4. The first model includes only the independent variable (disaggregated STEM fields) against objective job match and yielded a pseudo $R^2$ of .038. Interestingly, graduates of biology and the computer and information sciences are not statistically significantly more or less likely than social science graduates to be underemployed. While graduates of physics/chemistry, agriculture related sciences, and mathematics are less likely to be underemployed, the effect is barely significant at (p<0.05). Engineering and technology graduates have the lowest chances of being underemployed in the model (p<.001). Visual arts graduates and those in the field of health, recreation, and fitness are not statistically different from social science graduates in their probability of being underemployed. Graduates of business related fields, and those in education are significantly less likely to be underemployed in their early labour market outcomes than graduates of the social sciences (p<0.05).

Introducing sociodemographic/socioeconomic controls (model two) more than doubled the pseudo $R^2$ to .087 from .038 in the previous model. After controlling for background effects, only one STEM field (biology) is not statistically significantly

---

36 The effect of mathematics is particularly high. It is possible that bachelor graduates of mathematics are highly malleable in terms of the types of career opportunities available to them. A search of job opportunities available to mathematics graduates indicates career paths in accounting, computer programming, and market research, among others. Therefore, it is possible that the bachelor degree provides a wide range of opportunities that are beyond the purview of traditional mathematics.
different from social science graduates in respect to underemployment. The remaining
STEM fields are all statistically significantly less likely to be underemployed than
Table 4 Logistic Regression of Underemployment by Disaggregated STEM Fields (Category 1 of the dependent variable: Respondent had the same or less education than required for their current job)

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fine Arts/Humanities</td>
<td>1.051</td>
<td>1.059</td>
<td>1.139</td>
</tr>
<tr>
<td></td>
<td>(0.226)</td>
<td>(0.229)</td>
<td>(0.254)</td>
</tr>
<tr>
<td>Business Related Degrees</td>
<td>1.697*</td>
<td>1.730*</td>
<td>1.367</td>
</tr>
<tr>
<td></td>
<td>(0.362)</td>
<td>(0.373)</td>
<td>(0.306)</td>
</tr>
<tr>
<td>Biology</td>
<td>1.213</td>
<td>1.052</td>
<td>1.180</td>
</tr>
<tr>
<td></td>
<td>(0.330)</td>
<td>(0.290)</td>
<td>(0.327)</td>
</tr>
<tr>
<td>Physics/Chemistry</td>
<td>3.409*</td>
<td>2.970*</td>
<td>3.148*</td>
</tr>
<tr>
<td></td>
<td>(1.643)</td>
<td>(1.484)</td>
<td>(1.690)</td>
</tr>
<tr>
<td>Mathematics</td>
<td>2.411*</td>
<td>2.477*</td>
<td>2.154</td>
</tr>
<tr>
<td></td>
<td>(0.992)</td>
<td>(1.105)</td>
<td>(1.156)</td>
</tr>
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<td>Agricultural Sciences</td>
<td>1.883*</td>
<td>1.809*</td>
<td>1.523</td>
</tr>
<tr>
<td></td>
<td>(0.512)</td>
<td>(0.495)</td>
<td>(0.417)</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>5.933***</td>
<td>5.951***</td>
<td>3.922***</td>
</tr>
<tr>
<td></td>
<td>(1.569)</td>
<td>(1.622)</td>
<td>(1.127)</td>
</tr>
<tr>
<td>Computer and Information Sciences</td>
<td>1.549</td>
<td>1.797*</td>
<td>1.346</td>
</tr>
<tr>
<td></td>
<td>(0.373)</td>
<td>(0.458)</td>
<td>(0.365)</td>
</tr>
<tr>
<td>Health, Recreation, and Fitness</td>
<td>1.532</td>
<td>1.745</td>
<td>1.622</td>
</tr>
<tr>
<td></td>
<td>(0.339)</td>
<td>(0.604)</td>
<td>(0.263)</td>
</tr>
<tr>
<td>Education</td>
<td>2.369*</td>
<td>2.776**</td>
<td>2.454*</td>
</tr>
<tr>
<td></td>
<td>(0.886)</td>
<td>(1.029)</td>
<td>(0.892)</td>
</tr>
<tr>
<td>Other</td>
<td>0.831</td>
<td>1.011</td>
<td>0.835</td>
</tr>
<tr>
<td></td>
<td>(0.392)</td>
<td>(0.471)</td>
<td>(0.382)</td>
</tr>
<tr>
<td>Disability</td>
<td>-</td>
<td>0.580</td>
<td>0.748</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>(0.230)</td>
<td>(0.297)</td>
</tr>
<tr>
<td>Gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>1.212</td>
<td>-</td>
<td>1.402*</td>
</tr>
<tr>
<td></td>
<td>(0.178)</td>
<td>-</td>
<td>(0.213)</td>
</tr>
<tr>
<td>Male</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Age</td>
<td>0.949***</td>
<td>-</td>
<td>0.925***</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>-</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Married</td>
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<td>1.296</td>
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</tr>
<tr>
<td></td>
<td>-</td>
<td>(0.199)</td>
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</tr>
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<td>-</td>
</tr>
<tr>
<td>Visible Minority Status</td>
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<td>0.834</td>
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<th>U.S.A.</th>
<th>Bursaries/Grants</th>
<th>Income (Logged)</th>
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</tbody>
</table>

Exponentiated coefficients; Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001
graduates of the social sciences. Again, with the exception of the engineering/technical fields (p<.001) the remaining STEM fields are barely statistically significant at p<.05. Still, graduates of these fields are more likely to have the same or less education than is required for the job than graduates of the social sciences. As with model one, visual arts graduates and those from health-related fields are not statistically significantly different from those in the social sciences. Similarly, business graduates and those with degrees in education related fields are less likely to be underemployed (p<.05 and p<.01 respectively).

Among the sociodemographic variables included in the model: disability, gender, marital status, and visible minority status are not statistically significant. Age is negatively associated with underemployment—that is, the chance of having more education than required for the job increased with the age of the respondent (p<.001). The same is true for graduates with immigrant status; immigrants with a Canadian university degree are more likely to be underemployed (p<.05). Graduates whose parents did not attend university (the proximal indicator of socioeconomic status) are significantly more likely to be underemployed than graduates with at least one parent who has earned a degree (p<.05). Interestingly, region is significantly related to underemployment, whereby graduates located in Western Canada (p<.01), Quebec (p<.001), and those in the U.S. (p<.05) are significantly less likely to be underemployed than graduates in Ontario. Atlantic Canadian graduates are not significantly different from Ontario respondents with respect to being underemployed.

As with previous analyses, model three introduces the log of income to determine if the relationships in the previous models change when income is taken into account.
The pseudo $R^2$ for the model increased considerably to .141 from .087 in model two. The effect of income was significant, where higher earnings are associated with substantially lower chances of being underemployed ($p<.001$). After controlling for earnings, social science graduates are not statistically significantly different from graduates of biology, mathematics, agricultural science, and computer and information science in their chances of being underemployed. In fact, physics/chemistry graduates ($p<.05$) and engineering graduates ($p<.001$) are the only STEM fields less likely to be underemployed than social science graduates. The difference between business graduates and those with social science degrees disappears when the log of income is added to model 3.\footnote{Recall that the variable used to capture underemployment in these analyses is derived from the level of education earned by the graduate against the level of education that is required for the job they secure three years after graduation. Therefore it is possible that the underemployment differences observed in the previous models are the result of the way in which occupations are coded in the NGS and are corrected when earnings differences are accounted for.} It is also worth noting that while graduates of fine arts/humanities and health fields remained statistically indifferent from social science graduates, those in the education fields continued to be statistically significantly less likely to be underemployed ($p<.05$), regardless of the model. This points to potentially better school-to-work matches for graduates of education related fields.

There are several differences between models two and three in regard to sociodemographic indicators. While previously not statistically significant, women are less likely to be underemployed than men when income is added to the model ($p<.05$). This difference was likely overlooked in previous analyses as a result of the higher earnings reported by men. Given the relationship between income and underemployment, controlling for income inequalities between men and women
elucidates the better work linkages for women. Alternatively, the effect of immigration status disappeared when earnings are included in the model, suggesting that differences in underemployment based on immigration status are dependent on the income of the graduate. Therefore, it is possible that graduates who immigrated prior to graduation do not face systemic barriers over similarly qualified Canadian graduates. The effects of the remaining control variables are consistent with the previous model.

As with the previous analyses of subjective education-to-work match, predicted probabilities have been calculated with the estimates derived from Model 3. The predicted probabilities, along with the corresponding 95 percent confidence intervals are presented in Figure 2. Consistent with the previous section, probabilities have been calculated with control variables held at typical values.

Graduates of physics/chemistry and engineering graduates had statistically greater probabilities of having the same or less education than was required for their early careers than social science graduates (with predicted probabilities of .83, .86, and .61 respectively). Notably, the predicted probabilities for graduates of the remaining STEM fields were not significantly different from those in the social sciences. The predicted probabilities are as follows: .64 (biology), .77 (mathematics), .70 (agricultural-related sciences), .68 (computer and information sciences).

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38 The education-to-work advantages of women observed here seem to be consistent with past literature that has indicated that the labour market returns to postsecondary education have risen at a faster rate for women than men (Diprete and Buchmann 2014; 2006a). This discussion will be pursued further in Chapter 6.
4.3.3 Job Satisfaction

The next set of analyses assesses the relationship between the key independent variable and job satisfaction; these results are presented in Table 5. As with the previous regression analyses, Model 1 includes only the variable for field of study net of controls. In this analysis, field of study is conceptualized using the disaggregated STEM categories consistent with the previous two sets of analyses, in order to parse out any potential differences between technical fields that are traditionally overlooked by grouping these programs together. Interestingly, the first model reveals that none of the fields of study are statistically significantly different from the reference category (social sciences).

39 The pseudo $R^2$ of model one is .002
science graduates) with respect to whether they are very satisfied with their early labour market occupations.

The next model includes the sociodemographic control variables. The pseudo $R^2$ for model 2 is .022, a substantial increase over the previous model (.002). Again, the results indicate that field of study does not significantly affect respondents’ level of job satisfaction.

Of the sociodemographic variables in the model, only visible minority status has a statistically significant effect on job satisfaction ($p<.05$). Visible minority graduates are less likely to report being very satisfied with their employment than non-minority graduates. Gender, disability, age, marital status, parental education and immigrant statuses are not significantly related to job satisfaction. The respondents’ region and the variables related to student funding are also unrelated to the focal dependent variable.

Model three considers the effect of income and again increases the explanatory power of the model; producing a pseudo $R^2$ of .041, versus .022 for the previous model. After controlling for earnings, social science graduates are not statistically different from any of the fields captured in the analyses. It would appear that STEM fields are no different than liberal education programs in regards to the level of job satisfaction graduates have towards their early occupational outcomes. After accounting for income, the effects of the control variables remain unchanged from the previous model.
Table 5 Logistic Regression of Job Satisfaction by Disaggregated STEM Fields (Category 1 of Dependent Variable: Satisfied with Employment)

<table>
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<tr>
<th>Field of Study</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
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<td>Social Sciences</td>
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<td>-</td>
</tr>
<tr>
<td>Fine Arts/Humanities</td>
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<td>0.978 (0.217)</td>
<td>0.920 (0.209)</td>
</tr>
<tr>
<td>Business Related Degrees</td>
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<td>0.994 (0.217)</td>
<td>1.157 (0.258)</td>
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<td>0.966 (0.255)</td>
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<tr>
<td>Physics/Chemistry</td>
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<td>Mathematics</td>
<td>1.136 (0.400)</td>
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<td>1.143 (0.415)</td>
</tr>
<tr>
<td>Agricultural Sciences</td>
<td>1.000 (0.264)</td>
<td>1.026 (0.267)</td>
<td>1.126 (0.297)</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>0.991 (0.208)</td>
<td>0.914 (0.210)</td>
<td>1.220 (0.292)</td>
</tr>
<tr>
<td>Computer and Information Sciences</td>
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</table>

Exponentiated coefficients; Standard errors in parentheses

* p < 0.05   ** p < 0.01   *** p < 0.001
4.3.4 Earnings

For the last set of analyses the natural log of earnings is treated as the dependent variable, and is regressed on the disaggregated STEM fields used in the previous regressions. Two models are presented in Table 6. The first model regresses the dependent variable against the field of study, net of controls; sociodemographic control variables are then included in the second model. The $R^2$ for model one is .077. The first model reveals notable variation among STEM fields with respect to earnings. Graduates of engineering and technology ($p<.001$), computer and information science ($p<.001$), mathematics ($p<.05$), and agricultural science ($p<.05$) earn more than graduates in the social sciences. However, biology graduates and those from physics/chemistry did not earn significantly different incomes than social science graduates. This is also true for fine arts/humanities, education, and health, recreation, and fitness graduates. Graduates of business fields (including finance, accounting, and economics) earned significantly more than graduates of the social sciences ($p<.001$).

Additionally, the effects of the majority of sociodemographic variables are statistically significant. Graduates with disabilities earn less than their counterparts without disabilities ($p<.05$). Consistent with past research, male graduates earn more than female graduates ($p<.01$), though the gap is smaller than it is for disabled graduates. Married respondents earn more than those who are not married ($p<.01$). Graduates whose parents have not attained a university degree earn less than those who have at least one parent with a degree ($p<.01$). Visible minority graduates also earn less than non-minority graduates ($p<0.05$). The variables related to whether or not the respondent has
Table 6 Ordinary Least Squares Regression of Earnings by Disaggregated STEM Fields

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<th>Field of Study</th>
<th>Model 1</th>
<th>Model 2</th>
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<td>Field of Study</td>
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<td>***</td>
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<td>-</td>
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<tr>
<td>Fine Arts/Humanities</td>
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<td>-0.059 (0.031)</td>
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<td>0.087 (0.047)</td>
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<td>0.307*** (0.053)</td>
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<td>Computer and Information Sciences</td>
<td>0.269*** (0.063)</td>
<td>0.208*** (0.063)</td>
</tr>
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<td>Health, Recreation, and Fitness</td>
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<td>0.059 (0.047)</td>
</tr>
<tr>
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</tr>
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<td>-0.073** (0.021)</td>
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<tr>
<td>Ontario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic Provinces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quebec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Provinces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
dependent children, age, and whether or not the graduates immigrated to Canada prior to graduation did not have a significant effect on income. Similarly, the control variables related to student funding are unrelated to employment income.

Model two introduces sociodemographic control variables, and increases the $R^2$ from .077 to .144. After introducing controls, graduates of the social sciences still earn less than those in engineering and technology programs and the computer and information sciences (P<.001). However, graduates of mathematics programs and the agricultural sciences did not have significantly different earnings than social science graduates once control variables are entered into the models. It is therefore likely that the earnings differences between these graduates are attributable to sociodemographic differences among the graduates. Graduates of health related fields, those from fine arts/humanities programs, and graduates of education are also not statistically different from social science graduates with respect to earnings. Respondents who earned their
degrees in business related fields continue to earn more than the reference group after accounting for controls (p<.001).

With respect to region, graduates living in the Atlantic Provinces and Quebec earn lower incomes than Ontario graduates (p<.05 and p<.001 respectively). On the other hand, Western Canada graduates earn more than Ontario graduates (p<.05). Graduates who travelled outside of Canada are not statistically significantly different from Ontario graduates in terms of earnings. This is surprising, as earlier analyses have indicated substantially more favorable employment outcomes for this group. One explanation could be that the U.S. may offer a wider array of jobs that allow Canadian graduates to find employment that more closely aligns with their skills, while Canada provides similar financial rewards for a more limited selection of careers.

The estimates for Model 2 have been converted into actual earnings for ease of interpretation. The effect display for the predicted earnings by fields of study is presented in Figure 3. The estimates in the effect display are obtained by holding the quantitative variables (e.g., age) at their means, and the categorical variables (e.g., gender, disability status) at their proportions. The estimates are accompanied by their corresponding 95 percent confidence intervals for comparative purposes.

Engineering and technology graduates have the greatest predicted earnings in the model, with a predicted income of $62,352. This is followed by computer and information science graduates ($57,615) and graduates of business related fields ($55,621). Among the STEM fields that are not significantly different from graduates of the social sciences, mathematics graduates have predicted earnings of $55,496, while those in agricultural-related sciences are predicted to earn roughly $51,845.
With respect to non-STEM fields, graduates from health related fields have the highest predicted earnings ($50,512), followed by social science graduates ($47,691), education ($47,129), and those with fine arts/humanities degrees ($44,972).

4.4 Summary of Results

The descriptive crosstabulations of disaggregated fields of study point to considerable variation in the job outcomes assessed in this study for both liberal arts and technical fields. A summary of these outcomes is presented in Table 7. Labour market outcome differences within liberal arts fields are considerable when disaggregated. Particularly, the labour market returns for graduates of anthropology and cultural studies are interesting, as the graduates in these fields acquired markedly lower returns across nearly every measure. However, it is equally important to highlight that significant
variation exists among graduates of STEM fields, as the outcomes of graduates of biology, mathematics, and physics/chemistry are comparable to the outcomes of many liberal arts graduates. This flies in the face of previous literature that has indicated that graduates of STEM fields as a whole fare better in the labour market than graduates of liberal arts programs (Fenesi and Sana 2015; Delisle, Guay, Senecal and Larose 2009; Charles and Bradley 2009; Andres and Adamuti-Trache 2007; Davies and Hammack 2005; Guppy and Davies 1998; Lin, Sweet, Anisef, and Schuetze 2000; Schwartz and Finnie 2002; Schaeffer 2000).

The regression results also indicate significant variation among STEM fields. Table 8 offers a summary of these results. Graduates of biology, mathematics, and physics/chemistry do not greatly differ from social science graduates across the majority of outcome measures. Even graduates with highly technical degrees such as computer and information sciences do not show significantly different rates of underemployment,

<table>
<thead>
<tr>
<th>Education/job fit</th>
<th>Underemployment</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakest: Anthropology</td>
<td>Most likely: Anthropology</td>
<td>Weakest: Anthropology</td>
</tr>
<tr>
<td>Strongest: Engineering</td>
<td>Least Likely: Engineering</td>
<td>Strongest: Engineering</td>
</tr>
</tbody>
</table>
once income is included in the model. Unfortunately, for this analysis, social science and fine arts/humanities programs could not be disaggregated due to sample size constraints.

The findings of this study reveal that not all STEM fields guarantee strong labour market returns. This is an important point, as past research has considered graduates of these programs to be a single group with a shared set of outcome experiences (Xu 2013; Nelson, Sullivan, Zimmerman, and McCormick 2011). It would appear that the labour market returns of engineering and technology graduates are considerably more favorable than any other field included in analyses. Therefore, while the marketability of engineering and technology degrees has remained strong in Canada’s economy, it may be that the portability of STEM fields such as biology, mathematics, and physics/chemistry is eroding.

Aside from fields of study, the outcomes for respondents of traditionally disadvantaged groups provide mixed results. Analyses of perceived education-to-work match revealed that persons with disabilities report a closer match than their counterparts without disabilities. This is consistent with previous literature that has noted that the self-
efficacy and self-determination of persons with disabilities is reinforced through educational attainment (Trainor 2008; Schumaker et. al. 2002; Wehmeyer 2002; Algozzine et. al., 2001). Similarly, it is encouraging that none of the other sociodemographic indicators have significant effects when earnings and education-related characteristics were taken into account. This suggests that the perceived match between postsecondary education and work is dependent upon other factors than sociodemographic background.40

With respect to objective measures of underemployment, older graduates, and graduates whose parents did not attain a university degree are both significantly more likely to be disadvantaged, even after accounting for income. This suggests that there is some segmentation occurring in the labour market, consistent with literature positing the benefits of social and cultural network capital (Bourdieu 1986). This may not be true for women, however, as they are less likely to be underemployed than men after controlling for income. This is encouraging, as recent literature has suggested that women have surpassed men in regards to university completion rates (Diprete and Buchmann 2014; 2006a; 2006b).41

Visible minority status seems to be associated with job satisfaction, as graduates of colour are significantly less likely to report being “very satisfied” with their early careers than non-minority graduates. The remaining demographic characteristics,

40 Demographic characteristics are included into the models after the variables related to education. It is therefore possible that these demographic characteristics may have had statistically significant effects that are explained by the variables related to education. Regardless, the overall focus of this discussion is to identify the effect of university programs on labour market outcomes, thus requiring the variables be included in the models in the order presented.

41 Diprete and Buchmann (2013) have found that women have overtaken men in regards to completion rates at American colleges. The authors make the argument that this trend is common to all industrialized countries.
however, have little effect on job satisfaction—an encouraging finding that may suggest potential parity in graduates’ satisfaction with early labour market opportunities.

The earnings analyses identify troubling results with respect to disadvantaged groups that are more in line with past research. Graduates with disabilities earned significantly less than their counterparts; this is also true for women, and graduates whose parents have not attained a university education. This wage gap presents a persistent problem among postsecondary graduates—background effects remain influential on labour market outcomes, even after controlling for the effects of the other variables in these analyses. Visible minority and immigration status did not have an effect on earnings, suggesting that at least some outcome parity has been achieved for some groups of traditionally disadvantaged graduates.
Chapter 5: The Labour Market Returns of Higher Education

This chapter will assess the labour market outcomes of graduates with different types of postsecondary education. It is divided into two sections. The first section of this chapter examines the underemployment and earnings of distance education graduates in comparison to the outcomes of traditional education graduates.\textsuperscript{42} The second section will again assess the underemployment and earnings outcomes of graduates with respect to two areas of specialization, bilingualism in official Canadian languages and the development of technical skills.

5.1 Distance Education and Traditional Programs

The variables in the following analyses will be entered into models in a series of stages, similar to the regressions in Chapter 4. That is, the dependent variable will first be regressed against the independent variable without controls. Next, sociodemographic control variables will be introduced into the model. Finally, for analyses where underemployment is the dependent variable, a third model will include income to determine if the effects from the previous models remain constant after accounting for earnings. Earnings analyses will employ ordinary least squares (OLS) regression. Logistic regression will be used for models where employment status is the dependent variable.

5.1.1 Objective Measure of School-to-Work Match

The underemployment of graduates of distance and traditional education programs are presented in Table 9. The first model represents a binary logistic regression of the dependent and independent variables without controls. The results indicate that

\textsuperscript{42} Due to the limited sample of distance education graduates with undergraduate degrees in the NGS, the analyses pertaining to distance education will include graduates of all levels of education.
graduates of distance education programs do not statistically differ from graduates of traditional programs with respect to underemployment.

The second model includes sociodemographic variables to assess whether there are differences in underemployment between traditional and distance education programs when accounting for sociodemographic characteristics. The model also controls for field of study, level of education, and graduates’ previous work experience prior to completing their studies. Contrary to the central hypothesis, distance education graduates are less likely to be underemployed than traditional graduates after introducing control variables (p<.05).

There are a number of noteworthy sociodemographic effects in the model. Prior work experience does not significantly influence underemployment. On the other hand, it would appear that underemployment is significantly associated with fields of study. That is, graduates of education, business, health, and STEM-related fields have lower chances of being underemployed than those with liberal arts degrees (p<.001). With respect to level of education, bachelor graduates are the least likely to be underemployed than every other group of graduates in the model. That is, bachelor graduates have lower chances of being underemployed compared to trades/vocational graduates (p<.001), graduates of college programs or college/university diploma programs below a bachelor degree (p<.001), Masters (p<.001), and Doctorate graduates (p<.05).

---

43 Field of study is used as a control variable in the analyses of distance education. As this section is representative of graduates of all levels of education, the disaggregated coding of programs that is used in other analyses is not feasible here due to the incompatibility of fields across education levels. Therefore the analyses in this section use the original coding structure offered by Statistics Canada within the NGS.

44 Wald tests are used for all categorical variables with more than two categories. The effect of field of study is statistically significant using the Wald chi² test. Hereafter in the chapter, only subsequent categorical variables with more than two categories that produce statistically significant Wald tests will be discussed.
Table 9 Logistic Regression of Underemployment by Distance Education (Category 1 of Dependent Variable: Same or Less Education than Required for Career)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Education</td>
<td>-</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>Yes</td>
<td>1.021 (0.143)</td>
<td>1.439* (0.253)</td>
<td>1.383 (0.253)</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Number of years worked prior to graduation</td>
<td>-</td>
<td>0.997 (0.010)</td>
<td>0.988 (0.010)</td>
</tr>
<tr>
<td>Field of Study</td>
<td>***</td>
<td>***</td>
<td>-</td>
</tr>
<tr>
<td>Liberal Arts</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Education related fields</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business related fields</td>
<td>2.078*** (0.285)</td>
<td>1.949*** (0.262)</td>
<td></td>
</tr>
<tr>
<td>STEM fields</td>
<td>1.552*** (0.178)</td>
<td>1.398** (0.162)</td>
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</tr>
<tr>
<td>Health related fields</td>
<td>1.506*** (0.159)</td>
<td>1.276* (0.139)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2.594*** (0.324)</td>
<td>2.203*** (0.282)</td>
<td></td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trades</td>
<td>0.202*** (0.027)</td>
<td>0.270*** (0.038)</td>
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<tr>
<td>College Diploma</td>
<td>0.336*** (0.033)</td>
<td>0.409*** (0.041)</td>
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</tr>
<tr>
<td>University Diploma below a bachelor's degree</td>
<td>0.335*** (0.063)</td>
<td>0.346*** (0.066)</td>
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</tr>
<tr>
<td>University degree above bachelor's</td>
<td>0.137*** (0.044)</td>
<td>0.117*** (0.040)</td>
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</tr>
<tr>
<td>Master's degree</td>
<td>0.257*** (0.026)</td>
<td>0.204*** (0.021)</td>
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<tr>
<td>Doctorate</td>
<td>0.728* (0.093)</td>
<td>0.586*** (0.077)</td>
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</tr>
<tr>
<td>Person with Disability</td>
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<tr>
<td>Yes</td>
<td>0.837 (0.160)</td>
<td>0.960 (0.184)</td>
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</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Gender</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Female</td>
<td>1.170 (0.099)</td>
<td>1.359*** (0.116)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Visible Minority</td>
<td></td>
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<td></td>
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<tr>
<td>Yes</td>
<td>1.112 (0.130)</td>
<td>1.138 (0.135)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td></td>
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</tr>
<tr>
<td>Respondent Married</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.981* (0.009)</td>
<td>0.977* (0.009)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
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178
<table>
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<th>Category</th>
<th>Yes</th>
<th>(0.101)</th>
<th>No</th>
<th>(0.100)</th>
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<tr>
<td>Respondent has Dependent Children</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Yes</td>
<td>0.977</td>
<td>(0.101)</td>
<td>0.967</td>
<td>(0.100)</td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immigrant Status</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.649**</td>
<td>(0.094)</td>
<td>0.679**</td>
<td>(0.160)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Least One Parent with a University Degree</td>
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<td></td>
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<tr>
<td>No</td>
<td>0.762**</td>
<td>(0.063)</td>
<td>0.794**</td>
<td>(0.067)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
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</tr>
<tr>
<td>Region</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Yes</td>
<td>***</td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic Provinces</td>
<td>1.107</td>
<td>(0.127)</td>
<td>1.200</td>
<td>(0.137)</td>
</tr>
<tr>
<td>Quebec</td>
<td>1.488***</td>
<td>(0.108)</td>
<td>1.624***</td>
<td>(0.185)</td>
</tr>
<tr>
<td>Western Provinces</td>
<td>0.952</td>
<td>(0.092)</td>
<td>0.890</td>
<td>(0.087)</td>
</tr>
<tr>
<td>U.S.A</td>
<td>3.478***</td>
<td>(1.183)</td>
<td>3.745***</td>
<td>(1.222)</td>
</tr>
<tr>
<td>Student Grants</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.178</td>
<td>(0.134)</td>
<td>1.199</td>
<td>(0.137)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Student Loans</td>
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</tr>
<tr>
<td>Yes</td>
<td>0.929</td>
<td>(0.084)</td>
<td>0.942</td>
<td>(0.085)</td>
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<tr>
<td>Academic Scholarships</td>
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<tr>
<td>Yes</td>
<td>1.331***</td>
<td>(0.115)</td>
<td>1.291**</td>
<td>(0.112)</td>
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<tr>
<td>No</td>
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<tr>
<td>Student Loans from Other Sources</td>
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<tr>
<td>Yes</td>
<td>1.019</td>
<td>(0.091)</td>
<td>1.016</td>
<td>(0.092)</td>
</tr>
<tr>
<td>No</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Log of income</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Wald chi2(1)=0.02</td>
<td></td>
<td></td>
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<tr>
<td>p&gt;chi2=0.881</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Pseudo R2=0.000</td>
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<td></td>
</tr>
<tr>
<td>n=14,810</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald chi2(2)=550.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p&gt;chi2=0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudo R2=0.000</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>n=14,810</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald chi2(3)=659.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p&gt;chi2=0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudo R2=0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=14,810</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exponentiated coefficients, Standard errors in parentheses

* p<0.05  ** p<0.01  *** p<0.001
Age, immigration status, and parental education are also significantly associated with underemployment. Older graduates are more likely to be underemployed than younger graduates (p<.05), while graduates who immigrated to Canada prior to completing their schooling are also more likely to be underemployed than Canadian graduates (p<.01). Finally, underemployment is more likely among graduates who do not have at least one parent with a university education (p<.01).

There are mixed results for the variables relating to region of the respondent and student funding. Graduates living in Quebec and those who leave Canada after graduating are statistically significantly less likely to be underemployed than Ontario graduates (p<.001). On the other hand, there is no statistical difference among graduates living in Ontario and those from the Atlantic or Western provinces. Finally, whether or not a graduate received scholarships prior to the completion of their degree is statistically related to underemployment; graduates with past scholarships are less likely to be underemployed than students who do not receive scholarship funding during their postsecondary study (p<.001).

Model 3 introduces the log of income as a control to assess whether earnings differences among graduates account for the effects in Model 2. The model has a pseudo R² of 0.118, a modest increase over the previous model (an R² of .099). Including income in the model reveals that underemployment is lower among higher-earning graduates (p<.001). On the other hand, the effect of distance education is no longer statistically significant when income is included in the model. Therefore, it may be that the closer school-to-work match of distance education graduates revealed in Model 2 is explained by income differences between graduates of traditional and distance education.
The effects of the control variables are consistent with the previous model, with the exception of field of study and gender. Field of study remains significantly associated with underemployment, though the effect weakened slightly for graduates of business related fields, and STEM programs. On the other hand, men are more likely to be underemployed than women when income is included into the model (p<.001). The gender effect elucidates the importance of accounting for income when examining underemployment, as this relationship was not evident in Model 2. The analysis reveals that women are more likely than men to secure careers that match their education once income is included in the model as a control.

5.1.2 Earnings

For the next set of analyses the natural log of earnings is treated as the dependent variable and is regressed on the distance education variable along with the control variables. These findings are presented in Table 10. The first model presents the OLS regression results of the dependent and focal independent variable net of controls. Counter to the initial hypotheses, the model reveals that graduates who acquire their credentials through distance education earn more than those who pursue their education through traditional programs (p<0.05).

Similar to earlier analyses, Model 2 includes key sociodemographic control variables. Accounting for background factors greatly increases the explanatory power of

45 The p-value for graduates of STEM fields decreases to (p<.05) from (p<.001) once income is introduced into the model. Similarly, the effect also weakens for graduates of business related fields, though to a lesser extent—(p<.01) from (p<.001). Still, both groups of graduates are significantly less likely to be overeducated than graduates of liberal arts programs.

46 These findings are consistent with the wider literature that has indicated that women have largely surpassed men’s postsecondary education outcomes (Diprete and Buchmann 2014; 2006a). Women are securing more closely matched education, once gender earnings inequalities are accounted for.

47 The R² for Model 1 is .003.
<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>10.790 (0.007)</td>
<td>10.708 (0.044)</td>
</tr>
<tr>
<td><strong>Distance Education</strong></td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>Yes</td>
<td>0.123* (0.065)</td>
<td>0.022 (0.035)</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Number of years worked prior to graduation</strong></td>
<td>-</td>
<td>0.008*** (0.002)</td>
</tr>
<tr>
<td><strong>Field of Study</strong></td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td><strong>Liberal Arts</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Education related fields</strong></td>
<td>0.043 (0.048)</td>
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</tr>
<tr>
<td><strong>Business related fields</strong></td>
<td>0.119*** (0.021)</td>
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<tr>
<td><strong>STEM fields</strong></td>
<td>0.206*** (0.024)</td>
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<tr>
<td><strong>Health related fields</strong></td>
<td>0.264*** (0.026)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>0.043 (0.027)</td>
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</tr>
<tr>
<td><strong>Level of Education</strong></td>
<td>***</td>
<td>***</td>
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<tr>
<td><strong>Bachelor Degree</strong></td>
<td>-</td>
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<tr>
<td><strong>Trades</strong></td>
<td>-0.393*** (0.023)</td>
<td>-</td>
</tr>
<tr>
<td><strong>College Diploma</strong></td>
<td>-0.238*** (0.015)</td>
<td>-</td>
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<tr>
<td><strong>University Diploma below a bachelor's degree</strong></td>
<td>-0.061 (0.030)</td>
<td>-</td>
</tr>
<tr>
<td><strong>University degree above bachelor's</strong></td>
<td>0.108* (0.049)</td>
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<tr>
<td><strong>Master's degree</strong></td>
<td>0.243*** (0.030)</td>
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<tr>
<td><strong>Doctorate</strong></td>
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<td>-</td>
<td>-</td>
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<tr>
<td><strong>Gender</strong></td>
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<tr>
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<td>-0.161*** (0.013)</td>
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<td>-</td>
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<td></td>
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<td><strong>Age</strong></td>
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<tr>
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<td>0.076*** (0.020)</td>
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<td><strong>Dependent Children</strong></td>
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<tr>
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<td>0.010 (0.021)</td>
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<td>-</td>
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<tr>
<td><strong>Immigrant Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-0.077** (0.023)</td>
<td>-</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>At Least One Parent with a University Degree</strong></td>
<td>-0.040** (0.015)</td>
<td>-</td>
</tr>
<tr>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
the model, bringing the $R^2$ to 0.210. After introducing control variables, the relationship between distance education and earnings disappears. The earnings of distance education graduates are not significantly different from graduates of traditional programs.\textsuperscript{48} It would appear that differences in earnings between graduates of distance and traditional education in Model 1 are explained by sociodemographic differences between graduates of the two types of programs.

There are a number of significant control variables in Model 2. As might be expected, a graduate’s work experience prior to the completion of their degree is positively associated with income ($p<.001$). Therefore, it is possible that the earnings

\begin{table}[h]
\centering
\begin{tabular}{lcccc}
\hline
Region & & & *** & \\
Ontario & - & - & - & \\
Atlantic Provinces & - & -0.069** & (0.021) & \\
Quebec & - & -0.065*** & (0.018) & \\
Western Provinces & - & 0.079*** & (0.020) & \\
U.S.A. & - & -0.079 & (0.085) & \\
Student Grants & & & & \\
Yes & - & -0.034 & (0.019) & \\
No & - & - & - & \\
Government Student Loans & & & & \\
Yes & - & -0.016 & (0.015) & \\
No & - & - & - & \\
Academic Scholarships & & & 0.052*** & (0.015) \\
Yes & - & - & - & \\
No & - & - & - & \\
Student Loans from Other Sources & & & & \\
Yes & - & 0.003 & (0.019) & \\
No & - & - & - & \\
\hline
R-Squared= 0.0025 & R-Squared= 0.2098 & \\
F(1,15722)=4.05 & F(29,15694)=87.07 & \\
Prob > F = 0.0441 & Prob > F = 0.000 & \\
n=15,724 & n=15,724 & \\
\hline
\end{tabular}
\caption{Standard errors in parentheses}
\end{table}

\textsuperscript{48} One potential argument is that the lack of earnings differences could be attributable to selection bias, as analyses only select full-time, full-year employees. Additional analyses not presented here accounted for part-time and non-permanent workers. Including these respondents did not significantly alter the results.
differences between graduates witnessed in Model 1 are the result of prior experience in the labour market.\textsuperscript{49} Field of study is also a predictor of income; graduates of business, STEM, and health related fields earn more than liberal arts graduates (p<.001). There are earnings differences among levels of education, consistent with the wider literature. Bachelor graduates earn more than graduates with college diplomas, and those with trades certificates (p<.001). On the other hand, bachelor graduates have lower earnings than masters graduates (p<.05) and those who earn a doctorate or professional degree (p<.001). Bachelor graduates are not statistically different from graduates with university diplomas under a bachelors degree, while earning slightly less than graduates who hold a university degree above a bachelors degree while below a masters degree (p<.05).

The majority of the sociodemographic variables in the model have statistically significant effects. Graduates with disabilities earn less than those without disabilities (p<.001). Female graduates earn less than male graduates (p<.001). Age is positively associated with income, such that income increases with the age of the graduate (p<.01). Immigration status and parental education also have significant effects on earnings. Graduates who immigrated to Canada prior to attaining their degree earn less than Canadian graduates (p<.01). Likewise, graduates whose parents had not attained a university education earn less than graduates who have at least one parent with a bachelor degree (p<.01). Finally, married graduates earn higher incomes than those who are

\textsuperscript{49} Additional analysis (not shown here) identified that distance education graduates in the National Graduate Surveys are typically older, more advanced in their careers, and are more likely to pursue advanced degrees above the bachelor level through distance education. Therefore, one assumption that can be made is that the relatively new programs offered through distance education are used as a way to build upon pre-existing human capital among those workers already situated in the labour force, rather than as a means to circumvent traditional higher education.
unmarried (p<.001). Two variables—visible minority status and whether or not the respondent has children—are not significant predictors of income.

Region has an effect on income; the Atlantic provinces and Quebec have lower earnings than graduates in Ontario (p<.01 and p<.001 respectively). Alternatively, graduates in the western provinces have higher earnings than Ontario graduates (p<.001), while those who have moved to the U.S. do not earn significantly different incomes than Ontario graduates.

Finally, with respect to the student funding variables that are included within the model, only prior scholarships have a significant effect on income. Graduates with a history of scholarships earn higher salaries post-graduation than those without a history of academic awards (p<.001).

5.1.3 Summary of results

A summary of the distance and traditional education analyses are presented in Table 11. The results from both the earnings and underemployment analyses indicated

<table>
<thead>
<tr>
<th>Underemployment</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Education: No Statistical Difference from Traditional Education</td>
<td>Distance Education: No Statistical Difference from Traditional Education</td>
</tr>
</tbody>
</table>

that graduates of distance and traditional education programs do not significantly differ in their labour market outcomes, when the control variables are included in the models. There is not a distinct advantage for either type of program after controlling for potential background differences between the two groups of graduates.
The analyses in this section also examined sociodemographic effects across all levels of education and fields of study. The results that have been presented in the chapter contribute to the wider literature by providing an update on some of the existing relationships that were revealed using previous versions of the NGS. There were a number of significant effects in the models using this latest wave of NGS data. It would appear that many of the traditional lines of disadvantage that have been indicated in the wider literature are still salient among this recent cohort of postsecondary graduates. Persons with disabilities, women, graduates from low SES backgrounds, and graduates who had immigrated to Canada prior to graduation earn less than their respective counterparts. These differences have also been documented in the analyses of underemployment. Graduates who did not have at least one parent with a university education were more likely to be underemployed. The same was true for graduates who had immigrated to Canada prior to completing their postsecondary education. Alternatively, where women were disadvantaged in the earnings analyses, they were actually less likely to be underemployed for their early careers than men. Therefore, while women are actually finding more suitable employment in the initial years after completing their programs, it would appear that they are still at risk of persistent earnings inequality.

5.2 Outcome Differences between Bilingualism and Technical Skill

This section examines the earnings and education-to-work match associated with fluency in Canada’s official languages and technical skills. For analyses where the natural log of income is the dependent variable, OLS regression will be used. When underemployment is the dependent variable, logistic regression is employed.
Models will be presented in a series of stages. For the first two models, the focal dependent variable will be regressed against the bilingual and technical skill variables separately, net of control effects. Model 3 will then include both key independent variables, again net of controls. Model 4 will introduce sociodemographic control variables to the focal variables within the previous model. Finally, Model 5 will present the interaction between bilingualism and field of study with all control variables.50

5.2.1 Objective Measure of School-to-Work Match

This section of the chapter focuses on the underemployment among bilingual graduates and those who have specialized in technical skills. The logistic regression results for the effect of bilingualism on education-to-work match are presented in Table 12. Model 1 regresses the dependent variable on the independent variable without controls. The results indicate that bilingual graduates are less likely to be underemployed in their early labour market outcomes than graduates who only speak one official language (p<0.05).51

Model 2 presents the school-to-work match of graduates with different technical skillsets. The regression results indicate that underemployment varies for graduates with different technical skillsets. That is, graduates with skills related to natural science fields, mathematics, and computer and information sciences are not statistically different from graduates with non-technical skills in their propensity for being underemployed for their

---

50 Additional sets of analyses investigating the interaction between bilingualism and level of education, as well as bilingualism and region. Neither of the analyses produced statistically significant results.

51 While the theoretical implications of this finding will be discussed in more detail in the next chapter, it is possible that investment in an additional language may provide a favorable return that is consistent with human capital theory (Becker 1963). In a related study, Armstrong (2015) suggests that in the absence of a sufficient level of bilingual candidates in the workforce, bilingualism might be a positive human capital investment to garner wage advantages.
early career outcomes. On the other hand, graduates with skillsets that are related to engineering fields are much less likely to be underemployed for their early careers than graduates of non-technical degrees (p<0.001).
| Table 12 Logistic Regression of Underemployment by Bilingual and Technical Specialization |
|---------------------------------|-----------------|-----------------|-----------------|
|                                 | Model 1         | Model 2         | Model 3         |
| Bilingual                       | *               | *               | *               |
| Yes                             | 1.464*          | (0.202)         | 1.353*          | (0.202)         |
| No                              | -               | -               | -               | -               |
| Field of Study                  | ***             | -               | ***             | -               |
| Liberal Arts                    | -               | -               | -               | -               |
| Science related Degrees         | 1.157           | (0.219)         | 1.183           | (0.230)         |
| Mathematics                     | 1.849           | (0.713)         | 1.904           | (0.734)         |
| Engineering and Technology      | 4.541***        | (1.014)         | 4.429***        | (0.994)         |
| Computer and Information Sciences| 1.185           | (0.231)         | 1.236           | (0.245)         |
| Person with Disability (Yes)    | Gender          | Female          | Male            |
| Visible Minority                | Yes             | No              | Age             |
| Respondent Married              | Yes             | No              | Dependent Child |
| Immigration Status              | Yes             | No              | Immigration Status |
| At Least One Parent with a University Degree | Yes | No | At Least One Parent with a University Degree |
| No                              | -               | -               | -               |
| Yes                             | -               | -               | -               |
| Region                          | Ontario         | -               | -               |
| Atlantic Provinces              | -               | -               | -               |

189
Quebec
Western Provinces
U.S.A.
Student Grants
Yes
No
Government Student Loans
Yes
No
Academic Scholarships
Yes
No
Student Loans from Other Sources
Yes
No
Income
Bilingual by Field of Study
Bilingual and Science Related Degrees
Bilingual and Mathematics
Bilingual and Engineering and Technology
Bilingual and Computer and Information Sciences

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<tr>
<th></th>
<th>Wald</th>
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<tbody>
<tr>
<td></td>
<td>chi2(1)=3.55</td>
<td>chi2(4)=47.22</td>
<td>chi2(5)=50.78</td>
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<tr>
<td></td>
<td>p&gt;chi2=0.019</td>
<td>p&gt;chi2=0.000</td>
<td>p&gt;chi2=0.000</td>
</tr>
<tr>
<td></td>
<td>Pseudo</td>
<td>Pseudo</td>
<td>Pseudo</td>
</tr>
<tr>
<td></td>
<td>R2=0.004</td>
<td>R2=0.026</td>
<td>R2=0.029</td>
</tr>
<tr>
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<td>n=3,885</td>
<td>n=3,885</td>
<td>n=3,885</td>
</tr>
</tbody>
</table>

Exponentiated coefficients; Standard errors in parentheses
* p<0.05  ** p<0.01  *** p<0.001
(Cont.) Table 12 Logistic Regression of Underemployment by Bilingual and Technical Specialization

<table>
<thead>
<tr>
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<th>Model 4</th>
<th>Model 5</th>
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<td>Bilingual</td>
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<td>-</td>
</tr>
<tr>
<td>Field of Study</td>
<td>***</td>
<td>*</td>
</tr>
<tr>
<td>Liberal Arts</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Science related Degrees</td>
<td>1.088 (0.208)</td>
<td>1.388 (0.319)</td>
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<tr>
<td>Mathematics</td>
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<td>1.486 (0.943)</td>
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<td>Engineering and Technology</td>
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<td>3.084***</td>
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<td>Computer and Information Sciences</td>
<td>1.094 (0.251)</td>
<td>1.508 (0.399)</td>
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<td>Person with Disability (Yes)</td>
<td>0.710 (0.279)</td>
<td>0.716 (0.280)</td>
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<tr>
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<td>1.363 (0.273)</td>
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<tr>
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<td>0.639 (0.150)</td>
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<td>0.710* (0.102)</td>
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<td>Region</td>
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<td>------------------------------</td>
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<td>-----</td>
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<tr>
<td>Ontario</td>
<td>-</td>
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<tr>
<td>Atlantic Provinces</td>
<td>1.379 (0.293)</td>
<td>1.373 (0.291)</td>
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<tr>
<td>Quebec</td>
<td>2.539*** (0.590)</td>
<td>2.544*** (0.591)</td>
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<td>1.417* (0.223)</td>
<td>1.410* (0.221)</td>
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<td>Academic Scholarships</td>
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<tr>
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<td>1.175 (0.170)</td>
<td>1.177 (0.170)</td>
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<td>Income</td>
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<td>Bilingual by Field of Study</td>
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<td></td>
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<tr>
<td>Bilingual and Science Related Degrees</td>
<td>0.408* (0.155)</td>
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<tr>
<td>Bilingual and Mathematics</td>
<td>1.474 (1.371)</td>
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</tr>
<tr>
<td>Bilingual and Engineering and Technology</td>
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</tr>
<tr>
<td>Bilingual and Computer and Information Sciences</td>
<td>0.219** (0.104)</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Wald chi}^2(22)=170.16 \quad p>\text{chi}^2=0.000 \\
\text{Pseudo R}^2=0.1296 \quad n=3,885
\]

Exponentiated coefficients; Standard errors in parentheses

* $p<0.05$ ** $p<0.01$ *** $p<0.001$
Model 3 regresses the school-to-work match variable against both bilingual and technical skill variables, net of controls. The model reveals that bilingual graduates are still less likely to be underemployed than graduates who speak only one official language (p<0.05). The effect of technical specialization on underemployment remains unchanged from the previous model. That is, only graduates with engineering-related skillsets are significantly less likely to be underemployed than graduates with non-technical skills (p<0.001).

Model 4 introduces sociodemographic control variables, greatly increasing the pseudo $R^2$ to 0.130 (from 0.029 in the previous model). The results indicate that the effect of language disappears when controls are included; bilingualism does not have a significant influence on whether or not a graduate is underemployed when background factors are taken into consideration.52 Thus, the effect of bilingualism observed in the previous models is attributable to demographic differences between graduates.

With respect to technical specialization, graduates with engineering-related skills remained statistically less likely to be underemployed than graduates with non-technical skillsets (p<.001). Aside from engineering graduates, however, none of the other graduates with technical skillsets are significantly different from graduates with non-technical skills. Therefore it is likely that close education-to-job match is not determined by the pursuit of technical skills, but rather the pursuit of engineering-related credentials.

There are a number of notable sociodemographic control effects in Model 4. Men are more likely to be underemployed than women (p<0.05), while older graduates are

52 While Armstrong (2015:204) notes that bilingualism may be productive in a human capital sense, it is a “noisy signal” when used by prospective candidates to signal unobservable productivity. The author therefore concludes that bilingualism is less marketable in the absence of direct employer demand. This will be discussed further in Chapter 6.
more likely to be underemployed than younger ones (p<0.001). Graduates who do not have at least one parent with a university degree are more likely to be underemployed than graduates whose parents are university educated (p<0.05). Graduates living in Quebec, the Western Provinces, and those who have moved to the U.S. since graduation are less likely to be underemployed than Ontario graduates. None of the variables related to student funding prior to graduation are statistically significant. As expected, the income a graduate earns is significantly associated with the chances of underemployment such that higher incomes are associated with a lower propensity for underemployment (p<0.001).

Model 5 introduces the interaction between bilingualism and technical fields in addition to the control variables used in Model 4. Interestingly, the interaction results reveal that bilingualism is actually associated with greater levels of underemployment for graduates of the natural sciences (p<.05) and computer and information science graduates (p<.01) than for graduates of non-technical degrees. The effects of the control variables included in the model remain unchanged from the previous model.

The predicted probabilities of having the same or less education than required for the graduate’s current occupation are derived from Model 5. The effects display for the marginal predictions of underemployment by technical specialization and bilingual status are presented in Figure 4. To calculate these predicted values the control variables in the model have been held at typical values, where means are used for quantitative variables (i.e., age² and income), and proportions are used for categorical variables (gender, disability status, etc.). The probability of having the same or less education than required for the graduate’s current occupation is 0.69 for bilingual graduates from non-technical
degree programs, in comparison to a probability of 0.56 for bilingual graduates of the natural sciences, and 0.42 for those in the computer sciences who are bilingual. Interpreted a different way, bilingual computer science graduates are most likely to be overeducated, followed closely by graduates of the natural sciences.

It would seem that bilingualism in these fields is not rewarded with better school-to-work linkages. One argument could be that these fields are so heavily based upon technical proficiencies that the proficiency in multiple languages is not a necessary requirement to find suitable employment, and is therefore not rewarded by employers. Bilingualism can be a “noisy signal of unobservable productivity… while there is a correlation between linguistic abilities and favorable cognitive abilities and personality traits, the correlation is weak” (Armstrong 2015:204). Given the close connection between technical skills and employers’ demands in these fields, bilingualism may not be recognized as a reliable proxy for capabilities over more-easily utilized technical skillsets. Still, it is curious that this negative dynamic is not evident among mathematics and engineering graduates. This inconsistency further reaffirms that there is considerable variation among STEM fields with respect to labour market outcomes, consistent with the findings of the previous chapter.
5.2.2 Earnings

The earnings associated with bilingualism and technical specializations are presented in Table 13. Model 1 regresses the natural log of earnings on the bilingual variable. The first model reveals that bilingual graduates do not have significantly different earnings than graduates who speak only one official language.

Model 2 regresses earnings on the proxy for technical specialization. Here, the earnings of non-technical degree holders are compared to those in a number of technical fields. Graduates of non-technical degrees do not significantly differ from graduates of mathematics with respect to earnings. However, graduates with skills related to the natural sciences actually earn less than those with non-technical specializations (p<.05),
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Exponentiated coefficients; Standard errors in parentheses
* p<0.05  ** p<0.01  *** p<0.001
(Cont) Table 13 Ordinary Least Squares Regression of Income by Bilingual and Technical Specialization

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At Least One Parent with a University Degree

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R- Squared = 0.105
F(22,4081)=12.23
Prob > F = 0.000
n= 4,104

R- Squared = 0.1068
F(26,4077)=10.66
Prob > F = 0.000
n= 4,104

*p<0.05  **p<0.01  ***p<0.001 Exponentiated coefficients; Standard errors in parentheses
while graduates of engineering-related fields, and those with computer and information science skillsets have the greatest predicted earnings premium in the model (p<0.001). These findings indicate that not all technical specializations are equally rewarded in the labour market. Still, it would appear that specialization in certain technical skills provides an economic return that is greater than the returns associated with bilingual investment.

Model 3 regresses earnings on both of the focal independent variables without controls. Consistent with Model 1, bilingualism does not influence graduates’ earnings. Similarly, the predicted earnings across technical specializations remain unchanged from the previous model. Therefore, it seems that the earnings differences among technical specializations are not explained by whether or not graduates speak more than one official language.

Model 4 introduces controls and increases the $R^2$ considerably to 0.105; nearly triple the figure of Model 3. The independent variable capturing bilingualism remains unrelated to earnings when controls are included in the model. The variable related to technical skills, however, remains mostly unchanged from the previous models. Graduates who have earned degrees in engineering and technology continue to earn more than graduates of non-technical degree programs (p<0.001) while graduates in the natural sciences continue to earn less than non-technical graduates (p<0.05). However, introducing control variables weakens the significance level of the relationship for computer science graduates to p<0.01 from p<0.001.

There are a number of notable sociodemographic effects in the model. Graduates with disabilities earn less than their counterparts who do not report a lasting impairment
(p<.01). Men report greater incomes than women (p<.001), while married graduates have higher earnings than unmarried graduates (p<.001). Graduates with at least one university-educated parent have higher incomes than graduates whose parents have not acquired a university education (p<.05). Of the variables related to student funding, graduates with prior scholarships have greater earnings than graduates without a history of receiving academic awards (p<.05).

Region also has a noteworthy relationship with earnings. Graduates in Ontario earn more than graduates in the Atlantic Provinces (p<.05), but earn less than those in the Western Provinces (p<.05). Alternatively, graduates in Ontario do not have significantly different earnings than graduates in Quebec or those who have moved to the U.S. to find careers.

Model 5 includes the interaction of language and technical skill specialization alongside control variables. The interaction between language and technical specialization is not statistically significant. Therefore, the earnings of graduates from different technical fields are not contingent upon their proficiency in both official languages, and vice versa. The control variables remain unchanged from the previous model.

The technical specialization estimates of Model 4 have been converted to predicted earnings for ease of interpretation. The estimates are obtained by holding the quantitative variables (e.g., age) at their means, and the categorical variables (e.g., gender, disability status) at their proportions. An effect display for the earnings estimates are presented in Figure 5. The estimates are accompanied by their corresponding 95 percent confidence intervals for comparative purposes.
The predicted earnings for non-technical degrees (the reference category) are $49,349, which did not significantly differ from the predicted earnings of mathematics graduates ($53,725). Graduates of science related degrees actually have the lowest predicted earnings ($46,288), while engineering graduates and those in the computer and information sciences have the greatest predicted earnings in the model ($60,305 and $55,631 respectively). Therefore, consistent with the results in the previous chapter, it would appear that technical specializations are not associated with equal labour market returns.

![Adjusted Predictions of income by technical fields with 95% CIs](image)

Figure 5.

5.2.3 Summary of Results

There are a number of notable results from the bilingual and technical specialization analyses. These results are summarized in Table 14. Surprisingly, proficiency in both of Canada’s official-languages was not associated with either
earnings or underemployment once sociodemographic backgrounds were introduced into the models. This is contrary to previous literature that has documented that bilingualism has a positive labour market returns in Canada (Armstrong 2015; Nadeau 2010; Christofides and Swidinsky 2010).

There was also significant variation in labour market outcomes among technical fields. It would seem that graduates with engineering-related skills have significantly more favourable earnings and a closer school-to-work fit than every other group of graduates in the model. On the other hand, mathematics graduates and graduates of the

Table 14 Summary of Bilingual and Technical Specialization Analyses

<table>
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<th>Underemployment (Bilingualism)</th>
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<td>Bilingualism: No Statistical Difference</td>
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<td>From Unilingual Graduates</td>
<td>From Unilingual Graduates</td>
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<td>Underemployment (Technical Skill)</td>
<td>Earnings (Technical Skill)</td>
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natural sciences do not have significantly different outcomes than graduates of non-technical fields. Graduates with skills related to computer and information science fields have mixed outcomes. While graduates with computer science related skillsets are more likely to enjoy better earnings than graduates with non-technical skills, or those with mathematics-focused, or natural science-related skillsets, they are not statistically
different from other graduates in their chances of being underemployed for their early careers.

Furthermore, the interaction between bilingualism and field of study revealed curious findings; while there was no statistical connection between language and technical skill in regards to earnings, analyses of underemployment indicated that bilingual graduates in certain technical fields were actually at a distinct disadvantage. It would appear that the findings do not support Graham’s (2002) assertion that all forms of serious intellectual inquiry can be a wealth creating investment. Moreover, it is surprising, given the literature on human capital investment, that the pursuit of bilingualism is not universally rewarded. However, having educational credentials in specific fields is a better predictor of whether or not graduates secure favourable outcomes.

There were a number of significant sociodemographic effects in the analyses. While graduates with disabilities earned less than those who did not report a lasting impairment, disability status was inconsequential with respect to the propensity of underemployment. The same was true for marital status—while those who were married earned more than their non-married counterparts, marital status did not have a significant effect on the chances of underemployment. With respect to gender, the analyses indicated that although men earn more than women, they are also more likely to be underemployed.

Prior academic scholarships were also positively associated with earnings while having no association with underemployment. The proxy for socioeconomic status had a significant effect in both sets of analyses. That is, graduates of higher SES backgrounds earned more, and are less likely to be underemployed than graduates from less affluent
backgrounds. While age has no effect on earnings, older graduates are more likely to be underemployed than younger ones.

Earnings and underemployment also depend on region. Ontario graduates earn more than those in the Atlantic Provinces, and less than those in Western Canada. With respect to underemployment, Ontario graduates are more likely to be underemployed than those living in Quebec, the Western Provinces, and those who had moved to the U.S. since graduation.
Chapter 6: Discussion and Conclusion

6.1 Summary and Chapter Outline

The previous chapters of this dissertation offered an examination of the labour market outcomes associated with a number of the higher education programs available to Canadians. It is necessary to investigate the advantages of particular types of postsecondary education, as enrolments continue to rise irrespective of employer-side demand and alternatives to traditional university degrees become more common. This dissertation has investigated the labour market outcomes associated with field of study, program type (distance and traditional education), and bilingual and technical skill proficiency. These analyses offer important insights into the types of programs that successfully acclimate graduates for the labour market, while revealing those programs that are disproportionately associated with less-than-ideal outcomes. As it is also important to investigate the extent to which graduates’ backgrounds influence school-to-work transitions, the previous chapters have dedicated attention to the sociodemographic forces that can mediate the labour market experiences of graduates.

This chapter will be separated into two main sections. The first section will address the major findings of this research, and will revisit the guiding research questions and hypotheses for each set of analyses. This section will also offer a discussion of the significant contributions of the research, as well as the broader implications of the findings with respect to social theory, the wider literature, public policy, and the career plans of students and their parents. The second section is dedicated to the limitations of this research and provides suggestions for future areas of inquiry. The chapter will close with a number of concluding remarks.
6.2 Major Findings and Central Hypotheses

The expansion of postsecondary education has accommodated increasing numbers of non-traditional university programs allowing greater numbers of students to pursue a postsecondary education. This expansion has led to questions regarding the returns on investment of university degrees. This dissertation therefore set out to investigate the labour market returns of university programs by utilizing the most recent wave of the National Graduate Survey. The analyses were guided by four main research questions. First, which university fields of study provide the best early labour market outcomes with respect to subjective education-to-work match, objective over-education, job satisfaction, and earnings? Similarly, with the increased popularity of distance education, do graduates of traditional and distance education programs share similar labour market outcomes? Do the early career outcomes of postsecondary graduates differ by their fluency in both official languages and/or technical skills? Finally, for each of the questions above, do the observed outcomes differ among graduates with traditionally disadvantaged backgrounds?

6.2.1 Disaggregated Fields of Study

Graduates’ outcomes are generally conceptualized along lines of division that emphasize the differences between liberal arts degrees from those in STEM-related fields (Fenesi and Sana 2015; Hango 2013; Frank and Walters 2012; Davies and Hammack 2005; Guppy and Davies 1998; Lin, Sweet, Anisef, and Schuetze 2000; Finnie 2001; Allen, Harris, and Butlin 2001; Tumen and Shulruf 2008; Schwartz and Finnie 2002; Finnie and Frenette 2003; Walters 2004). Such studies typically use aggregated coding structures that elucidate the differences between these conceptual dichotomies of degree
programs; however, the differences within these aggregated program categories are often overlooked. Therefore, by further disaggregating liberal arts and STEM fields this dissertation was able to investigate more subtle differences that traditional program categories have not been able to capture. The central hypothesis posited that the differences between STEM and liberal arts degrees are disproportionately influenced by a small number of bachelor programs with outcomes that deviate from the average returns associated with a university degree. Therefore, by disaggregating fields of study, the traditional gaps in outcomes between liberal arts and STEM degrees are better understood.

Recall that descriptive analyses revealed considerable variation among the disaggregated categories of liberal arts and technical fields. With respect to the first hypothesis, outliers were observed in the descriptive analyses that provide some evidence for hypothesis one. The effects of anthropology and engineering programs are particularly influential as these degrees were considerably different from the rest of the fields included in analyses. With respect to engineering graduates, the regression analyses indicated that these graduates had the most favourable outcomes across every analysis, further supporting hypothesis one. On the other hand, anthropology programs had the least favourable outcomes. These graduates skew the outcomes of liberal arts graduates when the degree is aggregated with other liberal arts programs.

The second hypothesis posited that the outcome differences between liberal arts and STEM fields would be inconsequential when considered separately from the influential effect of engineering degrees. This hypothesis was supported in both

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53 Graduates of anthropology programs were not disaggregated from those in the social sciences in regression analyses. Removing these graduates from regression analyses would likely further close the gap
descriptive and regression analyses. For most analyses, graduates of biology, mathematics, and physics/chemistry had comparable earnings and employment outcomes to those of many liberal arts graduates. Likewise, graduates of engineering had markedly more favourable outcomes across every analysis.

A number of the findings of this research contradict the existing literature. Interestingly, the results of this study reveal that not all STEM fields are associated with significantly more favourable labour market returns than liberal arts programs. Therefore, the results indicate a problem with conceptualizing graduates of STEM programs as a homogeneous group with a shared set of employment outcomes. Moreover, this study complicates the STEM/non-STEM dichotomy that has been used to report graduates’ labour market outcomes in previous literature (Xu 2013; Nelson, Sullivan, Zimmerman, and McCormick 2011). The findings indicate that using a dichotomy of STEM/Non-STEM to present the employment returns of university degrees ignores the variation within these conceptual categories. It would appear that some STEM and liberal arts programs provide more successful labour market transitions than others.

The results of this study have a number of theoretical implications. Critics of human capital theory may view the differential outcomes between graduates with equal time invested into higher education as a challenge to human capital theory. One assumption of human capital theory is that every year of schooling should provide a return on that investment within the labour market (Schultz 1962; Dae-Bong 2009; see

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between social science graduates and those of STEM programs. Still, even with anthropology graduates included in the regressions, there is still little variation in outcome measures between some STEM graduates and those of social science fields.
also Land 2000; Baker 2011; Bol and Van de Werfhorst 2011; van der Meer 2011).

Given that the years of schooling required to complete a bachelor degree are roughly the same across the majority of university level programs, there are some criticisms of human capital theory on the grounds that inequality exists among educational outcomes for individuals with similar investment (Brown 2001; Land 2000).

Becker (1964) accounts for these criticisms, however, arguing that skill-based returns are dependent upon the equilibrium of supply and demand. The supply of skilled workers is dependent upon the real wage differences between skilled and unskilled labour. When appropriately skilled workers are scarce, the returns for those skills will rise. Alternatively, as the supply of appropriately skilled workers increases, the value of those skills (and the subsequent returns they award) decline (Becker 1975). Equilibrium will again be restored as the supply of skilled workers decline in the absence of suitable advantages over non-skilled workers (Becker 1964). As a consequence, this decline will increase demand for workers with those skills (as well as increase the associated remuneration they receive) in relation to the declining supply. Therefore, human capital theorists would argue that the differences among university programs revealed in this study are temporary, and are caused by the labour market saturation of certain types of skilled workers beyond what is required by employers.54

Still, it is curious that graduates of some STEM fields (primarily the natural sciences and mathematics) have similar labour market outcomes to liberal arts and

54 Field differences are temporary insofar as the requirements of employers are inconstant. While it is possible that liberal arts graduates could theoretically catch up to engineering graduates, it would require an influx of postsecondary enrollment in engineering degrees (increasing the number of graduates with these degrees), beyond employer demand and for the skills learned in a liberal arts program to become scarce in the labour market.
humanities graduates, given the literature that has indicated differences between these two groups (Fenesi and Sana 2015; Frank and Walters 2012). The conclusions drawn in past research, however, should be interpreted cautiously as the researchers used aggregated coding structures that could potentially have obfuscated their results.\textsuperscript{55} It may be indicative of a credentialing effect, especially if the returns of natural science and mathematics degrees are declining as they become a means to an end for further graduate-level study. That is, as enrollments in these programs increase, better labour market outcomes become reserved for individuals who attain higher level credentials through postgraduate and professional study.\textsuperscript{56} This leads to the downward spiral of credentialism, where youth are pressured to pursue increasingly greater levels of education, while at the same time inflating the credential requirements of employers and lowering the returns of the bachelor degree (Collins 1979).\textsuperscript{57}

On the other hand, there are a number of explanations for why graduates of engineering and the computer sciences fare better than others. One explanation is that these STEM programs still serve as ends in themselves due to their strict barriers of entry. According to credentialism, programs are differentiated in their labour market outcomes by the amount of “gate-keeping” practiced within the enrollment process (Collins 1979:185). This selectivity increases the status and value of certain fields by maintaining high standards of entry, attracting highly competitive applicants, while keeping

\textsuperscript{55} Fenesi and Sana (2015), for example, collapsed math graduates with computer science. Similarly, Frank and Walters (2012) collapsed all liberal arts graduates into a single category, while at the same time grouping mathematics graduates with graduates of engineering and computer science.

\textsuperscript{56} For example, degrees in the natural sciences may be pursued as prerequisites for medical school and pharmaceutical professional programs while degrees in mathematics may be tied to advanced graduate programs or professional designations.

\textsuperscript{57} While this occurs in all fields, some fields are more susceptible to credentialing than others.
enrollment numbers low. Therefore, by controlling the supply of workers available to employers, some fields are able to secure high wage and employment returns for their graduates. 58

Of course, another possible explanation is that the degrees that fare the best in the labour market have clearly defined occupations. Engineering and computer science graduates with bachelor degrees may have more clearly defined occupations than graduates of arts and natural science programs. These occupations utilize the skills engineering and computer science graduates receive in their bachelor degrees, ensuring that their transition into the labour market is more likely to be successful. On the other hand, the occupations for graduates with degrees in traditional academic fields (e.g., sociology, anthropology, the natural sciences, mathematics, etc.) are typically not as clear. As a result, while engineering and computer science graduates may be able to plan accordingly for the transition into awaiting occupations, graduates in traditional academic fields may experience pressure to continue their postsecondary education and obtain higher levels of credentials in order to secure comparable employment opportunities. Unfortunately, this assumption is difficult to test using NGS data due to sample size limitations among masters and doctoral graduates in the survey. Still, the findings of this study have a number of potential implications. It is important for researchers to note that the “STEM/non-STEM” narrative describing postsecondary graduates’ outcomes is inadequate. While it is encouraging that the past literature indicating an outcome gap between liberal arts and STEM programs is not supported when STEM fields are disaggregated, we must be cautious of the fact that there is still stratification in outcomes

58 The positive effect of restrictive entrance requirements on graduates’ outcomes has been noted by Clark (1999:13), with respect to graduates in health-related fields.
among fields of study. Despite the fact that many liberal arts and STEM fields are experiencing similar outcomes, stark differences exist between, what I refer to as, “outlier programs”. That is, engineering and computer science graduates have significantly better outcomes than any other group of graduates, while those in anthropology and cultural studies have the least favourable labour market experiences. It is therefore important to monitor these differences to see if the gap between these outlier programs increases as new waves of NGS data utilizing a three-year survey design become available.

6.2.2 Distance and Traditional Education

Online education has received significantly more attention in the academic literature as increasing numbers of postsecondary institutions adopt distance education programs. Distance education has been praised for its accessibility, with some scholars going as far as to liken the provision of online education to “Educational ATM’s” (Yu-Feng and Nguyen 2007:31). The proliferation of online pedagogy has become so prevalent that the majority of Canadian schools now offer at least some form of distance education (Cote and Allahar 2011). As distance education becomes increasingly popular among recent cohorts of graduates, researchers must evaluate the returns associated with these programs to determine the viability of these educational pathways for young Canadians. Unfortunately, however, there are no readily available empirical studies that have used the NGS to understand the labour market outcomes of graduates who have taken their postsecondary education through distance education. This dissertation therefore sought to ameliorate this gap in the literature by comparing the outcomes of graduates of non-traditional education to those graduates who earned their degrees through traditional avenues.
Recall from earlier in the dissertation that the hypothesis posited that Canadian graduates who pursued more than half their degree through distance education would have labour market experiences that are at least equivalent to those graduates who earned their degrees through traditional means. Given the relatively recent expansion of online education in Canada, it was assumed that employers have not yet had an opportunity to formulate a definitive appraisal of credentials attained via distance education. Indeed, after controlling for potential background differences between the two groups of graduates, it seems that there is not a distinct advantage for either type of education over the other in regards to either earnings or finding suitably matched employment. Therefore, it would appear that the early labour market outcomes of graduates do not significantly depend on whether or not they obtained their degrees through correspondence. This is an encouraging finding, given that distance education can help members of disadvantaged groups access postsecondary education (Sturgis 2012; Perri 2016). At the same time, skeptics may argue that the equal returns of traditional and distance education may further reinforce an educational market where for-profit online institutions perpetuate a “wild west” phase of higher education that is characterized by questionable learning experiences, and ambiguous (or non-existent) accreditation (see Cote and Allahar 2011).

These findings contribute to our theoretical understanding of postsecondary education. It would appear that the relatively recent expansion of online programs in Canada has resulted in little differentiation of degree types among employers. This lack of differentiation has provided graduates of distance programs with similar labour market outcomes to graduates with traditional degrees. Graduates of distance education programs
do not appear to be at a disadvantage with respect to either earnings or the chances of underemployment, despite what theorists of credentialism, or either maximally maintained, or effectively maintained inequality would predict.

Moreover, it also does not appear that distance education has become populated with lower-class students who are otherwise barred from traditional education institutions, as has been previously suggested (Wladis et al. 2015). In contrast, descriptive analyses indicated that graduates of distance education are typically older and in more established careers than graduates of traditional postsecondary programs. It would seem that a significant proportion of distance education programs are populated with Canadians who have obtained postsecondary education and are already working in the labour market. In this way, distance education has largely been used as a credentialing mechanism by already-educated Canadians, rather than as an alternative pathway to traditional higher education at the bachelor-level. The evidence therefore does not suggest that distance education programs have supplanted traditional education avenues, but rather are used mostly by individuals who already hold employment and require a flexible option to pursue further accreditation.

The results of these analyses support human capital assertions of educational investment. It would appear that pursuing education through either distance or traditional education yields similar returns. That is, employers have not differentiated the value of traditional and non-traditional postsecondary programs. One possible explanation for the accepted legitimacy of online education could be attributable to increasing reliance upon information and communication technologies. As the popularity and capabilities of interactions via correspondence rises, the legitimacy of online education will likely be
further validated. It is also possible that distance education has improved greatly in its teaching capabilities (e.g., the inclusion of lecture capturing technology, online discussion boards, and other methods of sharing and disseminating course material), which if employed effectively may now make for comparable (or nearly comparable) learning experiences. This is particularly important, as this study has provided evidence that distance education programs (which have been viewed as a way to improve educational accessibility for underrepresented groups) provide employment outcomes that rival graduates of traditional programs.

A concern still remains, however, that as graduate-level distance education programs become increasingly accessible, pressure for bachelor degree holders to attain higher-level credentials in order to remain competitive may lead to the kind of deliberate over-education commonly associated with credentialism. Given the credentialist argument that the educational training graduates receive from university programs are becoming less connected with the actual requirements of the job (Bol and Van de Wefhorst 2011), graduates of some bachelor programs may have to compete with masters and professional degree holders from online institutions for positions; especially if the labour market becomes saturated with accessible online graduate degree programs irrespective of the actual labour demands of the work force.

59 College graduates typically have greater associations between the training received during their education and the job-specific skills required by employers. Therefore it is unlikely that a surplus of graduates from distance education graduate programs would greatly influence the outcomes of college graduates.
6.2.3 Bilingualism and Technical Skill

The labour market outcome differences between graduates of liberal arts programs and those with STEM-related degrees have been attributed to the skillsets attained in these programs (Goyder 2014; Walters 2004). Outcomes are typically more favourable among those degree programs that provide skills that employers can easily assess and utilize (Goyder 2014). The crux of this argument is grounded in comparisons of the employability of graduates with technical skillsets to those with non-technical proficiencies. (Mason et al. 2009; Lindberg 2007; Adamuti-Trache 2006; Brown, Hesketh, and Williams 2004).

Therefore, this dissertation sought to compare two types of skills that are associated with more favourable returns in Canada—investment in learning Canada’s official languages, and earning a degree that offers technical field-specific skills. These two types of human capital investment were used as proxies for language acquisition and technical skill competency, respectively. The central hypothesis posited that technical skills would have the most favourable outcomes, as these skills are often directly related to specific occupations and are therefore much easier for employers to strategically utilize. Recall, however, that a secondary hypothesis tested Graham’s (2002) assertion that all serious intellectual pursuits can be used for wealth creation within an economy that can capitalize on those skills. Therefore, it was expected that graduates who invested in bilingualism would have more favourable labour market returns than graduates who only speak one official language.

The results from chapter five partially support hypothesis one. Contrary to the first hypothesis that posited that graduates with technical skills would have the most
favourable outcomes, the analyses revealed considerable outcome variation among graduates of technical fields. For example, mathematics graduates and graduates of the natural sciences do not have significantly different outcomes than graduates of non-technical fields. On the other hand, graduates with skills related to computer and information sciences have mixed outcomes. While graduates with computer science skillsets enjoy greater earnings than graduates with non-technical skills, they are not statistically different from graduates of non-technical fields, or those with mathematics-focused, or natural science-related skillsets in their propensity for underemployment. Finally, graduates with engineering-related skills have significantly more favourable earnings and a closer school-to-work fit than every other group of graduates. It would appear that technical skills alone do not adequately guarantee favourable labour market outcomes. Rather, labour market success is determined by whether or not graduates acquire the right types of technical skills.

One possible explanation could be that the returns of some technical skills have declined as a result of credentialism. Credentialists argue that the returns to a degree will decrease as greater numbers of graduates of those programs enter the labour market irrespective of employer-side demand. In such cases, the content of the degree does not matter as much as having attained a given level to remain competitive in relation to similarly trained candidates. Graduates may therefore experience pressure to pursue additional education to maintain competitive advantages, driving down the value of the skills learned through a bachelor degree as more and more graduates with advanced

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60 Recall from the analysis section that “non-technical fields” refers to liberal arts and business fields—programs not captured by the traditional designation of science, technology, engineering, and mathematics in the NGS.
levels of education compete for a finite number of jobs (Collins 1979). If natural science and mathematics degrees are becoming a means to an end for further professional and postgraduate study then this may explain why skilled graduates from these programs do not significantly differ from graduates with non-technical skillsets. On the other hand, it is possible that graduates with engineering-related training have maintained significantly greater labour market rewards than the other groups of graduates in this study if the strict barriers to entry into engineering programs have successfully controlled the supply of graduates entering the labour market. In this way, these barriers moderate the supply of graduates with industry-specific skills ensuring it does not exceed employer demand.

Davies and Hammack (2005:99) note that, in comparison with U.S. postsecondary institutions that emphasize hierarchies of school prestige, education standards in Canada are maintained by increasingly disparate entrance requirements “between programs within institutions.” The authors posit that “in Canada, the advantageous fields of study are increasingly setting their standards and tuition fees apart from the rest of the university” (2005:99). This is also echoed by Goyder (2014:43); commenting on the admission standards of certain programs he notes that “there is no escaping the fact that those admitted to science and technology programs are, on average, academically

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61 One recent report in the U.S. noted that graduates of biology and the life sciences were the most likely of all graduates to pursue further postsecondary graduate programs (54 percent) (Carnevale, Strohl, and Melton 2011:40). Similarly, the authors noted that approximately 50 percent of mathematics graduates pursue a post-graduate degree (2011:94). Comparatively, 28 percent of computer science graduates, and 37 percent of engineering graduates went on to earn a post-graduate degree (2011:40, 94). While comparable Canadian literature is not readily available, Fenesi and Sana (2015) note that Canadian science graduates and those from computer and mathematics were more likely to pursue post-graduate study than those in engineering, although their analyses were relative to humanities graduates.
stronger than those in humanities and social science departments”.

Similarly Montmarquette, Cannings, and Mahseredjian (2001) found that the requirements and academic standards of certain programs, and the potential risk of failure, were significant contributors in students’ field of study choices. The authors found that these academic standards can act as barriers to entry for students depending on their social class, gender, and race.

Despite evidence of credential barriers, the findings in this study do not refute human capital theory, however. Similar to credentialism, human capital theory also recognizes that a supply of skilled labour beyond the requirements of employers will result in a decline in the return on investment for those skills (Becker 1993). The difference, however, is that human capital theory views the valuation of skills along an equilibrium, whereby the decline in the return on investment of some skills will reduce enrollments in those degrees, creating a scarcity in the market that will slowly lead to employer demand for that training in the absence of appropriately skilled labour.

Therefore, according to human capital theory, the significantly greater returns afforded by engineering and (to a lesser extent) computer science degrees is the result of employers’ demand exceeding the supply of workers with those skills. On the other hand, the skills offered by traditional arts and science fields have currently exceeded the needs of the labour market, driving down the returns awarded by those fields.

Goyder cites Cote and Allahar’s (2011) argument that the expansion of higher education has allowed greater numbers of high school graduates, who a decade earlier would not be admitted to universities, an opportunity to get a bachelor degree. Goyder argues that because of this, Canadian universities have maintained field prestige by becoming more selective within programs, rather than between universities (2014:43).

63 A convincing argument can be made that the labour market outcome differences by field of study indicated in this dissertation have remained consistent for decades, effectively calling into question the assumptions of human capital theory and its assertions of an equilibrium of demand. Unfortunately as the NGS will not allow for comparison to past versions, it is impossible to definitively reject human capital
The second hypothesis tested the assumption that acquiring fluency in both of Canada’s official languages provides a return on investment within the knowledge economy. It is surprising that proficiency in both English and French was not associated with earnings. At the same time, while bilingual graduates were less likely to be underemployed, the effect disappeared once sociodemographic backgrounds were controlled. Therefore, it seems that the advantages of bilingualism are explained by graduates’ sociodemographic differences. These findings are inconsistent with the general conception among Canadians that bilingualism in both official languages has a positive effect on labour market outcomes.

The findings from the bilingual analyses contribute to the existing discussion regarding human capital investment. It would seem that university graduates’ investment in bilingualism is not rewarded within the labour market. It is possible that acquiring proficiency in both English and French languages is not widely valued by employers. Armstrong (2015), for example, notes that the productivity signaled by bilingualism can be difficult for employers to measure. While bilingual investment may signal cognitive ability and personal traits that are attractive to employers, it would appear employers rely on other indicators of ability. Therefore, from a standpoint of remuneration for the time spent investing in the skillset, bilingualism does not seem to provide a significant return in wages.

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64 It is worth noting that these findings are only representative of bachelor graduates. It is possible that bilingual investment might be valuable among high school, or college graduates. Future research would do well to investigate these avenues.
It is of course possible that bilingualism provides indirect human capital rewards that were not measured here. For example, bilingual candidates may be more portable in the labour market due to their abilities to effectively communicate with a wider number of employers. This is especially important given that the ability to migrate to seek new job opportunities was one of the central human capital investments discussed by Schultz (1981). It is therefore logical to conclude that not being restricted to certain job markets by language barriers might have a positive effect on their chances of getting a job.

On a similar note, bilingualism may also improve graduates’ chances of being employed, or working full-time in particular sectors. For example, it may be an attractive skill for securing work in the public sector. While previous Canadian research on these topics is not readily available, Christofides and Swidinsky (2006) have found that bilingual public sector workers had noticeable earnings advantages in the public sector over unilingual public sector workers. The authors also found that bilingualism had a greater premium in the public sector than it did in the private sector. Their study revealed that the advantages of bilingualism persisted in the public sector even after observable characteristics were controlled (2006:329). Therefore, it may be that bilingualism has advantages within specific occupational sectors.

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65 Additional analyses not shown here accounted for the effect of bilingualism on the employment status of university graduates in the wider labour market. The results indicated that bilingualism did not significantly influence whether graduates held full-time employment, part-time employment, or were unemployed.

66 One example of an earnings advantage available to public sector workers is the bilingual salary bonus conferred by the Government of Canada to public service employees who occupy a bilingual position. Though it is worth mentioning that the premium has reduced over time (Treasury Board Secretariat 2012). While at its conception, bilingualism was rewarded with a 7% differential from non-bilingual positions, in its current iteration, the bonus provides $800 dollars per year for a full-time government employee occupying a bilingual position, while part-time employees earn a percentage of that amount depending on the number of hours worked.
It would appear that some forms of human capital investment are more valued than others within the labour market. This is acknowledged by Fenesi and Sana who noted “the knowledge and skills offered by different programs are not equally marketable in today’s workforce” (2015:384). The results of the present study revisit this discussion, finding that there is a weak relationship between technical skill investment and labour market outcomes, such that only graduates with certain technical skills (primarily engineering, although to a lesser extent also computer sciences) are significantly rewarded over graduates without technical skills. On the other hand, in comparison to bilingual investment, it would appear that possessing certain types of technical skills is a more influential investment than acquiring fluency in French and English when measuring income and employment match.

It is possible that technical skills are only valuable insofar as they have close labour market application. The value of applied skills has been discussed thoroughly by Goyder (2014). Goyder refuted the idea perpetuated by Giles and Drewes (2002) that the general skills learned in the liberal arts are more portable and therefore become increasingly valuable as graduates mature in the labour market. Instead, Goyder found that applied skills are the most lucrative, regardless of maturation effects. Similarly, Frank and Walters (2012) found that fields that provided both technical and applied skills provided the most favourable returns in the labour market. To extend this argument to the present discussion, it may be that the success associated with technical skills is also reliant upon the applicability of those skills within the labour market. In this way, while mathematics and natural science programs are very technical, unless employers are convinced that they can effectively utilize those skills, the technicality of the skills is not
as valuable as those technical skills that are also highly applicable. This might explain why graduates of technology and engineering programs captured under the banner of STEM are enjoying significantly greater success than graduates with science and mathematics degrees. Likewise bilingualism, while not a technical skill, does have certain applications; this may help explain Christofides and Swidinsky’s (2006) findings that bilingualism is more valuable within the public sector than the private sector.

The findings from the current study present a number of important considerations for students, parents, and policy makers. It is surprising, given the anecdotal importance placed on French immersion and bilingualism, that proficiency in Canada’s official languages was not associated with more favourable outcomes among university graduates. Parents and students would do well to know that investment in bilingualism does not guarantee a direct financial return. Still, fluency in Canada’s official languages might have indirect benefits that were not captured in these analyses.

On the other hand, the results of this study reveal that technical skill acquisition is important in ensuring successful labour market transitions, provided the right skills are learned. Therefore, prospective students should take care when planning future postsecondary careers. Students, as well as their parents, would do well to know that pursuing skills in traditional academic areas such as the natural sciences and mathematics are associated with less lucrative returns at the bachelor level than the returns awarded by technology and engineering related skillsets. Instead, students wanting to pursue careers in science and mathematics fields should be aware that the bachelor programs in these areas are more likely to be better utilized as means to pursue further professional and
graduated training. Educating students and parents on the importance of the decision to pursue particular fields of study is therefore necessary to inform students’ expectations and guarantee successful and satisfactory labour market transitions.

At the same time, academics, government officials, and policy stakeholders would do well to consider the implications of the chosen field of study on labour market outcomes. From a social welfare standpoint, pursuing science, technology, engineering, and mathematics may be productive avenues for social progress. However, expanding postsecondary education irrespective of the demands of employers can lead to greater numbers of graduates entering a labour force that is not prepared to utilize their skills. For students who pursue postsecondary education in the hope of acquiring favourable job opportunities, pursuing careers in the natural sciences and mathematics do not guarantee job outcomes that are significantly different from those available to liberal arts graduates. Alternatively, the applicability of technology and engineering skills provides graduates with successful career pathways.

6.2.4 Traditional Indicators of Disadvantage

Graduates’ labour market experiences are mediated by their individual characteristics. Understanding variation in graduates’ experiences by sociodemographic profiles was therefore an important avenue that guided this doctoral research. The analyses of this dissertation included gender, visible minority status, disability status, and SES to determine whether these sociodemographic factors influence the outcomes of

67 See Carnevale, Strohl, and Melton (2011) for a comprehensive analysis of U.S. graduates’ decisions to pursue advanced level of education by various fields of study. Unfortunately directly comparable Canadian research is not available.

68 Carnevale, Smith, and Melton 2011 present the argument that a decline in graduates of STEM fields will result in a nation that is less competitive in the global economy.
recent graduates. Four hypotheses were formed based upon the wider literature. First, with respect to gender, it was expected that the types of occupations that women secure with their degrees would provide stronger education-job linkages than men, consistent with recent research (see Legewie and DiPrete 2014; DiPrete and Buchmann 2013; Buchmann and DiPrete 2006). On the other hand, men were expected to have greater earnings than women, as has been identified in previous literature (Zarifa 2012; Andres and Adamuti-Trache 2007; Buchman and DiPrete 2006; Schwartz and Finnie 2002, Finnie 2001). The next hypothesis held that visible minority graduates would have significantly different earnings, job satisfaction, and objective and subjective measures of school-to-work match than their white counterparts. The third hypothesis presumed that disability status would have an identifiably negative effect on the labour market outcome experiences of graduates. The final hypothesis asserted that SES would be influential on the outcomes of graduates, and the effect would persist when other sociodemographic indicators were included within statistical modeling. The significant sociodemographic findings are summarized in Table 15, followed by a discussion of the results.

### Table 15 Summary of the Indicators of Traditional Disadvantage

<table>
<thead>
<tr>
<th>Disadvantage Indicator</th>
<th>Education/Job Fit</th>
<th>Job Satisfaction</th>
<th>Underemployment</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>N/S</td>
<td>N/S</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>SES</td>
<td>N/S</td>
<td>N/S</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>Disability Status</td>
<td>Significant</td>
<td>N/S</td>
<td>N/S</td>
<td>Significant</td>
</tr>
<tr>
<td>Visible Minority</td>
<td>N/S</td>
<td>Significant</td>
<td>N/S</td>
<td>N/S</td>
</tr>
</tbody>
</table>

#### 6.2.4.1 Gender

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The first hypothesis was supported by the results of this research. Female graduates were more likely to secure jobs that closely matched their education than their male counterparts. This finding is consistent with the wider literature that has observed that women are securing much closer education-to-work linkages than men (Legewie and DiPrete 2014; DiPrete and Buchmann 2013; Buchmann and DiPrete 2006). These outcomes are complicated, however, by the results from the earnings analyses that revealed lower incomes for women in comparison to men. This inconsistency raises important theoretical implications that should be addressed.

First, human capital theory is challenged by the results of this study. Particularly, the theory does not adequately account for the wage differentials between male and female university graduates that persist when fields of study and level of education are taken into consideration. While human capital theorists would assume that differences in wages are attributable to differences in the skills men and women acquire, controlling for field of study and level of education indicates a persistent wage inequality that cannot be explained by differences in skills. Therefore, it is possible that discriminatory remuneration practices remain a factor in the lower wages of female graduates.

The lower financial returns of female graduates is surprising given their lower levels of underemployment in comparison to men that was revealed in this study. While it would appear that human capital investment has had greater returns on the abilities of women to find suitably matched employment, it draws further attention to the disparity in wages women receive in comparison to men. This creates a paradox that significantly

69 Recall from chapter four that women were not statistically significantly different from men in either job satisfaction or subjective education-to-work match.
70 It is also important to note that the results are based on earnings three years after graduation. Thus, wage differentials that are attributable to years of experience are factored out of the earnings analyses.
challenges the assumptions of human capital. It would appear that women are not receiving the financial return on their human capital investment, irrespective of their acquired skills and the opportunities to use them. This again indicates the possibility that there is unmeasured discrimination in the remuneration of women.71

Second, credentialist assumptions also struggle to explain the results relating to gender. Credentialist scholars argue that as university degrees become more accessible employers will become increasingly selective in order to screen the most highly educated candidates regardless of the actual requirements of the job. According to credentialist theory, labour market outcomes should be mainly attributable to differences in field of study and level of education. Therefore, the relationship between gender, earnings, and underemployment that has been presented in this study does not fit the typical narrative offered by credentialist theorists. Still, credentialism does offer some theoretical insight as credentialism shares with labour segmentation theory the conceptualization of “opportunity hoarding” (Tilly 1998; Bourdieu 1984; 1986; Kern 1997). Social boundaries are created on behalf of groups in positions of power that seek to reproduce their holdings (Tilly 1998). In credentialism, this form of social closure typically revolves around prestige groups in occupational strata (Savage et al. 2013; Goldthorpe 2010; Breen & Rottman 1995; Grusky and Sorensen 1998). Labour segmentation theory, on the other hand, expands the conceptualization to include other social groups, making it particularly useful for analyses of sociodemographic backgrounds.

71 One potential criticism for the conclusions presented here are that women could be more likely to pursue closer-matched, yet lower-paying occupations in comparison to men. Therefore, women may be more likely to pursue and obtain jobs that closely match their training, while men in the same field are more likely to pursue higher-paying occupations that are, on average, slightly less matched to their education.
Labour segmentation theorists have argued that aside from social class, gender is another dimension where social closure is practiced (Kett 1977; Willis 1977; Lee and Wrench 1987; Valentine et al. 1998 in Bauder 2001). Gendered labour market identities shape the opportunities available to men and women; these gendered identities exist outside of the confines of the market and shape the employment relationships of supply and demand in order to reproduce the structure of the traditional social order (Bauder 2001). Symbolic representations of disadvantaged groups perpetuate inequality, in part, through the legitimization of discriminatory identities (Lamont and Molnar 2010; Bauder 2001; Wetherell and Potter 1992). As symbolic boundaries become widely identified, patterns emerge that come to form solid social boundaries through “objectified forms of social differences manifested in unequal access to, and unequal distribution of resources and social opportunities” (Lamont 2002:168).

Labour segmentation theory is therefore useful when conceptualizing the labour market outcome differences between male and female graduates. However, Hudson (2007) explains that caution should be exercised when developing empirical measures to adequately capture discrete labour segments. In his review of the existing methodology, he notes that past literature has utilized a wide variety of variables to represent labour segments (Hudson 2007). While some researchers have attempted to identify segments based on worker characteristics (i.e., the race or female segments posited by Reich et al. 1973), there is some indication that attempting to identify or define labour segments using individual characteristics such as race or gender is conceptually inappropriate (Hudson 2007). Rather, a considerable number of researchers have demarcated segments by measuring the differential returns to investment in human capital (see Hudson
The research in this dissertation has adopted this methodology to study the earnings and employment returns of university graduates. While it is not possible to definitively conclude that female graduates are more represented in secondary sector or lower-tier primary sector jobs, the lower earnings of females irrespective of field of study choice, level of training, or employment match is characteristic of labour segmentation (Hudson 2007; Daw and Hardie 2012; Reich et al. 1973).

It is surprising, given the results of the earnings analyses, that the findings indicated that men are more likely to be underemployed than women. Underemployment is an undesirable employment characteristic that is more in line with secondary sector or subordinate primary sector jobs (Reich et al. 1973). Yet, despite men’s increased likelihood of underemployment, women continue to earn less than men even after accounting for other educational factors. This paradox points to the possibility that women occupy segments of the labour market that are associated with disproportionately lower financial returns than men. One of the central tenets of labour segmentation theory is that there is limited mobility between market segments (Hudson 2007). Therefore, the issue here is not the types of employment men and women acquire, but rather the fact that earnings inequalities persist regardless of women’s fields of study, levels of education, or employment matches.

The fact that women have not been able to acquire equivalent remuneration as men—despite having lower levels of underemployment—is characteristic of labour market segmentation. Past literature has documented persistent social perceptions regarding male and female ability (see Charles and Bradley 2009; Correll 2004; Budig 2002). Perceptions form labour segments that offer different experiences for men and
women. In fact, these labour segments have been documented for women in social work (Sakamoto et al. 2008) and the natural sciences (Andres and Adamuti-Trache 2007). It is therefore possible that the earnings inequalities female graduates experience are the result of the segmentation female workers experience in the labour market.

Dorothy Smith’s extension of Marxist theory is also useful here. Building on Marx, Smith identifies the role that gender plays in class relations, leading to gendered divisions of labor (Smith 1987:67-68). In these terms, Smith notes that the processes of exploitation and oppression that are consistent with class relations can also be mapped on to lines of gender inequality (Smith 1987:109). While her discussions of the authority of the male voice as a ruling apparatus can be considered within the confines of opportunity hoarding (a mechanism most often tied to agendas centering on life chances), the social justice undertones of Smith’s work are explicitly emancipatory, arguing that women need to be consciously aware that their social relations are governed by wider social, political and economic contexts that perpetuate the systemic authority of men. In this way, the worth of women in the workplace is evaluated from the male standpoint. Therefore, although more women than men are securing close work linkages, the status quo is maintained through compensation inequality between men and women that disproportionately values the contributions of men. This financial dimension of inequality perpetuates social boundaries between men and women even after controlling for field of study and level of education differences. Therefore, the persistent inequality in remuneration between male and female graduates may indicate persistent social boundaries that require continued policy attention.

6.2.4.2 Visible Minority Status
The second hypothesis, that visible minority status would have an identifiable effect on graduates’ outcomes was only partially supported in this dissertation. That is, while visible minority status had a significant effect on job satisfaction, it had little effect on earnings, and the subjective and objective measures of education-to-job match. Still, it is surprising that graduates of colour are less satisfied with their careers than non-minority graduates.

Unfortunately, the visible minority status variable contained in the NGS only indicates whether the respondent identified as a person of colour or not. This does not allow for testing of whether differences vary by specific ethnic backgrounds. Therefore, the analyses contained should be considered with caution, as the heterogeneity of the visible minority variable is not sensitive to a potential variation in outcomes experienced by individual racial groups.

Still, the results offer a number of theoretical insights. The fact that visible minority status had a significant effect on job satisfaction is worth discussing. It could be argued by labour segmentation theorists that visible minority graduates are less satisfied as an artefact of the segmentation of coloured workers into less desirable occupations. However, labour segmentation theorists would be hard-pressed to account for the fact that there was no other indication of segmentation across either earnings, or the subjective and objective measures of job match when visible minority graduates were considered as a single group. Credentialist theory is similarly limited in providing an explanation for the lack of statistical difference between non-minority and visible minority graduates’ outcomes. It is therefore possible that a university education offers people of colour relatively similar labour market outcomes to those of white graduates,
consistent with the assumptions of human capital investment. Further research should investigate the variation between graduates of various visible minority groups to determine how, if at all, these experiences differ. Regardless, the evidence that persons of colour are less enthusiastic about their jobs three years after graduation than their white counterparts is nevertheless a curious finding that is worthy of note.

6.2.4.3 Graduates with Disabilities

Similar to the findings for graduates of colour, the results of the disability analyses only partially support hypothesis three. While it was presumed that graduates with disabilities would have more negative labour market experiences than graduates without disabilities, the results actually indicated a positive effect of disability status on subjective education-to-work match. This is consistent with past research that has identified the positive effect of human capital investment on self-efficacy and self-determination among persons with disabilities (Trainor 2008; Schumaker et. al. 2002; Wehmeyer 2002; Algozzine et. al., 2001). Graduates with disabilities were not found to be statistically different from graduates without disabilities in either the objective measure of underemployment or job satisfaction. On the other hand, graduates with disabilities earn significantly less than graduates without disabilities. Therefore, these earnings differences indicate that graduates with disabilities still experience some persistent labour market inequality.

While the lack of underemployment differences between individuals with and without disabilities provides some support for human capital theory, the theory is unsupported by the subjective job match and earnings differences among individuals with
similar types of schooling. Likewise, labour segmentation and credentialist arguments can only roughly account for the experiences of graduates with disabilities. That is, earnings differences between graduates with and without disabilities may be attributable to potential segmentation occurring. While graduates with disabilities may not differ from their counterparts without disabilities in regard to objective underemployment, they may disproportionately occupy segments of the labour market that are associated with lower pay scales, or otherwise be unequally remunerated for similar positions held by their counterparts without disabilities. This is consistent with the assumptions of labour segmentation theorists, who argue that inequalities are maintained through social boundaries that differentially advantage certain groups over others (Horvat, Weininger and Lareau 2003). Still, the significantly more positive subjective education-to-work match reported by graduates with disabilities cannot be accurately accounted for by the assumptions of either labour segmentation or credentialist theories. Therefore, it is likely that graduates with disabilities have their labour market experiences mediated by their individual-level resources, consistent with Bourdieu (1986; 1984) and Trainor (2008). Indeed, past literature has documented the beneficial effects self-affinity and feelings of personal accomplishment have on outcome satisfaction (Finn, Getzel, and McManus 2008; Brackin 2005; Algozzine, Browder, Karovonen, Test, and Wood 2001; Abery and Stancliffe 1996).

It is important to continue to examine the outcomes of graduates with disabilities as this is an often overlooked demographic that has been documented as being particularly at risk for systemic inequality (see Zarifa, Walters, and Seward 2015). By continuing to study this group, it is hoped that the conversation will generate further
policy attention to encourage stronger school-to-work transitions for graduates with disabilities. It is equally important to address systemic inequalities, as rational choice explanations of the labour market trajectories of persons with disabilities places too heavy an emphasis on individual level decisions, rather than the structural forces that discourage the equal treatment of similarly-qualified workers with and without disabilities.

6.2.4.4 Socioeconomic Status

Finally, the research in this dissertation supported the fourth hypothesis concerning the effects of socioeconomic status on graduates’ outcomes. That is, graduates from lower socioeconomic backgrounds had less favourable returns than more affluent graduates in nearly every analysis that captured earnings and underemployment. More specifically, graduates whose parents did not attain a university degree were both more likely to be underemployed, and earned less than those graduates who had at least one university-educated parent. This effect was present even with other traditional indicators of disadvantage accounted for in the models, revealing that SES has an influential effect on graduates’ labour market outcomes. These findings suggest that there is some segmentation occurring in the workforce, consistent with previous literature documenting the influence of social and cultural network capital on the opportunities available to individuals (Bourdieu 1986; DiMaggio 2012; Khan 2012; Lamont 2002; Erikson 1996; Kern 1997). Interestingly, however, less affluent graduates did not differ from affluent graduates with respect to either their job satisfaction or their subjectively reported education-to-work match. Therefore, while the objective labour market outcome measures point to systemic disadvantage, it would appear that graduates from lower SES
backgrounds do not seem to differ from higher SES graduates in their subjective accounts of employment outcomes.

The results of the analyses present a number of important theoretical considerations regarding socioeconomic status. For example, human capital theory is inadequate when attempting to account for the differences in labour market outcomes between graduates with similar educational investment. Critics of human capital have noted the theory’s inability to account for the effect of socioeconomic advantage (see Brown 2001:22).

On the other hand, the identifiable effect of SES does provide support for the theoretical conceptualizations of credentialism and labour segmentation. One possible explanation is that the outcomes of graduates are attributable to forms of opportunity hoarding that disproportionately provide affluent graduates with more successful transition experiences. Therefore, social boundaries form to represent the lines of division created by socioeconomic advantage. Drawing upon labour segmentation specifically, graduates who lack the social and cultural resources of the affluent are at a greater risk of populating less favourable areas of the workforce (DiMaggio 2012; Khan 2012; Lamont 2002; Erikson 1996; Kern 1997). Socioeconomic segmentation is unsurprising, given the importance of social and cultural capital emphasized by Bourdieu (1986) and his contemporaries (Horvat, Weininger, and Lareau 2003; Lareau 2011, 2002; Khan 2013, 2012; Lamont 2002) who documented the advantages of having established networks when pursuing favourable positions in the labour market.72 At the same time, it

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72 Although social capital was not central to Bourdieu’s original discussions of life chances (see Weininger pp: 87 in Wright 2005), other scholars have convincingly noted the importance of social networks on life chances (DiMaggio 2012; Erikson 1996; Granovetter 1973).
is also possible that opportunities are further entrenched by the entrance requirement standards among university programs. As advantageous fields of study increasingly set their standards and associated tuition costs apart from the rest of the university, only the strongest students financially and academically will be able to access these programs (see Davies and Hammack 2005, Montmarquette, Cannings, and Mahseredjian 2001, and Goyder 2014). These lines of division are a form of opportunity hoarding that will reproduce the advantages of particular fields, especially as the gate-keeping of advantageous fields moderates the supply of appropriately skilled labour, keeping demand for these skilled individuals (and their associated earnings and employment levels in these occupations) high (Collins 1979).

The effects of SES presented in this study also support the theory of Effectively Maintained Inequality (EMI). Recall that EMI theory posits that when educational access is widened, additional lines of division will be created within higher education (Raftery and Hout 1993; Lucas 2001). In this way, the inequality between groups of different social origins will not decrease, as those from privileged backgrounds will continue to look for additional ways to draw social boundaries. Given the fact that postsecondary education continues to expand in Canada, it would appear that qualitative lines of advantage have formed to perpetuate the effects of social origin. One possible explanation in support of EMI could be that qualitative differences between graduates occur on a micro-level, whereby graduates of different socioeconomic backgrounds receive different opportunities within program departments that either encourage or discourage successful advancement into the labour market. For example, having the cultural capital that is necessary to form connections with certain professors that lead to
further network opportunities that can indirectly translate into labour market opportunities. In this way, SES would have a passive effect on outcomes that cannot be captured in the level of analysis presented here. However, such analysis is beyond the limitations of the NGS data.

Alternatively, the theory of Maximally Maintained Inequality (MMI) is only partially supported by this dissertation. MMI refers to social boundaries that are created by credential tiers that disproportionately favour members of certain social strata (Davies et al. 2014; Zarifa 2012; Ayalon and Shavit 2004). Raftery and Hout (1993) predicted that as upper-class participation in advanced levels of education rise, the influence of social background on postsecondary education would decline in all subsequent lower tiers. Therefore, socioeconomic status should have a decreasing effect on the outcomes of university bachelor graduates, given the policy initiatives that have aimed to widen access to undergraduate enrollment in excess of population demand in order to accommodate the structural expansion of advanced postgraduate and professional degrees (Davies et al. 2014; Zarifa 2012). However, the results of this study revealed that socioeconomic background had a notable effect on outcome, even after accounting for level of education. Therefore, social background has a persistent effect on outcomes that has not yet been alleviated by the upward mobility of the socioeconomically advantaged into advanced professional and postgraduate degrees. Unfortunately, however, as the NGS is cross-sectional it cannot be definitively concluded whether the effect of SES has declined, stayed the same, or increased. Still, the fact that SES remains salient in these analyses provides at least some support for MMI.
Furthering our understanding of how socioeconomic and sociodemographic characteristics mediate the labour market experiences of graduates is necessary in order to develop effective policy to encourage successful outcomes. To ignore these dynamics would be problematic; such an oversight fails to consider the persistent systemic inequality that can curtail the experiences of otherwise equally qualified graduates within a given labour segment. By furthering our understanding of systemic inequalities, policies can continue to target disparities in hiring and remuneration. Moreover, continuing to study these systemic inequalities is also necessary to determine what policy initiatives have been successful at closing the gap between groups that have traditionally received unequal returns. It is important that researchers continue this conversation as much as possible in order to encourage social progress across in these pivotal areas.

6.3 Limitations and Suggestions for Further Research

There were a number of research limitations that arose from the NGS. Firstly, revisions to the survey design of Statistics Canada’s 2013 National Graduate Survey make it impossible to compare this survey to previous waves of the NGS. Where earlier surveys tracked the labour market outcomes of cohorts at two and five years after graduation, later iterations of the survey have focused on cross-sectional data collection by only surveying graduates two years after graduation. This latest wave of NGS data only captures the 2009/2010 cohort of postsecondary graduates three years after graduation. Due to the revised survey framework of the 2013 NGS, the results in this dissertation cannot be compared with past cohorts of NGS respondents. As additional waves of the revised NGS survey are released, future research would benefit greatly by comparing the experiences of cohorts of these waves to the experiences of the graduates.
captured in this doctoral thesis. Creating future comparisons is necessary to determine how the experiences of graduates three years after graduation may change over time.

A second limitation of the NGS was in regard to the disaggregation of university fields of study. While disaggregating university programs was a central focus of this dissertation, unfortunately sample size restrictions only allowed for the use of descriptive statistics for some of this research. Given the marked differences between graduates in the descriptive analyses, more rigorous comparisons of liberal arts graduates using regression analyses would undoubtedly have been desirable. A similar limitation occurred in the distance education analyses. While the NGS does offer a variable that measures the proportion of graduates’ degrees that were offered via distance education, only a limited number of respondents had undertaken more than half of their university degree through distance education. Therefore, in order to acquire sufficient sample sizes this analysis included graduates of all levels of education. Given that many distance education programs are masters programs, the analyses are unable to adequately capture the experiences of undergraduates who pursue distance and traditional programs. As distance education continues to grow in Canada, it is possible that future waves of the NGS will have sufficient sample sizes of graduates who pursued their university degrees through correspondence.

There were also a few limitations with respect to sociodemographic identifiers. For example, the NGS employs a crude measure of disability status that can only tap into whether or not respondents had a lasting disability or impairment longer than six months. The inability to distinguish among different types of disabilities is problematic, as past research has indicated the importance of disentangling physical and learning disabilities
as well as disability severity noting that there is significant variation within the measure (Janus, 2009; Robert and Harlan, 2006; Trainor, 2008; Blackorby and Wagner, 1996). Blackorby and Wagner (1996), for instance, identified substantial differences in labour market outcomes among individuals with learning disabilities, physical impairments, and multiple disabilities (Blackorby and Wagner 1996:410). Janus (2009) similarly found that young people who had a visual, hearing, speech, or “other” impairment were “more likely to find themselves in a ‘laggards’ group (i.e. young people who have not found a full-time job, established an independent residence, married and had children by age 26)”, while those with a learning disability were significantly closer to their non-disabled peers (Janus 2009:115). It is therefore possible that the collapsed measure of disability may have implications on the results. Hopefully, more detailed measures of disability can be added to the National Graduate Survey in the future.

Likewise, the inability to differentiate between visible minority groups is another limitation to the analyses in this study. Unfortunately, the NGS collapses visible racial groups into one visible minority status variable. This assumes that graduates of colour have a shared set of postsecondary transition experiences—a finding that has been refuted in the literature (Keshishian et al 2010; Xie and Goyette 2003; Simpson 2001; Pendakur and Pendakur 2007). Therefore, the analyses in this study pertaining to visible minority status should be considered cautiously. Hopefully future research can attempt to address the experiences of individual racial groups with the outcome measures outlined in this dissertation.

The NGS could also provide better measures for socioeconomic background. Instead, the NGS has variables capturing the maximum educational achievement of
respondents’ mothers and fathers, and whether or not money was borrowed as student loans prior to graduation. These variables were used as proximal indicators of background affluence in this dissertation. Given the literature indicating the importance of social and cultural capital on networks and employability (see Bourdieu 1986; Devine 2004; DiMaggio 2012; Erikson 1996; Granovetter 1973; Kern 1997), these proxy variables can only indirectly estimate the effect of socioeconomic advantage. Future research would benefit from more detailed measures of familial backgrounds—primarily the field of study choices of parents, and household income prior to graduation. Such measures would allow researchers using the NGS to develop better understanding of the connection between graduates’ social class background and their labour market outcomes.

Finally, the NGS does not contain direct measures of academic ability of graduates. The inability to directly control for differences in ability is problematic. We cannot definitively say whether differences between graduates of different programs or specializations were the result of their education, or were the result of selection effects based on academic ability. Still, the analyses used a proxy for ability by accounting for whether or not the student received academic awards. While this may partly account for ability differences, future NGS surveys would benefit from more detailed measures of academic proficiency.

6.4 Concluding remarks

It is important to understand how the evolution of postsecondary education has influenced graduates’ outcomes, particularly as greater numbers of Canadians invest in higher education during an era of postsecondary expansion. At the same time, departures
from traditional work arrangements have resulted in a continuing need to examine the opportunities available to new graduates entering the labour force. This dissertation has examined several avenues of higher education, and has shown that traditional field of study conceptualizations, which emphasize outcomes along dichotomies of STEM and liberal arts programs, do not adequately capture the experiences of recent graduates.

Compartmentalizing the experiences of graduates using the STEM/non-STEM dichotomy does not account for the considerable variability in the labour market outcomes within each group. It is likely that successful outcomes are not dependent upon whether or not graduates pursue degrees in STEM related fields, but rather, which STEM fields they pursue. At the same time, those students wishing to pursue liberal arts degrees face a similar dilemma. This study has indicated considerable variation in the labour market outcomes of liberal arts programs. It is therefore necessary for students and parents to plan accordingly when deciding which field of study to invest in, particularly if these students are concerned about potential job opportunities when they transition into the labour market.

It is also important for policy makers to acknowledge the structural barriers that differentially equip families with the resources that are necessary to successfully navigate educational pathways. Social and cultural capital differences between families can lead to different understandings of the expected outcomes of postsecondary education.

Therefore it is important for policy makers to consider the implications that socioeconomic differences between families can have on the educational trajectories of students. While high SES families may be equipped to understand and account for the outcome differences among STEM fields, and subsequently position their children into
the best educational pathways, policy makers would do well to ensure that lower SES families do not ascribe to the rhetoric that all STEM fields provide equally favourable returns. It is therefore equally important that policy makers ensure that enrollments in the most favourable STEM programs are not disproportionately populated with students from the most affluent backgrounds.

The findings of this research do still provide support for human capital investment. While there is evidence that the expansion of the labour market has saturated some fields with an excess supply of labour that has decreased the need for certain skills, there are some bachelor degrees that have continued to secure positive rewards. Still, it is also possible that the labour market is becoming more heavily reliant upon credential tiers. This study revealed that traditional arts and science degrees are associated with less favourable labour market returns at the bachelor level. Therefore, graduates in these fields may experience increasing pressure to pursue further graduate and professional-level study in order to remain competitive and secure positive outcomes.

It would also appear that a number of sociodemographic characteristics continue to play a role in the outcomes of recent graduates. In particular, the experiences of female graduates, and graduates from less affluent social backgrounds provided support for labour segmentation theory and the theory of effectively maintained inequality. Therefore, while examining the usefulness of different educational tracts is still pivotal in forecasting successful labour market transitions, persistent inequalities exist that are apart from the dimensions of education that negatively influence the school to work transitions of graduates from diverse backgrounds.
It is necessary to determine the postsecondary pathways that are associated with the most positive labour market outcomes so that future cohorts of students can plan accordingly. With the rapid expansion of postsecondary education, having sufficient information regarding the expectations of different educational pathways is necessary to manage graduates’ expectations during their transition into the labour market. It is important for both parents and students to have the appropriate knowledge concerning the outcomes associated with different postsecondary avenues in order to strategically plan for careers in these fields. This is particularly important as the costs of higher education continue to rise; unchecked borrowing can lead to delayed life course milestones (child rearing, owning a house, pension contributions, etc.) particularly when the pecuniary returns of education are mismatched from expectations.
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