EMERGING FORMS OF STRATIFICATION IN HIGHER EDUCATION: COMPARING CANADA AND THE UNITED STATES

EMERGING FORMS OF STRATIFICATION IN HIGHER EDUCATION: COMPARING CANADA AND THE UNITED STATES

By

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Abstract

This study combines longitudinal and cohort analyses to provide an extensive examination of the nature of postsecondary stratification among Canadian and American universities and students in this era of unprecedented postsecondary expansion, institutional diversification, and rising competition for external research funding. Multiple statistical methods and a range of data sources are employed to analyse new and increasingly important forms of stratification at two levels of analysis: the structural (i.e., universities) and the individual (i.e., students). At the structural level, the results demonstrate that both nations have become more stratified over time. The extent of institutional stratification and rate of growth, however, is much higher in the U.S. At the top end of the U.S. hierarchy, a few "elite" and larger institutions appear to be winning the majority of contests for economic resources and other independent sources of revenue. In Canada, universities changed only slightly over the span of thirty years, though there is some evidence of mild convergence across nations, particularly in areas where government regulation has become more variable (e.g., endowments, tuitions). At the individual level, even though a wider variety of students from varied social backgrounds are entering into higher education, the analyses reveal a significant degree of inequality in both Canada and the United States. Consistent with existing research, gender remains an important and consistent predictor of school and field of study choices. These educational decisions were also influenced by family background effects, as both parental education and SES exhibited positive and strong influences on institutional selectivity decisions across two U.S. cohorts. For field of study choices, moderate family background effects, strong and consistent academic ability effects and growing academic aspiration effects were found across most analyses, lending support to theories that predict family background has direct *and* indirect effects on higher education choices.

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Executive Summary

In the last few decades, the face of higher education has changed dramatically. Enrolments have reached unprecedented numbers, as governments and international organizations (e.g., OECD, UNESCO) have called for higher education to expand and maintain a healthy economy. Students from a variety of socio-demographic backgrounds are being encouraged to attend, and consequently their educational expectations have heightened dramatically. These new trends may be encouraging greater institutional stratification among post-secondary schools as well as greater stratification among those individuals who attend. For institutions, research is becoming a high-stakes venture, and pressures to privatize and generate revenue are increasing, even in nominally public systems. All the while, pervasive calls for obtaining the necessary credentials to partake in the new 'knowledge-based economy' have pressured students to compete for entry into selective schools and rewarding programs. In the midst of these changes, a critical question presents itself: is higher education becoming more stratified?

This study combines longitudinal and cohort analyses to provide an extensive examination of new and increasingly important forms of postsecondary stratification in this era of unprecedented postsecondary expansion, institutional diversification, and rising competition for external sources of research funding (e.g., Spencer grants, SSHRC fellowships or Canada Research Chairs). Universities may become increasingly stratified in their prestige, selectivity and resources, while students may find their school and field of study choices have become more important points of selection. Therefore, it is essential to compare various forms of stratification at two levels of analysis: the structural (i.e., universities) and the individual (i.e., students). At the same time, the analyses compare higher education systems in Canada and the United States – one system that is largely public, highly regulated, and historically much less stratified and another that is highly stratified, relatively decentralized in terms of state control, and has a high degree of private funding.

As pressures for universities to obtain greater resources grow, it has become increasingly important to look at how higher education systems are structured. Some U.S. studies have focused on the prestige and reputations of universities while others have examined resources more generally. The evidence, however, is scattered, and their approaches have not been consistent. In Canada, no studies have examined institutional stratification in a measured or coherent way. While some general characteristics of universities have been published in the media (e.g., *Maclean's*), these analyses are often conceptually and methodologically problematic. Thus, a study that systematically reconceptualizes the structure of higher education is highly warranted. Drawing on several theories in the organizations and sociology of education literature, this project tests the emergence of three major institutional responses to recent changes in higher education. According to 'path dependency' and neoinstitutional theories, universities may become more homogeneous over time, either nationally or internationally. Conversely, theories of organizational adaptation and institutional competition predict more heterogeneity. Finally, some researchers expect little or no apparent change *among*

institutions and more diversification *within* institutions, since greater internal discretion is often granted to faculties than to universities as a whole.

At the individual level, this dissertation moves beyond the traditional 'black-box' focus on access to higher education. We know a great deal about the unequal labour market returns to attending schools and fields of varying selectivity or prestige but significantly less about who enters particular institutions or fields of study. In Canada, no systematic analyses currently exist. In the U.S., only a few similar studies exist, but their findings are largely inconsistent. The effects of SES on one's choice of institution and/or field, in particular, are not entirely clear. One perspective, derived from the work of Robert Mare, downplays the importance of social background effects and posits that a more meritocratic process occurs once students enter into higher education. Other researchers, borrowing from Pierre Bourdieu, have argued that similar cultural capital disparities may exist for students who are *already* enrolled in higher education. A final, and related, perspective focuses more on the effects of institutionalized cultural capital (i.e., academic performance) and educational expectations. Socio-demographic characteristics, ability, and aspirations are also considered, since previous researchers have identified their important influence on these education decisions.

Collectively, this study makes two distinctive contributions to the existing sociological literature: (1) it provides an innovative examination of institutional stratification; and (2) it enhances our understanding of how higher education sorts and selects students from varied economic, social, and cultural circumstances in an expansionary era.

Methodologically, this dissertation includes two levels of analyses, individual and structural, comparisons over time, and comparisons cross-nationally. Institutional stratification, as measured by the relative distribution of institutional resources (e.g., income from donations per FTE[1] student, expenditures on scholarships per FTE student), is analysed quantitatively, using Gini coefficients, and graphically, using Lorenz curves and boxplots for the last 30 years. The data for Canadian institutions were extracted from the Financial Information of Universities and Colleges (FIUC), Tuition and Living Accommodation Survey (TLAC), and the University Student Information System (USIS). The Integrated Post-secondary Education System (IPEDS) and its predecessor, the Higher Education General Information System (HEGIS), provide the U.S. data.

At the individual level, the statistical analyses involve ordinary least squares regressions and generalized linear models, predicting students' undergraduate institution (in the U.S. only) and field of study across several cohorts. Field of study choices are examined both nominally using multinomial logits and numerically by ranking fields by the average early labour market earnings of their graduates. The Canadian data are drawn from the 1995 and 2000 National Graduate Surveys (NGS), and the U.S. data from the 1993 and 2000 cohorts of the Baccalaureate & Beyond Longitudinal Studies (B&B). Both surveys are nationally representative samples of recent university graduates, include

[1] Full-time Equivalent (FTE) enrolments give the weighted sum of full-time undergraduate or graduate students (weight=1), part-time undergraduate students (weight=1/4) and part-time graduate students (weight=1/3). While a standard measure for FTE enrolments does not currently exist, this formula has been adopted by institutional analysts at several Canadian universities (e.g., University of Calgary).

many identical and comparable measures which facilitate robust international comparisons, and interview new *degree-holders* thereby eliminating inconsistencies that may have otherwise occurred from interviewing students who switched majors or degrees.

At the institutional level, the results demonstrate that both nations have become more stratified over time. The extent of institutional inequality and rate of growth, however, is much higher in the U.S. For American universities, the results support theories that predicted the growth of stratification among universities. At the top end of the hierarchy, a few "elite" and larger institutions appear to be winning the majority of bouts for economic resources and other independent sources of revenue. Among lower-ranked institutions, more parity was found, supporting hypotheses that posit various types of competition and strategies may be at play for different segments of the population of U.S. schools. In Canada, the "no change" scenario best describes the situation, as universities changed only slightly over the span of thirty years. Indeed, Canada's formally equal, publicly regulated and governed system of higher education reacts quite differently to market pressures. Still, there is some evidence to suggest some mild convergence across nations, particularly in areas where universities have been granted more discretion (e.g., income from endowments, income from tuitions).

At the individual level, the analyses reveal a significant degree of inequality, even among those privileged students who enter higher education. Despite the national differences in institutional stratification found at the structural level, students appear to be sorted and selected in higher education in a similar manner. Consistent with existing research, gender remains an important and consistent predictor of school and field of study choices. Decades of school reform, increased access, and normative change have led to significant representation of women in higher education. However, women are still entering traditionally 'female' fields of study (e.g., education), even when controlling for academic factors.

Educational decisions are also influenced by family background. Both parent education and income exhibited positive and strong influences on institutional selectivity decisions in both U.S. cohorts. For field of study choices, family background effects were less consistent. In fact, when stratifying fields by their labour market returns, no significant family background effects were found in the U.S. analyses. In Canada, however, family status appears to have a greater direct influence on field of study decisions. Given the strong and consistent ability effects observed across all models, cohorts, and nations, it appears that parents cannot simply reproduce their advantages by virtue of their level of income or education. While family income may produce some *direct* advantages to students, other parental influences appear to operate *indirectly* through students' measured ability on institutionalized standards of assessment and aspirations.

The unequal selection of students across schools and fields sheds some light on how inequalities across socio-economic groups remain 'maximally maintained' (see Gamoran 2001; Raftery and Hout 1993). Recent modifications of this theory have turned their focus to the qualitative ways in which inequality persists (Lucas 2001), as substantial enrolment expansion has failed to reduce socioeconomic inequalities. This

study lends some support to the idea of 'effectively maintained inequality'. In expanding systems of higher education where postsecondary access has become more equitable, fields of study and school selectivity, as qualitative modes of differentiation, may be playing an increasingly important role in the process of social mobility.

Chapter 1: Introduction

1.1 Expanding Enrolments in Higher Education

At the turn of the twenty-first century, the face of postsecondary education looks markedly different from that of a previous era. No longer are a privileged few knocking on the doors of higher learning, but well over half of all young Canadians and Americans are entering some form of postsecondary education. In 1970, the postsecondary enrolment rate for American youth ages 18-19 was approximately 48 percent. Thirty-five years later, this figure climbed to 68 percent (NCES 2006). In Canada, a slightly different indicator reveals similar levels of postsecondary participation in recent years. In 2005, 79 percent of all participating young adults in The Youth in Transition Survey had attended a postsecondary institution by the time they reached ages 24 to 26 (Shaienks and Gluszynski 2007:28).[2] In an age of 'knowledge-intensive' labour markets, which have been bolstered time and again by human capital sentiments and 'education-for-all' ideologies or equal access reforms, world-wide post-secondary enrolments have risen dramatically (Schofer and Meyer 2005). Governments and international bodies (e.g., UNESCO), inspired by the promise that a highly educated workforce begets a healthy economy, have called for higher education expansion. Such national desires for a 'knowledge economy' have paralleled a preoccupation with human capital investments among college-age students. Some are attending out of a thirst for knowledge, but the great majority of students see higher education as a stepping-stone to labour market successes (Côté and Allahar 2007; Labaree 1997). Whether post-industrial labour markets actually require a highly 'skilled' workforce or are merely cashing in on a proliferation of credentials (Bills 2004; Brown 2001; Livingstone 1999; Collins 1979), the reality is that students who attend postsecondary institutions have more favourable labour market experiences than those who do not attend (Guppy and Davies 1998).

1.2 Rising Stratification in an Expansionary Era

In the midst of this postsecondary expansion, stratification may be on the rise. At the structural level, stratification refers to the degree of disparity that exists among a country's postsecondary schools. That is, how much do institutions within a given nation vary in their level of resources? In systems of high institutional stratification, a few elite institutions may benefit from disproportionate levels of prestige, resources, wealth/endowments, and may be much more selective. In such situations, the level of competition is great, making upward mobility difficult. What about systems with lesser degrees of institutional stratification? At this end of the spectrum, flatter, less stratified systems of institutional parity exhibit much less pressure to compete for distinction and

[2] This figure applies to only high school graduates in the YITS. When broken down by type of postsecondary education, 40 percent of graduates attended university, 26 percent attended college/CEGEP and 13 percent attended other postsecondary institutions.

are often publicly funded. As a consequence, institutional actions are much more highly regulated, and resources are much more evenly distributed.

In recent years, research is becoming an ever-grander enterprise, and formerly public institutions in many countries are now encouraged to become more market-driven and partly privatized (Slaughter and Leslie 1997; Geiger 2002; Polster 2007). Some institutions and fields are increasingly generating revenue, leading to greater disparities. Specifically, many professional schools have deregulated tuition fees and have expanded enrolments, creating a surplus foreign to most other disciplines across campus (see Quirke and Davies 2002). This recent market-like mechanism may yield financial autonomy for some fields but not so for others.

Such trends may be creating a hierarchy among and within universities and departments, and are fuelling a high-stakes competition for resources and relative status (or ranking) (Trow 1984:162). At the same time, universities, corporate educators, international organizations (e.g., UNESCO, World Bank, OECD), policy think-tanks, and governments have strongly advocated using performance indicators to fine-tune higher education's link with the economy (Finnie and Usher 2005). The once exclusively American "college choice industry" is growing in Canada as in other parts of the world. The importance of rankings has intensified so much so that where an institution falls in the hierarchy affects its ability to compete for top faculty, top students, endowments, and partnerships with industry (Davies and Zarifa 2006).

Moving beyond the ordinal nature of wide-spread rankings systems, this project seeks to characterize and compare the distribution of two entire populations of universities. All the while, it will judge accordingly whether or not the distances among universities are growing. That is, are universities becoming increasingly disparate on a number of economic dimensions (e.g., incomes, tuitions, expenditures, and non-government grants)? Commercial systems of rankings are valuable to the extent that universities (or students) may see what place a particular institution holds relative to others in their category (e.g., medical-doctoral) or in the distribution as a whole. For example, for many years now McGill and the University of Toronto have oscillated between the top two positions in the *Maclean's* rankings. To understand just how far first place is from second and second from third and so on, however, one must examine the level of inequality beneath this overlay of rankings. The task of uncovering and explaining this institutional stratification makes this dissertation uniquely sociological and separates its findings and implications for theory from commercial publications of rankings. Moreover, this project systematically analyses more concrete and reliable measures than those often found in commercial rankings, revealing an emerging and increasingly important area of institutional stratification – economic resources.

In the existing higher education literature, the common practice has been to examine the stratification of universities in terms of their relative levels of selectivity or prestige. Institutional selectivity refers to the quality of students that are attending a university. In the U.S., this is most often operationalized by measuring the SAT scores of incoming students. In Canada, where no standardized measures of aptitude currently exist for entering high school students, average high school grades are used to indicate the selectivity of the university. High school grades, however, are not standardized and are

unreliable. Few mechanisms exist to ensure all high schools, public or private, adhere to similar standards and methods of evaluation. This inconsistency among schools is further compounded with recent trends that show grades have inflated over the last forty years. That is, some schools may hand out an unusual level of A's in order to ensure their graduates enter higher education, while other schools may do so to a lesser degree (see Côté and Allahar 2007). One might think of an institution's level of prestige as a consequence or benefit of having attained a positive reputation in the eyes of the general public, future students, and academics at other institutions. Most generally, prestige is measured by rankings or reputation. In recent years, the annual *U.S. News & World Report (USN&WR)* and *Maclean's* rankings have made the distributions of prestige more explicit. Economic resources constitute an increasingly important third dimension of institutional stratification. But, for the most part, the stratification of resources has not received currency similar to the other two concepts. When institutional resources or finances do enter the higher education picture, the focus is generally centred on tuitions and/or per capita student aid (e.g., Dale and Krueger 2002).

Before discussing the increasing stratification among students at the individual level, it is important to briefly discuss how prestige, selectivity, and resources relate to each other. That is, do they represent different dimensions of institutional stratification, or are they simply interchangeable measures of school status? While Canadian research in this area is virtually non-existent, some scholars have touched on these ideas as they relate to the U.S. system. Specifically, Hoxby's Model of Selectivity (1997) posits that a positive feedback loop exists among institutional revenues and costs, prestige, selectivity, and school quality. In other words, institutions with high levels of tuition are able to entice students with higher SAT scores. As a result, the average SAT scores of incoming students increases (i.e., selectivity). Higher levels of selectivity then translate into higher commercial rankings and more reputability. These increases in prestige allow universities to win bouts for research grants and attract top faculty, therein increasing their revenues. Of course, the relationships among these various measures of status are complex and depend upon numerous circumstances (e.g., sector).

Drawing on Hoxby's ideas, Geiger (2004) finds that the experiences of state/public research universities may be quite different than those of private institutions. While they operate within the same market, high levels of prestige are more easily translated into increased revenue (i.e., tuition hikes) and increased spending on university services in the private sector. Public universities cannot simply raise their tuitions in order to increase their educational spending and have to rely on alumni or donations. Their enrolments tend to be much higher on average, however, so private sources of revenue often get diluted. These constraints have also led public universities to put less emphasis on their undergraduate education (i.e., selectivity, high SAT students) and more emphasis on winning bouts for research funding (Geiger 2004).

Similarly, some scholars have examined the role of 'donative wealth' (e.g., gifts, endowments, sales of educational services) in relation to this theoretical feedback loop (Winston 1999:18). For Winston, wealthier schools have more funds to attract higher quality students which serves to increase the overall quality of the student body and educational experience. In return, this translates into higher prestige, since these

institutions are able to buy students with higher SAT scores. The wealth of the university is directly related to prestige and selectivity. For private schools, wealth usually takes the form of large endowments. For public schools, wealth takes the form of government subsidies, at least for schools at the top of the hierarchy (Winston 1999:27-28). The feedback cycle of student subsidies further rewards those institutions at the top, as higher quality students may earn more in the labour market and eventually have more money to donate as alumni. Winston (1999) claims that student quality is best thought of as academic or intellectual abilities, whereas school quality is dependent on expenditures on students and the average quality of their peers. Others, who take a more social-psychological look at the learning process and practices, maintain that the relationship between selectivity and the quality of undergraduate education is questionnable, indicating that average SAT scores had little, if any, impact on 'good practices' in undergraduate education (Pascarella et al. 2006:279). Nevertheless, even though selective institutions may not offer a higher quality of education, researchers have found significantly higher earnings for individuals who attended high- and mid-selectivity institutions, especially four years after graduation (Thomas 2003:276).[3]

Similarly, graduates from resource-rich universities also experience favourable labour market outcomes. Some researchers have shown, for example, that among the top 50 universities in the U.S., average SAT/ACT scores are highly correlated with the *USN&WR* rankings (Pascarella et al. 2006:252). Similarly, Grunig (1997) observed that the total funding allotted for research and development was found to be highly correlated with *USN&WR* ratings. In addition, Grunig (1997:34) found that for both public and private institutions, undergraduate reputational ratings or rankings were highly correlated with selectivity.

By and large, institutional selectivity, prestige, and economic resources may represent different dimensions of stratification. Some studies have indicated that they are closely related in a feedback manner. While prestige and selectivity hierarchies have been well-researched within the existing U.S. literature, structural inequality as defined by an unequal distribution of economic resources has yet to be systematically explored. As a practical matter, given Canada's lack of a standardized measure of student quality (i.e., no SAT), cross-national comparisons on selectivity may be less reliable. Further, the current Canadian indicators of institutional prestige (i.e., *Maclean's* rankings) are quite different from those in the U.S. (e.g., *USN&WR*). As such, this dissertation explores the structural level with multiple indicators, all the while noting that economic indicators represent only one dimension of stratification.

At the individual level, the nature and degree of stratification may also be changing. The decision to attend or not attend university may no longer be the most prominent point of selection for today's students. As enrolments continue to grow, students who have already made the decision to pursue postsecondary studies are being further selected *within* the system, as they compete for entrance into lucrative fields and

[3] Graduates from liberal arts institutions, however, did not experience the large earnings gain, since many of these institutions serve as stepping stones for high quality graduate programs and many baccalaureate graduates seek advanced degrees prior to entering the labour market (Thomas 2003:284).

selective institutions (see transition A in Figure 1.1). Though fields of study and institutional choices have been important determinants of labour market outcomes for quite some time, with more and more students entering higher levels of education, these avenues for distinction may be becoming even more salient. Thus, educational policies geared towards getting students to merely attend university may need some revision. As a result, this dissertation seeks to provide a renewed examination of school selection by examining who is making advantageous field and institution choices. Furthermore, it explores whether or not the socio-demographic characteristics of these individuals have changed over the last few decades.

For those considering or attending a postsecondary program, the stakes are quite high. Today's students encounter a level of competition similar to no other generation. With more students filling up the seats of the lecture halls, including "non-traditional" students who are older and already have families and/or careers, national and global calls for information on academic quality have proliferated (Dill and Soo 2005:495). Students and parents, confronted with increasing pressures to attend prestigious universities or rewarding fields, have sought new ways of navigating the expanded system of higher education (Davies and Hammack 2005). That is, assuming that employers value credentials from one university over another, students are turning to whatever academic quality indicators they can find to obtain that edge. These consumer demands have led to the widespread development of university rankings, league tables, and organizational report cards in a number of countries. Once a largely American phenomenon, ranking schemes have emerged on several continents around the globe.[4] As well, ratings for business schools and other professional programs have become popular in recent years, contributing to the growth of an international higher education marketplace.[5]

In this era of expanded enrolments and heightened student expectations, greater stratification may exist at both the institutional (i.e., university) and the individual (i.e., student) levels. Trow (1984) argues that U.S. institutions are ordered by their level of resources and prestige, and that one's rank in this hierarchy is closely related to one's degree of exclusivity. In other words, resource-rich universities are less open to the masses. Since inequalities found among post-secondary students can often be traced to inequalities at the structural level, this dissertation investigates both the stratification of universities as well as students in this age of continuous higher education expansion. As explained in detail below, a competitive environment at the institutional level impacts the nature and extent of stratification at the individual level. For instance, as inter- and intra-institutional disparities continue to proliferate, student outcomes by fields and institutions continue to reflect these inequalities (Zarifa and Walters 2008; Goyette and Mullen 2006; Walters 2004; Finnie and Frenette 2003; Brint 2002a; Betts et al. 2000; Finnie 1999). Although the relationship does not simply translate one-to-one, organizational changes contribute to changes at the individual level. Students may exercise some degree of choice in terms of fields and schools, but these decisions are made within a wider

[4] A few commercial ranking systems that have emerged are *The Maclean's Guide to Canadian Universities*; *The Good Universities Guide* (Australia); *The Times Good University Guide* (UK); *The Guardian University Guide* (UK); and *US News & World Report, America's Best Colleges* (see Dill and Soo 2005).
[5] See Paxton and Bollen's (2003) examination of measurement issues in graduate department rankings.

framework of larger structural changes (e.g., family background; institutional characteristics; 'knowledge-based' economy). That is, their actions are inherently 'bounded' by organizational, economic, and social conditions. As noted earlier, high quality students (i.e., high SAT scores) are both consumers of higher education as well as a critical input (see Hoxby 1997). Typically, students who seek out a high quality education are themselves high quality students. While students may be attracted to schools with the best reputations and by extension the highest educational quality, they themselves are in high demand, since students with high SAT scores serve to boost the reputation of the college or university.

While more selective and prestigious universities attract higher status students, the relationship between these high status students and better resourced universities is not as clear. Studies have shown that more prestigious and selective institutions must pay a premium for high status students by offering large student subsidies and spending large sums on educational facilities (Geiger 2004). So, by extension, it may be the case that economic resources are another dimension that is closely tied to the maintenance of the reputation and selectivity of the university. If this is the case, then one may expect labour market returns for students from high resourced universities to reflect the well-established outcomes for graduates from selective and prestigious universities (e.g., Thomas 2003). Some evidence suggests that students who attend schools with higher tuition and higher expenditures on students earn more on average (Dale and Krueger 2002). Examining the impact of university resources on labour market outcomes, however, is beyond the scope of this dissertation. At this point, the intention is to examine how economic resources are distributed among universities, if these inequalities have changed over time, and whether or not these patterns vary cross-nationally. Subsequent analyses may examine how these inequalities affect student outcomes.

1.3 Comparing the Two Nations: Canada and the United States

In the extant sociological literature, these emerging forms of stratification have received some attention with a particular focus on the American college and research university system (Goyette and Mullen 2006; Mullen et al. 2003; Karen 2002; Turner and Bowen 1999; Davies and Guppy 1997; Solnick 1995; Stolzenberg 1994; Hearn 1991; Maple and Stage 1991; Cebula and Lopes 1982). Institutional stratification within the Canadian university system and field of study choices of Canadian students, to my knowledge, have yet to be systematically explored, nor have they been compared to their counterparts in the United States.[6] Scholars writing in the Lipset tradition have highlighted the importance of comparing these two neighbouring countries, though the

[6] Several studies have predicted field of study decisions using U.S. data. To date, however, no systematic study of Canadian students exists nor has anyone sought to make comparisons across cohorts of graduates. One recent Canadian study by Andres and Adamuti-Trache (2007) charts enrolment and completion trends by gender and field of study from 1980 to 2004, but looks only at the marginal relationships between gender and undergraduate field enrolments over time.

extent and antecedents of their differences have been greatly contested.[7] Although higher education systems across borders have received only minimal attention and comparison in the debate, this project borrows from the comparative rationale intrinsic in this long-standing exchange. Specifically, by comparing two nations that are markedly similar, one can isolate those factors which account for apparent differences (see Lipset 1990).

Most recently, expansionary trends have prompted researchers to compare the higher education systems between the two nations (Davies and Hammack 2005). While Canada and the United States remain similar in a number of respects (e.g., high postsecondary enrolments, high labour force demand for credentials and occupational structures), their educational systems vary in a number of intrinsically interesting ways (see Ogmundson 2002). Specifically, they vary in the level of government control, the range of tuition fees and per FTE operating expenditures, the presence of private universities and two-year undergraduate degrees, and the sheer size of endowments to name a few (Davies and Zarifa 2006; Davies and Hammack 2005). These differences in structure make these two countries particularly interesting for comparisons. In fact, the two systems may stratify students in quite different ways. For instance, both Canadian and American students face similar competitive pressures but are responding to these demands in different ways. Brought about by the highly stratified postsecondary structure, much more inter-institutional competition exists in the U.S. In Canada, the transition from high school to postsecondary education usually occurs locally, placing a premium on entry into the most lucrative fields rather than selective institutions (see Davies and Hammack 2005).

American higher education has long been marked by a steep hierarchy of institutions. Since the emergence of a distinct prestige hierarchy in the late 1800's, American colleges and universities have been preoccupied with conveying status (Collins 1979:125). As such, U.S. colleges and universities differ greatly in their selectivity and resources (Davies and Guppy 1997). Famous and elite universities and colleges greatly overshadow less renowned entities in a system composed of several segments of highly unequal public and private institutions (Brint 2002a). Further, this hierarchy is fairly well entrenched. Even though the open market for credentials, students, and faculty means that no institution is guaranteed its place in the status hierarchy, movement up or down the top rungs is not common. Prestigious universities enjoy a "halo effect" as past accomplishments resonate in subsequent ratings (Geiger 2004:149).

In contrast, the Canadian system is composed of formally equal, academically oriented public universities. Differences among universities in budgets, expenditures, resources, and selection are relatively small compared to the American case. As a result, Canada lacks a national market for undergraduate credentials (Davies and Hammack 2005). Applications to Canadian universities are mainly at the local level, with only small numbers of undergraduates crossing provincial borders. The practice of ranking colleges, so established in the U.S., is relatively new to Canada (Dill and Soo 2005). Few

[7] On the one hand, Seymour Martin Lipset (1990) conceives the American Revolution as the origin of apparent cultural differences between the two nations. Critics, on the other hand, have challenged Lipset's origins thesis and characterize Canadians as more similar than different to Americans, when the two nations are compartmentalized into smaller nations (or cultural regions) within nations (see Grabb and Curtis 2005).

employers regard the name-brand of a particular Canadian university as being more valuable than another. Thus, an American-styled competition to enter nationally renowned institutions barely exists north of the border.

The situation may be changing in Canada, however. The past decade has witnessed a sea-change in ideologies about higher education in Canada, as elsewhere around the globe. Politicians and policy-makers press for changes in response to the emerging "knowledge economy" calling for universities to enrol more students, while also becoming more differentiated, market-driven, and entrepreneurial (Powell and Snellman 2004; Wolf 2002). As part of an effort to emulate top U.S. schools, universities are ever-mindful of finding independent ways to generate revenue, and presidents of some universities are calling for a more explicitly tiered system that designates a few elite, and semi-private, research-intensive institutions. Since the mid-1980s, the ratio of government to private contributions for operating revenue has steadily declined. What was once over 80 percent government funding (e.g., 1986-87) has declined to just over 60 percent in the 2000-01 fiscal year (Robertson 2003). Such a reduction in government funding has put added pressure on universities to rely on private means to offset the shortage. Though a number of government programs [e.g., Canadian Foundation for Innovation (CFI), Canada Research Chairs (CRC) and Ontario Research Chairs (ORC)] have emerged in the last decade to support academic research, institutions and departments have no guarantee that they will obtain this sponsorship, as academics enter highly competitive bouts for such research grants (Polster 2007). This new reality may prompt a convergence, with Canadian universities slowly forming a hierarchy parallel to that in the United States. In other words, a decline in public funding and increasing pressures to secure external grants may cause more stratification, as the market expands to encourage non-public monies from corporations and other private enterprises (see Geiger 2002). Alternatively, the apparent 'flatness' of the Canadian higher education hierarchy may lead to more pronounced inter-disciplinary inequalities rather than a vast inter-institutional hierarchy that exists in the U.S., as only some disciplines successfully manage a changing institutional environment (see McLaughlin 2005). In fact, resource differences among and between institutions may be growing, and this may translate into increasing discrepancies in selectivity and payoffs. These major organizational shifts have had a dramatic impact on the stratification of American and Canadian universities, one that appears to be making postsecondary institutions increasingly unequal.

Recent growth in institutional stratification has been paralleled by a new form of stratification among college and university students. While many European nations stream students at the secondary and often elementary levels (see Kerckhoff 2001), finding one's way in North American systems of higher education is more likely to occur with one's choice of program. Where students enter into the postsecondary system may be becoming increasingly important. That is, choosing the right school or right program may have greater implications for students than simply making the transition from high school to postsecondary education. It is plausible that this new form of sorting and selecting characterizes systems of higher education that have once confronted issues of access. It seems that the proliferation of higher education has created new avenues for social inequality.

As individuals confront these new pressures toward higher education, they must decide which schools and disciplines will yield the greatest return. As other researchers have stated previously, much of the stratification occurs *within* different sectors of the higher education system (Davies and Guppy 1997:1418; Karen 2002:192). Attending top Canadian schools may impact one's employability and candidacy for graduate schools and post-graduate programs. Further, a student's choice of major has a profound impact on their labour market earnings (Walters 2004; Finnie and Frenette 2003; Betts et al. 2000; Finnie 1999). Quite simply, fields and schools have very different payoffs. In fact, the payoffs to attending selective universities in the United States are becoming greater, as inequality among institutions and disciplines continues to increase (Brint 2002a). Consequently, entry into more prestigious and lucrative disciplines is also becoming more difficult, as attendance levels and resulting student competition increase. There is some evidence to suggest a greater relative impact of major on labour market outcomes for Canadian graduates than for U.S. graduates, since there is less institutional stratification in Canada (Davies and Hammack 2005).

At present, we have considerable evidence to suggest that students are becoming increasingly stratified in their labour market outcomes. In Figure 1.1, transition B represents this important point of differentiation, where students enter careers that are stratified on a number of aspects. But, what remains unclear, particularly in Canada, is whether or not postsecondary access is also becoming more stratified. That is, we know much less about how students are stratified within their university careers (transition A). To what extent are students sorted and selected into some fields or institutions and not others? What are the social background factors that account for these different choices? In response, the individual level analyses will provide a recent picture of the level of inequality students encounter as they make the transition into schools and fields with varying rewards and opportunities.

1.4 Contributions to Existing Research

This study will present long-overdue answers about the evolving status structures of Canadian and American institutions, while providing a renewed examination of how higher education sorts and selects individuals prior to their entry into the labour market. Up to this point, researchers have not been concerned with reconceptualizing the structure of higher education. Some U.S. studies have focused on the prestige and reputations of universities. Others have examined resources (Geiger 2004; Kraatz and Zajac 2001; Pfeffer and Moore 1980; Ross 1976; Pfeffer and Salancik 1974; Salancik and Pfeffer 1974), but the evidence is scattered, and their approaches have not been consistent. In Canada, no existing studies have examined institutional stratification in a measured or coherent way. While some general characteristics of universities have been published in the media (e.g., *Maclean's*), these analyses are often conceptually and methodologically problematic (see Kong and Veall 2005; Shale and Liu 2002; Page 2001; Monks and Ehrenberg 1999; Page 1995; McGuire 1995; Stuart 1995). For years, researchers have assumed that the level playing field of Canadian universities stands in stark contrast to the

highly stratified, private-public configuration south of the border (see Skolnick 1990). Indeed, it once did. With the recent surge of 'education for all' initiatives and 'knowledge economy' demands, however, status competition among students may be on the rise, leaving room for an emerging stratified higher education system. While the broad objectives of this project are to measure the degree of structural stratification and look for changes over time, establishing which factors (e.g., knowledge economy or government policy) have prompted or inhibited such change remain an important direction for future research. As a result, explanations as to why such change has or has not occurred will only be speculative.

The results of this study will be of importance to a number of constituencies. Economic inequalities that may arise within and between the two systems of higher education may prompt strategic action or policy reforms from university administrators and government officials, especially if Canada's predominantly public system is privileging a few universities over others. Theoretically, this project will provide empirical evidence to inform existing theories. For example, some researchers have levelled criticisms toward New Institutional Theories for overemphasizing global similarities (see Cummings 1999:419-421). This project provides an opportunity to compare how two nations with different types of postsecondary systems, one with a high degree of public regulation and one with a large private sector, may react differently to rationalizations of higher education expansion and competition for resources. It is possible that national differences may serve to mediate the way higher education norms are adopted world-wide.

A greater postsecondary hierarchy, whether among or within universities, represents a new form of streaming. Whereas, in a previous era, the key streaming process was located in high schools; in the new era, where most high school graduates go on to postsecondary institutions, more of the streaming function occurs within higher education. Issues of 'access' or 'entry' into higher education that once concerned sociologists and educational policy analysts are no longer sufficient for social inequality analyses at the postsecondary level. The historically binary conceptualization of attending or not attending university has become less important as students from a variety of social and cultural backgrounds enrol in great numbers. Thus, this dissertation seeks to establish who enters certain institutions and fields. Most generally, this dissertation will examine and test the existence of effects (e.g., SES, gender, race) on student choices. At the K-12 level and for decisions to enter into postsecondary education, such effects have been fully established. But, internal (or intra-institutional) stratification has received far less attention. Establishing such effects will set the stage for further research that seeks to explain *how* certain individuals enter into lucrative fields and selective institutions (e.g., networks).[8] In Canada, no systematic analyses currently exist. In the U.S., only a few

[8] While this project seeks to examine *who* enters particular areas in higher education, social networks may impact *how* students navigate the education system and eventually the labour market (see Bourdieu 1998; Granovetter 1995). Sacerdote (2001), for example, examines peer effects on college major choices among freshman year roommates. While peers had an impact on grade point average and participation in social memberships (e.g., fraternities), a roommate's choice of college major did not have a statistically significant impact on a student's choice of major.

studies exist, but their findings are largely inconsistent. Further still, no existing studies have made cohort or cross-national comparisons.

Current sociological research must respond to these new trends in the emerging mass system of tertiary education (Kerr 2002). While the issue of access was touted as the key selection mechanism of yesteryear, researchers today need to break open the traditional 'black-box' system of higher education and examine the multi-faceted internal structures at work (see Figure 1.1). To that end, it becomes more fruitful to think of individual trajectories as products of the social location of one's post-secondary institution and one's field of study in conjunction with one's social background. To fully understand the sifting and sorting of students into varied social locations we need to see stratification in higher education as occurring at two levels: the institutional, where universities and disciplines increasingly compete with one another for greater resources and reputability and the individual, where students compete for entry into the "right" schools or the "right" programs. This conceptual oversight has led to an apparent dearth of empirical studies to address inefficient public policies and the persistence of social inequalities. This dissertation will bridge existing studies, by exploring the education linkage that lies between family background and labour force outcomes.

An examination of these new modes of differentiation may shed light on some familiar yet persistent trends. Perhaps the most the prominent trend in the higher education literature is how individuals from unfavourable socioeconomic circumstances remain at a distinct disadvantage and students from middle-class families excel in their educational and labour market experiences (Shavit and Blossfeld 1993). Often described as being 'maximally maintained', inequality across socioeconomic groups has been an incessant concern for academics and policy-makers for decades (Gamoran 2001; Raftery and Hout 1993). Recent modifications of this theory have turned their focus to the qualitative ways inequality persists (Lucas 2001), as substantial enrolment expansion fails to reduce socioeconomic inequalities. In an era of expanding postsecondary markets and heightened student and institutional competition, social stratification persists, though in new and changing ways.

This project contributes to the existing literature in several ways. First, it provides a much needed examination of the field of study choices in Canada. To this point, no existing research has sought to uncover the factors that influence students' field of study choices. The labour force inequities experienced by graduates of varying fields of study are well documented in previous educational research, but the impact of achieved and ascribed characteristics on field choices has been neglected. In the United States, there are a few existing studies that have examined these issues. Yet, it is absolutely essential to provide an up-to-date examination of field of study and selectivity choices, since postsecondary education systems are not static and continue to change and become more important. Moreover, as the institutional literature has shown, universities are much different places than they were fifteen or even ten years ago, and it remains unclear whether the sorting processes of students within these structures have similarly changed. Methodologically, this project provides a comprehensive examination with multiple methods and multiple measures. The results of this research will be of utmost importance to academics in this longstanding debate, and may also qualify theories of maximally

maintained inequality. At the same time, it will serve to inform policymakers and university officials who have long been concerned with affirmative action programmes and more general notions of equal access in higher education. Specifically, an examination across cohorts may reveal the persistence of inequalities, which may require some change to existing higher education policies. For Canadians, the level of access among Canadian students has for a long time been neglected in academic and policy literature, and a comprehensive empirical examination is long overdue.

1.5 Dissertation Outline

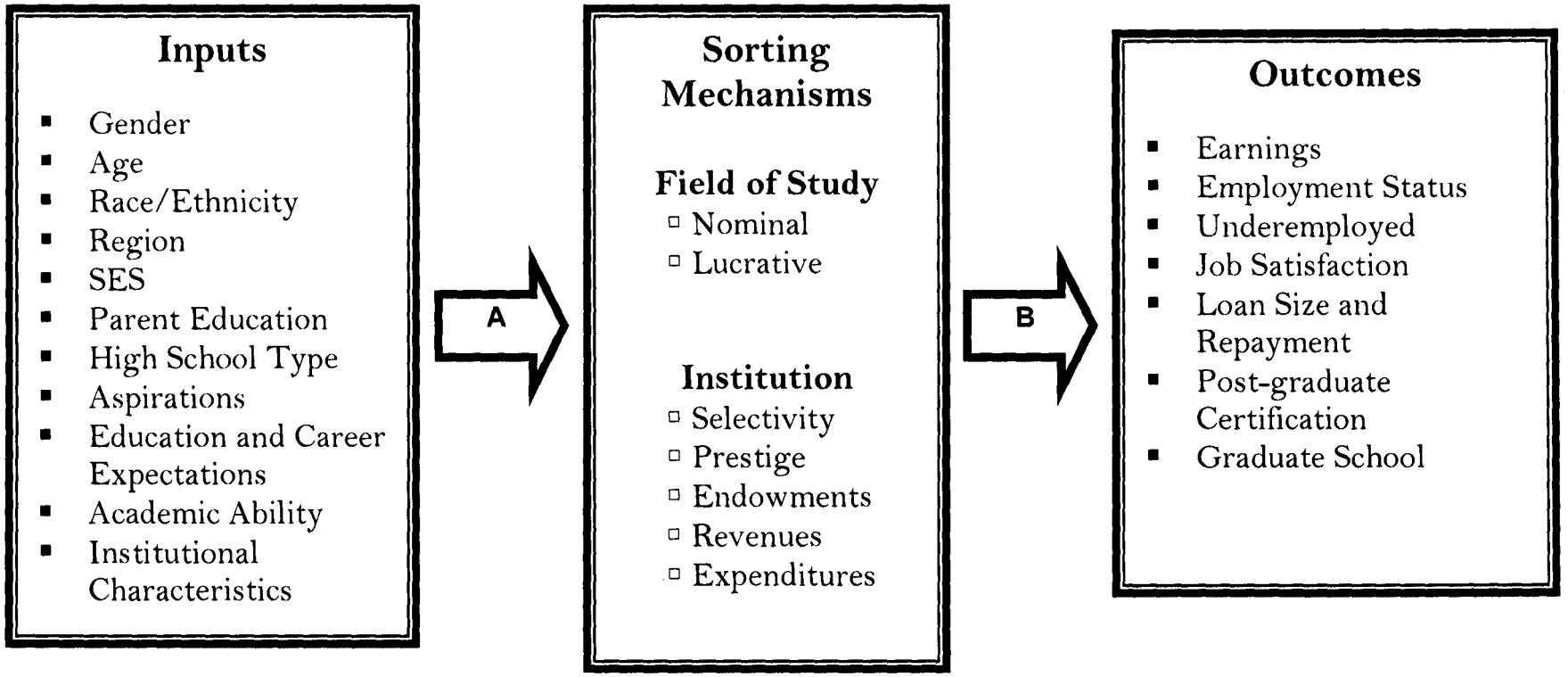
In the next chapter, several structural level theories are reviewed and discussed in greater detail. To explain the recent change (or lack thereof) in the level of institutional stratification among Canadian and American universities, three possible scenarios are presented, drawing on New Institutional Theory, path-dependency theories, and several stratification studies in the existing sociology of education and organizations literature. The second part of the chapter reviews the existing research on field of study and college selectivity choices. Previous research often examines student choices at various points in their educational careers, leading to inconsistent findings on the relationship between socioeconomic status and students' educational choices.

Chapter 3 is divided into two parts. The first part describes the data and methods used in the structural level analyses. Specifically, the Integrated Postsecondary Education Data Information System and Financial Information of Universities and Colleges (1971-2002), Tuition and Living Accommodation Costs Survey (1972-2001), and the University Student Information System (1972-2001) are described in detail. In the second part, I describe the Baccalaureate and Beyond Surveys (1992-93, 2000-01) and the National Graduates Surveys (1995, 2000), the explanatory and response variables for the selectivity and field of study analyses, and the criteria used to select comparative subsamples. To predict field of study and college selectivity choices, linear regressions and multinomial logit models are employed to isolate the unique effects of particular ascribed or achieved characteristics on student choices, holding all other explanatory variables in the model constant.

In Chapter 4, the results from the institutional level analyses are analysed graphically using boxplots and Lorenz curves and numerically using Gini coefficients. In Chapter 5, the results from the individual level analyses are presented. Predicted probabilities from Canadian and American models are presented side-by-side in graphical displays.

Finally, the last chapter discusses in further detail the implications of the results. A call for introducing an element of stratification to New Institutional Theories is made at the structural level, while at the individual level, field of study and college selectivity are presented as two increasingly important avenues which can inform traditional theories of maximally maintained inequality (MMI). This chapter also discusses unexplored issues in this dissertation and directions for future enquiry.

Figure 1.1 A Processual Diagram of Sorting and Selection in Higher Education



Chapter 2:
From Structures to Individuals: Reviewing the Existing Research on Institutional Stratification and Student Field of Study and Selectivity Choices

Chapter Outline

This dissertation will explore the level of stratification among institutions as well as examine the factors which influence postsecondary school and field of study choices. At the structural level, no existing research has measured the degree of inequality among all Canadian universities, nor has anyone sought to make cross-national comparisons to colleges and universities in the United States. Moreover, existing studies have also neglected to measure institutional stratification over time. At the individual level, this dissertation will unravel the complexity of the competition and stratification among university students. Specifically, it explores the factors which influence a student's choice of college major or field of study. In the United States, it also examines the factors which influence the choice of college.

The first part of this chapter will discuss new institutional theory and path dependency theories, stratification theories, and other comparative theories in relation to the level of inequality among Canadian and American universities. Some of these theories have been used to characterize the hierarchy of postsecondary institutions in the U.S., but none have been used to measure and compare the level of institutional stratification in two countries. Three hypotheses will be derived from these existing theories.

The second part of this chapter reviews the existing literature on selectivity and field of study choices. Three theoretical perspectives are carved out of the existing sociology of education literature. Many existing studies have examined these issues at different points in time and include or exclude several theoretically important variables in their analyses. In Canada, no existing research has sought to chart the sorting and selection of students into various fields of study. Taken together, these analyses provide a renewed examination of the situation among American students, as pressures to attend the 'right' programmes and schools becomes a more salient issue among university age students. Moreover, this project is the first systematic investigation of these issues as they pertain to the population of Canadian university students.

Part 1: Institutions in an Expanding and Competitive Market

As global pressures for institutions to expand enrolments, diversify, and compete (e.g., for funds, students or faculty) increase dramatically, Canadian and American universities may respond in a number of ways. In the U.S., the higher education system is highly stratified, relatively decentralized in terms of state control, and has a high degree of private funding. The Canadian post-secondary system, on the other hand, is largely

public, highly regulated, and historically much less stratified. These differences in structure make these two countries particularly interesting for examining the growing influence of market-like and entrepreneurial pressures. Bringing together several existing theories in the organizations and sociology of education literature, the empirical analyses may reveal three possible scenarios. Most generally, the distribution of postsecondary institutions may become more heterogeneous, more homogeneous, or exhibit little or no change.

2.1.1 Homogeneity: New Institutional Theory and Path-Dependency

Have universities in Canada or the United States changed in the last thirty years? That is, are postsecondary institutions becoming more unequal in their levels of economic resources? One possibility is that universities may be becoming more homogeneous over time. Emerging international markets have led to a rise in international guidelines or benchmarks of postsecondary quality and subsequent policy evaluations (e.g., Finnie and Usher 2005). With the recent surge of standardized measures of evaluation (see Dill and Soo 2005) and an increasingly loyal group of followers (i.e., university administrators, policy leaders), universities may become more similar. As national ranking schemes such as *Maclean's Rankings* or the *U.S. News and World Report* achieve more attention and become more influential, some degree of isomorphism may result. That is, institutions may conform to pressures to maintain good student-faculty ratios, a certain number of books in the library, or ensure that their recent graduates report that they are 'satisfied' with their postsecondary experiences. Consistent with New Institutional theories, which conceive postsecondary institutions as loosely coupled to any one nation-state, universities are believed to be converging around a broad, standardized template of higher education.

New Institutional Theory can be traced largely to the classic writings of Max Weber (see Zarifa and Davies 2008). Weber understood the importance of rationalization as a global force and its role in the convergence of educational systems. In recent years, John Meyer and colleagues have extended Weber's ideas to analyze contemporary schooling. At its core, New Institutional Theories diverge from the functional assumptions of both Marxist (e.g., Bowles and Gintis 1976) and Structural Functionalist or Human Capital theories of education (e.g., Parsons 1959; Becker 1993). That is, new institutional theories do not see schools as imposing an ideological hegemony or as a vehicle for imposing conformity and deference to the needs of capitalist employers, nor do they see schools as skills factories designed to satisfy labour market demands. Rather, New Institutional Theory emphasizes the absence of a strong linkage between schools and their local environments. Departing from Weber's 'rationalization' of the world, New Institutional theory sees change as the product of conformity to normative images or ideals (e.g., rational myths) of the proper university. Further magnified by the proliferation of world-wide rankings, universities feel pressures to maintain legitimacy in the eyes of their constituents (e.g., governments, public, and organizations). These pressures to conform often result in a degree of 'isomorphism', where institutions

converge around a template of the modern university. For example, this type of convergence can been seen in the world-wide expansion and transformation of tertiary education into a system of mass, if not universal, education in most Western industrialized countries (Meyer and Ramirez 2000). In fact, recent research indicates that these rationalizations have become so well entrenched (i.e., institutionalized) in the minds of government officials and policymakers, that higher education has proliferated in less developed countries, where its importance for economic growth is less obvious (Schofer and Meyer 2005).

These global trends may be promoting a degree of isomorphism among institutions (Schofer and Meyer 2005; Baker and LeTendre 2005; Meyer and Ramirez 2000). Such conformity could bring about a reduction in overall system and even global differentiation, as universities around the world adopt similar strategies and policies (e.g., movement toward offering "practical courses"; see Ramirez 2004). In other words, New Institutional Theory predicts less stratification over time both within and between nations.

Scholars in the New Institutional tradition have identified three possible mechanisms of isomorphic change: coercive, normative, and mimetic (DiMaggio and Powell 1991). Coercive isomorphism is the product of political pressures or even government mandates (e.g., new laws). Institutions may be forced to comply with new regulations or law requirements. For postsecondary institutions, this may take the form of affirmative action programs, where schools adopt these programs to maintain legitimacy and public approval. In other words, schools may become more homogeneous because of the authority of the state (e.g., public accountability schemes).

A second mechanism puts imitation at the forefront of change. Mimetic isomorphism occurs when organizations, faced with uncertainty, adopt similar strategies and procedures to reputable organizations in their field. For example, universities, consciously or unconsciously, may adopt goals or strategies from other schools that they see as more successful or legitimate. In a comparative sense, the political and economic structure of one nation may vary significantly from the next, but education policy reforms may be modeled after nations with reputable systems of higher education in hopes of parallel successes. Within educational systems, mimetic isomorphism may be characteristic of newer or lower ranked institutions imitating higher ranked or more established schools. In relation to the analyses that follow, as top schools seek greater research funds and endowments, lower ranked schools may also adopt these practices.

Finally, isomorphic change may be normative and emerge out of the process of professionalization (DiMaggio and Powell 1991:70). The emphasis here is on a collective pursuit of professional standards. This may take the shape of some schools adopting a research model. Less prestigious, teaching-based schools may seek to become more legitimate in the eyes of the public. Ryerson University, formerly a polytechnic college, has gone to great lengths to ensure that their tenured faculty now possess a Ph.D. Moreover, many of Ryerson's programs now offer typical undergraduate courses (e.g., statistics), and diplomas have been transformed into BA's and BSc's and even a handful of Master's degrees to resemble the university model.

Hypothesis 1: The populations of Canadian and American universities are becoming more homogeneous over time.

Pressures to conform, however, may be influenced by the prevailing historical arrangements within a given nation. That is, prior structural forces may shape the way dominant rationalizations are adopted in other systems. Following the 'path dependency' rationale, patterns of change may be largely the product of unique historical, cultural and economic conditions, and postsecondary systems may adapt differently to emerging market forces (Cummings 2003). That is, higher education systems may maintain distinct cross-national differences, as a result of national differences (e.g., postsecondary systems in socio-democratic countries). Some scholars, who emphasize national differences more than global similarities, point out that the process of institutionalization is greatly impacted by prior educational traditions of the geographic area. In Japan, for example, the traditional pedagogy on moral education was largely maintained with the emergence of modern education, despite the replacement of other subjects with a 'Westernized' curriculum (Cummings 1999). In France, the education system maintained its emphasis on 'encyclopedic knowledge' (i.e., oral recitation; exams) and Enlightenment principles. For the issue at hand, path-dependency theories would predict that the structural differences between Canada and U.S. would persist. The institutions may be becoming more and more similar within each nation over time, but the two countries, given their varied historical experiences and arrangements, may be evolving on two different trajectories. For that reason, new market pressures may not necessarily lead to increased stratification among Canadian universities, since Canada's high degree of public regulation may limit the level of stratification among universities.

Still, national idiosyncrasies can be reconciled by New Institutional Theory's concept of loose coupling, which posits university systems only pay minimal attention or employ a 'logic of confidence' to some aspects of the education system (e.g., classroom instruction), and tightly couple others (e.g., curriculum; teacher credentials) to maintain public legitimacy and organizational survival. In other words, some variation across countries is a real possibility, since some areas of the higher education system may be more responsive to or restricted by the demands of local governments, policies, or markets. In relation to the focus on institutional stratification, it is possible that Canada's traditionally more egalitarian system of universities may impede (at least temporarily) the diffusion of a U.S.-style competitive marketplace for postsecondary credentials.

2.1.2 Heterogeneity: Institutional Stratification Theories

A second possibility is that these new market-like trends may yield even greater stratification *among* universities. More reputable, established and larger institutions at the top of the hierarchy may win the majority of bouts for corporate funds and other independent sources of revenue. Within this elite group of institutions, competition may grow increasingly fierce, as fluctuations in rankings could bring about unprecedented

market losses. Such competition may evolve into a winner-take-all market for top faculty, top students, and research dollars, where resources become increasingly valued and concentrated among a few select universities.

Over twenty years ago, Martin Trow (1984) realized this rich-get-richer possibility. Trow argued that postsecondary institutions are stratified by unequal levels of prestige and varied amounts of resources. Moreover, Trow (1984) hypothesized that elite institutions, schools that are able to secure the highest levels of prestige and wealth, create a "virtuous cycle", where advantages are reproduced and even elaborated over time. In this sense, elite institutions are able to buffer themselves from environmental changes (e.g., democratization, governmental regulation), all the while maintaining their high status (Trow 1984:149).

The U.S. postsecondary system has long been marked by a high level of competition. In recent years, this growing competition may be further bolstering the establishment of an elite track of institutions. Some researchers speculate that the sheer scale of private contributions, historically high levels of institutional competition, and substantial research and development sector may be difficult to imitate in other nations, posing a challenge to New Institutional ideas of global convergence (see Brint 2006). This competition is fuelled largely by notions of 'excellence'. Depending on the type (e.g., public or private) and strategy of the university, 'excellence' is achieved by the institutions meeting particular goals or self-imposed benchmarks of quality. Universities may seek to improve their student-faculty ratios, raise faculty salaries and recruitment packages, increase their percentage of graduate students, improve graduate student aid, and attain more external research awards through national competitions. Among the mid-level and lower ranked institutions, the nature of competition may be quite different or even non-existent. At these levels, smaller and newer institutions may opt out of the competition for the top spots.[9] Competing with the 'heavy hitters' may be too lofty a goal. Carving out a subordinate, specialized niche (i.e., 'anticipatory subordination'), however, may ensure organizational survival and potential for growth, a strategy analogous to that of the American community colleges in the 1970s and 1980s (see Brint and Karabel 1989). Drawing on strategic plans and interviews at eighty-nine American universities, Brint (2005) uncovers an alternative strategy among lower ranked institutions, 'interdisciplinary creativity'. In direct opposition to the traditional notion of disciplinary specialization, universities such as the University of Southern California

[9] It is possible that significant growth within a nation's postsecondary system may increase the level of institutional stratification. Indeed, new institutions will differ significantly from older institutions, as they spend some time developing a reputation, attracting top students and high quality faculty, solicit alumni for donations, and secure external funding. Thus, the degree of expansion within a nation may inflate the level of institutional stratification. As noted in Chapter 6, a further exploration of this relationship remains an important topic for future work. In this project, the private for-profit institutions, a sector which accounts for much of the recent growth in the U.S. system, was separated out from the analyses in Chapter 5. Unfortunately, the age of the institution is not available in the U.S. data, and thus when new institutions are included in the data, it is unclear whether they are new participants in the IPEDS or new postsecondary institutions. In Canada, only a handful of institutions emerged during the thirty year time frame, and thus it is unlikely that further analyses that removed new institutions would substantially alter the level of institutional inequality.

employ a different strategy, one that encourages the intersection of traditional disciplinary boundaries. The emergence of this new governing logic of 'excellence' may be creating more systemic differentiation among American universities.

By the same token, other researchers have levelled criticisms at neoinstitutional theory, providing evidence that in some situations organizations may act rationally, as global and local technical environments prompt adaptive change. Researchers in this tradition posit that a growing emphasis on the homogenizing and constraining power of institutions needs to be qualified to recognize that technical environments (i.e., adaptation) and shifts in markets may have some impact on firm change (Kraatz and Zajac 1996). Private liberal arts colleges in the U.S., for example, became more heterogeneous rather than homogeneous during the 1970s and early 1980s. Rather than maintain their long standing purpose of providing a broad and general liberal arts education (i.e., 'generalized rationale'), most schools responded to market demands in 'illegitimate' ways (e.g., professionalizing and vocationalizing). As a consequence, Kraatz and Zajac (1996) call for the theoretical pendulum to swing back slightly and acknowledge a situation where the technical environment may have some influence on the formal structure of universities. Moreover, in certain situations, some degree of real/adaptive change rather than purely ceremonial change, as neoinstitutional theories suggest, may occur within organizations. In sum, this body of literature suggests a second possible outcome from this investigation of institutional stratification – one that predicts more heterogeneity over time.

> Hypothesis 2: The populations of Canadian and American universities have become more stratified over the last thirty years.

2.1.3 No Institutional Change: Vertical Parity and Horizontal Stratification

Finally, it is possible that the level of stratification among universities may have changed only slightly or not at all over the last thirty years. The implications for 'no change' may be quite different for the U.S. and Canada. On the one hand, Geiger (2004) claims, universities enjoy a 'halo effect' and change little over time in terms of their relative position in the postsecondary hierarchy. Indeed, this may be true for the United States, since its public-private structure has long been marked by a steep hierarchy of substantial differentiation. In Canada, on the other hand, the likelihood of finding only minor changes is much lower. While it is quite possible that the distribution of institutions will appear to maintain its historically high level of institutional parity, more variation may present itself at the field or discipline level.

New market forces may be generating more stratification *within* rather than *among* institutions (see Davies and Hammack 2005; McLaughlin 2005).[10] In line with

[10] The Canadian and U.S. institutional data were collected and recorded by institution rather than by fields, and thus intra-institutional inequalities will remain a topic for subsequent analyses.

the 'path-dependency' reasoning, it is possible that formally equal, publicly regulated and governed systems of higher education institutions may react differently to market pressures. In Canada, for example, there is a long history of institutional parity. In such situations, the probability that an elite group of institutions will obtain a disproportionate portion of corporate funding, resources, and the best recruits may be much lower than in less regulated systems. One possible outlet for growing competitive pressures is to diversify internally. Since universities are decentralized in Canada, administrators enjoy a high degree of discretion. As noted earlier, tuition fees for professional schools (e.g., law, medicine or business) are being de-regulated, while general arts and sciences tuitions remain tightly controlled. It is these professional schools that further exhibit competitive strategies and concerns for rankings. In light of these trends, Davies and Hammack (2005) argue that in a publicly regulated system, market pressures may be channelled differently. Rather than expecting more stratification among universities, we may witness more inequality within institutions, as certain fields answer the market call.

Several resource dependency studies from the late 1970s and early 1980s that examined the relationship between intra-institutional power differentials and resource allocations lend some support to these speculations, though the linkage to situations where inter-institutional stratification may be constrained or limited (e.g., by government regulation) was not of particular interest (Pfeffer and Moore 1980; Pfeffer and Salancik 1974; Salancik and Pfeffer 1974).[11] In the university setting, beneath the horizontal distribution of power (i.e., universities) operates a vertical system of power (i.e., departments), and the extent of this power depends upon the ability of a discipline to obtain outside grants and contracts. The more powerful a department is (by virtue of the proportion of budget received), the less work load and course offerings influence its further acquisition of resources. In fact, a relatively weak department in a strong college may fair better than a strong department in a weak university (Pfeffer and Salancik 1974:149).

Taken together, these studies suggest that inter-institutional inequality may have changed very little or not at all over the last few decades. In the U.S., the historically high level of institutional stratification may not have changed all that much. In Canada, this perspective suggests that inter-institutional disparities may still be modest in comparison, yet intra-institutional inequalities (i.e., departments or faculties) may have increased, since public regulation maintains a tighter grip on school-level policies.

> Hypothesis 3: The levels of inequality among American and Canadian universities have not changed over the last thirty years.

2.1.4 Summary

[11] By and large, resource dependency approaches emphasize adaptation to 'context'. That is, organizations cannot simply close their doors and remain 'self-sufficient' but must depend upon a changing environment of resource exchanges with other organizations. In other words, organizations may in fact incur real change, when their environment is altered.

In the previous sections of this chapter, three possible scenarios were derived from the existing education and organization literature. Drawing on the works of New Institutional Theorists and 'Path dependency' scholars, the first perspective predicts that Canadian and American institutions may be growing more equal over time, as a greater proportion of schools world-wide adopt a competitive strategy for faculty, students, and external funding. A second perspective sees this competitive strategy as too lofty a goal for most institutions. In systems where an elite group of institutions distinguish themselves from the majority, the majority may essentially cut their losses and adopt a strategy to embrace interdisciplinary partnerships. A final theory predicts little or no change at the level of the institutions. That is, over time, the level of inequality among schools may look relatively stable. In a public system like Canada's, this apparent 'no change' over time may be representative of greater horizontal inequality emerging at the level of fields. In the United States, a 'no change' finding may indicate a traditionally high degree of inequality among schools that remains constant from 1971 to 2001.

Part 2: Intra-institutional Stratification in an Expansionary Era: College Selectivity and Fields of Study

In the last few decades, the barriers to college and university access have been greatly reduced, as individuals from a variety of demographic and socioeconomic backgrounds increasingly enter higher education. Governments around the globe have gone to great lengths to expand higher education, in order to improve the equality of opportunity at postsecondary institutions. Some researchers have shown, however, that this structural expansion often fails to reduce 'real' inequalities, as less privileged students get absorbed into an expanding subordinate sector of higher education (e.g., community colleges) where future employment opportunities are less lucrative and prestigious (see Brint and Karabel 1989). Still, the reality is that more and more students are making the transition to higher education, as pressures to expand enrolments continue to spread worldwide (Meyer and Schofer 2005).

What implications does this postsecondary expansion have on students' institution and field of study choices? As higher education transforms itself from an elite to a mass- and now a nearly universal-based system, the selectivity of a student's school and his/her field of study may have a greater role in the sorting and selection of students. The more salient issues for academics and policymakers today are which school a high school graduates will attend and what major or field of study they will pursue. Employers and students are increasingly valuing the prestige of the school attended. Graduates from highly selective schools obtain higher earnings, are more likely to continue their education, and experience more stable employment (Mullen et al. 2003; Marini and Fann 1997). In terms of fields, some researchers have found that vocational students may obtain 'good jobs', as they obtain concrete skills that have high 'use value' on the labour market (Goyette and Mullen 2006:526). Arts and sciences majors, given the cultural capital that their credentials signal and the currency of their prestigious fields of study and schools, are able to enter the upper echelons of the labour market. Other studies indicate

that computer science, business, engineering, and health professions yield high economic returns, while education, the social sciences, and the humanities yield lower labour market returns (see Zarifa and Walters 2008; Walters 2004; Finnie 1999; Guppy and Davies 1998; Marini and Fann 1997).

Institution selectivity and field of study are becoming more important sorting and selection mechanisms in the process of social stratification. Collins (1979, 2002) and others (e.g. Wolf 2002) have long pointed out that education is a 'positional good'. As more and more students enter undergraduate education, a bachelor's degree becomes less valuable and new modes of differentiation emerge. Some students are setting themselves apart from the masses by continuing on to higher levels of education (e.g., graduate school), but for most, the prestige or selectivity of their institution or field of study have become effective ways of securing more favourable labour market opportunities.

2.2.1 Family Background, Ability, Expectations and Aspirations

When predicting one's choice of field or institution, it is necessary to examine which social factors affect this increasingly important decision. A number of empirical studies in the sociological literature suggest that family background has a strong impact on the decision to attend college (Hossler et al. 1999; Manski and Wise 1983; Mare 1980). Moreover, over the past half century, access to postsecondary education has emerged as one of the cornerstones of social mobility and class reproduction in post-industrial societies. Accordingly, sociologists have long studied this point of selection to find substantial class effects and more variable gender effects (see Karabel and Halsey 1977). But, recent changes in the structure of higher education bring these assumptions into question. What happens to these background effects once students enter into higher education? A simple dichotomy of attending or not attending postsecondary education implicitly assumes an even playing field and similar value and currency of fields and institutions. One would be hard-pressed, however, to find evidence that all fields or institutions yield similar labour market rewards. Rather, it becomes more apt to explore whether family background confers advantages to students who are *already* enrolled in higher education. Operationally, what factors predict a student's choice of undergraduate major or institution?

Three possible family background effects are carved out of the existing sociological literature. At the outset, it is important to note that these approaches are not mutually exclusive, and that many existing studies lend support to one or more of the three possibilities that follow. The broad goal here is to present three possible outcomes that may emerge from both the selectivity models conducted for the U.S. as well as the field of study models conducted for both nations. In terms of selectivity, previous studies have largely established which particular socio-demographic factors influence these choices. But, the results of these studies are somewhat dated, and a renewed examination across two recent cohorts of American baccalaureate degree-holders is highly warranted.

For field of study decisions, existing studies have examined the issue from very different perspectives. Some studies have been primarily concerned with who enters the

natural sciences (e.g., Maple and Stage 1991). Others have focused on the choice of a liberal arts versus a vocational degree. These studies have also paid particular attention to the way students' options are limited by the type of institutions they attend (Goyette and Mullen 2006; Brint et al. 2005). A larger body of research has examined the relationship between gender and fields more generally (Andre and Adamati-Trache 2007; Bradley and Charles 2004; Turner and Bowen 1999; Jacobs 1995, 1999). Finally, other studies have sought to first stratify fields in terms of their earnings potential in the labour market (Xie and Goyette 2003; Davies and Guppy 1997). This project seeks to combine several of these approaches all the while making comparisons across cohorts and two nations. Field choices are ranked or stratified by their early labour market earnings. Critics of this approach are quick to point out that liberal arts students often earn less immediately after completing an undergraduate degree, but that higher proportions of students in these fields continue on into graduate school and eventually earn comparable wages. Consequently, this project also analyses the nominal differences of field choices. Discussed in further detail in Chapter 3, a discrete variable for field of study with seven categories is employed to predict who goes into which particular field. This approach does not assume fields have any particular order or rank but serves to link students' social background characteristics with their degree choices.

Stemming from the work of Pierre Bourdieu (1984, 1988; Bourdieu and Passeron 1990), the first approach predicts that family background would still have *direct* effects on field of study and/or institution choices, even when controlling for academic ability. Bourdieu and Passeron (1990) examine the French university system and find that students from privileged families obtain greater amounts of cultural capital, as their home life includes more opportunities to increase verbal abilities and experience high culture in ways that facilitate academic success. According to this theory, we should find similar cultural capital disparities when examining students throughout their post-secondary careers, as in studies that examine the decision to attend postsecondary education. When higher education expands rapidly, Bourdieu (1984) argues that greater stratification results (especially at the top) and consequently increases the impact of social background effects. Socially privileged students, seeing a wide array of socio-economic groups entering higher education, look for avenues to get a leg up on the rest of the pack (Bourdieu 1988; Lareau 2002). Attending that prestigious institution, entering that lucrative field, and continuing on to graduate school are representative of this 'getting ahead' strategy. The know-how to spot these avenues of advantage is by definition *cultural capital* (see Lareau and Weininger 2003; Bourdieu 1998). At its core, some students, more than others, simply know the 'hot fields' to enter.

At the level of fields of study, Bourdieu (1984) sorts disciplines on a continuum of cultural (e.g., science and the humanities) and economic or political (e.g., law and medicine) power. Elite students acquire greater levels of cultural capital in the home, use this cultural capital to enter culturally powerful educational fields and therein maintain their advantages in the social world. Applying Bourdieu's work on fields to the situation in the Netherlands, Van de Werfhorst et al. (2001) found that individuals from lower class backgrounds were more likely to enter economics or engineering programmes. Individuals from more privileged socioeconomic backgrounds were more likely to enter

fields where their family capital could be more easily reproduced. In other words, they enter into fields with the greatest cultural capital. Where parental economic capital was great, the children were more likely to enter into high paying jobs. On the other hand, where the cultural capital of the parent was high, the children were more likely to choose fields that would make use of this cultural capital.

In the U.S., much of the empirical support for direct SES effects has come from models predicting school selectivity choices (Karen 2002; Davies and Guppy 1997; Hearn 1991). Karen (2002), for example, examines two cohorts (1980 and 1992) of the National Education Longitudinal Study and finds that even though much social selection takes place prior to one's choice of postsecondary institution, in both cohorts, family income and father's education had strong direct effects, even once controlling for academic factors. For Davies and Guppy (1997), strong direct SES effects on selectivity choices were accompanied with strong ability effects. Moreover, the authors also revealed the presence of a 'combination effect'. When including an interaction term for SES and ability, the authors found high-SES and high-ability students were more likely to enter selective schools. Thus, there appears to be an added advantage to having significant SES resources and the ability to perform well in school (Davies and Guppy 1997:1431).

Still, recent research has found some support for direct SES effects on field of study choices. Goyette and Mullen (2006) examine the choice of arts and science degrees over vocational degrees. Noticing a growing preference for vocational degrees, the authors examined field choices with a particular emphasis on how students' social background relates to curricular choices. The authors found SES to have a strong impact on selecting an arts and sciences major. In fact, once controlling for academic performance, expectations and sociodemographic characteristics, the impact of SES actually increased. Low SES students were more likely to enter vocational programmes. The authors concluded that students' social background strongly influences their field of study choices.

> Hypothesis 1: Family background has strong direct effects on the field of study and college selectivity decisions of students.

A second approach questions whether family background impacts one's school or major choices irrespective of one's academic performance in higher education. This view suggests that social background effects are largely *indirect* and must operate through one's academic performance and educational and career expectations (Mullen et al. 2003; Davies and Guppy 1997; Hearn 1991; Ethington and Smart 1986).[12] Similar to the

[12] There is some evidence to suggest that individuals who do well in a particular area of study will proceed to major in that field. While the NGS does not provide details regarding student transcripts, the B&B includes a measure for the student's GPA in their undergraduate major. Previous researchers who have examined this relationship, however, did not control for family background and many sociodemographic characteristics that will be considered in this research (e.g., Arcidiacono 2003).

perspective above, this view sees individuals as healthy competitors (i.e., strategizers) who cannot simply reproduce their advantages but have knowledge of the system and play the game better (Lareau and Weininger 2003). In this sense, middle-class individuals maintain their privilege by becoming experts of institutionalized standards of assessment (i.e., examinations). That is, academic ability (as a product of social origins) becomes the major influence on student choices. As well, educational and occupational expectations have a greater impact on student decisions (Goyette and Mullen 2006). Critics in this long standing cultural capital debate, however, see little evidence that such decisions are unique to a particular social group (e.g., Kingston 2001). Moreover, if the effects of this institutionalized cultural capital greatly minimize the effects of social advantage on school success, then the linkage between family status and school achievement may be indirect. In other words, the direct effects of family background are significantly weakened through selection.

Hearn (1991) sees the presence of indirect parental background effects operating through academic outcomes in high school and students' educational aspirations. The presence of these indirect effects, he argues, stand in opposition to meritocratic norms, as entry into resource rich, selective or prestigious universities is a function of not only achieved characteristics (e.g., test scores, grades), but ascribed characteristics (e.g., gender, race, SES). Hearn (1991) found academic factors to be the most powerful influence on selectivity choices. As well, educational aspirations were conceived as an important indirect effect of SES. In the Bourdieuan sense, aspirations may provide some important insights into the 'habitus' of individuals. That is, individuals may adjust their particular goals and dreams into somewhat reachable preferred outcomes – outcomes that originate from social class origins and are shaped by structural circumstances (Bourdieu and Passeron 1990; Bourdieu 1984).

While Hearn (1991) found academic ability and aspirations to be the strongest predictors of student choices, he also found traces of direct nonmeritocratic effects. For example, father's education, mother's education and parental income all had positive effects on selectivity, while family size was not found to have a significant effect on selectivity choices. Overall, Hearn (1991) concludes that the "most stubborn barriers" to a meritocratic process of choices are those factors directly and indirectly related to SES rather than race or gender.

In their analyses of the 1992-93 cohort of the Baccalaureate and Beyond Study, Mullen et al. (2003) found only indirect effects of parent education on entrance into graduate programs. The authors argue that parent education does not simply determine one's choice of graduate program; the impact of such advantages is largely indirect. The type and prestige of parental education does not merely provide their children with a passport to a Master's or doctorate degree. Rather, family background effects operate through the student's academic achievements, career and educational expectations and the institutional characteristics of their undergraduate university. According to these findings, the role of postsecondary institutions is somewhat contradictory. On the one hand, academic institutions provide avenues for conferring the educational advantages of

parents. On the other hand, students from disadvantaged backgrounds can overcome some of their disparities by performing well in their undergraduate careers.[13]

For fields of study, Davies and Guppy (1997) found significant SES effects on field of study choices within selective schools. But, for fields of study in general, they found little impact of SES on lucrative fields, once controlling for academic ability. Academic performance was shown to have a very strong and positive effect on lucrative field choices.[14]

Hypothesis 2: Family background characteristics are largely indirect and operate through academic ability and aspirations.

A final group of studies also predict minimal direct SES effects. Developing out of Mare's (1980) status attainment work and gaining momentum in recent replications of this research (see Stolzenberg 1994), researchers expect graduate school admissions to be 'uncontaminated' by social origin effects. Proponents of this perspective argue that everyone who is in a college or university program has roughly the same skill set and that a different type of selection process is at play. Most of the selection effects (e.g., by SES) occur when students enter into the postsecondary system. Applying this logic of prior selection to this project, social background effects should be largely eliminated by the time one graduates from a particular field. Put differently, as one climbs the postsecondary ladder, one becomes further removed from one's social origins and engages in a more meritocratic process. Thus, the effects of SES on selectivity choices will likely be stronger than those on field choices. As students spend more time in postsecondary education, they become further removed from their social origins.

Mare's (1980) data from the late 1960s and early 1970s, for example, revealed little influence of father's education or socio-economic index scores on decisions to attend graduate programs. Similarly, Stolzenberg's (1994) cohort analyses of the National Longitudinal Study (1972, 1976 and 1986) showed little effects of family

[13] These first two theories are not mutually exclusive, but in the former, we are predicting direct effects from family background variables on field of study and selectivity. In the latter, we are predicting indirect effects of family background. Moreover, many studies in the existing literature have found the presence of both direct and indirect SES effects and do not fit into one particular perspective. Here, it is expected that family background predicts field of study decisions through one's academic performance (i.e., institutionalized standards of evaluation).

[14] One of the strengths of Davies and Guppy (1997) is that they impose a hierarchy on the distribution of fields of study – one that captures the stratification of fields in the eyes of some students and also employers. This project borrows this logic and imposes a hierarchy based on the early labour market earnings of graduates in the sample. In doing so, the author does not assume that all students approach higher education as 'econometricians'; a number of other motivating factors may be at play. In addition, this study also fits multinomial logit models, recoding all undergraduate fields of study into 7 categories. This method produces a 'map-like' result, where family origins, race, or gender may be directly connected to particular fields of study. The two measurements of fields (a continuous metric or a series of nominal categories) are employed to uncover the partial associations between variables and not necessarily the causal mechanisms or rationales (i.e., motivations) behind these choices.

background on a student's likelihood of taking a graduate entrance examination (LSAT, GMAT or GRE) or entering into an MBA program.[15] Stolzenberg suspects that background SES effects decline over the course of the college career, though not necessarily linearly. Parental background effects (if they exert any influence at all) may operate through educational aspirations. While the two previous perspectives see social origins as an important determinant of educational and occupational aspirations, Stolzenberg sees the process quite differently. As the student obtains more and more experiences during college, the effects of status origins decline. In other words, the formative years for student aspirations to attend graduate school occur during the undergraduate degree. Students develop aspirations and goals in an atmosphere and at a time in their life when parental influences have declined or even subsided.

Hypothesis 3: Family background effects will have minimal or no direct effects on selectivity and field of study choices.

This line of inquiry is largely characteristic of the educational transitions literature. Mare (1980) and others (Shavit and Blossfeld 1993) see educational attainment as a series of yes/no decisions. Overall, researchers in this tradition have largely focused on the continuation of schooling. Typically, each continued year of schooling represents a positive decision to stay in school and not drop out. All the while, social background effects decline at each transition point. By the same token, when enrolments expand and access becomes universal, social background effects decline.

Declining social background effects have largely been explained by the theory of maximally maintained inequality (MMI). Raftery and Hout (1993) explain that the expansion of higher education may reduce social class inequalities, since a greater number of lower-class individuals may obtain schooling, particularly if enrolment increases outpace demand. As well, if a particular transition point becomes nearly universal, then the effect of social class background on that particular transition will decline. Applying this logic to our current discussion, as undergraduate enrolments increase and more and more students continue on into graduate school, according to MMI, we should find minimal SES effects at the college entry point. Indeed, this seems to be the case. But, what if the decision to attend college is further complicated by a ranking of colleges and fields? As it stands, as others have noted previously, MMI may be "couched at too general a level" to really evaluate its strength in predicting college selectivity choices (Karen 2002).[16] In fact, MMI developed out of a concern for drop-

[15] The goal of this project is to establish the type of background effects that occur. Once the nature of these effects is established, future analyses may explore the mechanisms (e.g., networks) through which these effects operate.

[16] Karen (2002) finds clear evidence of the persistence of inequality but interprets this in terms of political mobilization rather than MMI. That is, political mobilization by blacks and women was able to reduce inequalities, whereas lower SES individuals did not mobilize and inequality persisted.

outs and years of schooling, and has not been concerned with the various modes of differentiation that exist after entry into college or university.

An alternative explanation has refined the tenets of MMI. Lucas (2001) argues that educational transitions studies may underemphasize or ignore the presence of within-school stratification. Using the MMI thesis as his point of departure, Lucas further refines and revises the thesis into what he terms effectively maintained inequality, arguing that while a certain level of education may reach expand significantly to reach saturation, the level of inequality among groups will not decrease as MMI advocates once thought. Rather, privileged groups look for new ways to differentiate themselves. That is, advantaged individuals find qualitative differences as a means to distinguish themselves from the majority. When saturation is not present, both quantitative and qualitative modes of advantage may be operating. Most generally, this theory moves beyond decisions to continue schooling to focus on qualitative decisions in educational careers. The theory asserts that if there is a qualitative advantage (e.g., field of study; college selectivity), groups from privileged SES backgrounds will find it. Contrary to MMI predictions, the universality of access may not reduce the level of inequality, but may change the nature of inequality (e.g., from quantitative to qualitative). In our situation, as higher education enrolments expand rapidly in Canada and the United States, students from privileged socioeconomic backgrounds may seek out new advantages and modes of distinction in order to maintain some form of qualitative advantage. That is, when quantitative advantage (e.g., act of enrolling) declines and more and more students attend, high SES students and their parents concentrate on qualitative points of differentiation (e.g., lucrative fields; selective schools).

Some authors have started to apply these notions to the relationship between field of study and social background in predominantly public postsecondary systems (see Ayalon and Yogev 2005). When access to higher education increases, privileged groups within the education system were found to seek out qualitative advantages to separate themselves from the rest of the pack. Ayalon and Yogev (2005:237) found ability to be the utmost determinant of university enrolment, as colleges absorb students with lower academic ability. While the emergence of new colleges produce a more egalitarian image of higher education at the outset, much 'qualitative' inequality remains. Despite greater overall enrolments, socially privileged students remain disproportionately likely to enter more rewarding fields. Moreover, the findings support the EMI approach outlined by Lucas (2001). As access increases for disadvantaged groups, members of privileged groups maintain their advantages by entering more rewarding fields.

Overall, the effects of SES on one's choice of college major have not been as obvious or consistent as in studies that predict college selectivity decisions. Part of the confusion seems to have developed out of the various focal points of existing studies. For instance, some researchers have set their sights on the application behaviours of students (Ayalon 2007; Hurtado et al. 1997), some studies have examined students as they enter undergraduate studies or their initial choice of major (e.g., Goyette and Mullen 2006; Xie and Goyette 2003; Karen 2002; Davies and Guppy 1997; Hearn 1991), while others have examined students as they enter graduate studies (Mullen et al. 2003; Stolzenberg 1994; Ethington and Smart 1986). On the one hand, if we examine students' initial choice of

undergraduate major, it stands to reason that the family background effects would likely be greater, and would more likely resemble the well-established SES relationships at the K-12 level. By contrast, if we examine students' choice of graduate school type or major, there is some evidence to suggest that family background effects may decline over the course of the college career and eventually dissipate, once controlling for academic ability and educational expectations (Goyette and Mullen 2006). At the same time, the situation effects of SES on student choices are likely to differ for field of study and college selectivity choices. Davies and Guppy (1997), for example, found significant SES effects on students' selectivity choices and field of study choices within selective schools. For fields of study in general, however, they found little conclusive evidence of socioeconomic influences on lucrative field choices, once controlling for academic ability.

2.2.2 Age, Race and Gender

In addition to social background effects, ascriptive characteristics may also affect one's postsecondary choices. In the United States, previous research has found age to have highly significant negative effects on entering more lucrative fields of study and more selective institutions, especially when controlling for academic ability (Davies and Guppy 1997). This pattern among younger students may be a reflection of the heightened competition and culture of maximizing one's postsecondary investment in recent years.

For racial background, the relationship is not as clear. Hearn (1991) showed that blacks entered lower selectivity institutions, and for Hispanics, no significant trends emerged. Moreover, this finding was reconfirmed in Karen's (2002) replication study using the NELS data. In terms of field of study, Thomas (1985) found that African American students were more likely than white students to major in the humanities, the social sciences, and education – fields that offer lower immediate economic returns. Similarly, other researchers have found women and non-Asian visible minorities to be less likely to major in the sciences (e.g., Mullen 2001; Maple and Stage 1991). Moreover, Simpson (2001) also found significant racial effects, indicating that the most significant differences exist between Asian Americans and other races. Yet, in Davies and Guppy's (1997) analyses, no significant racial effects consistently predicted students' lucrative field of study choices.

More recently, Xie and Goyette (2003) payed particular attention to the Asian American situation. In their analyses of U.S. college students, the authors found Asian Americans were most likely to choose lucrative majors. Further, the authors found that Asian American students were more likely to choose occupations with high concentrations of Asians and higher educational requirements and earnings compared to their white counterparts. The authors attribute a great portion of this racial gap to Asians' higher educational and occupational expectations.

Similarly, other researchers have found Asian Americans are more likely to enter higher education immediately after high school and are also the best prepared racial group for college (see Suzuki 1994). Hurtado et al. (1997) examine the college application

behaviours with a particular focus on racial groups. Compared to other racial groups, Asian Americans exhibited higher degree expectations and applied to a larger number of colleges, while Latinos to have the lowest degree attainment expectations, apply to the least number of colleges, and least likely group to immediately enter higher education (Hurtado et al. 1997:64). Overall, Hurtado et al. (1997) claim socioeconomic characteristics are strongly tied with academic ability among Asian students, leading the authors to suspect SES plays more of an indirect role in the college choice process.

Despite the documented successes of Asian students at various junctures of the education system, recent studies reveal some improvements in access for other racial groups. Grodsky (2007), for example, found that affirmative action programmes for African American students are more widespread than previously assumed, and an increasing number of institutions have expanded these initiatives to include Hispanic students. As a response to prevailing historical arrangements and as a response to the political climate, selective schools sought to include African Americans in their affirmative action plans. Unfortunately, Grodsky claims the same cannot be said for individuals from lower SES origins. While SES and gender effects are easily comparable across nations, Canada and the United States are quite dissimilar in their racial formation and may not yield similar effects.[17]

In an expansionary era of higher education, women have made substantial inroads into higher education and, since the late 1980s, have outnumbered men in postsecondary education enrolments and completion rates (Andres and Adamuti-Trache 2007; Guppy and Davies 1998). When examining undergraduate degrees by field of study, however, gender disparities are more pronounced (see Andres and Adamuti-Trache 2007; Goyette and Mullen 2006; Bradley and Charles 2004; Charles and Bradley 2002; Jacobs 1999; Davies and Guppy 1997; Jacobs 1995). Despite some substantial desegregation in traditionally male-dominated fields (e.g., medicine, law or business), some gender inequality remains. Women remain less likely than men to enter and graduate from 'quantitatively-based' fields of study (e.g., science or math) (Turner and Bowen 1999; Solnick 1995; Maple and Stage 1991; Ethington and Wolfe 1988). For the same reasons (e.g., 'relative attractiveness', 'unwelcoming climate', or high school preparation), men are also still majoring disproportionately in some disciplines such as engineering or architecture (Davies and Guppy 2006:112-114; Ethington and Wolfe 1988). At the same time, traditionally female disciplines (e.g., nursing, education or social work) continue to produce a limited number of male graduates. Further still, women may be segregated *within* particular fields of study. An example of this can be seen in the choice of specialization within law schools. There is a tendency for family law to have a higher concentration of women when compared to more lucrative areas such as corporate law, which remains predominantly occupied by men. These differences, of course, translate into disparities in the labour market and contribute significantly to the stubbornness of the

[17] In Canada, aboriginals are the most disadvantaged ethnic group in the education system. As well, race often gets confounded with immigration status in Canada more so than in the U.S. These differences may serve to cloud true effects or result in misleading racial effects or inconclusive results. In the U.S., the racial dynamic is quite different. Blacks are often found to be the most disadvantaged group.

wage gap. Given the aggregated nature of the field of study variables in these analyses, it is possible that much of the gender differences by fields may remain unaccounted for.

In addition to these inequalities by fields, there is also some evidence to suggest that men are more likely than females to enter selective schools (Karen 2002; Dale and Krueger 2002; Jacobs 1999; Persell et al. 1992; Hearn 1991). Even after taking academic factors out of the mix, it would seem that families continue to invest more heavily in their sons' rather than in their daughters' education. In their examination of the pathways to selective colleges, Persell et al. (1992) find women need greater levels of cultural capital than men to enter selective institutions. That is, in order for women to attend selective colleges at the same rates as men, they need to have more economic, cultural, and educational assets. Interestingly, Persell et al. (1992) find that gender inequalities may be greatly reduced if women attended a private boarding school. Specifically, the authors (1992:216) found that 10.3 percent of male and 9.3 percent of female public high school graduates enrolled in selective colleges in 1980. For elite boarding school students, nearly 78 percent of the females and 76 percent of the females attended selective colleges.[18]

Hypothesis 4: Women will be less likely to enter selective schools and lucrative fields of study.

2.2.3 Diverse Logics and Constrained Choices

While the level of competition within higher education is certainly on the rise, it is important to recognize that not all students are similarly motivated by 'econometric' or 'lucrative' logics (Beattie 2002; Dale and Krueger 2002). That is, not all students enter fields or institutions for the economic returns to their educational experiences. Rather, there is a diversity of logics behind field and school decisions, since students approach the higher education system with a myriad of motivations and interests. As the number of students considering entrance into graduate school continues to rise, students may adhere to a 'stepping stone logic', obtaining non-vocational arts or science degrees as the first stage in the pursuit of advanced degrees (see Goyette and Mullen 2006). Alternatively, students may be less concerned with the particular degree they pursue, but embrace a 'selectivity logic' where the primary goal becomes attending the highly selective institution, and choice of college or university major becomes secondary. Finally, students may be motivated by family or practicality reasons, as they choose institutions or fields offered at institutions that are close to their home.

Many of these logics have been explored in relation to particular groups within the population. Beattie (2002) finds that lower and middle SES males' probability of

[18] The B&B data do not identify elite boarding schools, but a set of three dummy variables (i.e., public, private Catholic, private not religious, private other religious) for high school type will be included in the U.S. analyses. Unfortunately, the Canadian data do not contain information on the type of high school attended.

enrolment in college rises when the economic returns are high, while males from advantaged families and highly skilled males enrol in great numbers regardless of the economic returns. The effects of income returns may also vary by race. Blacks do not appear to follow human capital predictions, yet there is evidence that other racial and ethnic groups are motivated by economic returns. For example, Xie and Goyette (2003:25) find that Asian Americans are more likely than whites to pursue fields that are in high demand in the economy. On average, graduates from these fields tend to have higher earnings in the labour market. Finally, women are less influenced by fluctuations in returns than are men and do not appear to vary by SES (Beattie 2002:36). Overall, women were found to be less instrumental or motivated by nonpecuniary rewards more so than men.

The choice of a field or selective institution is further complicated by institutional factors. For example, Brint et al. (2005) find support for an increasing prevalence of occupational fields (e.g., business, engineering, education) and a shrinking of the general arts and sciences fields. This relationship is shown to vary by selectivity, reputation, and by some financial measures (e.g., operating budget per capita, tuitions). As each of these indicators increases, the likelihood of offering traditional arts and sciences majors also increases. In relation to this research, this implies that the choice of certain majors may be constrained by the selectivity, prestige, and/or economic resources of the university. In some situations the opposite may be true, as field preferences determine the range of available school choices (see Ayalon and Yogev 2005).

Jacobs (1999) finds that institutional attributes greatly influence the proportion of women found in highly selective schools. First, more selective schools were more likely to offer fields with high concentrations of men (e.g., engineering). Less selective colleges, on the other hand, were more likely to offer fields that are traditionally highly concentrated with women (e.g., education). Second, women were further selected into less selective colleges by virtue of their greater propensity to enrol part-time. That is, as the selectivity of the institution increased, the likelihood of offering part-time programs decreased. Thus, by virtue of the fields offered and the types of programs available, women may be disproportionately selected out of highly selective institutions.

Finally, the colleges that students attend are affected by the selection of the school as well as the selection by students and their families. That is, the fit of the institution is also an important factor, as not all students benefit (in terms of earnings) equally from attending the most selective institution they get admitted into (see Dale and Krueger 2002). The best institution may need to be further qualified as the "best for whom". Thus, in the empirical analyses, it is important to consider the impact of these variations by institutional selectivity.

2.2.4 Summary

As more and more individuals obtain undergraduate degrees, field of study and college selectivity may be growing increasingly important points of sorting and selecting students from varied backgrounds. The effects of SES, achievement, and ascriptive

characteristics are well-established for the decision to attend or not attend postsecondary schooling. However, the choices of students who enter higher education require further exploration. As a result, this project seeks to fill this empirical and theoretical void by examining these postsecondary choices among students in the United States and Canada. As indicated above, the different structures within the postsecondary systems in the two countries provide an interesting contrast for the comparison of outcomes. Specifically, Canada's system has been built on a foundation of parity. At the undergraduate level, students typically do not encounter the high-stakes competition for entry into prestigious and high-profile schools. In the United States, the opportunities for social reproduction may be greater, as postsecondary access is less formally regulated and partnerships with private enterprises are increasingly welcomed in higher education (e.g., academic capitalism).

In the previous sections of this chapter, three perspectives were derived from previous research in the U.S. In line with social reproduction theories, family background effects may be largely direct and have a strong influence on field of study and selectivity decisions. Operationally, we would expect to see strong SES effects and only little, if any, academic achievement effects (e.g., SAT scores). Second, the effects of SES may be indirect and work through or alongside skill or aspirations. Here, we would expect a more complex picture of effects, where SES and skill may have simultaneous influences on student choices, and interactions between SES and aspirations and SES and performance may be significant. Finally, the impact of social origins may be greatly minimized, as access to universities becomes more universal. Researchers in this tradition assume that as students enter higher and higher levels of education, family background has fewer effects. Since the samples in this study include only those students who attended university, these theories may predict the absence of either direct or indirect SES effects.

The next chapter provides details about the data and methods used to test the aforementioned structural hypotheses regarding the stratification of universities as well as the individual level hypotheses, which focus on the various factors and kinds of effects that influence school and field of study choices.

Chapter 3: Data and Methods

Part 1: Institutional Level

To examine the level of inequality among postsecondary institutions, this project compares and analyzes two longitudinal, institutional-level data sets: one that provides data to measure the degree of stratification in Canada and a second to characterize the situation in the United States. Both Canadian and American data sources include the entire populations of universities, further contributing to the validity and importance of the findings. The institutional level analyses make national and cross-national comparisons at five-year intervals, ranging from the early 1970s to the present.

3.1.1 Canadian Surveys

The Canadian data (1971-2001)[19] were extracted from publicly available surveys collected by Statistics Canada [Financial Information of Universities and Colleges (1971-2002), Tuition and Living Accommodation Costs Survey (1972 – 2001) and the University Student Information System (1972 – 2001)].[20] The Financial Information of Universities and Colleges (FIUC) surveys are designed to provide annual financial information (income and expenditures) on all universities and degree-granting colleges in Canada in order to provide governments and associations with an indication of the financial situation of postsecondary education and to inform public policies on the impact of increasing tuition fees and federal and provincial financial support. Data are collected on a voluntary basis via questionnaires and administrative files and are collected for all units of the target population (i.e., all degree-granting institutions in Canada). The population of universities in Canada ranges from the mid-40s to just over 50 over time. Therefore, no sampling was performed. For Ontario universities, the relevant data are collected by the Council of Financial Officers – Universities of Ontario (COFO) and are forwarded directly to Statistics Canada. Each institution's responses are compared to the previous year's response to detect possible errors. Missing, inconsistent, or invalid responses were imputed by Statistics Canada and are based on historical information and adjustments for inflation based on enrolment and Consumer Price Index (CPI) fluctuations.

The Tuition and Living Accommodation Costs for Full-time Students at Canadian Degree-granting Institutions (TLAC) surveys provide annual student financial information (e.g., tuition fees, living accommodation costs) on all degree-granting universities and colleges in Canada. As in the FIUC surveys, data is collected on a

[19] For comparative and data availability reasons, 2001 was selected as the most recent year for analysis. That is, many of the more recent versions of these surveys are not yet publicly available and/or did not contain the necessary indicators for cross-national comparisons.

[20] While the *Maclean's* rankings data (1993 – 2003) were merged with the other Statistics Canada surveys and are included in the longitudinal data set, this project does not analyze any measures collected by *Maclean's* magazine.

voluntary basis via questionnaires and for all units of the target population. Telephone follow-up surveys are also conducted to minimize non-response. Significant efforts are also taken to detect errors and ensure data comparability from year to year.

The final source, the University Student Information System (USIS), provides annual information from all degree-granting institutions in Canada on individual student background characteristics (e.g., gender, citizenship, age) and level and type of education. As in the two previous surveys, data are collected from all institutions through questionnaires and administrative files. Similar efforts are also taken to ensure 100 percent completion rates and data accuracy.

3.1.2 U.S. Surveys

To measure and compare the degree of stratification among all U.S. universities and colleges, two publicly available cross-sectional surveys were combined: the Integrated Post-secondary Education System (IPEDS) and the Higher Education General Information System (HEGIS). The IPEDS surveys are designed to provide data on all primary providers of postsecondary education in the United States. Moreover, each data source provides a large number of institutional characteristics comparable to the Canadian data, since the Canadian data set was largely modeled after the variables in the IPEDS and HEGIS surveys. The target population for the U.S. data is more broadly defined than that of the Canadian sources to include all institutions that provide formal instruction to students that are beyond the compulsory age for high school. For comparative reasons, the analyses are limited to degree-granting institutions that award a baccalaureate or higher degree. Thus, the analyses omit two-year and less-than-two-year institutions as defined by the National Center for Education Statistics. The IPEDS data also excludes educational institutions that are not open to the public (e.g., military bases; training sites at prisons; corporate education facilities) or schools whose only purpose is to prepare students for particular tests (e.g., CPA exams or bar exams). The populations of universities that meet the above criteria were just over 1000 for each year of analysis.

The IPEDS data replaced the HEGIS data in the mid-1980s. Thus, HEGIS data will be analyzed for 1971, 1976 and 1981 and IPEDS data for 1986, 1991, 1996 and 2001.[21] In 2001, the IPEDS program was completely redesigned, and the data collection methods were converted from paper-based surveys to a fully web-based data collection system. At this point, the universe of postsecondary schools was divided into two groups: institutions with Postsecondary Participation Agreement (PPA) with the Department of Education's Office of Postsecondary Education (OPE) and all other schools. Those with PPA's are required to complete the IPEDS survey and subsequent follow-ups to ensure data completeness. Institutions without PPA's are not bound to participate. Significant efforts were made to ensure variable comparability over time. However, the new system presented some minor inconsistencies with the previous years, as some data items were

[21] According to Brint (2002b), the IPEDS surveys provide the most comprehensive institutional information currently available in the United States.

tailored for and/or exclude certain types of institutions.[22] For example, private-for-profit institutions were given a different finance form than private not-for-profit institutions or public institutions.

The cross-sectional IPEDS and HEGIS data were merged to create a longitudinal data set in two stages. First, for each of the IPEDS and HEGIS surveys, a number of component surveys were merged to form one data set for each observation year. Second, institutional identifiers (e.g., FICE codes and INSTID codes) were used to combine these yearly data sets, creating a longitudinal data set for 7 points in time from the early seventies until the early years of the twenty-first century (see Appendix A for a detailed list of component surveys included in the final data set).

3.1.3 Income and Expenditure Variables

In the organizations literature, some studies have examined the association between institutional prestige, relative status, control, and adaptive organizational goals (e.g., Volkwein and Sweitzer 2006; Volkwein 1986; Abbott 1974). Volkwein (1986), for example, employs a number of institutional characteristics (e.g., grants per FTE student, endowments per FTE student as well as Cass and Birnbaum's selectivity scale) to predict campus autonomy. Because institutional reputation is often used as a proxy measure for prestige or status, these studies often rely on popular ranking systems and college handbooks (e.g., *U.S. News & World Report* (*USN&WR*)). These ranking systems, however, distribute much of the weight to crude measures of 'peer assessment' and 'academic reputation' derived from the opinions of other provosts and presidents, and most other indicators speak only minimally to questions of institutional quality (e.g., library holdings).

In Canada, several researchers have criticized the *Maclean's* rankings for their weighting methods, categorization of institutions, usage of self-reported data, and questionable indicators of school quality (Kong and Veall 2005; Shale and Liu 2002; Page 2001; Page 1995). In the U.S., similar criticisms have been levelled at the U.S. News and World Report rankings (Monks and Ehrenberg 1999; McGuire 1995; Stuart 1995). Moreover, in the last few years, *Maclean's* has solicited new graduates for information on their educational experiences (i.e., satisfaction) at their Alma Mater. Such measures are also problematic for many reasons, not the least of which is the issue of self-perception. Since many students are increasingly attending university for reasons other than academic interest (Côté and Allahar 2007; Bills 2004; Brown 2001; Livingstone 1999; Labaree 1997; Collins 1979), it becomes even more troublesome to interpret student satisfaction as a proxy for school quality. Most importantly, both surveys have significantly changed their methodology over time, which inherently confounds changes in rankings with changes in methodology. While rankings may draw attention to

[22] In the results chapter, one can see from the N's and medians over time that some survey items in 2001 were no longer collected from all institutions (i.e., public institutions were omitted). Thus, for some measures, certain segments of the population are excluded from the analyses.

increasing institutional competition, they do not systematically examine inequality among these institutions in a sociological way. The *USN&WR* and *Maclean's* rankings provide quick, marketable snap-shots of the university systems, but the rankings in and of themselves reveal very little about the shape of the distribution (i.e., distances between ranks) or changes over time.

This project rectifies these apparent deficiencies by examining the level of inequality among universities on a number of resources that are critical to the universities' research, innovation and operations. Further, it characterizes the economic disparities among the entire populations of universities and colleges in the two nations. A number of studies in the resource dependency tradition have stressed the importance of obtaining resources to be innovative, create new programs, and attract top faculty (e.g., Ross 1976). The more resources a university holds, the more likely it will be selective and benefit from high levels of prestige. As well, universities must have sufficient resources in order to adapt to prevailing circumstances (e.g., market demands). Further, when universities have more resources, they have the ability to refrain from changing or adapting to environmental influences (Kraatz and Zajac 2001). Although resource dependency theorists understand the significance and implications of the unequal acquisition of resources when applied to the study of higher education organizations, a couple of important questions remain unanswered by this body of research. Specifically, what does the entire hierarchy of resource allocations look like? And, have the shape and characteristics of this hierarchy changed over the last 30 years?

In the existing higher education literature, researchers have pointed to a number of indicators that measure (to varying degrees) institutional stratification (Geiger 2004; Astin and Henson 1977; Astin 1968). The Canadian and American data sets contain a wide range of indicators of institutional resources (e.g., expenditures per FTE student, income from donations per FTE student, income from federal government grants per FTE student, tuitions, per capita endowments) for all Canadian and American universities and their affiliates. These (and other) institutional level variables are analyzed quantitatively, by calculating Gini coefficients, and graphically, using Lorenz curves and boxplots. The challenge for comparative analyses is often to find similar measures in both nations. In some cases, the measures were identical in both nations, and in other cases, significant efforts were made to find the most comparable measures that would allow for cross-national comparisons (for a complete list of economic measures, see Table 3.1).

Table 3.1 Variable Descriptions for the Canadian and American Institutional Analyses.

Canada: TLAC, FIUC and USIS Measures	United States: IPEDS and HEGIS Measures
Average tuition and fees for full-time undergraduates	In-district average tuition and fees for full-time undergraduates In-state average tuition and fees for full-time undergraduates Out-of-state average tuition and fees for full-time undergraduates
Total income from federal government grants	Total income from federal grants and contracts for private n-f-p or public institutions Total income from federal grants and contracts for private f-p institutions
Total income from provincial government grants	Total income from state and local grants and contracts for private n-f-p or public institutions Total income from state and local grants and contracts for private f-p institutions
Total income from course fees	Total income from tuition and fees for private n-f-p or public institutions Total income from tuition and fees for private f-p institutions
Total income from bequests, donations and non-government grants	Total income from private gifts, grants, and contracts for private n-f-p or public institutions Total income from private gifts, grants, and contracts for private f-p institutions
Total income from sales of services and products	Total income from sales and services of educational activities for private n-f-p or public institutions Total income from sales and services of educational activities for private f-p institutions Total income from sales and services of auxiliary enterprises for private n-f-p or public institutions Total income from sales and services of auxiliary enterprises for private f-p institutions
Total income	Total income from revenues and investment return for private n-f-p or public institutions Total income from revenues and investment return for private f-p institutions
Total expenditures on scholarships, bursaries and prizes	Total expenditures on net grant aid to students for private n-f-p or public institutions Total expenditures on net grant aid to students for private f-p institutions
Total expenditures	Total expenditures for private n-f-p or public institutions Total expenditures for private f-p institutions

Note: n-f-p refers to not-for-profit; f-p refers to for-profit.

3.1.4 Analyses

First, Gini coefficients are calculated to provide a standardized measure of inequality that allows for comparisons among institutions over time and across national systems. Gini coefficients represent the cumulative difference in proportions of all adjacent pairs of incomes or expenditures in a population (Cowell 1995). The Gini coefficient can be calculated using the following formula:

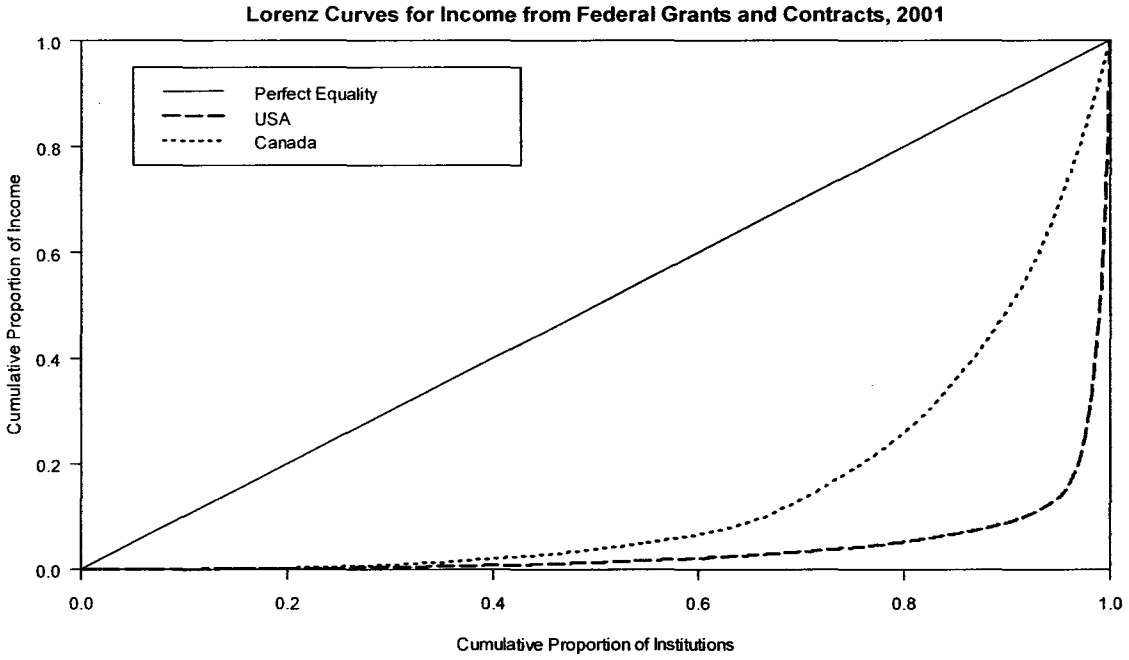
$$G = 1 - \sum_{i=0}^{k-1} (Y_{i+1} + Y_i)(X_{i+1} - X_i) \ ,$$

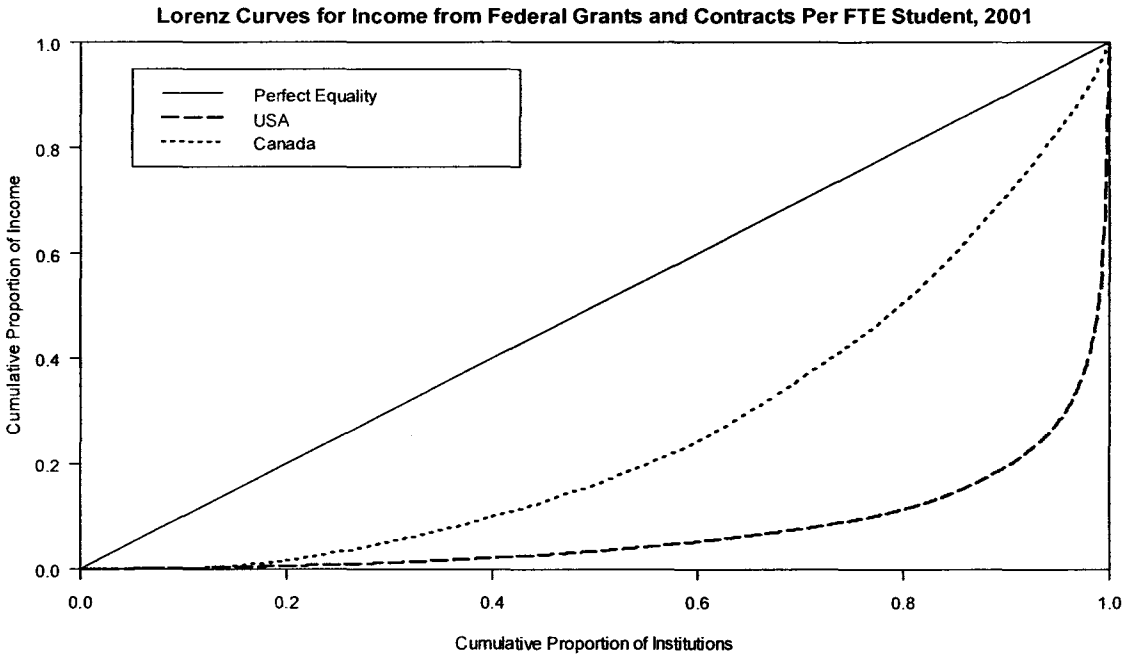
where Y represents the cumulative proportion of the income or expenditures variable and X is the cumulative proportion of schools.

Gini coefficients range on a scale from zero to one, where zero represents perfect equality and one represents total inequality. Often used for cross-national comparisons of the level of inequality in countries as a whole, here the innovative use of the Gini statistic provides a measure of institutional stratification in the higher education system. That is, large Gini coefficients indicate a high degree of institutional variation in a given year or country, while lower scores indicate more parity among university resources.

Second, Lorenz curves are plotted to provide a graphical representation of the Gini coefficient. For the analyses in this project, graphs will include the cumulative proportion of income or expenditures plotted against the cumulative proportion of post-secondary institutions (for an example, see Figure 3.1). A distribution of economic resources that is evenly distributed across all institutions is said to be perfectly equal (i.e., Gini = 0). That is, every institution has the same level of income or same level of expenditures. This is represented graphically by a 45 degree line of perfect equality that connects the lowest x and y proportions at the origin (0,0) to the highest possible proportions on the x and y axes (1.0,1.0). On the line of perfect equality y=x. For instance, an x value of .10 corresponds to a y value of .10. In this situation, the first 10% of institutions receive 10% of the income or expenditure measure of interest (Cowell 1995:19). Conversely, a line of perfect inequality would trace the x axis at y=0 until x=1.0 (i.e., Gini = 1.0). At x=1.0, the line traces the y axis. Twice the area between the line of perfect equality and the Lorenz curve is the Gini coefficient. That is, the Gini coefficient is a proportion of the area between perfect equality and perfect inequality. The greater this proportion, the more inequality among the observed institutions for a given measure of income or expenditures.

Figure 3.1 Lorenz Curves for Canadian and American Universities





Finally, boxplots will be used to provide a graphical representation of the distribution of universities. Boxplots overcome an apparent weakness in many systems of ranking. Often measured at the ordinal level, rankings reveal only one's relative placement in a hierarchy. Boxplots, however, offer visual information about the distances between institutions. For instance, one can see the distance between those at the top and those at the bottom or even how far outliers are from the rest of the distribution. Systems that are composed of largely similar universities have shorter 'whiskers', smaller inter-quartile ranges, and fewer outliers. Systems with a high degree of institutional stratification have longer 'whiskers', a larger inter-quartile range, and more outliers. Boxplots are particularly useful for skewed distributions. With the Ivy League schools, liberal arts colleges, and 'big ten' public universities likely to yield much greater incomes, endowments, tuitions and expenditures, boxplots may reveal these clusters of institutions at the high end of the distribution. For Canada, it is unclear whether any institutions will be split off from the rest of the distribution.[23] Historically, this has not been the case.[24]

Part 2: Individual Level

To examine who gets sorted and selected within higher education, this study draws on the restricted data files of the Baccalaureate and Beyond Longitudinal Studies (B&B) from the National Center for Education Statistics (NCES) in the United States and the National Graduates Surveys (NGS) available from Statistics Canada's Research Data Centres. The B&B and NGS surveys were selected for three particular reasons. First, the two surveys are nationally representative samples of recent college and university graduates and provide extensive information on past educational experiences of bachelor's degree-holders and their future education and labour market expectations as well as post-baccalaureate activities of respondents (e.g., job search/training, entry into graduate school, and loan repayment/financial status).[25] Second, the surveys include many identical and comparable measures thereby facilitating robust international comparisons. For example, the field of study variables in the most recent NGS and B&B surveys are identical. They are derived from the same Classification of Instructional Programs (CIP) codes developed by the NCES. Finally, since students have a tendency to switch their majors in the early years of their degrees, drawing on the NGS and B&B surveys, which interview new *degree-holders*, eliminates any inconsistencies that may have otherwise occurred from interviewing students who switched majors or even degrees. Unfortunately, the NGS data do not include information on students'

[23] Institutions identified as outliers in boxplots have values that are more than 1.5 times the inter-quartile range below the first quartile or above the third quartile.

[24] To allow comparisons over time, all graphs and results are converted to 2001 constant dollars using the Consumer Price Indices (CPI) in Canada and United States. For U.S. boxplots, the results are reported in 2001 CDN dollars, converted at 1.35 as per the Bank of Canada's historic exchange rate for June 1, 2001.

[25] Although the data allow for the prediction of labour market experiences, such analyses will remain topics for future research. In Chapter 6, several underresearched areas for future inquiry are discussed.

postsecondary institution, and analyses of selectivity choices will be conducted for only the United States.

3.2.1 Baccalaureate & Beyond Surveys

At present, the B&B surveys have been conducted for two cohorts (1993, 2000), each containing over 10,000 respondents. Respondents for the 1993 cohort were followed up in 1994, 1997, and 2003, while the 2000 cohort was re-interviewed again only in 2001. The 1993-94 B&B provides information on the educational experiences of a cohort of recent baccalaureate graduates, who received their degrees during the 1992-93 academic year. Students selected into the B&B were first interviewed in the National Postsecondary Student Aid Study (NPSAS, 1993). The 1993-94 B&B cohort consisted of about 12,500 individuals, deemed eligible to participate from their responses to the 1993 NPSAS. Respondents were asked a series of questions via computer-assisted telephone interviews (CATI), and additional information was obtained from undergraduate transcripts, supplied by the students' postsecondary institution.

The 1993-94 B&B is a multistage, stratified sample consisting of three stages. First, a sample of 1,386 institutions was derived from 22 institution level strata from the 1992-93 IPEDS school completions survey. From these 1,386 institutions, 1,243 were deemed eligible to participate in the 1993 NPSAS. Of these 1,243 eligible institutions, 88 percent participated in the NPSAS by providing a list of students. Second, the NPSAS respondents were limited to only those students who were attending the sampled institution and were enrolled in a program that led toward a degree or formal award and had a duration of at least three months. Based on these criteria, 79,269 students were deemed eligible to participate in the NPSAS. Finally, a subsample of 12,478 baccalaureate degree recipients (the B&B) was selected from the NPSAS respondents. These individuals either indicated in the CATI interview that they graduated in the 1992-93 academic year or were identified as having done so in graduation lists provided by the institutions. Of the 12,478 cases that were selected as potential participants in the B&B sample, just over 1,500 were found to have ineligible graduation dates (i.e., fell outside the July 1, 1992 to June 30, 1993 time frame). A final total of around 11,000 cases were considered eligible to participate and interviews were completed for just over 10,000 (92% response rate) of these respondents.

The 2000-01 Baccalaureate and Beyond Longitudinal Study was also collected using computer-assisted telephone interviews and draws on a cohort of students who were identified (in the NPSAS, 2000) as recipients of a bachelor's degree during the 1999–2000 academic year. As in the previous cohort, the 2000-01 B&B sample design consisted of three stages. First, a sample of 1,080 NPSAS eligible institutions was drawn from 22 institution level strata. Second, a sample of 70,230 students from 7 student-level strata was drawn from these eligible institutions. Finally, subsamples were drawn from confirmed and potential baccalaureate recipients from 25 student-level strata yielding a total of approximately 11,700 students. The overall response rate was 86 percent, after

eliminating approximately 1,500 ineligible respondents. That is, just over 10,000 respondents were interviewed in the final B&B sample.

3.2.2 Complex Survey Data

The B&B sampling design is quite complex, composed of multiple sampling stages and stratified sampling at each stage. As a result, statistical analyses were performed using the *survey* package in R and *svy* commands available in Stata 9. Both of these packages adjust the standard errors for the complexity of the sampling procedures. If design effects are left unaccounted for, researchers run the risk of committing a Type I error (i.e., reject the null hypothesis when it is true), since the sampling variance may be underestimated (see Carlson et al. 1993). To account for the complexity of the B&B data collection, both cohorts include a series of balanced repeated replicate (BRR) weights: 44 replicates in the 1993-94 cohort and 64 replicates in 2000-01 cohort. This method computes a statistic of interest once for each of k replicate sets of BRR weights and then estimates the variance of the full stratified estimate.

3.2.3 National Graduates Surveys

The Canadian data for the second set of analyses come from Statistics Canada's National Graduate Surveys (NGS). At present, the National Graduates Surveys have been conducted for five different cohorts of postsecondary graduates (1982, 1986, 1990, 1995 and 2000), each survey including more than 35,000 students. Respondents in each of these cohorts (i.e., to each survey) are surveyed two and five years following their graduation, with one exception. The data for the five-year follow-up survey for the 2000 cohort are not yet publicly available. Similar to the B&B, the NGS were conducted via computer-assisted telephone interviews, and in a few cases, interviews were supplemented with data from Statistics Canada's Enhanced Student Information System (ESIS) and information supplied by the institutions. The NGS provide an excellent source of information relating to the educational history and employment profiles of postsecondary graduates living in both Canada and the United States. The population includes graduates from three levels of postsecondary institutions: universities, colleges, and technical institutions. Graduates of private postsecondary education institutions that adhered to an alternative curriculum other than that followed by publicly funded institutions were excluded. The survey also excludes individuals who were enrolled in part-time trade courses while employed full time, individuals who completed 'continuing education' courses, and people who completed vocational programs lasting less than three months (for more detailed information, see User Guides for the 1995 and 2000 NGS).

Table 3.2 Variable Descriptions for the 1993-94 Cohort of the Baccalaureate and Beyond Survey.

Variables	Variable Descriptions
Marital Status	Coded 0 = Single/Previously Married, 1 = Married
Age	Student's age on 12/31/1992
Gender	Student's gender: coded 0 = Male, 1 = Female
Race	Student's race/ethnicity: set of dummy variables where 'White' is the reference category and other categories include 'Black', 'Hispanic or Latino', 'Asian', and 'Other'
Parents' Education	The highest level of education of either parent: coded 0 = Less than bachelor's, 1 = Bachelor's or higher
Income	Parent's income of dependent students or income of independent students
Aspirations	Highest post-baccalaureate educational plans or expectations: coded 0 = Below Master's, 1 = Master's or higher
High School Type	Student's high school type: set of dummy variables where 'Public' is the reference category and other categories include 'Private, Catholic', 'Private, not religious', 'Private, other religious'
SAT Score Combined	Merged SAT or ACT score quartile
Enrolment Size	Total enrolment of the institution where the student received the 1992-1993 bachelor's degree
Institution Sector	Indicates the sector and type of the student's undergraduate institution: set of dummy variables where 'Public, 4 year non-PhD' is the reference category and other categories are 'Public, 4 year PhD', 'Private, 4 year non-PhD', and 'Private, 4 year PhD'
Institution Selectivity	Institution's 75th percentile combined SAT math and verbal scores of the incoming class in 2005 (Source: IPEDS 2005)
Field	Undergraduate major field of study: set of dummy variables where 'Business and Management' is the reference category and other categories include 'Education', 'Engineering, Math and Physical Science', 'Biological Sciences and Health Professions', 'Humanities', 'Social Sciences', and 'Other'
Field (scored)	Undergraduate major field of study: 99 categories ordered by the mean income of graduates one year into the labour market
Weights	44 replicate weights used to generate BRR variance estimates for cross-sectional analysis of respondents to the B&B:1993/1994

Table 3.3 Variable Descriptions for the 2000-01 Cohort of the Baccalaureate and Beyond Survey.

Variables	Variable Descriptions
Marital Status	Coded 0 = Single/Previously Married, 1 = Married
Age	Student's age on 12/31/1999
Gender	Student's gender: coded 0 = Male, 1 = Female
Race	Student's race/ethnicity: set of dummy variables for where 'White' is the reference category and other categories include 'Black', 'Hispanic or Latino', 'Asian', and 'Other'
Parents' Education	The highest level of education of either parent: coded 0 = Less than bachelor's, 1 = Bachelor's or higher
Income	Parent's income of dependent students or income of independent students
Aspirations	Highest post-baccalaureate educational plans or expectations: coded 0 = Below Master's, 1 = Master's or higher
High School Type	Student's high school type: set of dummy variables where 'Public' is the reference category and other categories include 'Private, Catholic', 'Private, not religious', 'Private, other religious'
SAT Score Combined	SAT combined score, derived as either the sum of SAT verbal and math scores or the ACT composite score converted to an estimated SAT combined score from agency-reported or institution-reported SAT or ACT scores
Enrolment Size	Total enrolment of the institution where the student received the 1999-2000 bachelor's degree
Institution Sector	Indicates the sector and type of the student's undergraduate institution: set of dummy variables where 'Public, 4 year non-PhD' is the reference category and other categories are 'Public, 4 year PhD', 'Private, 4 year non-PhD', and 'Private, 4 year PhD'
Institution Selectivity	Institution's 75th percentile combined SAT math and verbal scores of the incoming class in 2005 (Source: IPEDS 2005)
Field	Undergraduate major field of study: set of dummy variables where 'Business and Management' is the reference category and other categories include 'Education', 'Engineering, Math and Physical Science', 'Biological Sciences and Health Professions', 'Humanities', 'Social Sciences', and 'Other'
Field (scored)	Undergraduate major field of study: 99 categories ordered by the mean income of graduates one year into the labour market
Weights	64 replicate weights used to generate BRR variance estimates for cross-sectional analysis of respondents to the B&B:2000/2001

For the purposes of this project, the Canadian analyses were limited to the two most recent cohorts of the NGS, since these two surveys most closely resemble the Baccalaureate and Beyond studies. Further, several theoretically important variables were either not available or were modified extensively across NGS cohorts. In particular, older surveys (e.g., 1990, 1986, and 1982) of the NGS did not include information on student scholarships or government-sponsored student loans, two variables necessary for use as proxy measures for ability and SES. As well, the surveys failed to include measures for student aspirations. One of the follow-ups to the 1990 survey did ask individuals whether they planned on pursuing a doctorate degree, but this question was limited to respondents who had obtained a Master's degree after their undergraduate degree obtained in 1990.

Both the 1995 and 2000 cohorts of NGS were derived from stratified, systematic random sample designs without the replacement of graduates within strata. The sample was stratified by the geographical location of the institution, level of certification, and field of study. For the 1995 survey, interviews were conducted between May and July of 1997; for the 2000 survey, the data were collected between May and July of 2002. This sampling design produced a total sample size of 61,759 and 43,040 (70%) responding graduates in the 1995 NGS. The response rates were similar for the 2000 NGS, as 38,493 (66%) graduates of a total 61,558 eligible respondents were interviewed.

3.2.4 Subsamples for Comparative Analyses

To ensure that the B&B and NGS samples were consistent across cohorts and cross-nationally, a number of restrictions were placed on the analyses. Specifically, the analyses were limited to students who completed their degree in a particular cohort, did not previously obtain a bachelor's degree prior to this degree, and were citizens of their country of education. The sample used in the U.S. selectivity and field of study analyses consisted of only students who completed their degree program in 1993 (n = 10,062), did not previously have a bachelor's degree by July 7, 1992 (n = 9985), were citizens of the United States (n = 8884), did not attend or transfer in their undergraduate degree from an HBCU (Historically Black College or University) (n = 8690), and have institutional level data available (n = 7126).[26]

For the 2000-01 B&B cohort, the analyses were limited to only those students who completed their degree in 2000 (n = 9896), obtained their first bachelor's degree at

[26] As in previous research on selectivity (see Thomas 2003), students who attended or transferred from an HBCU were excluded from the analyses to provide a more accurate picture of the inequalities racial minorities may face in their school and field of study choices. Traditionally, the principal mission of HBCU's has been the education of African Americans, and even today graduates from HBCU's account for a disproportionate percentage of all African American graduates nationwide (see http://www.ed.gov/about/inits/list/whhbcu/edlite-index.html for details). That is, the picture of access in HBCU's may look quite different from the rest of the population of postsecondary institutions, confounding the true level of racial inequality in entering particular schools or fields.

this time (9336), were U.S. citizens (n = 8960), did not spend any time at an HBCU (n = 8803), and have data on the bachelor's institution (n = 7133).

The Canadian samples were restricted in the same manner, with the exception of the availability of institutional level data considerations.[27] For the 1995 cohort of the NGS, the sample employed in the field of study analyses consisted of only students who completed a bachelor's or first professional degree in 1995 (n = 8221), did not previously hold a bachelor's degree prior to enrolment (n = 6403), and were Canadian citizens (n = 6232). Similarly, the sample from 2000 cohort of the NGS was limited to only those students who completed a bachelor's or first professional degree in 2000 (n = 11417), did not previously obtain a bachelor's degree (n = 10318), and were citizens of Canada (n = 9835).

3.2.5 Analyses

The statistical analyses contain ordinary least squares regressions and multinomial logit models (Long and Freese 2000; Fox 1997; Long 1997).[28] To aid in the interpretation of the multinomial logit results, predicted probabilities are calculated and presented in graphs.[29] In Canada, fields or majors have been examined only in terms of

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[27] Unfortunately, there is no way to identify clusters (e.g., by schools, census tracts or other geographical locations) with the NGS data available at Statistics Canada's Research Data Centres. Thus, the author was unable to estimate random coefficient models or even simply adjust the standard errors of the estimates for clustering. The author hopes that Statistics Canada will consider making this information available in future versions of the National Graduates Surveys.

[28] To explore the possibility of estimating mixed effects models for the U.S. analyses, null models (i.e., unconditional hierarchical linear model or the basic ANOVA model with nested random factors) with only a random intercept were estimated for the lucrative field of study models (Raudenbush and Bryk 2002; Pinheiro and Bates 2000). For the B&B 1993-94 data, the Intraclass Correlation Coefficient (ICC) was $(1302.312)^2/ (1302.312)^2 + (5373.773)^2 = 0.028$. In other words, only 2.8% of the variation in lucrative field choices are due to differences among schools (see Luke, 2004). For the 2000-01 B&B cohort, the ICC was $(1519.32)^2/ (1519.32)^2 + (6071.9)^2 = 0.020$. These extremely low ICC values suggest that mixed effect models incorporating schools and school characteristics may not be appropriate in this circumstance. Moreover, graphical displays of the variation by institution on a number of explanatory variables reconfirm these low ICC values. That is, neither the intercepts nor the slopes for income, SAT, GPA, nor GPA in major vary significantly by school. As a practical matter, the author was unable to locate software that was capable of estimating mixed effects models when using complex survey data. Further, the author also attempted to fit mixed effects multinomial logits using the GLLAMM add-on package for Stata (see Rabe-Hesketh et al. 2001). While the ICC was slightly higher than the lucrative fields models [e.g., .1759/(.1902+3.6309) = 0.046], there is still little evidence of school level differences. As a practical note, the author attempted a simple mixed effects multinomial model including only field of study regressed on gender using the 2000-01 B&B data. After 23 hours (456 iterations), the estimates had not converged. Further still, these models would not have accounted for the complexity of the B&B surveys.

[29] For example, as in Long (1997), the predicted probability that $y = m$ given x is calculated as follows: $\Pr(y = m \mid x_i) = \frac{\exp(x_i\beta_m)}{\sum_{j=1}^{J}\exp(x_i\beta_j)}$, where $\beta_1 = 0$ and, β_m is a vector of coefficients for the effect of xi on outcome m and J is the number of outcomes of the dependent variable. To examine the effects of particular explanatory variables x_k, all variables except for x_k will be held at their means or proportions.

Table 3.4 Variable Descriptions for the 1995 Cohort of the National Graduates Survey.

Variables	Variable Descriptions
Marital Status	Coded 0 = Single/Previously Married, 1 = Married
Age	Age of respondent in June 1997
Gender	Student's gender: coded 0 = male, 1 = female
Race	Coded 0 = Not Visible Minority, 1 = Visible Minority
Father's Education	The highest level of education for student's father: coded 0 = Less than bachelor's, 1 = Bachelor's or higher
Mother's Education	The highest level of education for student's mother: coded 0 = Less than bachelor's, 1 = Bachelor's or higher
SES	Total dollar amount received from government-sponsored student loans: set of dummy variables where 'No Loans' is the reference category and other categories are 'Loans of $15,000 dollars or less' and 'Loans above $15,000'
Scholarships	Total dollar amount of achievement-based scholarships, awards, and fellowships: set of dummy variables where 'No scholarships' is the reference category and other categories are 'Scholarships of $5,000 dollars or less' and 'Scholarships above $5,000'
Aspirations	Indicates whether or not the respondent plans on pursuing a Master's degree: coded 0 = No Master's degree, 1 = Master's degree plans
Field	Undergraduate major field of study: set of dummy variables where 'Business and Management' is the reference category and other categories include 'Education', 'Engineering, Math and Physical Science', 'Biological Sciences and Health Professions', 'Humanities', 'Social Sciences', and 'Other'
Field (scored)	Undergraduate major field of study: classification of instructional program at graduation (i.e., CIP codes) ordered by the mean income of graduates one year into the labour market (i.e., 1996)
Weights	Sampling weights

Table 3.5 Variable Descriptions for the 2000 Cohort of the National Graduates Survey.

Variables	Variable Descriptions
Marital Status	Coded 0 = Single/Previously Married, 1 = Married
Age	Student's age at time of interview
Gender	Student's gender: coded 0 = male, 1 = female
Race	Coded 0 = Not Visible Minority, 1 = Visible Minority
Father's Education	The highest level of education for student's father: coded 0 = Less than bachelor's, 1 = Bachelor's or higher
Mother's Education	The highest level of education for student's mother: coded 0 = Less than bachelor's, 1 = Bachelor's or higher
SES	Total dollar amount received from government-sponsored student loans: set of dummy variables where 'No Loans' is the reference category and other categories are 'Loans of $15,000 dollars or less' and 'Loans above $15,000'
Scholarships	Total dollar amount of achievement-based scholarships, awards, and fellowships: set of dummy variables where 'No scholarships' is the reference category and other categories are 'Scholarships of $5,000 dollars or less' and 'Scholarships above $5,000'
Aspirations	Indicates whether or not the respondent plans on pursuing a Master's degree: coded 0 = No Master's degree, 1 = Master's degree plans
Field	Undergraduate major field of study: set of dummy variables where 'Business and Management' is the reference category and other categories include 'Education', 'Engineering, Math and Physical Science', 'Biological Sciences and Health Professions', 'Humanities', 'Social Sciences', and 'Other'
Field (scored)	Undergraduate major field of study: classification of instructional program at graduation (i.e., CIP codes) ordered by the mean income of graduates one year into the labour market (i.e., 2001)
Weights	Sampling weights

their influence on earnings, job satisfaction, underemployment, and employability (e.g., Zarifa and Walters 2008; Walters 2004; Finnie and Frenette 2003; Betts et al. 2000; Finnie 1999), and thus many of the variables of interest are modelled after sociological studies conducted in the U.S. (e.g., Mullen et al. 2003; Karen 2002; Davies and Guppy 1997; Stolzenberg 1994; Ethington and Smart 1986; Mare 1980). The key response variables include field of study for both nations, a continuous measure of lucrative fields (i.e., fields scored by average early labour market incomes), and the average combined SAT score of entering students (in U.S. only), a demonstrated measure of institutional selectivity (see Davies and Guppy 1997). Specifically, this produced two sets of models predicting Canadian field of study decisions, two sets of models that examine what factors affect one's graduating major in the U.S., four sets of models (two for Canada and two for U.S.) predicting lucrative field of study choices, and two sets of models that predict one's choice of institution in the U.S. For each of these models, a number of key explanatory variables were entered in several stages. Base models will include a number of controls, and subsequent models will include family background variables, measures of ability and aspirations, and interactions of particular theoretical interest.

3.2.6 Explanatory Variables

A number of sociodemographic variables was entered into the first sets of the Canadian and American models including respondent's age (in years), marital status, gender, and racial background or ethnicity. Detailed descriptions and coding for all variables can be found in Tables 3.2-3.5. With the exception of racial background, which consisted of two categories in the Canadian analyses and five categories in the U.S. models, all of these variables were quite similar across cohorts and nations.

Subsequent models included theoretically and empirically supported measures of family background, ability, aspirations, and institutional characteristics (in U.S. only). The influence of family background on field and school choices was measured using parent's level of education, income of parent or independent student in dollars (B&B calculation)[30], and high school type in the B&B analyses. Since it is likely that parents who hold bachelor's degrees have a familiarity with university experiences, the variables on parental level of education were recoded into two distinct categories: parents with less than a bachelor's degree and parents with a bachelor's degree or higher.[31] To explore the

[30] Students under the age of 24 were generally considered to be dependent on their parents for financial support. The B&B surveys deemed students to be independent if they met any of the following criteria: 1) age 24 or older at the time of degree completion, 2) a veteran of the U.S. Armed Forces, 3) enrolled in a graduate or professional program beyond a bachelor's degree, 4) married, 5) orphan or ward of the court, or 6) have legal dependents other than a spouse. In the statistical analyses, additional field of study and lucrative fields models were estimated on *only* dependent students. The coefficients and standard errors changed only slightly when this was done, so the final models presented in this dissertation include all students.

[31] While the models have large numbers of degrees of freedom, creating a dichotomous variable for parents' education avoids unnecessary complexity in the models. In doing so, we are able to see whether or not

private versus public high school influence on postsecondary choices, high school type was included as a set of four of dummy variables (i.e., public; private, non-religious; private, Catholic; and private, other religious)

In the NGS analyses, father's and mother's level of education and the respondent's total dollar amount of government-sponsored student loans (i.e., income) were used to operationalize family background. Based on the highly skewed distribution of the loans variable, which included a large number of meaningful zero values, a set of dummy variables was created with the following categories: 'no loans', 'loans of $15,000 or less', and 'loans above $15,000'.[32] Unfortunately, the NGS surveys do not ask respondents about their high school type, and consequently, the author was unable to include a comparable measure in the Canadian analyses.

In addition to ascriptive and family background influences, existing studies also suggest that student ability and educational aspirations are important predictors of field of study and postsecondary institution choices. To measure ability, several variables were included in the B&B analyses. Specifically, these variables include respondents' SAT or ACT combined score, cumulative undergraduate GPA, and their cumulative undergraduate GPA in their college major. Unfortunately, Canada lacks an analogous standardized measure of student ability comparable to the SAT administered to high school students in the United States. While many advanced postsecondary programs in Canada require applicants to write standardized tests (e.g., law school, medicine and dentistry programs, MBA programs, as well as some graduate programs), their test scores are not available in the NGS. In the Canadian analyses, the total dollar amount of the respondents' achievement-based scholarships, awards, and fellowships was used as a proxy measure for ability. Since the distribution of scholarships was very highly skewed to the right and included a large proportion of students with meaningful zero values, the proxy for ability was treated as a categorical variable with three categories: 'no scholarships', 'scholarships of $5,000 or less', and 'scholarships above $5,000'.[33] In terms of aspirations, both the B&B and NGS surveys included similar measures. Since the original categories of the variables differed slightly across nations, the variables were recoded dichotomies that measure whether or not students were planning on pursuing studies beyond the bachelor's degree that they had just completed.

In the U.S. field of study analyses, a number of institutional characteristics were also included in the analyses. Previous research suggests that student choices, in particular for women, may be influenced by the type of institution (Dale and Krueger

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parents who hold at least a bachelor's degree have an impact on their students' choice of major or undergraduate institution.

[32] Unfortunately, the National Graduates Surveys do not contain measures of SES or family income. Government-sponsored student loans provide the best alternative, since family income is directly involved in students' eligibility and the amounts of loans offered. Moreover, since undergraduate tuitions are fairly similar across disciplines in Canadian institutions, the amount of loans may be only slightly affected by students' entering a more expensive program.

[33] Scholarships provide the best available proxy for ability in the NGS data. Unfortunately, Canada lacks a standardized measure of ability equivalent to the SAT in the United States. For the most part, scholarships at Canadian institutions are based largely on students' high school grades and provide a crude indication of ability. Still, scholarship dollar amounts may vary by fields of study.

2002; Jacobs 1999). To explore the variation of student choices across institutions, the size of the institution, the sector and type of the school, and a measure of institutional selectivity (described below) were included as predictors in the U.S. models.[34]

3.2.7 Response Variables: Selectivity, Fields of Study and Lucrative Fields of Study

Selectivity

As discussed earlier, selectivity is often operationalized using the average SAT scores of the freshmen class of postsecondary institutions. Similarly, in this project, the seventy-fifth percentile combined SAT score of the incoming class was employed as the measure of school selectivity and models (for only the U.S.) were estimated using OLS regression models. This measure of selectivity was obtained from the IPEDS (Integrated Post-secondary Education Data System) also available from the NCES (National Center for Educational Statistics). Specifically, the institutional identifiers in the B&B were matched with those in the IPEDS data to add this institutional characteristic to the B&B data sets. In 2001, the IPEDS surveys began including data on the post-secondary institution's 75th percentile math and verbal SAT scores. To create a combined measure of SAT scores for all institutions in 2001, 2002, 2003, 2004, and 2005, the author summed the 75th percentile SAT verbal and SAT math scores for each institution. In the 2001 data, an extremely low outlier 'Paul Quinn College' (INSTID = 227429) reported an average SAT score of only 200. In 2005, this same school reported a score of 1570. Correlations with and without 'Paul Quinn College' were performed. The correlations with 2001 scores before 'Paul Quinn College' was removed were .930**, .912**, .916**, .868** for 2002, 2003, 2004, and 2005 respectively; the correlations with 2001 scores after 'Paul Quinn College' was removed were .944**, .921**, .927**, and .923** for 2002, 2003, 2004, and 2005 respectively (** $p < 0.01$). Therefore, since this measure of

[34] Regression-based methods of imputation were used for quantitative variables with data missing at random in the Baccalaureate and Beyond Studies. This method imputes missing values based on regression estimates from non-missing variables in the data set. Predictors used in the regression-based imputations include respondents' gender, age, race, and high school type. While multiple imputation methods would have been desirable, these methods are not yet readily available for situations that simultaneously deal with complex survey data. In the 1993-94 B&B cohort, data were imputed for combined SAT scores (23%); in the 2000-01 cohort, imputations were performed for enrolments (0.3%), income (0.3%) and combined SAT scores (16%). As in previous research (Mullen et al. 2003; Walters 2004), categorical variables with missing data included separate categories for missing cases in order to keep these observations in the analyses. For the 1993-94 B&B, missing categories were created for marital status (0.3%), parent education (4.6%), and educational aspirations (0.3%). Similarly, in the 2000-01 cohort, missing categories were created for marital status (1.5%), parent education (4.3%), and educational aspirations (1.2%). In the 1995 NGS analyses, missing categories were created for marital status (1%), race (11.8%), father's education (4.1%), mother's education (3.5%), educational aspirations (21%), scholarships (1.4%), and loans (1.6%). For the 2000 NGS, missing categories were created for marital status (0.1%), race (3.4%), father's education (2.4%), mother's education (1.5%), educational aspirations (19%), scholarships (1.5%), and loans (1.3%).

selectivity is not available for the earlier IPEDS data and the scores are extremely highly correlated over time, the analyses were estimated using the 2005 scores. Since the sample size of reported scores increased over time, using the 2005 SAT scores to operationalize institutional selectivity maximizes the number of individuals who were included in the analyses when matched with the B&B.

Fields of Study

The field of study variables used in the B&B and 2000 NGS multinomial logits are based on the Classification of Instructional Programs (CIP), a field of study classification system developed by the National Center for Education Statistics in the United States (for a detailed description of CIP codes, see Appendix A in 2000 NGS User Guide). In the 1995 NGS, field of study classification codes used by the University Student Information System (USIS) and Community College Information System (CCSIS) and developed by the Centre for Education Statistics at Statistics Canada were used. The two coding schemes are quite similar, each consisting of approximately 100 categories. Both surveys also include aggregated versions of these field of study classifications into approximately ten categories. In the statistical analyses, the field of study variables were aggregated further into 7 mutually exclusive categories, making the slight differences in the two coding schemes negligible and results highly consistent across cohorts.[35] The final categories used in the multinomial logits are displayed below.

1. Business and Management
2. Education
3. Engineering, Math and Physical Science
4. Biological Sciences and Health Professions
5. Humanities
6. Social Sciences
7. Other

Lucrative Fields of Study

To measure the stratification of fields, respondents' reported fields of study were scored according to new graduates' average annual earnings one year after entering the labour market using the first-follow up surveys for each cohort of the Baccalaureate and

[35] Hausman tests for the Independence of Irrelevant Alternatives (IIA) assumption were performed to measure whether the omission of one or more categories of the recoded field of study variable would affect the estimates of the parameters. Since, the author was unable to reject the null hypothesis that IIA holds, the outcome categories were deemed distinct and independent (see Long and Freese 2000; Long 1997).

Beyond and National Graduate Surveys.[36] In other words, the group means [by unaggregated field of study (i.e., CIP code or CCSIS and USIS categories] of respondents' total earnings from wages, salaries, and self-employment one year into the workforce was regressed on the same explanatory variables and in the same manner as the multinomial logits described above. Coding the response variable in this manner does not assume that all individuals pursue more lucrative fields of study. As mentioned in the discussion of the existing literature, a myriad of rationales motivate the selection of college majors. At the same time, low economic returns in some fields may be the product of a high proportion of students entering graduate school (see Goyette and Mullen 2006). Students in the social sciences, for example, may have lower immediate economic returns with a BA, but may catch up to those in health or engineering fields by pursuing higher levels of education within their field. Still, for every Arts, Humanities or Social Science graduate student, there may be several hundred who do not continue on into graduate school and do enter the labour market with their baccalaureate degree. Consequently, the purpose of these analyses here is to predict who enters fields with the greatest potential economic payoff at the bachelor level. In this sense, applying the assumption of order provides a different picture than discrete choice or multinomial models – one that serves to stratify field choices by their labour market rewards (see Davies and Guppy 1997). Taken together, the two approaches will provide a comprehensive examination of field choices for young Canadians and Americans.

[36] Since not all of the surveys contain information on graduates earnings at later points in time (e.g., B&B 2000-01 and NGS 2000), incomes one year into the workforce provided the most comparable measure to order fields of study.

Chapter 4: Results for the Institutional Level

This chapter presents findings from the institutional level analyses. As mentioned in further detail above, these analyses seek to empirically measure institutional stratification and determine whether or not institutions are becoming more stratified over time. Specifically, three principal research questions guided the analyses. First, are universities in Canada becoming more stratified over time (since the early 1970s)? Second, are there any key differences in the economic stratification of Canadian and American universities? Finally, have cross-national differences changed over time?

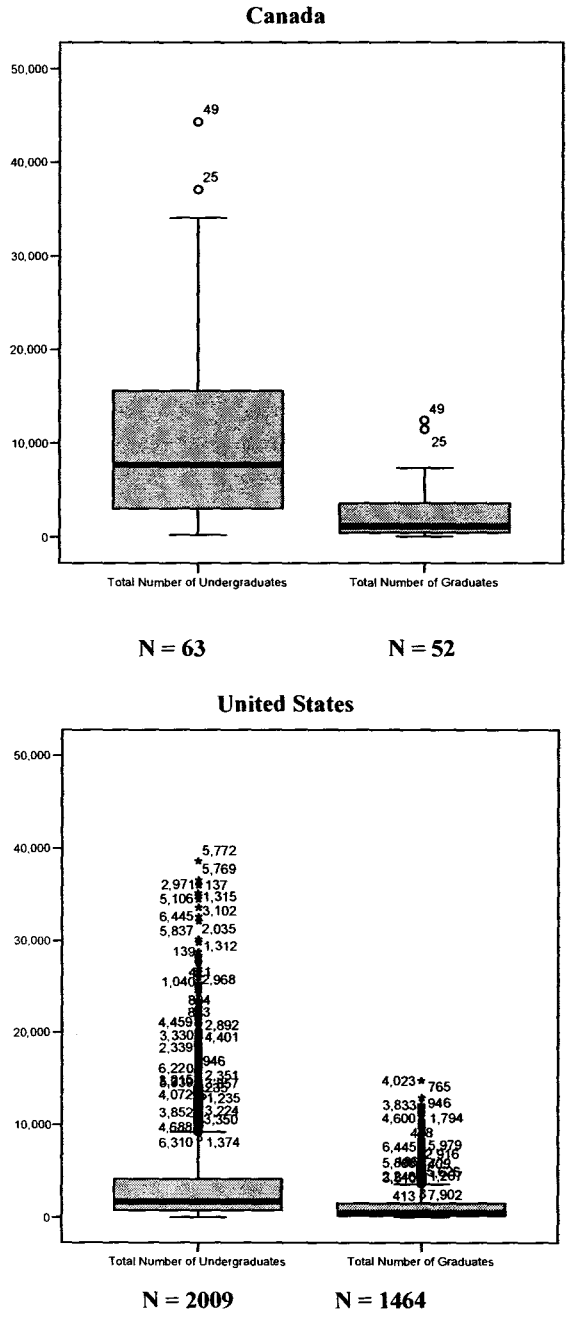
This chapter is divided into four sections. The first section characterizes the level of inequality among Canadian and American universities, making cross-national comparisons of the current level of stratification among universities. Second, patterns among Canadian universities are examined over time using Gini coefficients, Lorenz curves, and boxplots. Third, the results for U.S. institutions over time are presented and discussed in relation to the Canadian trends. Finally, this chapter concludes with a summary of the key findings and their broader implications.

4.1 Canada – U.S. Comparisons

Prior to examining measures of institutional inequality, it is revealing to consider first national differences in terms of the size of universities as an indicator of system differentiation. In Figure 4.1, boxplots of the distributions of undergraduate and graduate student enrolments are plotted for Canadian and American universities. The most striking contrast is that while the spreads of values are roughly similar, the shape of the Canadian distribution is much more symmetric, while the U.S. distribution is highly positively skewed. These plots illustrate that while universities differ in size in both countries, there is much greater dissimilarity within the United States. The smaller interquartile range and large number of outliers at the upper end of the American distribution suggests that the "typical" U.S. university is considerably smaller, but the many upper outliers suggest the existence of very large institutions. At the outset, this variation in school size shows some evidence of greater institutional differentiation and variability within the United States, and more similarity within Canada, likely reflecting its greater provincial regulation. These notions of size inequality become particularly interesting when examining the distributions of incomes and expenditures, as U.S. institutions (albeit significantly smaller on average) operate on a much larger scale than Canadian universities.

Nine measures were selected as the most comparable indicators across nations and over time. As mentioned in the previous chapter, the particular focus here is on measuring the relative degree of economic stratification among universities. Table 4.1 compares Gini coefficients along several measures of income and expenditures in 2001. For comparative purposes, the analyses include only 4-year and professional degree-

Figure 4.1 Comparing Undergraduate and Graduate Enrolments (2001)



Notes: 1. The two Canadian outliers are the University of Toronto (49) and the University of Montreal (25).
2. The most extreme outliers in the U.S. are the University of Texas at Austin (5772), Texas A&M University (5769), Ohio State University (4600), New York University (4023), National University (765), and Johns Hopkins University (2620).

Table 4.1 Gini Coefficients for Degree-Granting Institutions in Canada and the United States (controlling for FTE)

Canada	*2001*	United States	*2001*
Average Tuition and Fees for Full-time Undergraduates	0.1503	*In-district average tuition and fees for full-time undergraduates*	0.3603
		In-state average tuition and fees for full-time undergraduates	0.3603
		Out-of-state average tuition and fees for full-time undergraduates	0.2581
Total Income from Federal Government Grants	0.4777	*Total income from federal grants and contracts for private n-f-p or public institutions*	0.8536
		Total income from federal grants and contracts for private f-p institutions	0.3623
Total Income from Provincial Government Grants	0.2354	*Total income from state and local grants and contracts for private n-f-p or public institutions*	0.8790
		Total income from state and local grants and contracts for private f-p institutions	0.4944
Total Income from Course Fees	0.2424	*Total income from tuition and fees for private n-f-p or public institutions*	0.5884
		Total income from tuition and fees for private f-p institutions	0.2729
Total Income from Bequests, Donations and Non-Government Grants	0.5466	*Total income from private gifts, grants, and contracts for private n-f-p or public institutions*	0.7186
		Total income from private gifts, grants, and contracts for private f-p institutions	0.6441
Total Income from Sales of Services and Products	0.3505	*Total income from sales and services of educational activities for private n-f-p or public institutions*	0.8587
		Total income from sales and services of educational activities for private f-p institutions	0.8256
Total Income	0.1857	*Total income from revenues and investment return for private n-f-p or public institutions*	0.8597
		Total income from revenues and investment return for private f-p institutions	0.2674
Total Expenditures on Scholarships, Bursaries, Prizes	0.3789	*Total Expenditures on Net grant aid to students for private n-f-p or public institutions*	0.6811
		Total Expenditures on Net grant aid to students for private f-p institutions	0.7542
Total Expenditures	0.1792	*Total Expenditures for private n-f-p or public institutions*	0.8516
		Total Expenditures for private f-p institutions	0.3078

Table 4.1 *(Continued)*

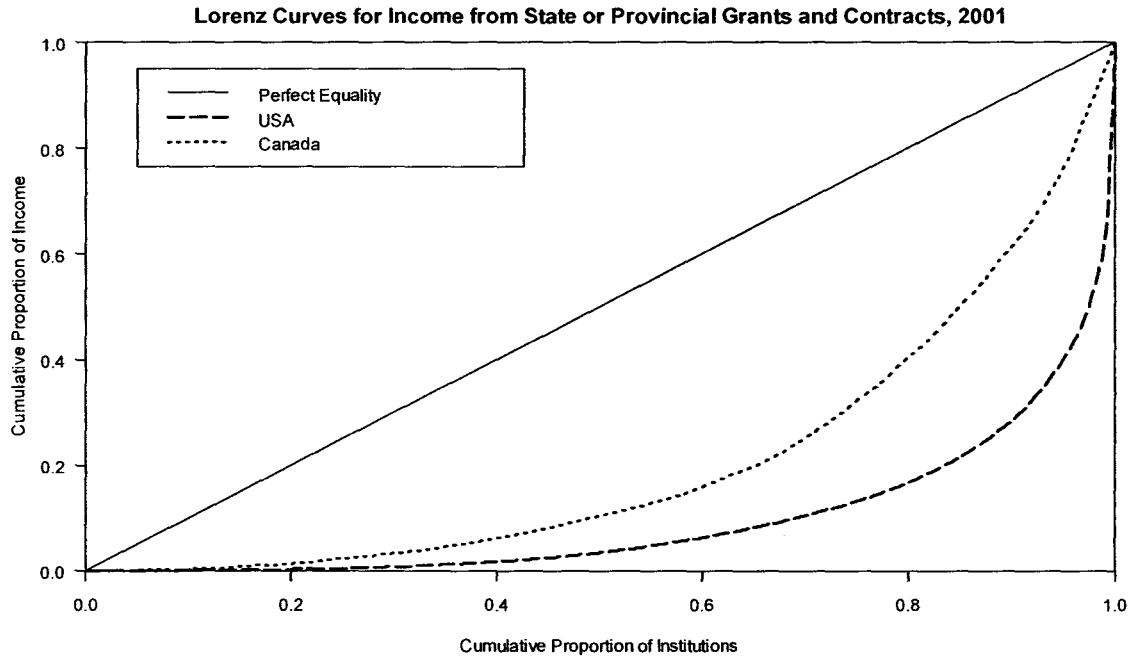
Notes: 1. All measures (except tuition) have been divided by the institution's quantity of full-time equivalent (FTE) students.
2. Given the sensitivity of Gini indices, negative and zero-values were omitted from calculations. As a result, the above estimates are more conservative albeit more stable.
3. f-p and n-f-p refer to "for-profit" and "not-for-profit" respectively.
4. For comparative purposes, U.S. data include only 4-year and professional degree-granting institutions.

granting institutions, control for FTE enrolments, and separate out for-profit private universities in the U.S. Comparisons are made between the Canadian institutions and the public and private non-profit American schools. Overall, the table shows that U.S. Gini coefficients for private not-for-profit and public institutions are larger for every economic measure. In fact, for this same group of institutions in the U.S., only the Gini coefficients for in-district tuition and fees, income from course fees, and expenditures on scholarships fall below 0.70. By contrast, in Canada only one Gini coefficient *exceeds* a value of 0.50 (e.g., income from bequests, donations, and non-government grants). For tuition, federal, state/provincial and private sources of income, and total overall income, the American coefficients are considerably larger than are those for Canada. In some cases, the contrast is quite striking, with some American coefficients more than doubling their Canadian counterparts. For example, the Gini coefficient for total income is over four times as large for the U.S. (approx. 0.86 versus approx. 0.19). As might be expected, there is far greater tuition inequality in the U.S., but also greater inequality on other sources of income. Canada's figure of just over 0.23 for provincial grants and contracts income suggests a fair degree of institutional parity, compared to the U.S. figure of about 0.88. A similar story is told by indicators of expenditures. While there is a striking degree of inequality among American institutions of just over 0.85, the Canadian coefficient of approximately 0.18 suggests once again a degree of parity and relative lack of stratification.

Lorenz curves provide some insight into which particular segments of the distributions contribute to the overall level of inequality. As demonstrated numerically with the Gini coefficients, all plots of the income and expenditure measures illustrate greater inequality among U.S. universities. That is, the narrower Lorenz curves for Canadian institutions are nested within the larger and wider U.S. Lorenz curves.[37] For instance, Figure 4.2 displays the Lorenz curves for state or provincial grants in Canada and the U.S. In the top plot, before accounting for differences in the size of the institutions, the shape and levels of inequality are quite similar. Both distributions illustrate a sizable amount of inequality among provincial or state funding. When controlling for FTE in the bottom plot, however, the degree of inequality among Canadian institutions shrinks dramatically. This pattern also holds for many of the other measures. Many of the marginal Gini's and Lorenz curves are similar in their distributions; however, once controlling for FTE, the patterns of inequality become noticeably different (e.g., total income, total expenditures, expenditures on scholarships). This pattern of relative equality likely reflects Canada's tighter postsecondary regulation, resulting in more institutional parity. While there are a few exceptions where the patterns of inequality among Canadian and U.S. institutions remain markedly similar even once controlling for FTE enrolments, these results were found in areas where government regulation has become more relaxed (e.g., for income from tuition and fees and income from gifts and donations). Still, it is possible that institutional inequality in Canada operates largely as a function of school size. Schools may expand enrolments to solicit more government funding on a per capita basis. Yet, this influx of students may be

[37] All of the Lorenz curves are based on measures for only the public and not-for-profit U.S. institutions.

Figure 4.2


Lorenz Curves for Income from State or Provincial Grants and Contracts, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

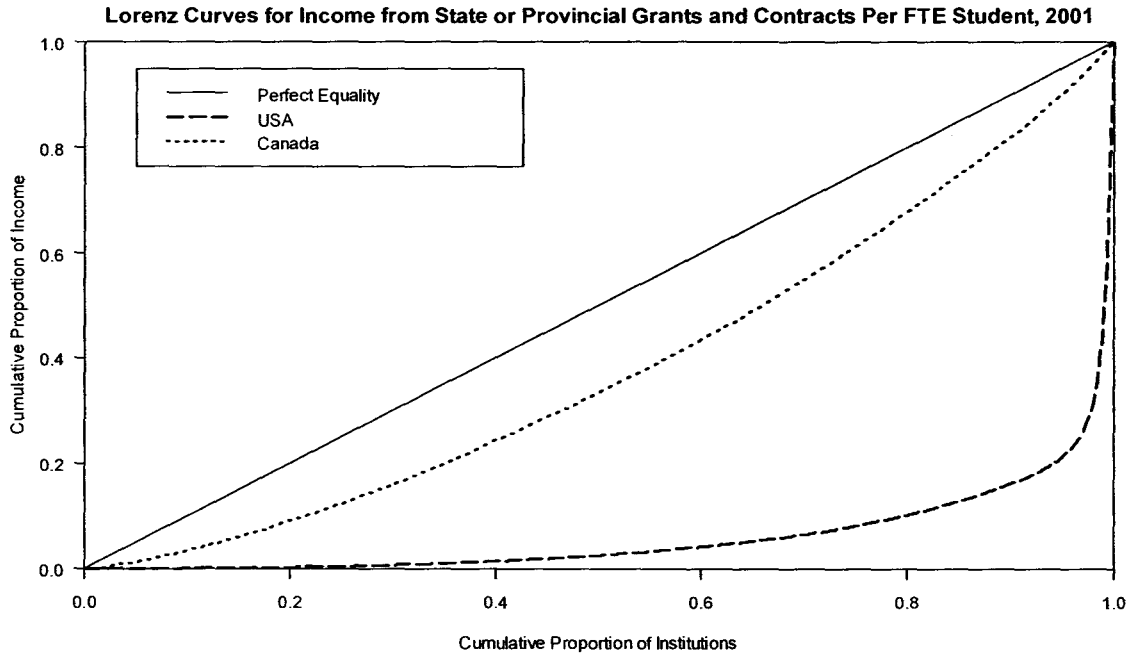
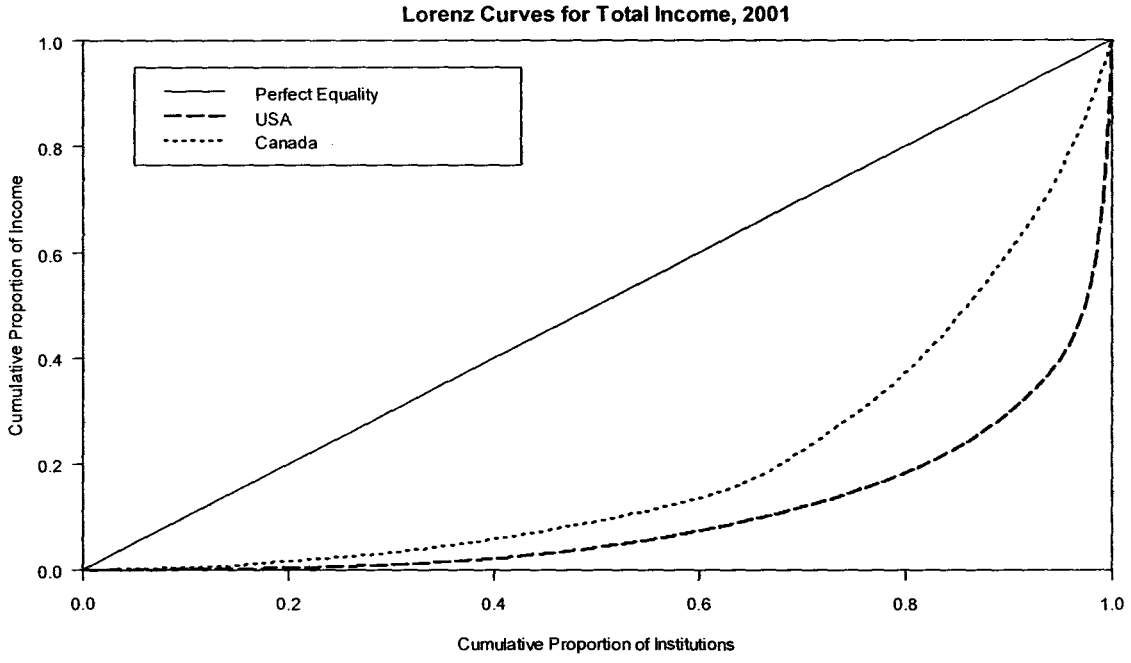

Lorenz Curves for Income from State or Provincial Grants and Contracts Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Figure 4.3


Lorenz Curves for Total Income, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

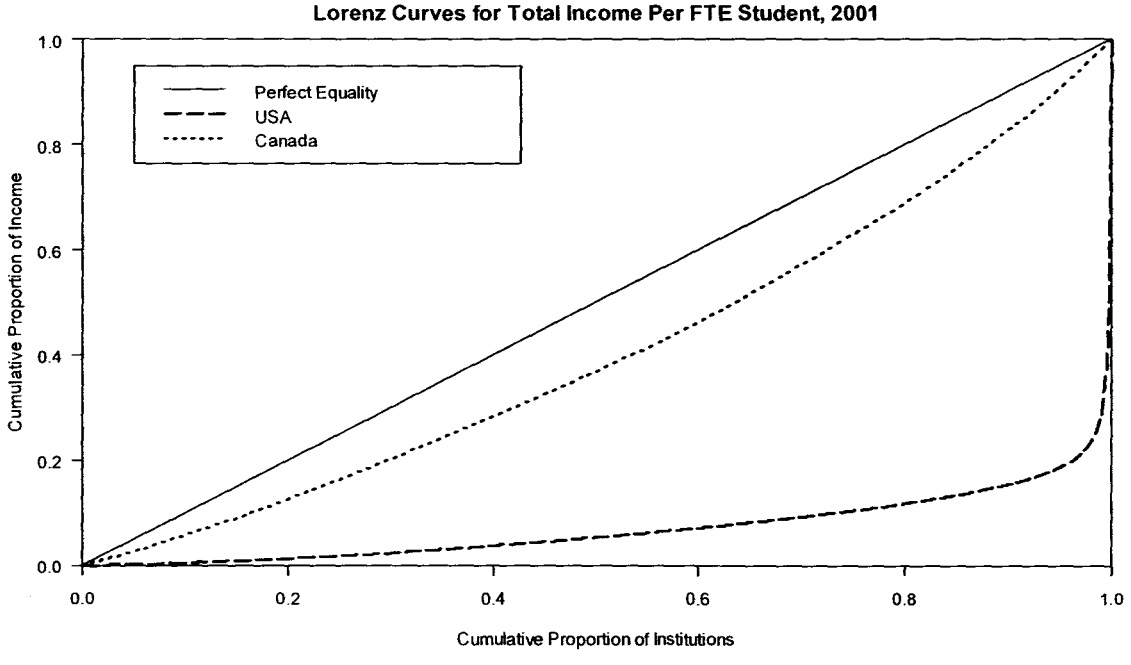
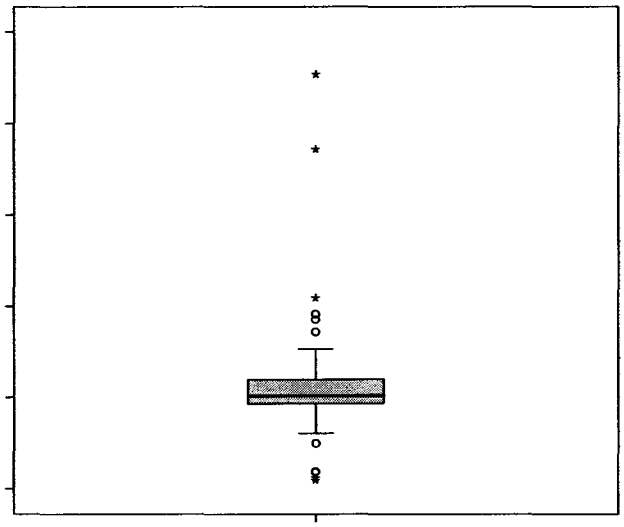

Lorenz Curves for Total Income Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

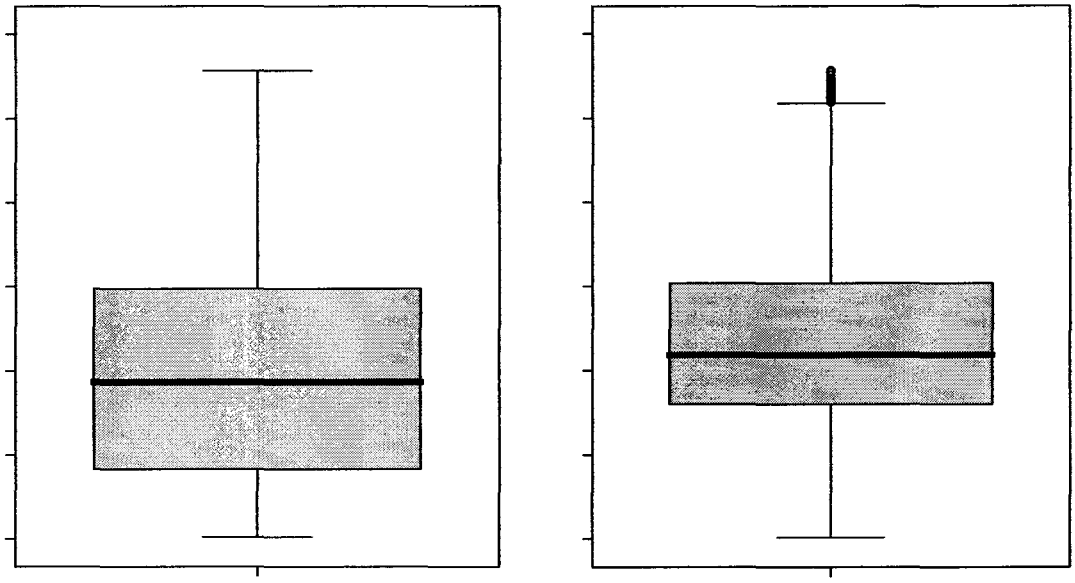
Figure 4.4 Average Full-time Undergraduate Tuition and Fees in 2001

Canadian Degree-granting Institutions (N=49)



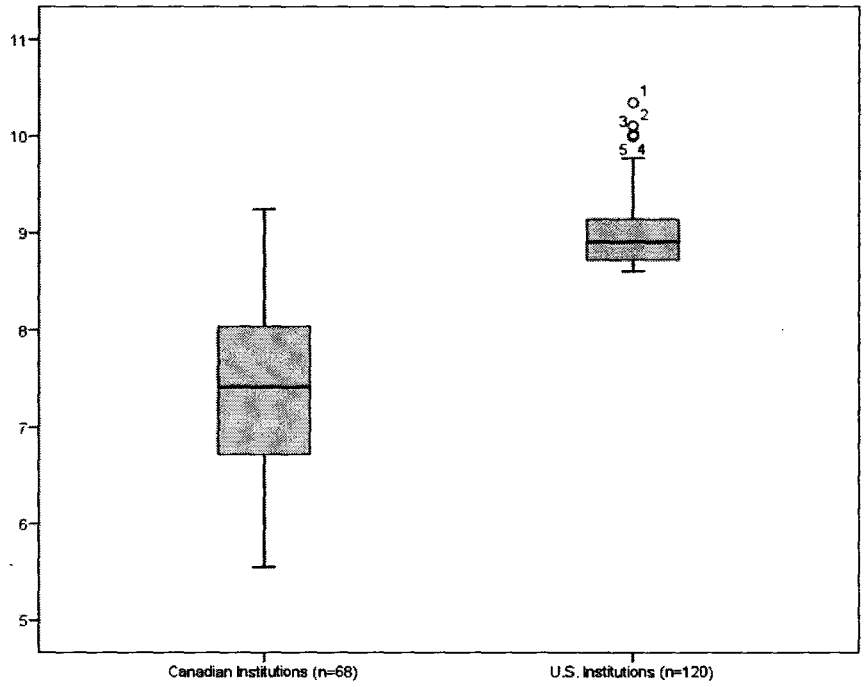
American 4-year Degree-granting Institutions

In-state (N=2151) **Out of state (N=2149)**



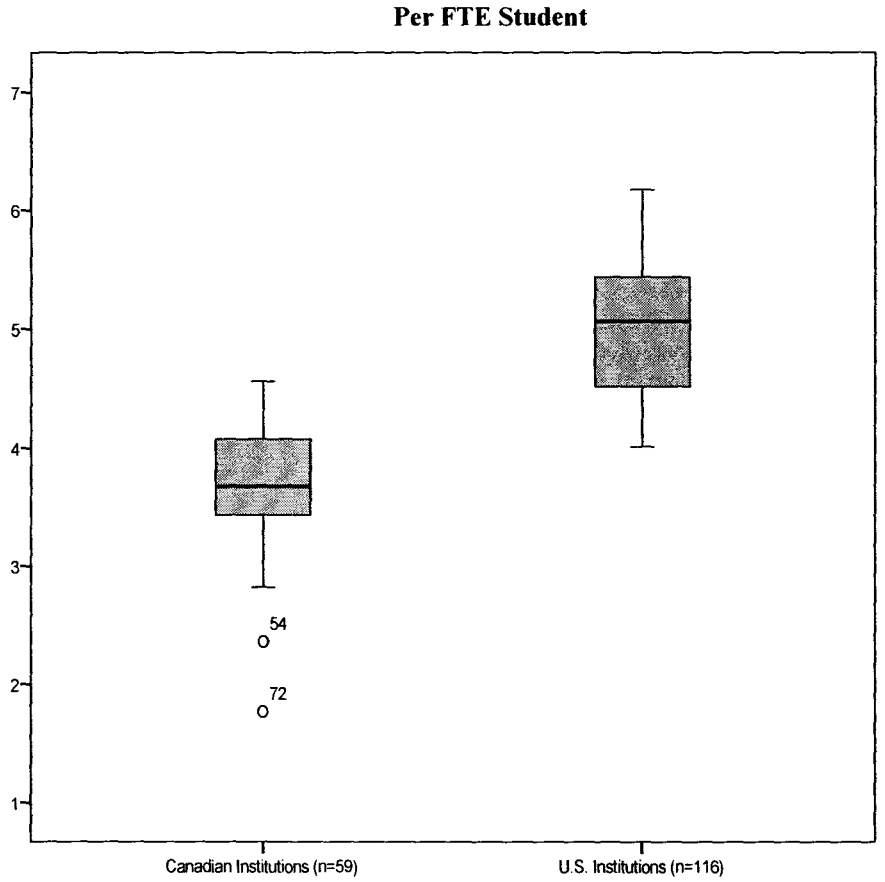
Notes: 1. The two Canadian outliers are religious universities (Trinity Western (71) and Redeemer College (44)).
2. The extreme outliers in the U.S. are Sarah Lawrence College (4089), Hampshire College (2754), and Duke University (4251).

Figure 4.5 Logged Endowments in 2004: Canadian and American Universities



Notes: 1. The Gini coefficients for Canadian and the top 120 U.S. schools are 0.75 and 0.55 respectively.
2. Canadian outliers are Toronto (1), McGill (2), U.B.C. (3), Alberta (4), and Queen's (5). U.S. outliers are Harvard (1), Yale (2), University of Texas (3), Princeton (4), and Stanford (5).
3. The source for the Canadian data is the CAUT Almanac 2006, and the U.S. source is the 2004 NCES Digest of Education Statistics.

Figure 4.5 *(Continued)*



Notes: 1. The Gini coefficients for Canadian and the top 120 U.S. schools are 0.52 and 0.59 respectively.
2. Canadian outliers are the University of Quebec at Montreal (54) and the University of Quebec at Trois-Rivieres (72)

Figure 4.6 Total Income in 2001, All Sources (Thousands)

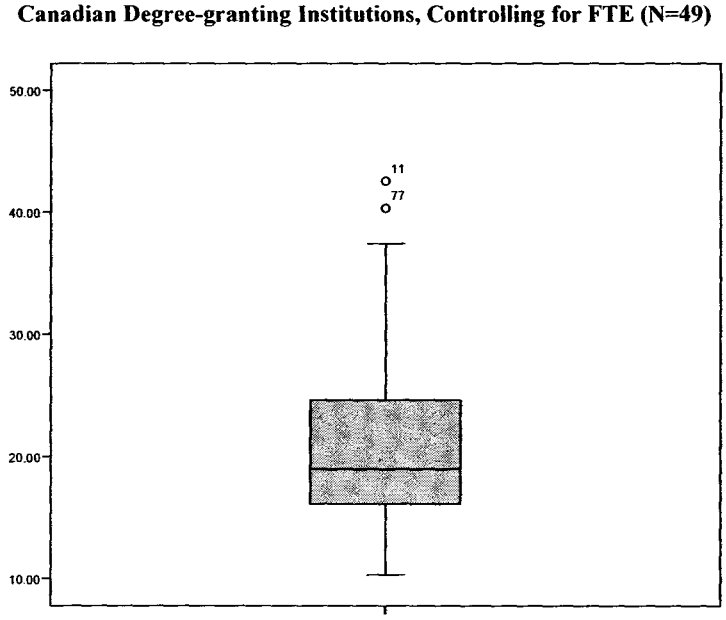
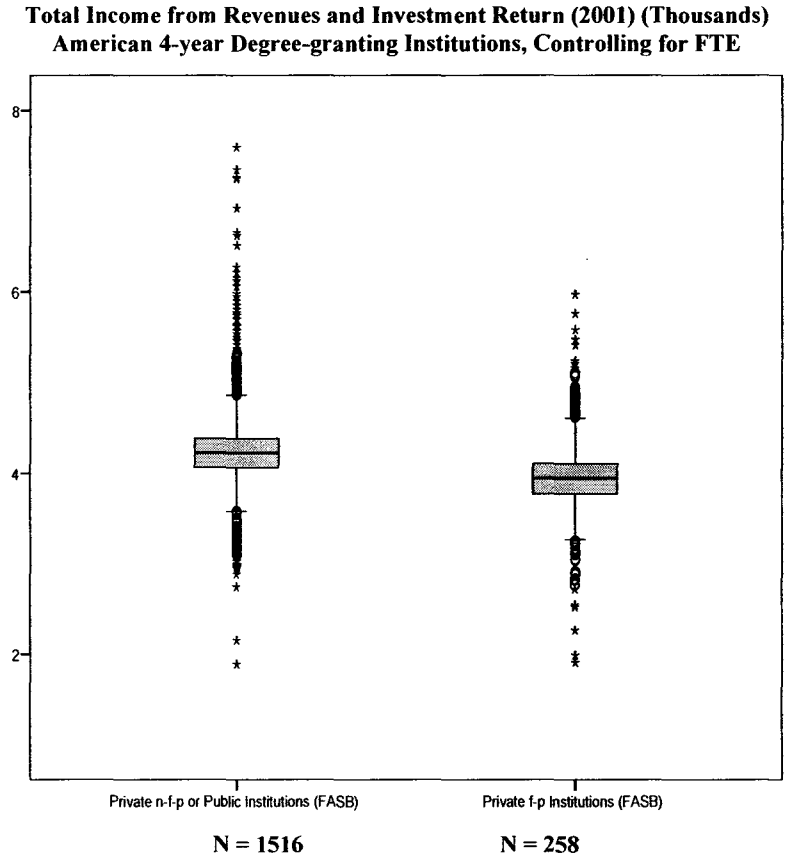


Figure 4.6 *(Continued)*



Notes: 1. The Canadian outliers are Universite Sainte-Anne (11) and Royal Roads University (77).
2. Due to extreme skewness, logged estimates are shown for the U.S. institutions.

Figure 4.7 Total Expenditures in 2001 (Thousands)

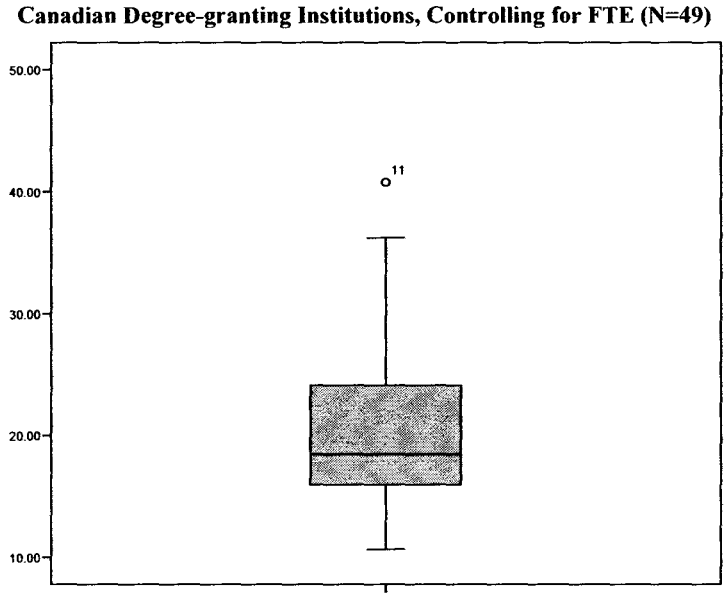
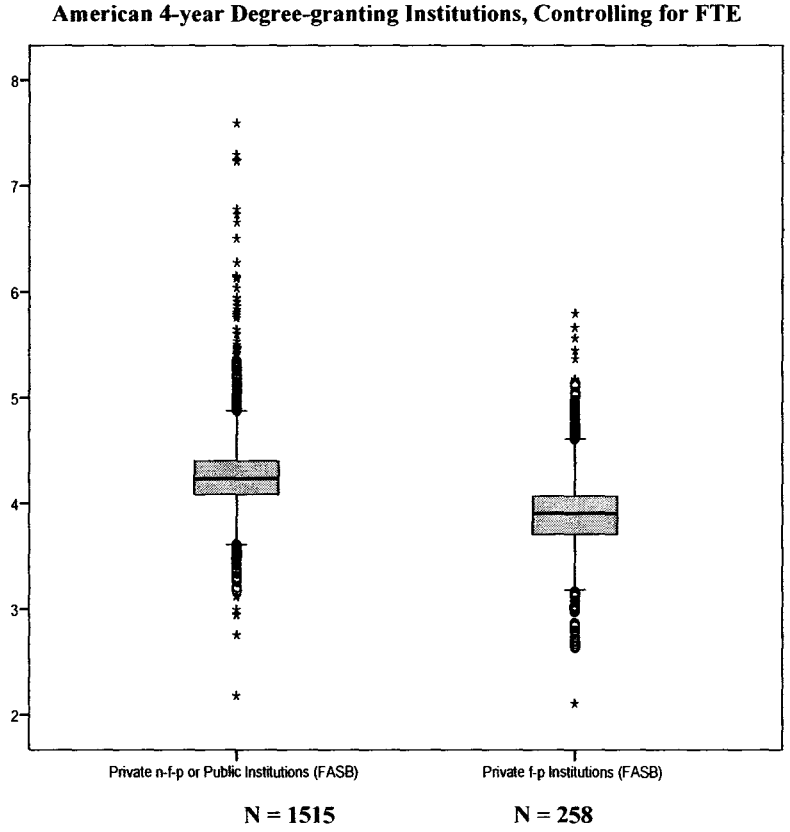


Figure 4.7 *(Continued)*



Notes: 1. The Canadian outlier is Université Sainte-Anne (11).
2. Due to extreme skewness, logged estimates are shown for the U.S. institutions.

absorbed by the existing structure (e.g., larger class sizes), representing only minimal additional operating costs. Enrolment expansion, in this sense, may be one avenue for differentiation in postsecondary systems with high levels of government regulation. In addition to cross-national differences in sheer size, the Lorenz curves appear to be smoother and more constant across the distribution of Canadian institutions. That is, all portions of the Canadian distribution appear to contribute fairly equally to the total level of stratification. In the U.S., however, this is typically not the case. For most of the income and expenditure measures, there is a greater degree of inequality at the top end of the distribution. Put differently, the plots reveal interesting differences in terms of the share of total wealth among institutions. On many of the measures (e.g., income from federal grants, income from provincial or state grants, income from sales and services, total income, and total expenditures), about 80 or 90 percent of the total income or expenditures is highly concentrated among the top 10 or 20 percent of institutions (see Figure 4.3). This greater stratification at the high end of the distribution may be representative of the well-established elite sector of institutions at the top of the U.S. hierarchy. By contrast, the Canadian distribution of total wealth is much more evenly distributed, especially when controlling for FTE enrolments.

To further grasp these differences, the analyses also include boxplots of the distributions. Figure 4.4 investigates one source of income, tuition. Typical tuition and fees are much higher in the United States. The median is approximately $10,000 USD, with an inter-quartile range of about $8,000 USD. In contrast, the Canadian median is about $4,000 CDN with an inter-quartile range of only $1,000 CDN (the two Canadian upper outliers are small religious colleges that do not receive public funds). One area where Canada's system more closely resembles that of the U.S. is in the area of endowments.[38] In Figure 4.5, even when controlling for the number of FTE students, the University of Toronto, University of British Columbia, University of Alberta, and McGill University maintain their position at the top of the distribution, in a manner similar to their well-established elite counterparts in the U.S. (e.g., Princeton University, Yale University and Harvard University). At the same time, it is quite clear from the distributions that the schools in the U.S. are operating on a much grander scale. The University of Toronto obtained approximately $1.75 billion CDN in endowments, while Harvard University nearly reached $23 billion USD.

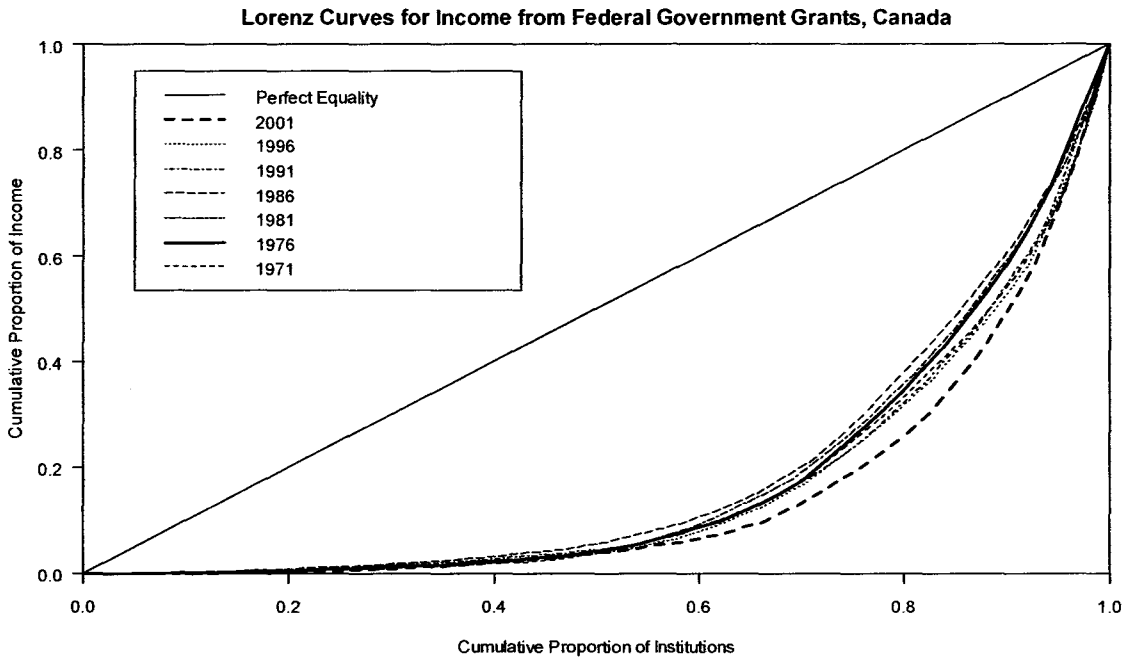
Still, when comparing total income, Figure 4.6 reveals a huge range in the U.S., evidenced by very squat mid-boxes coupled with many outliers (visually, the flat mid-boxes are a product of the long vertical scale that is created by the outliers) and a much more symmetric distribution in Canada. Finally, Figure 4.7 compares total expenditures. Again, boxplots contrast a relatively symmetric Canadian distribution to an American distribution marked by a vast range in which the majority are clustered into a flat midbox and with many outliers straggling upwards.

[38] Unfortunately, Canadian data on endowments were not publicly available in Statistics Canada's FIUC, TLAC, and USIS surveys. Thus, the author used supplemental endowment data published in the CAUT Almanac 2006.

Table 4.2 Gini Coefficients for Degree-Granting Institutions in Canada (1971-2001)

Variable	*Year*							*Gini Change (1971/76 to 2001)*
	1971	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*	
Total Income from Federal Government Grants	0.6727	0.6535	0.6486	0.6288	0.6681	0.6804	0.7099	+ 0.0372
Controlling for FTE	–	0.4430	0.4195	0.3927	0.4558	0.5307	0.4777	+ 0.0347
Total Income from Provincial Government Grants	0.4987	0.5027	0.5571	0.5598	0.5466	0.5671	0.5823	+ 0.0836
Controlling for FTE	–	0.1969	0.2016	0.2182	0.1615	0.2356	0.2354	+ 0.0365
Total Income from Course Fees	0.4568	0.4688	0.5328	0.5430	0.5391	0.5404	0.5740	+ 0.1172
Controlling for FTE	–	0.1150	0.1247	0.1872	0.1427	0.1796	0.2424	+ 0.1272
Total Income from Bequests, Donations and Non-Government Grants	0.6460	0.6457	0.6809	0.7002	0.7326	0.7205	0.7483	+ 0.1023
Controlling for FTE	–	0.4577	0.4476	0.4986	0.4751	0.4852	0.5466	+ 0.0889
Total Income from Sales of Services and Products	0.4648	0.4656	0.4727	0.5525	0.5884	0.5826	0.6545	+ 0.1897
Controlling for FTE	–	0.2944	0.2880	0.3112	0.3128	0.3417	0.3505	+ 0.0561
Total Income	0.4992	0.5094	0.5671	0.5710	0.5779	0.5785	0.6051	+ 0.1059
Controlling for FTE	–	0.1598	0.1672	0.1920	0.1603	0.1684	0.1857	+ 0.0259
Total Expenditures on Scholarships, Bursaries, Prizes	0.6860	0.6178	0.5989	0.6355	0.6516	0.6671	0.6887	+ 0.0027
Controlling for FTE	–	0.6016	0.3718	0.4135	0.4008	0.4266	0.3789	- 0.2227
Total Expenditures	0.4941	0.5065	0.5637	0.5696	0.5794	0.5826	0.6044	+ 0.1103
Controlling for FTE	–	0.1665	0.1701	0.1913	0.1625	0.1723	0.1792	+ 0.0127
Total General Operating Expenditures	0.4947	0.4959	0.5469	0.5485	0.5592	0.5527	0.5597	+ 0.0650
Controlling for FTE	–	0.1404	0.1491	0.1460	0.1227	0.1460	0.1492	+ 0.0088

Figure 4.8


Lorenz Curves for Income from Federal Government Grants, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

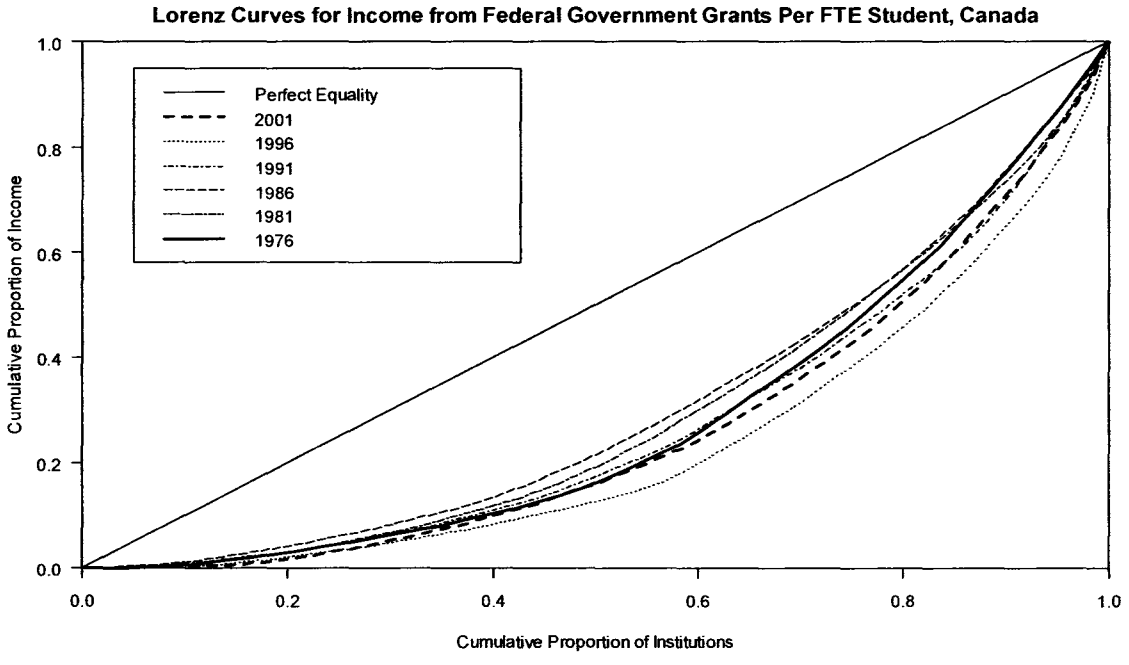
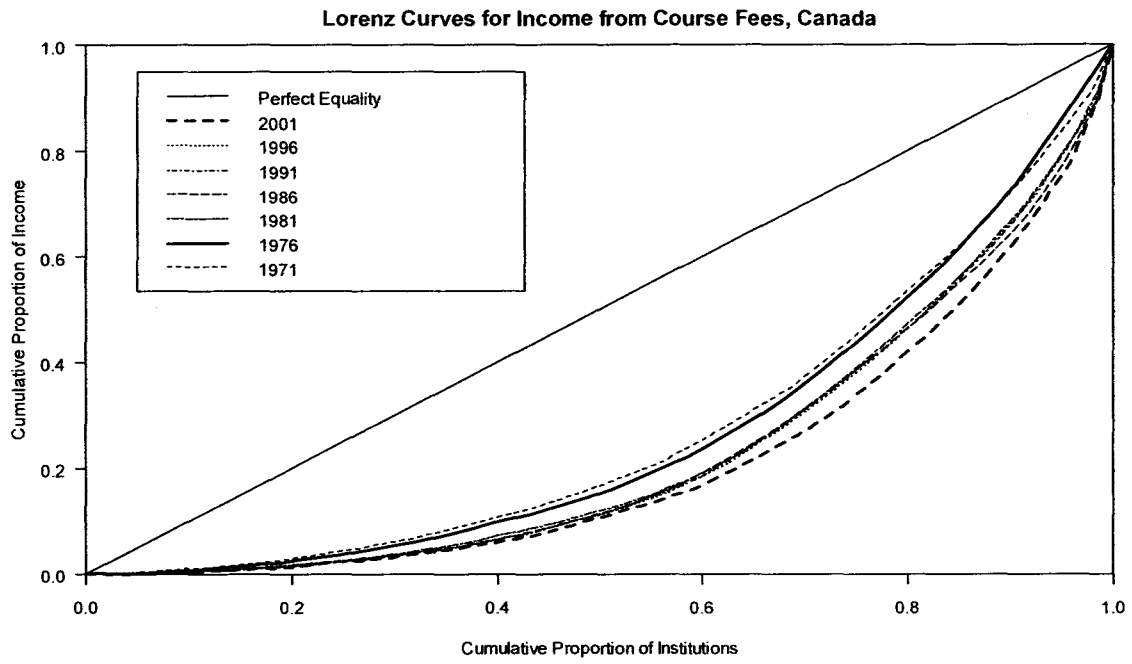

Lorenz Curves for Income from Federal Government Grants Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Figure 4.9


Lorenz Curves for Income from Course Fees, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

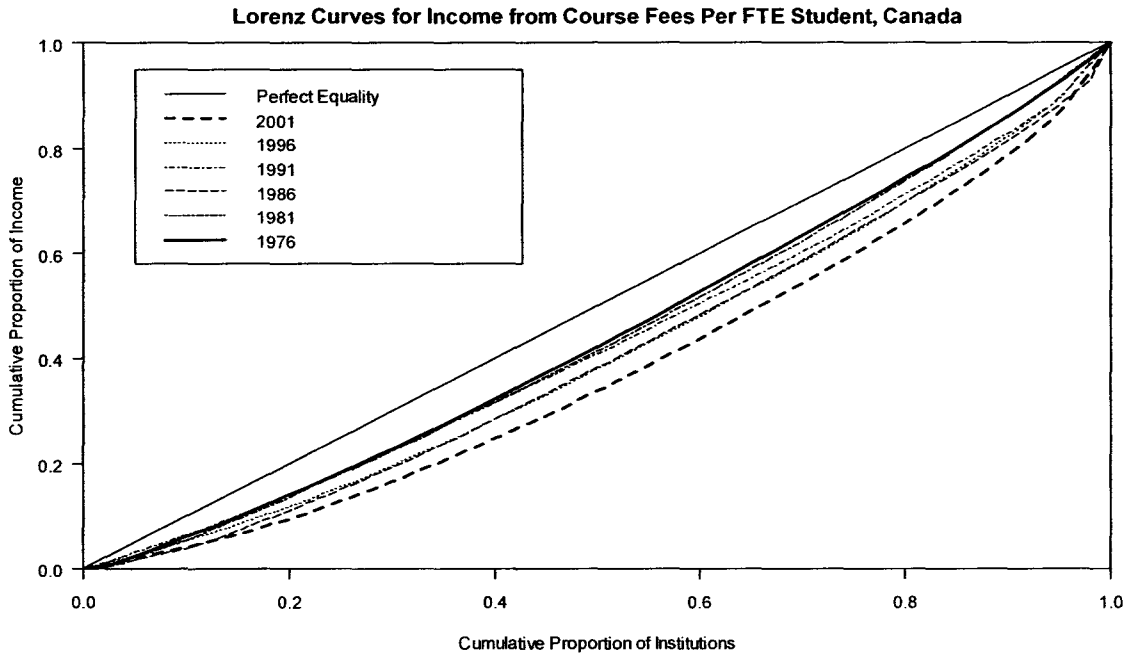
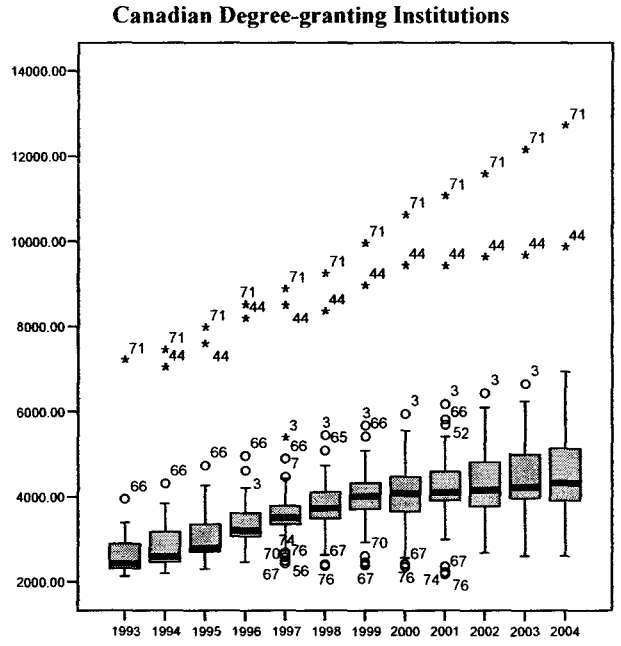
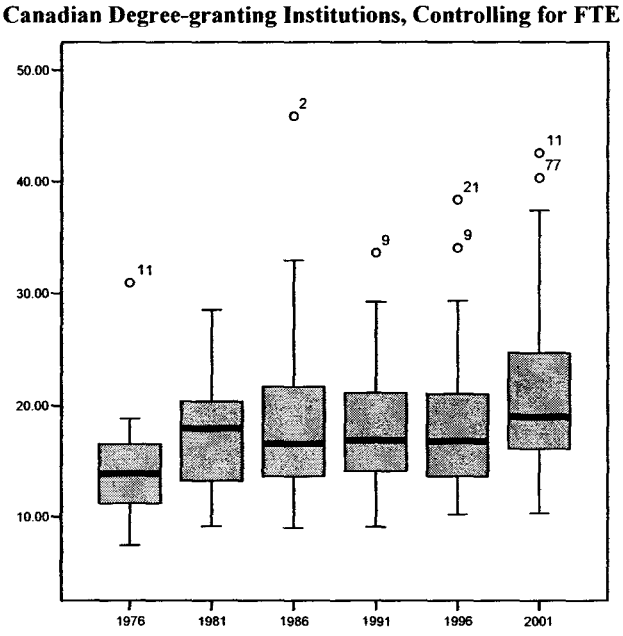

Lorenz Curves for Income from Course Fees Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Figure 4.10 Average Full-time Undergraduate Tuition and Fees



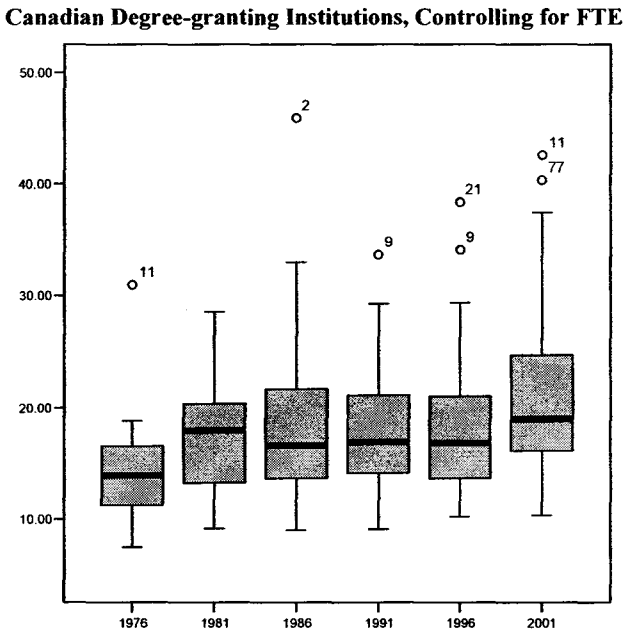
Notes: 1. Figures adjusted for inflation as per Consumer Price Index (Statistics Canada, 2006; 2001 = base year)
2. The two Canadian outliers are religious universities (Trinity Western University (71) and Redeemer College (44)).

Figure 4.11 Total Income, All Sources (Thousands)



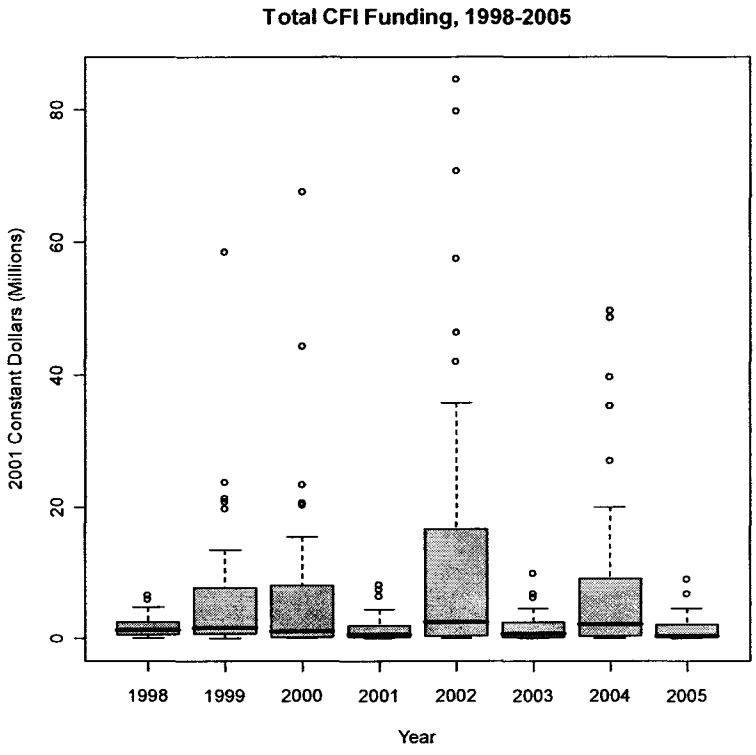
Notes: 1. Figures adjusted for inflation as per Consumer Price Index (Statistics Canada, 2006; 2001 = base year).
2. The Canadian outliers are Université Sainte-Anne (11), University of Prince Edward Island (2). Nova Scotia Agricultural College (9), Ecole Nationale D'Admin. Publique (21), and Royal Roads University (77).

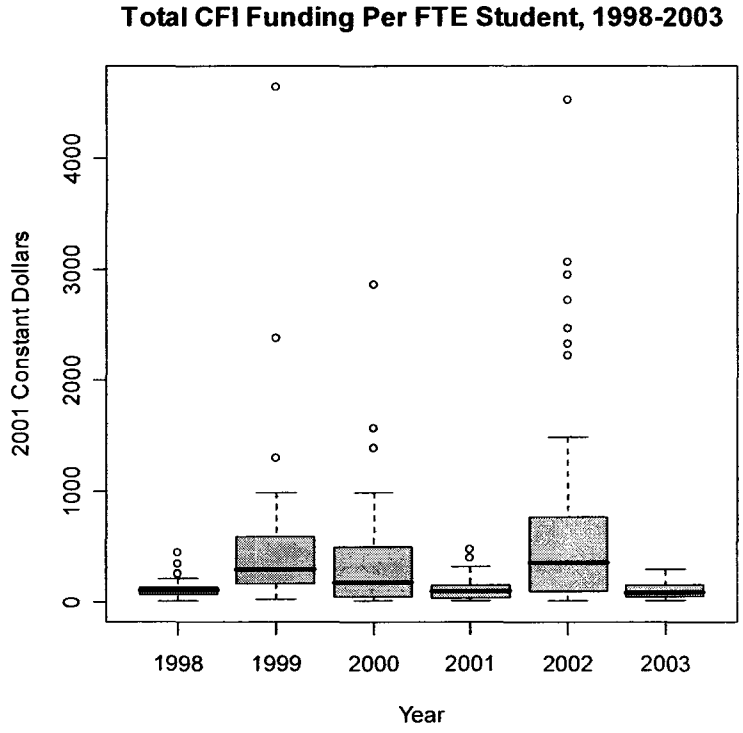
Figure 4.12 Total Expenditures (Thousands)



Notes: 1. Figures adjusted for inflation as per Consumer Price Index (Statistics Canada, 2006; 2001 = base year).
2. The Canadian outliers are Université Sainte-Anne (11), University of Prince Edward Island (2), Nova Scotia Agricultural College (9), Ecole Nationale D'Admin. Publique (21), and Royal Roads University (77).

Figure 4.13


Total CFI Funding, 1998-2005
2001 Constant Dollars (Millions)
0
20
40
60
80
1998
1999
2000
2001
2002
2003
2004
2005
Year


Total CFI Funding Per FTE Student, 1998-2003
2001 Constant Dollars
0
1000
2000
3000
4000
1998
1999
2000
2001
2002
2003
Year

Overall, these comparisons reveal that the U.S. system is marked by substantial positive skew; in most cases, the bottom 75% or more is relatively flat, while the top institutions straggle off in a very elongated fashion. The Canadian distributions are clearly stratified, yet much less skewed. These findings highlight the existence of a more elite-driven system in the United States, in which a relatively few but dominant set of institutions are highly distinct from the mass.

4.2 Canadian Trends over Time

Have Canadian universities become more stratified over time? Table 4.2 presents the Canadian Gini coefficients between 1971 and 2001, using 2001 constant dollars. Adjacent to each variable description are two cells, an upper cell, which contains the marginal Gini coefficient for each year of analysis, and a lower cell, which contains the Gini coefficient when controlling for Full-Time Equivalent (FTE) enrolments. For nearly every income and expenditure measure, the difference between the 1971 and 2001 Gini coefficients was positive. That is, Canadian universities appear to have become increasingly stratified economically over time. For most indicators, these increases were moderate when FTE was taken into consideration, as Gini coefficients only increase by about 0.02 or 0.03 over the thirty year span. Three of the most noticeable increases, when controlling for FTE, were evident among incomes from course fees (+0.1272), incomes from donations (+0.0891), and incomes from the sales and services of products (+0.0561). In a predominantly publicly regulated system, it is interesting to find the greatest increases on measures that have either become less regulated in recent years (e.g., tuitions and course fees) or have always been largely independent modes of generating revenue (e.g., income from sales of products or income from donations and non-government grants).

Over the span of thirty years, however, the universities did not grow increasingly disparate. That is, the Gini coefficients did not increase in a monotonic fashion over time. For income from course fees, the Gini coefficients did reveal a substantial stratifying trend, particularly over the past decade. This pattern may be a product of a recent divergence of provincial regulation policies (see Quirke and Davies 2002). Among other sources of income, however, there are no clear trends. Coefficients for federal income grow and then shrink somewhat over time, while provincial sources become more disparate. Incomes from private sources (bequests, donations, and non-government grants) grew steadily over the time period, and represent an area containing a high level of inequality relative to other sources of income. Income from sales and services generally increased as well. Total income inequality also rose somewhat over the time period, but the increase was not dramatic. One possible explanation for this is that the bulk of postsecondary income in Canada still comes from provincial sources, and inequality from that source is the smallest among all sources (Gini = 0.2353). There is less of a trend for expenditures. Gini coefficients for both total expenditures and general

operating expenditures rose only slightly over time, and disparities for expenditures on scholarships actually fell during the period.

Plots of the corresponding Lorenz curves illustrate these findings. For example, in Figure 4.8, the Lorenz curves for federal grants income do not appear to increase gradually over time. Rather, many of the Lorenz curves for years prior to 2001 intersect. When Lorenz curves intersect in this manner, determining whether inequality is higher or lower becomes more difficult (see Cowell 1995). That is, when Lorenz curves cross, the inequality within certain segments of the distribution may be changing. When controlling for FTE in Figure 4.8, the pattern of inequality remains complex, with the greatest inequality occurring among universities in 1996. On the other hand, taking a look at the inequality among incomes from course fees (see Figure 4.9), there is a noticeable pattern of increasing stratification, as Lorenz curves generally expand over time. Both plots reveal some Lorenz curves intersecting in the upper 20 percent of the distribution, but overall, there is a much clearer trend of increasing inequality compared to trends in Figure 4.8.

Returning to boxplots, Figure 4.10 shows that the median and range for tuition rose as well, though not in an "elite" fashion. That is, the plots retain a symmetric shape (again, the two outliers are not elite institutions, but rather are small private religious colleges). Likewise, Figures 4.11 and 4.12 for total income and for total expenditures both show a slight rise in the medians between 1976 and 2001, an expanding range, yet a relatively symmetric distribution (again, the outliers are small institutions). One area where one might expect Canadian institutions to be increasingly stratified is the acquisition of external awards. However, additional data on research awards from the Canadian Foundation for Innovation (CFI) presented in Figure 4.13 reveal a story of more or less parity, once school size is taken into account. That is, once total CFI funding is examined on a per FTE student basis, the outliers change from the University of Toronto, UBC, McGill, Montreal and University of Alberta to smaller, less renowned schools like the Nova Scotia Agricultural College, The King's College (B.C.), and Quebec's École de Technologie Superieure.

4.3 U.S. Trends over Time

Has the level of stratification changed among U.S. universities over time? In the cross-national comparisons above, the U.S. exhibited much more diversity and disparity among incomes and expenditure distributions. Table 4.3 presents the Gini coefficients for public and not-for-profit degree-granting institutions in the United States.[39] As in the Canadian analyses, all but one of the measures increased over the span of thirty years. However, the Gini coefficients are much larger for all U.S. measures, indicating a higher level of institutional stratification. As well, the schools became more unequal at a faster

[39] Gini coefficients for private for-profit degree-granting institutions in the U.S. were also calculated but are not shown, since the number of institutions was quite small for many of the measures, making the Gini coefficients unreliable and possibly unstable over time.

Table 4.3 Gini Coefficients for Public and Non-Profit Degree-Granting Institutions in the United States (1971-2001)

Variable	*Year*							*Gini Change (1971 to 2001)*
	1971	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*	
Total Income from Federal Grants and Contracts	0.8484	0.8376	0.8383	0.8193	0.8335	0.8338	0.9222	+ 0.0738
Controlling for FTE	0.6692	0.7890	0.7992	0.5792	0.5984	0.8589	0.8536	+ 0.1844
Total Income from State and Local Grants and Contracts	0.7698	0.7727	0.7748	0.7665	0.7422	0.7693	0.8075	+ 0.0377
Controlling for FTE	0.6758	0.7643	0.7783	0.6832	0.6228	0.8264	0.8790	+ 0.2032
Total Income from Tuition and Fees	0.6383	0.6426	0.6497	0.6631	0.6562	0.6398	0.7296	+ 0.0913
Controlling for FTE	0.3486	0.4810	0.4867	0.3876	0.4082	0.8050	0.5884	+ 0.2398
Total Income from Private Gifts, Grants, and Contracts	0.6660	0.7298	0.7382	0.7627	0.7843	0.7810	0.7981	+ 0.1321
Controlling for FTE	0.7315	0.7554	0.7647	0.6875	0.6926	0.8171	0.7186	- 0.0129
Total Income from Sales and Services of Educational Activities	0.9092	0.8579	0.8713	0.8721	0.8810	0.8718	0.9399	+ 0.0307
Controlling for FTE	0.8484	0.8936	0.8953	0.8150	0.8531	0.8452	0.8587	+ 0.0103
Total Income from Endowments	0.8488	0.8456	0.8232	0.8216	0.8252	0.8283	0.8884	+ 0.0396
Controlling for FTE	0.7787	0.8272	0.8123	0.7533	0.7673	0.8667	0.9782	+ 0.1995
Total Income from Revenues and Investment Return	0.7327	0.7392	0.7455	0.7512	0.7528	0.7407	0.7933	+ 0.0605
Controlling for FTE	0.4904	0.5377	0.6200	0.4337	0.4470	0.8128	0.8597	+ 0.3693
Total Expenditures on Scholarships and Student Grants	0.7055	0.6903	0.6831	0.6360	0.6359	0.6395	0.7278	+ 0.0223
Controlling for FTE	0.4329	0.5102	0.5552	0.3674	0.3927	0.7888	0.6811	+ 0.2482
Total Expenditures	0.7267	0.7388	0.7457	0.7487	0.7523	0.7434	0.7958	+ 0.0691
Controlling for FTE	0.5052	0.5243	0.6212	0.4260	0.4468	0.8111	0.8516	+ 0.3464

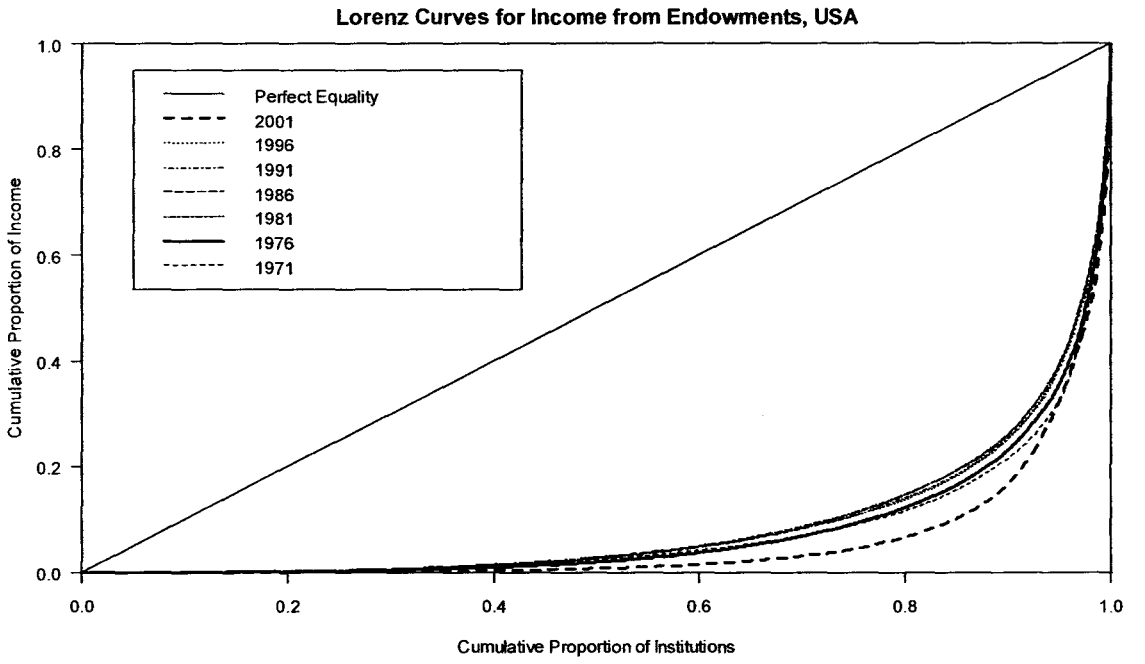
rate than Canadian institutions over the same time period. As discussed above, the greatest increase when controlling for the number of FTE students was just over 0.12 for Canadian schools. In the U.S., also controlling by FTE, many of the measures showed gains around 0.20 and some even exceed gains of 0.30. The U.S. Gini coefficients also increased more regularly over time (i.e., fewer fluctuations). In addition, once controlling for the size of the institutions, the two systems look even less similar. While Canadian institutions become more equal on a number of measures, once the size of the institution was taken into account, in the U.S. quite a different picture emerges. In most cases, the level of inequality did not change. Moreover, in about half of the cases (e.g., state and local funding, income from endowments, total income, and total expenditures), the Gini coefficients actually *increase* when examining per capita incomes and expenditures. Larger Canadian institutions may hold the greater share of wealth, but among U.S. institutions, institutional size is not as closely related to the acquisition of resources.

These patterns among Gini coefficients are illustrated in the Lorenz curves. Unlike the Canadian measures over time, the distance between the Lorenz curves and the line of perfect inequality is much greater. In Figure 4.14, for example, the Lorenz curve for income from endowments per FTE student in 2001 nearly traces the x and y axes, indicating substantial inequality among the schools. Similarly, in Figures 4.15 through 4.19, the distribution of wealth among institutions also appears to have changed over time. In the seventies and eighties, the level of inequality among institutions appears to be quite high, yet constant across all segments of the population of schools. However, in the last fifteen years, the distribution of resources appears be becoming increasingly concentrated among the top five or ten percent of the schools. That is, on many of the measures, an "elite" sector of schools appears to be obtaining the lion's share of the total wealth.

The boxplots of the measures over time reveal this increasing separation of an elite set of schools. Figure 4.19, for example, presents the boxplots for income from federal grants and contracts. There is a clear separation of upper outliers from the rest of the pack and increasingly so over time. For the most part, this pattern holds even when controlling for FTE enrolments. The boxplots for all measures stand in stark contrast to those plotted for the Canadian data above. While in the Canadian boxplots, most of the measures were fairly evenly distributed with few outliers (especially when controlling for FTE students). The U.S. boxplots are extremely highly skewed with a long trail of upper outliers extending upward from the upper fence. The presence of an "elite" sector among U.S. institutions is well documented among the extant higher education literature; however, it is interesting to find that these "elite" institutions have not only maintained their advantages over time but are pulling away from the rest of the pack.

These findings illustrate that the American university system is more stratified than the Canadian system. This stratification is embedded in an American system that is highly differentiated, and marked by an "elite" pattern that clusters most institutions into a relatively narrow range underneath several upper outliers. In contrast, Canada's universities are less stratified, being embedded in a more homogeneous institutional system that lacks elite upper outliers. Trends over time suggest that both systems are

Figure 4.14


Lorenz Curves for Income from Endowments, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

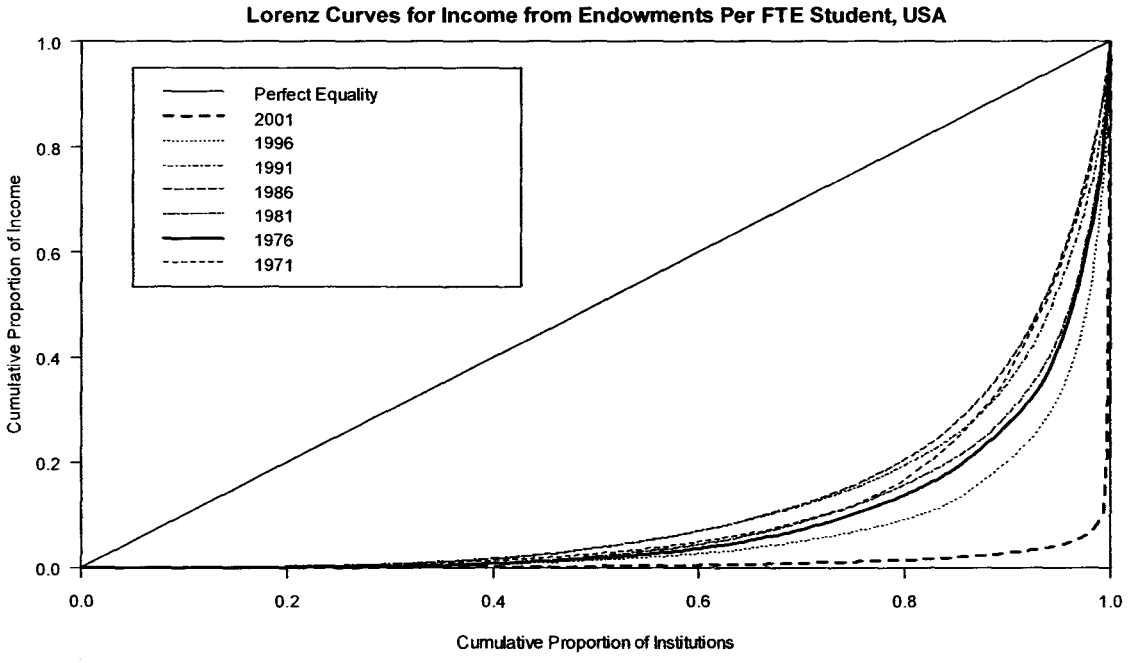

Lorenz Curves for Income from Endowments Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Figure 4.15

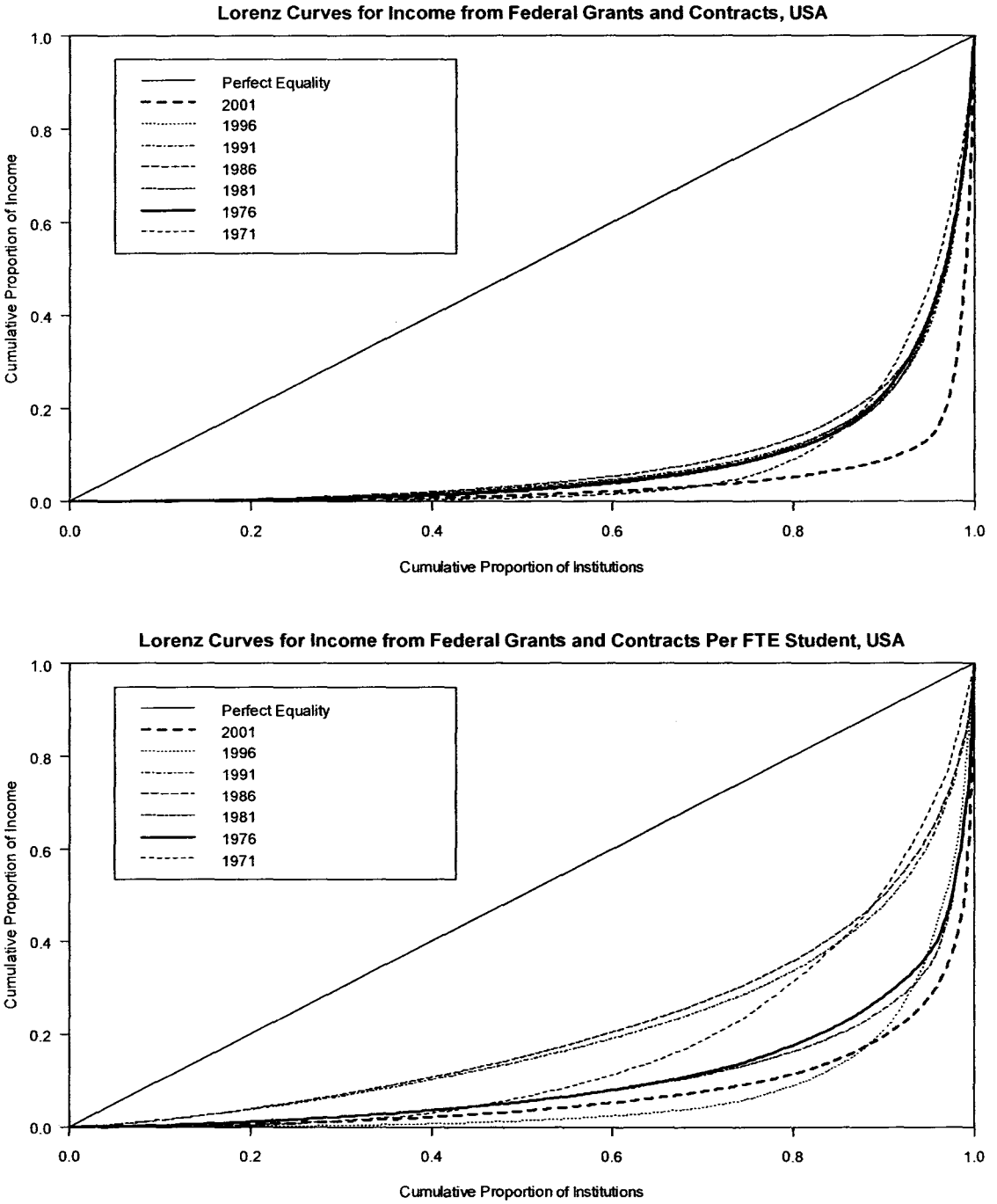

Lorenz Curves for Income from Federal Grants and Contracts, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0
Lorenz Curves for Income from Federal Grants and Contracts Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions

Figure 4.16

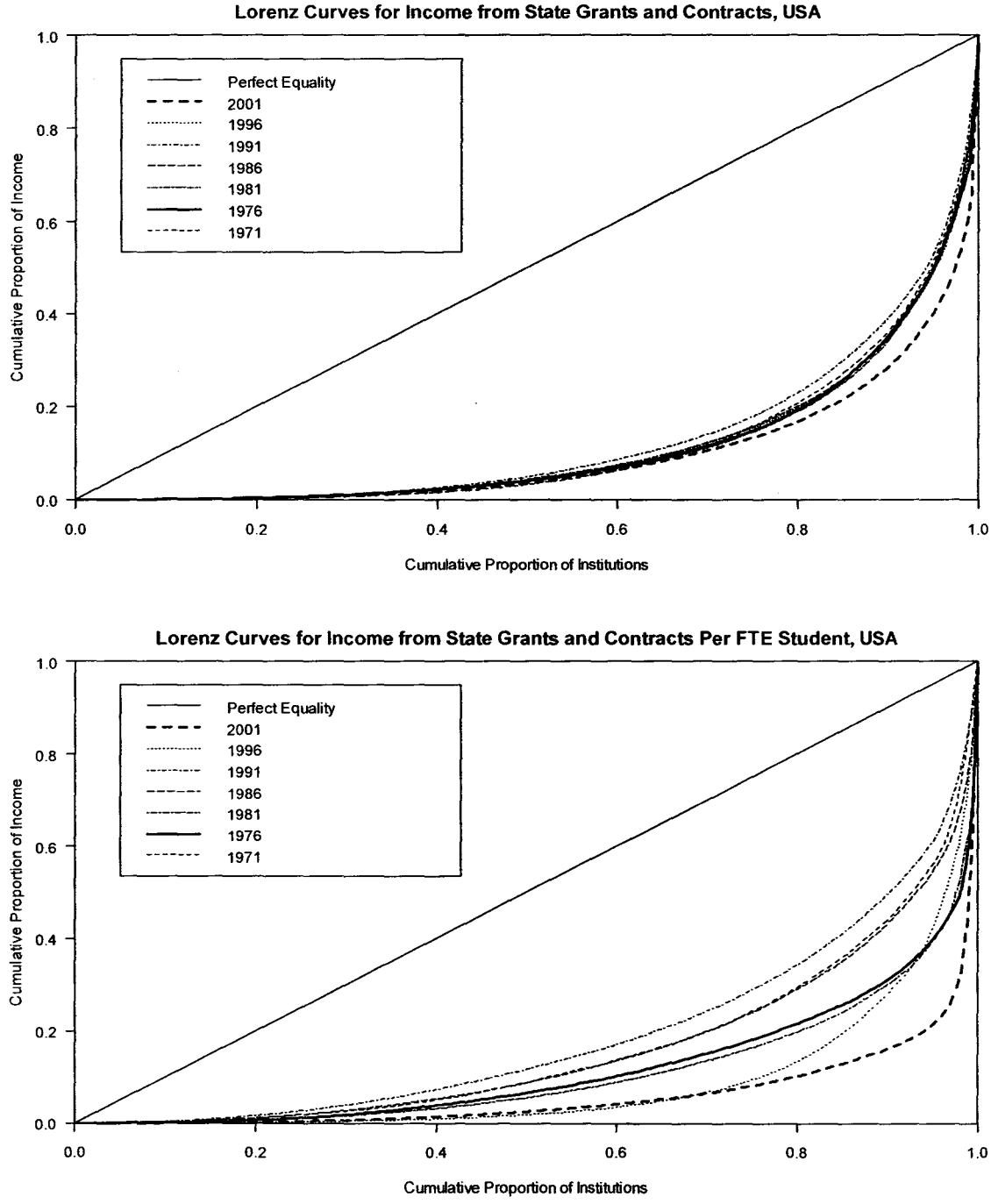
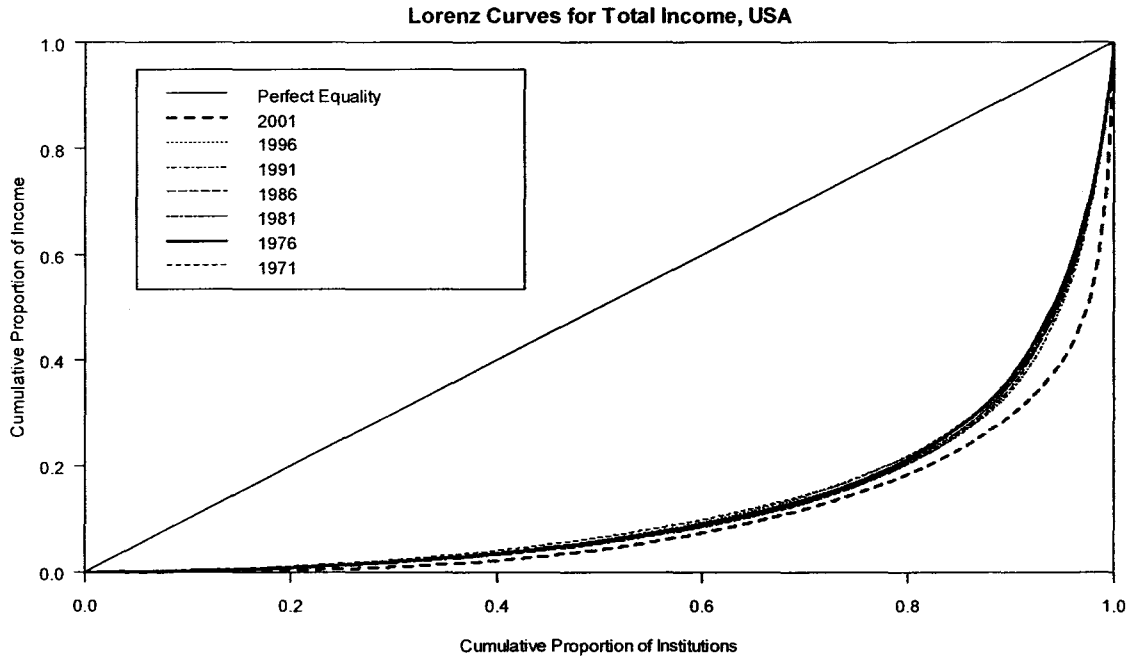

Lorenz Curves for Income from State Grants and Contracts, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0
Lorenz Curves for Income from State Grants and Contracts Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions

Figure 4.17


Lorenz Curves for Total Income, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

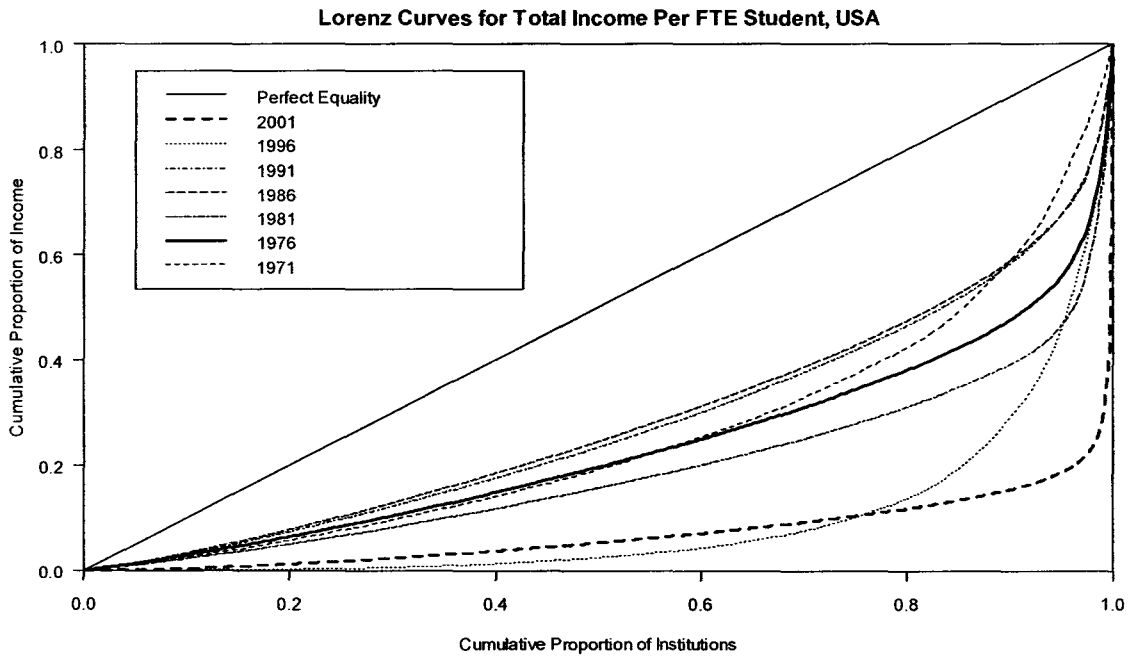
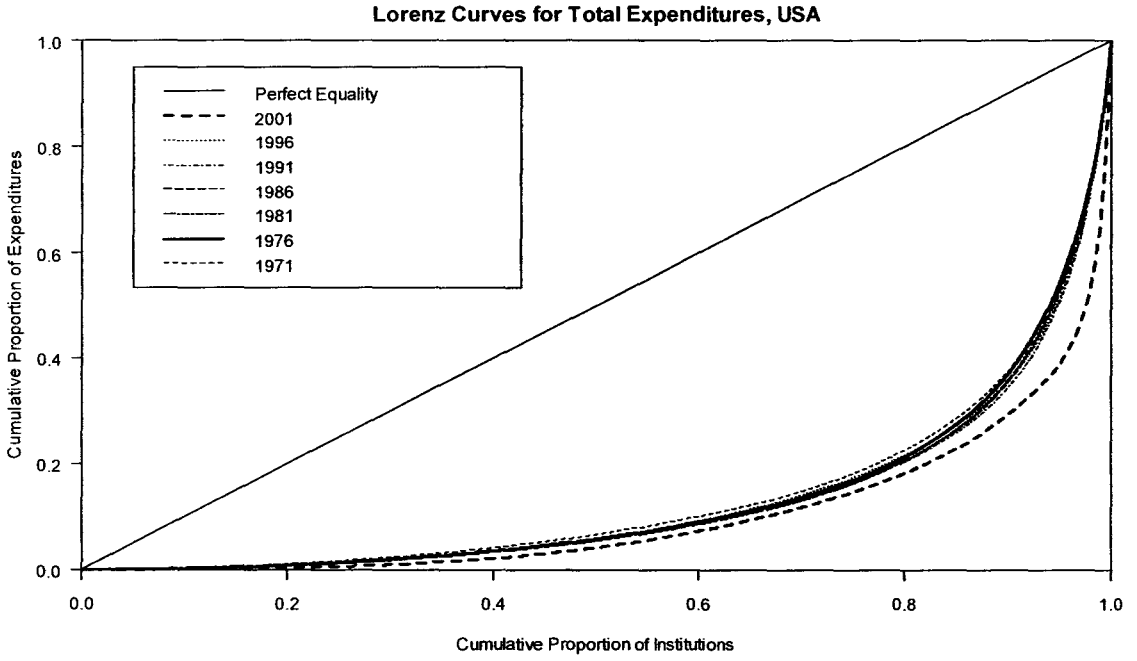

Lorenz Curves for Total Income Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Figure 4.18


Lorenz Curves for Total Expenditures, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

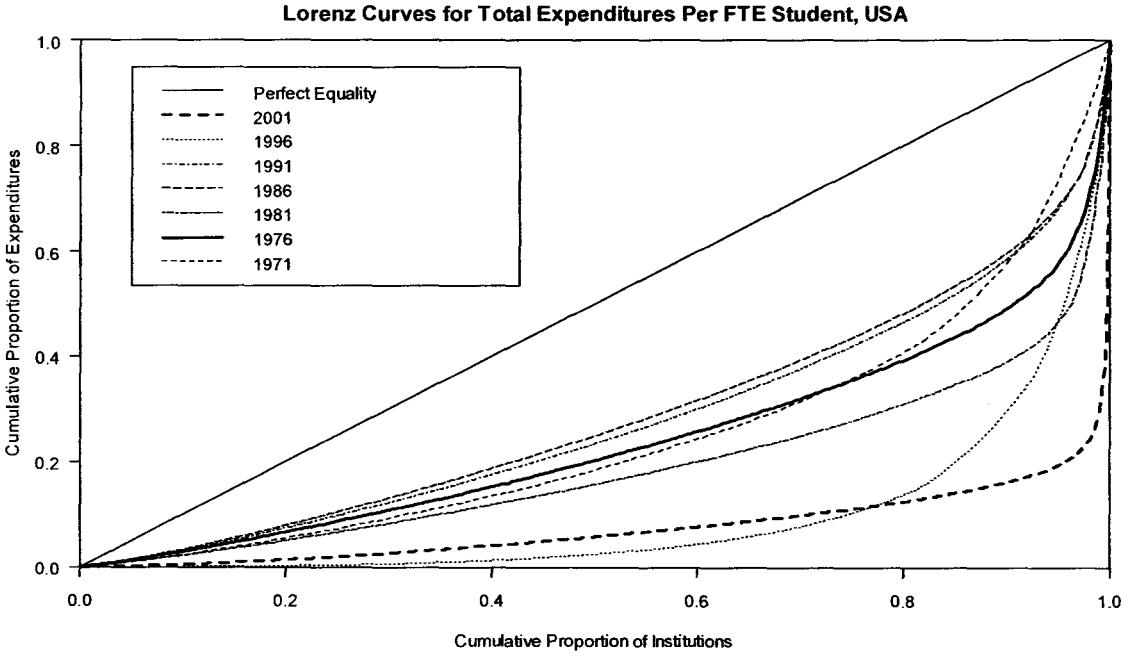
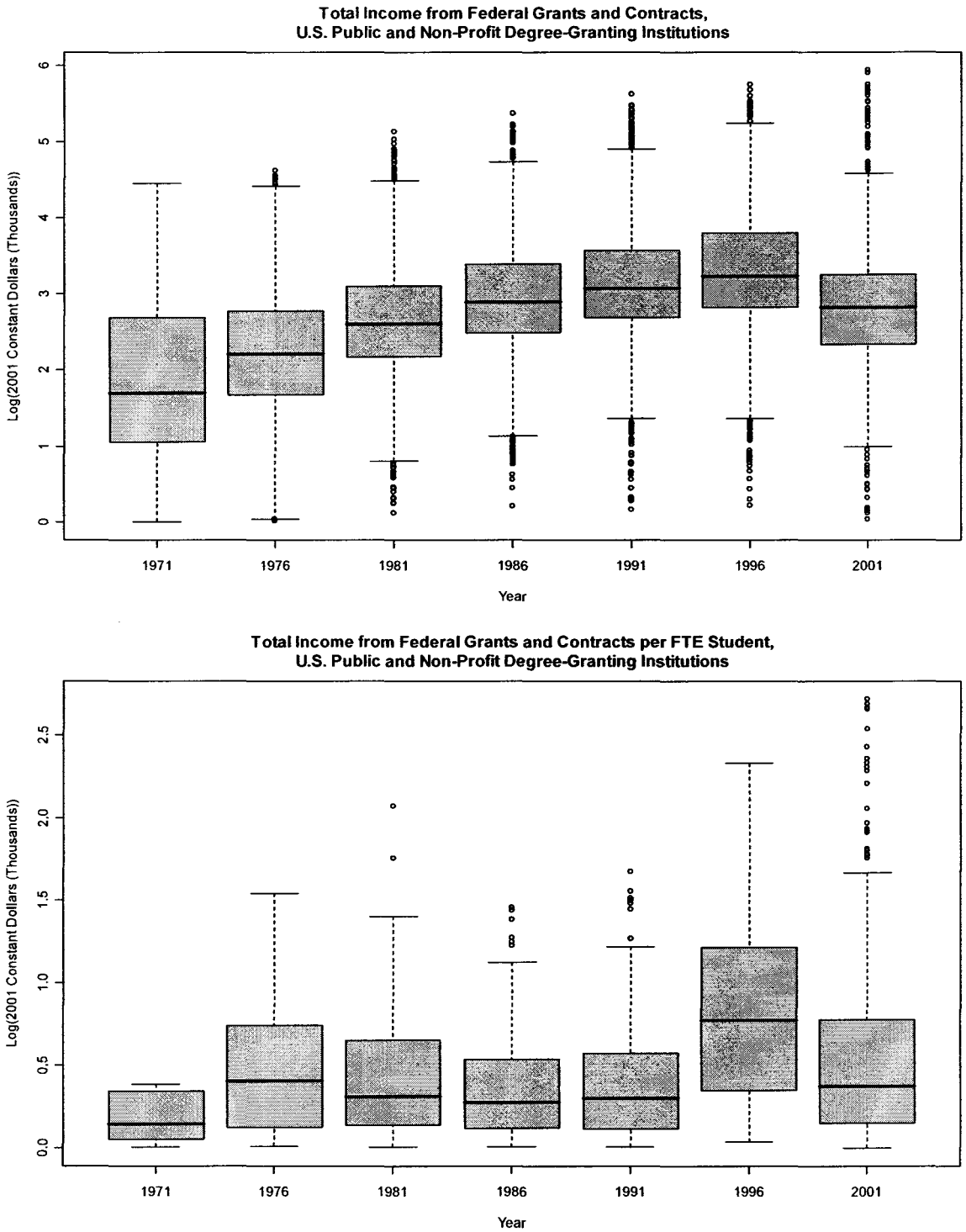

Lorenz Curves for Total Expenditures Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Figure 4.19



Note: Since these measures are very highly skewed in their natural units, the graphs show logged estimates.

becoming more stratified over time. In Canada, this trend is relatively mild, and does not yet appear to be producing an elite pattern. In the U.S., the opposite is true. A clear elite pattern exists and has further diverged from the bulk of schools.

4.4 Summary of Results and Broader Implications

As higher education continues to expand and universities face increasing pressures to become more accountable and market-driven, have the levels of stratification among Canadian and American universities changed? Are the two postsecondary systems changing in similar ways?

The analyses in this chapter demonstrate that both nations have become more stratified over time. Yet, the extent of institutional inequality and rate of growth is much higher in the U.S. For American universities, the results support theories that predicted the growth of stratification among universities. At the top end of the U.S. hierarchy, a few "elite" and larger institutions appear to be winning the majority of bouts for economic resources and other independent sources of revenue. The Lorenz curves demonstrated that this competition is growing increasingly fierce in recent years, as much of the inequality among institutions is located at the high end of the distribution. At the same time, more parity was found among lower-ranked institutions, supporting hypotheses that posit various types of competition and strategies may be at play for different segments of the population of U.S. schools (see Brint 2005).

In Canada, the "no change" scenario presented in detail in the theory chapter of this project best describes the situation. For most of the economic measures, Canadian universities changed only slightly over the span of thirty years. Moreover, these findings were particularly salient when school size was taken into account. Indeed, Canada's formally equal, publicly regulated and governed system of higher education reacts quite differently to market pressures. It is possible that the relatively equal distribution of resources found at the school level may not hold when examining resources at the level of fields, since market pressures may create more stratification within the institutions (Davies and Hammack 2005). Still, there is some evidence at the level of the schools to suggest some mild convergence across nations. In areas where government regulation is minimal or non-existent (e.g., income from endowments, income from tuitions), the results indicate that Canadian universities are becoming more and more disparate, and a small number of Canadian universities (e.g., University of Toronto, McGill University) are consistently winning competitions for resources.

Overall, however, historic or economic conditions (i.e., provincial funding) seem to be preventing the Canadian system from paralleling the steep hierarchy in the U.S. Global pressures for postsecondary institutions to expand enrolments, to create a larger menu of subjects for their customers to choose from, to compete for grant monies and maintain partnerships with industry may be pushing a relatively homogeneous and public system like Canada's towards a "creeping" form of stratification. In the U.S., these market forces are bolstering the existing hierarchy and reinforcing its "elite" sector of institutions.

Chapter 5: Results for the Individual Level

In this chapter, the findings from the individual level of analysis are presented. As discussed in further detail above, these analyses seek to answer three principal research questions. First, as postsecondary accessibility and student competition continue to increase, are individuals from more privileged socio-demographic backgrounds (e.g., by race, gender, socioeconomic status) more likely to obtain degrees from particular fields of study and selective institutions? Second, have these patterns changed over time? That is, are socio-demographic effects consistent across cohorts? Finally, are there any cross-national differences in any of the aforementioned relationships?

This chapter is divided into four parts. The first part summarizes the descriptive statistics and the OLS and multinomial regressions estimated using the Baccalaureate and Beyond Studies. In the same manner, the second part of the chapter summarizes the descriptives and regressions for analyses using the National Graduates Surveys. Third, cohort and cross-national comparisons of the statistical analyses are summarized and displayed using graphical displays of the predicted probabilities (for the multinomial logits). Finally, the chapter concludes with a summary of the results and their broader implications.

Part 1: Baccalaureate and Beyond Analyses

5.1.1 Descriptives: Comparing the B&B 1993-94 and 2000-01 Cohorts

Table 5.1 contains descriptive statistics for each of the two B&B cohorts. No major differences over time are evident across marital status, age, gender, race, parent education, income, and high school type. New bachelor's degree holders are more likely to be single, around age 25 (on average), female, White, have a parent with at least a bachelor's degree, an annual household income of about $50,000 USD, and previously attended a public high school.

For aspirations, the great majority of students in the 2000-01 cohort are still planning on pursuing a Master's degree or higher, though the relative percentage of students doing so dropped slightly since 1993-94. In addition, some changes to the characteristics of the schools students attended are noticeable over the seven year period. Average enrolment size grew by about 2,500 students. In addition, the distribution of students across fields changed slightly over time. Since the 1993 cohort, the proportions of the sample enrolled in business and management, education, and engineering, math and physical sciences have declined to some extent, while the proportions of students entering the biological sciences and health professions, social sciences, and most noticeably the humanities, have all grown slightly.

Table 5.1 **Descriptive Statistics for Variables from the 1993-94 and 2000-01 Cohorts of the Baccalaureate and Beyond Surveys of University Graduates in the U.S.**

	1993-94		2000-01	
	Mean/Proportion	***BRR SE***	***Mean/Proportion***	***BRR SE***
Marital Status				
Single/Previously Married	0.71	0.011	0.72	0.008
Married	0.28	0.011	0.28	0.008
Age	25	0.169	25	0.118
Gender				
Male	0.46	0.008	0.44	0.006
Female	0.54	0.008	0.56	0.006
Race				
White	0.85	0.008	0.80	0.007
Black	0.04	0.004	0.06	0.004
Hispanic or Latino	0.05	0.004	0.07	0.005
Asian	0.04	0.003	0.04	0.003
Other	0.01	0.002	0.02	0.002
Parent Education				
Less than bachelor's	0.48	0.009	0.46	0.008
Bachelor's or higher	0.52	0.010	0.54	0.009
Income	51,292.08	1288.999	58,883.12	681.109
Aspirations				
Below Master's	0.17	0.006	0.30	0.007
Master's or higher	0.83	0.006	0.70	0.007
High School Type				
Public	0.83	0.006	0.85	0.006
Private, Catholic	0.06	0.003	0.09	0.006
Private, not religious	0.04	0.003	0.03	0.002
Private, other religious	0.07	0.006	0.03	0.004
SAT Score Combined	2.52	0.024	1098	2.669
Enrolment Size	16,044	316.043	18,694	330.701
Institution Sector				
Public, 4 year non-PhD	0.21	0.011	0.16	0.011
Public, 4 year PhD	0.45	0.010	0.48	0.010
Private, 4 year non-PhD	0.18	0.010	0.20	0.008
Private, 4 year PhD	0.16	0.004	0.16	0.006
Institution Selectivity				
IPEDS 75th Percentile School SAT Score	1232	4.350	1232	3.100
Field				
Business and Management	0.22	0.009	0.19	0.004
Education	0.13	0.005	0.08	0.003
Engineering, Math and Physical Science	0.12	0.005	0.11	0.003
Biological Sciences and Health Professions	0.11	0.006	0.12	0.004
Humanities	0.11	0.005	0.16	0.006
Social Sciences	0.17	0.008	0.19	0.004
Other	0.14	0.006	0.16	0.005
Field (scored)	22,605.29	96.846	31,982.47	94.406
n	7126		7133	

Estimates and standard errors are survey weighted using balanced repeated replicates. SAT scores in the 1993-94 B&B survey were reported on a four-point scale.

Table 5.2 OLS Regression Models of Institutional Selectivity Choices for the 1993-94 Cohort of University Graduates in the U.S.

	Model 1			Model 2			Model 3			Model 4		
Constant	1623.134	(36.060)		1407.429	(41.190)		1344.736	(40.101)		1516.587	(52.861)	
Marital Status			***			***			***			***
Single/Previously Married	---	---		---	---		---	---		---	---	
Married	-25.612	(4.410)		-23.382	(4.220)		-19.109	(4.017)		-18.955	(4.062)	
Log(Age)	-272.139	(26.510)	***	-212.942	(25.127)	***	-208.678	(24.316)	***	-204.476	(24.069)	***
Gender			***			***						
Male	---	---		---	---		---	---		---	---	
Female	-15.371	(3.550)		-15.399	(3.567)		-5.471	(3.416)		-5.417	(3.440)	
Race			***			***			***			***
White	---	---		---	---		---	---		---	---	
Black	-11.203	(8.254)		0.929	(8.088)		17.544	(8.320)		15.578	(8.419)	
Hispanic or Latino	-19.959	(13.355)		-7.523	(12.658)		-0.693	(11.797)		-2.089	(12.208)	
Asian	49.440	(9.757)		49.883	(9.790)		46.828	(9.488)		45.127	(9.709)	
Other	31.666	(18.932)		36.440	(18.013)		25.811	(15.677)		26.315	(15.984)	
Parent Education						***			***			***
Less than bachelor's	---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		35.188	(3.399)		21.213	(3.427)		20.698	(3.467)	
Log(Income)	---	---		25.203	(4.219)	***	17.886	(3.643)	***	-21.509	(8.699)	*
Aspirations												
Below Master's	---	---		---	---		---	---		---	---	
Master's or higher	---	---		---	---		-1.425	(4.102)		6.464	(37.002)	
High School Type									***			***
Public	---	---		---	---		---	---		---	---	
Private, Catholic	---	---		---	---		5.436	(5.380)		6.316	(5.353)	
Private, not religious	---	---		---	---		50.735	(9.067)		49.639	(8.802)	
Private, other religious	---	---		---	---		0.115	(5.426)		0.686	(5.387)	
SAT Score Combined	---	---		---	---		35.323	(2.197)	***	-39.614	(11.225)	**
Income * SAT Score Combined	---	---		---	---		---	---		16.549	(2.514)	***
Income * Below Master's	---	---		---	---		---	---		---	---	
Income * Master's or higher	---	---		---	---		---	---		-1.757	(8.309)	
n	7126			7126			7126			7126		
R^2	0.097			0.136			0.232			0.237		

* p<.05; ** p<.01; *** p<.001; Multiple-df tests are reported for sets of dummy regressors. BRR standard errors for complex survey designs are in parentheses. Additional models included interactions between income and gender, race, parent education, and high school type, but none of these additional terms significantly improved the overall model fit.

5.1.2 Regression Results for Selectivity, B&B 1993-94

In Model 1, institutional selectivity is regressed on only students' demographic characteristics (see Table 5.2). Multiple and single-df tests indicate that all terms in Model 1 contribute significantly to changes in selectivity choices ($p<.001$). Moreover, both married ($p<.001$) and older individuals ($p<.001$) are significantly less likely to enter a more selective institution. Consistent with existing research (e.g., Karen 2002; Dale and Krueger 2002; Jacobs 1999; Davies and Guppy 1997), women are also significantly less likely than men to enter into selective institutions. Part of these inequalities of course may be explained by the courses offered at selective institutions and the limited number of part-time programmes also offered at selective institutions (see Jacobs 1999). Finally, in terms of racial differences, only one significant finding emerges. Asian students ($p>.001$) are more likely than whites to enter into selective institutions. This finding is also similar to the racial effects found in previous research (see Xie and Goyette 2003).

In addition to the demographic characteristics in Model 1, Model 2 includes measures of family background. Interestingly, the effects from Model 1 change very little with the addition of these terms. Both parent's education as well as family income have a significant impact on selectivity choices ($p<.001$). Students whose parents hold at least a bachelor's degree were significantly more likely to enter a more selective school than those with less education ($p<.001$). As well, individuals from more affluent family backgrounds were also more likely to enter more selective schools ($p<.001$). In Model 1, the demographic characteristics explained about 10 percent of the change in selectivity choices ($R^2 = 0.097$). Once family background characteristics are included in the models, the R^2 improves to 0.136.

In Model 3, measures of skill and aspirations are added to the OLS models. Nearly all of the variables in Model 2 maintain their effects, despite the addition of these new terms. One exception is that the gender effects have largely dissipated. Once social background and skill effects are included in the model, the impact of gender on student school choices no longer holds a statistically significant influence. As in the previous models, parents' education and family income have significant effects on school choices ($p>.001$). At the same time, SAT scores also have a positive effect on one's selectivity choices ($p>.001$). The strong family background effect, even once controlling for academic ability, lends some support to theories that predict direct social background effects (e.g., Bourdieu and Passeron 1990; Lareau 2002; Lareau and Weininger 2003). Finally, students' high school type is found to have a significant impact on selectivity choices ($p<.001$). Not surprisingly, much of this effect is attributable to students who attended a private, non-religious high school, as these individuals were on average entering more selective postsecondary schools than students in any other category ($p<.001$). Overall, we can see that the addition of skill, aspirations and high school type significantly improved the fit of the models, as the R^2 nearly doubled in Model 3 ($R^2 = 0.232$).

The final model (Model 4) in Table 5.2 includes interactions between income and academic ability and income and student aspirations/expectations. Significant

Table 5.3 OLS Regression Models of Institutional Selectivity Choices for the 2000-01 Cohort of University Graduates in the U.S.

	Model 1			Model 2			Model 3			Model 4		
Constant	1622.856	(40.338)		1441.102	(40.297)		1156.815	(41.490)		1750.268	(98.928)	
Marital Status			***			***			***			***
Single/Previously Married	---	---		---	---		---	---		---	---	
Married	-29.818	(4.331)		-27.317	(4.229)		-22.124	(3.807)		-20.610	(3.815)	
Log(Age)	-270.617	(28.088)	***	-198.803	(27.248)	***	-175.464	(26.818)	***	-171.173	(26.318)	***
Gender			***			***						
Male	---	---		---	---		---	---		---	---	
Female	-12.238	(3.486)		-11.755	(3.353)		-3.341	(2.900)		-3.264	(2.898)	
Race			***			***			*			*
White	---	---		---	---		---	---		---	---	
Black	-22.676	(9.224)		-13.130	(9.110)		3.145	(10.092)		0.437	(9.942)	
Hispanic or Latino	-18.034	(8.799)		-6.170	(8.918)		1.462	(8.277)		0.636	(8.197)	
Asian	39.048	(9.632)		41.138	(9.470)		30.391	(8.684)		29.769	(8.857)	
Other	-0.212	(11.594)		0.674	(11.944)		2.779	(11.249)		2.633	(11.325)	
Parent Education						***			***			***
Less than bachelor's	---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		44.105	(3.400)		21.729	(3.253)		21.700	(3.260)	
Log(Income)	---	---		12.632	(2.964)	***	5.890	(2.723)	*	-125.261	(18.912)	***
Aspirations												
Below Master's	---	---		---	---		---	---		---	---	
Master's or higher	---	---		---	---		5.701	(2.864)		-39.632	(24.658)	
High School Type									***			***
Public	---	---		---	---		---	---		---	---	
Private, Catholic	---	---		---	---		3.990	(3.934)		4.045	(3.983)	
Private, not religious	---	---		---	---		44.462	(8.349)		43.756	(8.532)	
Private, other religious	---	---		---	---		11.412	(7.789)		12.725	(7.534)	
SAT Score Combined	---	---		---	---		0.256	(0.011)	***	-0.275	(0.084)	
Income * SAT Score Combined	---	---		---	---		---	---		0.116	(0.018)	***
Income * Below Master's	---	---		---	---		---	---		---	---	
Income * Master's or higher	---	---		---	---		---	---		10.046	(5.255)	
n	7133			7133			7133			7133		
R^2	0.100			0.142			0.265			0.276		

* p<.05; ** p<.01; *** p<.001; Multiple-df tests are reported for sets of dummy regressors. BRR standard errors for complex survey designs are in parentheses. Additional models included interactions between income and gender, race, parent education, and high school type, but none of these additional terms significantly improved the overall model fit.

interactions with either term would indicate that it is a combination of income with ability or income and aspirations that influences school choices. Indeed, the results in Model 4 indicate that income does interact with student's SAT scores ($p<.001$). In other words, the effect of family income on selectivity choices, varies by one's academic ability (i.e., SAT score). Students who attend more selective schools must not only come from more affluent family backgrounds, but they must also possess a high level of ability.

5.1.3 Regression Results for Selectivity, B&B 2000-01

In Table 5.3, identical models are estimated for the 2000-01 cohort of the Baccalaureate and Beyond survey. In Model 1, the selectivity of the institution is regressed on the demographic characteristics of bachelor's degree-holders. As in the previous cohort, all variables in the model have a significant impact on students' school choices ($p<.001$). Moreover, married individuals are less likely than single individuals to enter into selective institutions ($p>.001$). As respondents' age increases, they become less likely to pursue a degree at a selective institution ($p>.001$). In terms of gender, women are significantly less likely to enter more selective institutions than men ($p<.001$). For race, Black and Hispanic or Latino respondents are significantly less likely to enter more selective institutions than White respondents ($p<.05$), while Asian students are more likely than Whites to enter selective institutions ($p<.001$).

Model 2 adds family background variables to further explain institutional selectivity choices. As in Model 1, all of the demographic effects maintain their effects. In addition, parents' education and family income are also shown to have significant effects ($p<.001$). As in the previous cohort, students from more educated and more affluent families are more likely to enter selective schools. Similar to the previous cohort, the R^2 values for the models improve with the addition of social background variables (0.100 to 0.142).

When controlling for academic ability and aspirations in Model 3, the gender effects dissipate once again. In addition, the effect of race decreases slightly in strength ($p<.05$), as only the significant effect for Asian Americans relative to whites holds. In terms of family background effects, respondents whose parents obtained a bachelor's degree or higher were much more likely to enter into more selective institutions ($p<.001$). Family income also has a significant positive effect on one's selectivity choices ($p<.05$), but the strength of this effect has weakened slightly across cohorts. In terms of aspirations, no significant effects emerged. SAT scores, however, have a significant positive effect on selectivity choices ($p<.001$). Once again, a strong high school effect on selectivity choices ($p<.001$) is noticeable, even when controlling for all other factors in the model. As in the previous cohort, the addition of skill, aspiration and high school type variables greatly increases the model fit, as the R^2 nearly doubles from 0.142 in Model 2 to 0.265 in Model 3.

Finally, Model 4 includes two interactions with family income, to further explore the relationship between income and ability and selectivity decisions. As in the first cohort, only the interaction between academic ability and family income is statistically

significant (p<.001). That is, the effect of income on selectivity choices continues to vary by the SAT score of the student.

5.1.4 Comparisons of Selectivity Results

Overall, few real differences occur over time. The rather short period of time (seven years) between the two B&B cohorts may account for this lack of change. Despite this short time frame, there is some weak evidence that the role of aspirations in predicting selectivity choices may be increasing over time. In 2000-01, students from privileged family backgrounds are still entering more selective institutions, but aspirations appear to have an increasing influence, though they are not quite significant at the 0.05 level. Moreover, the interaction effect between income and student aspirations is also nearly statistically significant in the latest cohort. While it may be too early to tell, it may not be enough for students to have the resources and know-how to enter more selective institutions. As shown previously at the graduate level, students may increasingly have to carry with them a high level of motivation or educational expectations (Mullen et al. 2003).

5.1.5 Multinomial Logits for Field of Study, B&B 1993-94

To explore which students are entering particular fields, multinomial logit models were estimated predicting students' field of study in their undergraduate degrees. In Table 5.4 (see Appendix C), Model 1 estimates the effects of only demographic characteristics on field of study choices. Multiple-df tests indicate that martial status, age, gender and race all have statistically significant effects on students' field choices. Married individuals are significantly less likely to enter into the humanities (p<.01) or social sciences (p<.001) and are more likely to enter education (p<.05) than business and management. Older individuals are significantly less likely to enter into education (p<.05), engineering, math and physical science (p<.01), social sciences (p<.05) relative to business and management majors.

In terms of gender, much segregation across fields exists. Not surprisingly, women are 0.438 times as likely as men to enter into engineering, math and physical sciences, and significantly more likely to enter into all other fields over business and management (p<.001). Specifically, the odds of women entering education, the biological and health professions, the humanities, or the social sciences over business and management are 4.221, 2.121, 1.66 and about 1.65 times greater than those for men respectively. These inequalities are consistent with existing studies that propose a gender cleavage along 'quantitatively-based' fields of study (e.g., Jacobs 1999; Turner and Bowen 1999; Solnick 1995; Maple and Stage 1991; Ethington and Wolfe 1988).

Finally, the most notable racial effect is that Asian students are 2.718 times more likely than Whites to enter into engineering, math or physical science relative to business and management (p<.001). They are also 1.775 times more likely than Whites to enter

into biological sciences or health professions rather than business ($p<.05$). This result is consistent with Xie and Goyette's (2003) finding that Asian Americans are more likely than Whites to pursue fields that are in high demand in the economy. As the United States fully embraces a knowledge economy where information technology and research and development occupations become increasingly valued, it would seem that Asian Americans, more so than Whites, are answering the market call by obtaining more technical degrees.

In the second model, the demographic variables continue to exhibit a strong influence on field choices. In addition, new variables for parents' education and family income also show statistically significant effects on field of study choices. Specifically, students who have parents with a bachelor's degree or higher are 1.669 times more likely to major in engineering, math or the physical sciences ($p<.001$), 1.432 times more likely to major in the biological sciences or health professions ($p<.05$), 1.795 times more likely to major in the humanities ($p<.01$), and 1.350 times more likely to major in the social sciences ($p<.05$) relative to business and management. Since education was less of a prerequisite to business in the past, it is possible that students whose parents are entrepreneurs and do not have a bachelor's degree may now encourage their children to enter into business. This explanation, however, assumes that children follow in their parents' footsteps – a theory that requires further exploration.

For income, the higher an individual's income, the lower their odds of majoring in education ($p<.001$), engineering ($p<.01$) or the biological sciences ($p<.01$) over business and management.[40] In other words, students from more affluent family backgrounds are more likely than others to enter business, net of all other factors in the models. This finding is perhaps less surprising when considering that business and management graduates enter into a highly competitive market with the greatest risks but also the greatest potential earnings (e.g., CEO's, CFO's).

Model 3 contains additional measures to examine the influence of academic ability. The great majority of the previous effects hold in this model. The effect of parents' education does weaken slightly, but still has a statistically significant effect on field choices ($p<.05$). Interestingly, the effect of student ability (i.e., SAT scores) on college major decisions is quite different from the effects of income noted above. Students with higher SAT scores are more likely to enter biological sciences or health professions ($p<.05$), the humanities ($p<.001$), and almost twice as likely to enter engineering, math or physical sciences ($p<.001$) over business. In terms of student plans, educational expectations or aspirations, students who plan on obtaining a Master's degree or higher have greater odds of entering education (odds ratio=2.469; $p<.001$), engineering, math or physical science (odds ratio=1.492; $p<.01$), biological sciences or health professions (odds ratio=1.685; $p<.05$), and the social sciences (odds ratio=1.863; $p<.01$) relative to business and management. This is not particularly surprisingly, since business and management does not tend to be a 'stepping stone' degree like those of the

[40] The effects were similar in direction but were not statistically significant for the humanities and the social sciences, as students from more affluent backgrounds were more likely to graduate with business and management degrees. The relatively weak effects in the areas of the humanities and social sciences may reflect a tendency for more affluent families to also encourage their children to enter the liberal arts.

general sciences or arts (see Goyette and Mullen 2006). Finally, in Model 3, the multiple-df test indicates that high school type significantly affects field choices ($p<.01$). Students who attended a private, non-religious high school were over three times more likely than students from public high schools to enter the humanities over business and management ($p<.01$).

In the fourth model, institutional characteristics are included in the analysis. Many of the previous effects demographic and social background characteristics hold, with the exceptions of parents' education and high school type no longer being significant. Enrolment size did not have any significant effects on field choices, but institution type or sector does appear to have some influence, which may be attributable to the selection of fields that are offered at the institution (see Brint et al. 2005; Jacobs 1999).

Model 5 contains all of the terms from the previous models and the addition of several higher order terms (i.e., interactions with income). To test for the presence of interaction effects on field of study choices, we include several theoretically interesting higher order terms in the model. The results indicate that neither the interaction between income and ability nor the interaction between income and aspirations proves to be statistically significant.

5.1.6 Multinomial Logits for Field of Study, B&B 2000-01

Similar models were estimated for the 2000-01 B&B cohort (see Table 5.5 in Appendix C). As in the previous cohort, in the first model, multiple-df tests revealed martial status, age, gender and race all have statistically significant effects on students' field choices. Married individuals are more likely to major in education ($p<.001$) and less likely to major in the social sciences ($p<.001$) than single individuals relative to business and management. As in the previous cohort, older individuals are much more likely to major in business and management over other fields of study. Specifically, older students are 0.122 times as likely to enter education ($p<0.05$), 0.06 times as likely to enter engineering, math or physical sciences ($p<.001$), 0.188 times as likely to enter biological science or health professions ($p<.01$), 0.181 times as likely to enter the humanities ($p<.05$), and 0.097 times as likely to major in the social sciences ($p<.001$).

For gender, segregation across fields of study is still quite prevalent. Women are much more likely than men to enter education (odds ratio=4.486; $p<.001$), the biological sciences and health professions (odds ratio=3.040; $p<.001$), the humanities (odds ratio=1.758; $p<.001$), and the social sciences (odds ratio=2.250; $p<.001$) over business and management. They also remain significantly less likely to enter the traditionally male-dominated fields of engineering, math and physical sciences (odds ratio=0.712; $p<.001$). It is quite evident that gender continues to play an important role in the sifting and sorting of students into various fields or college majors.

In terms of racial effects, most notably, Black students are more likely than Whites to enter the social sciences (odds ratio=1.756; $p<.05$) and less likely to enter the humanities (odds ratio= 0.480; $p<.05$) rather than business and management. Hispanics

are also more likely than Whites to enter the social sciences over business (odds ratio=1.687; p<.05). For Asians, no significant effects on field of study were found. Interestingly, the extremely strong, positive Asian effect on entering engineering, math and physical sciences majors evident in the previous cohort has weakened considerably over time.

The second model includes two additional terms to measure family background – parents' education and family income. Similar to the previous cohort, parents' education has a significant effect on field choices, but the strong negative relationship between highly educated parents and students' propensity to enter business and management that was found in the previous B&B cohort appears to have weakened over time. Students with highly educated parents were no longer opting to major in any field over business. Specifically, students from more educated families were 0.705 times as likely to enter education (p<.01) and 1.461 times more likely to enter the humanities (p<.01) over business and management. Unlike the previous cohort, family income does not have a statistically significant impact on students' field of study choices.

In Model 3, the addition of academic ability, aspirations, high school type does not alter the previous relationships. For ability, students with higher SAT scores are less likely to major in education (odds ratio=0.999; p<.01) and more likely to major in engineering, math or physical sciences (odds ratio=1.006; p<.001), biological sciences or health professions (odds ratio=1.002; p<.001), the humanities (odds ratio=1.003; p<.001) or social sciences (odds ratio=1.001; p<.05) relative to business and management.[41] Student motivation or aspirations also contributed significantly in explaining variation in field choices. Similar to the previous cohort, those who plan on pursuing a Master's degree or higher are more likely than those with below Master's plans to major in education (odds ratio=2.625; p<.001), biological sciences and health professions (odds ratio=1.449; p<.01), and the social sciences (odds ratio=1.639; p<.001) in relation to business and management. Finally, unlike the 1993-94 cohort, high school type did not have a significant effect on field choices.

Model 4 adds several institutional measures to the analysis. Once again, school size does not appear to have a considerable impact on field decisions. For institution type, however, a few effects emerge. Students who attended a public 4 year, PhD granting institution were less likely than those at public 4 year non PhD schools to major in education (odds ratio=0.636; p<.05). The same relationship holds true for individuals at private 4 year PhD granting schools (odds ratio=0.520; p<.01). Though not surprising, it would seem that students at these PhD granting schools are more apt to head in the direction of the business school rather than the education school.

Finally, Model 5 contains all of the previous terms with the addition of interactions with income. In the previous cohort, these higher order terms did not significantly improve the fit of the model. Here, however, income and SAT scores significantly improve the fit of the model. The positive effect on field choices indicates that students with high income and high ability are more likely than those with lower

[41] Despite the statistically significant effects, the odds of entering business versus the other fields are quite small in their differences (see Table 5.5 in Appendix C).

incomes and lower academic ability to enter engineering, math and physical sciences (odds ratio=1.002; p<.05) rather than business. As well, these individuals are more likely to major in the humanities (odds ratio=1.002; p<.05) over business and management majors. As in the selectivity models for the 2000-01 cohort above, family background appears to interact with students' academic ability.[42]

5.1.7 Comparisons of Multinomial Logits for Field of Study

Age, Gender and Race

Figure 5.1 illustrates the predicted probabilities for each cohort, holding all variables at their sample means or proportions. The graphs include the point estimate and the whiskers on either end of the predicted probability represent the upper and lower limits of 95 percent confidence bands. Graphing the predicted probabilities in this manner is extremely beneficial for comparing differences over time and across countries.

Comparing the two cohorts, students' probabilities of graduating with bachelor's degrees in education or business decreased substantially across cohorts. To a lesser extent, students were also slightly less likely to graduate with a degree in engineering, math and physical sciences and the biological sciences and health professions in 2000-01. On the other hand, students' probability of entering the humanities and the social sciences increased dramatically by 2000-01. In fact, students in the more recent B&B cohort were more likely to graduate with degrees in the social sciences (p = 0.2068) than business and management (p = 0.1952). Overall, this exodus of students from the natural sciences into the social sciences may be a product of substantial institutional growth of the social sciences over the past half century (see Frank 2006).

The effects of age on field of study choices changed minimally over time (see Tables 5.4 and 5.5 in Appendix C). In both cohorts, older individuals opted to enter business and management over education, engineering, math and physical sciences, and the social sciences. Moreover, in the 2000-01 cohort, older individuals were also significantly less likely to enter the humanities. For gender differences, the situation also remained largely similar across cohorts. The direction and statistical significance of the effects are identical for both cohorts. Furthermore, taking a look at the predicted probabilities in Figure 5.2, it is evident that the gender disparities found in the 1993-94 cohort are still very much at play in the 2000-01 cohort.[43] Men still have much higher

[42] As for the first cohort, a final model (not shown) was estimated to control for institutional selectivity, but the estimates changed only minimally from Model 5.

[43] The predicted probabilities in these graphs were calculated by holding all other variables in the model at their means or proportions.

Figure 5.1

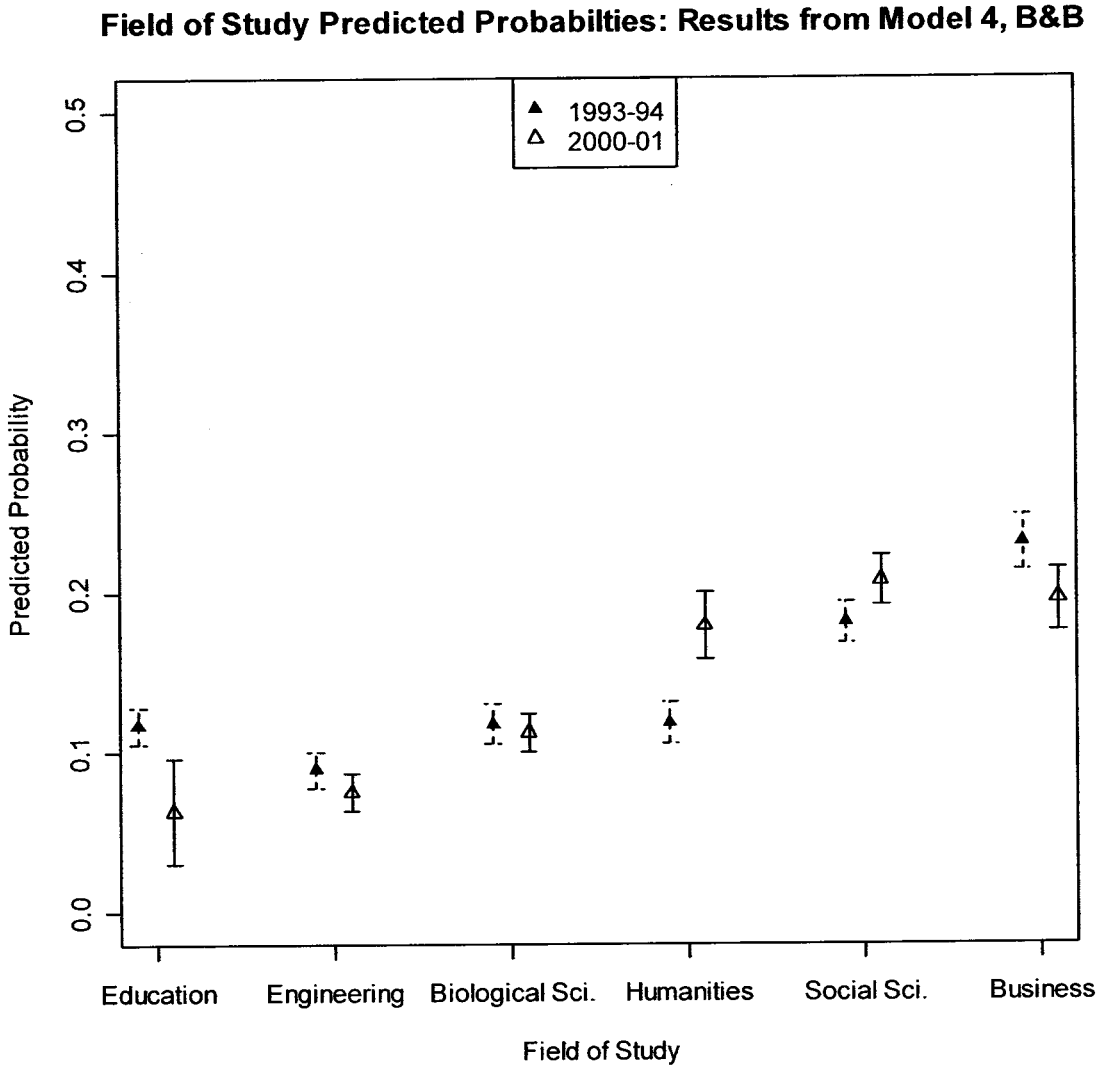

Field of Study Predicted Probabilties: Results from Model 4, B&B
1993-94
2000-01
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

Figure 5.2

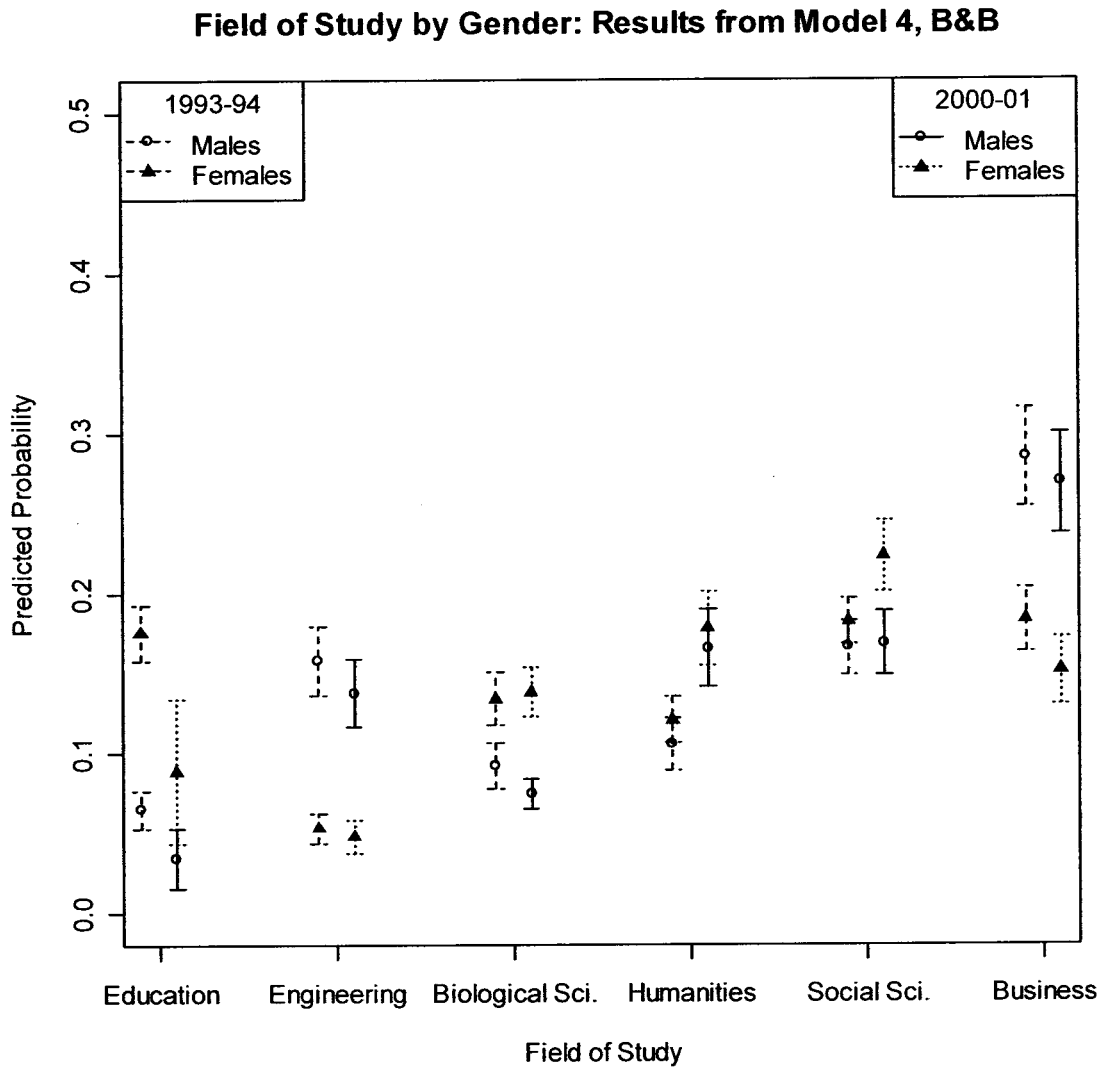

Field of Study by Gender: Results from Model 4, B&B
1993-94
Males
Females
2000-01
Males
Females
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

Figure 5.3

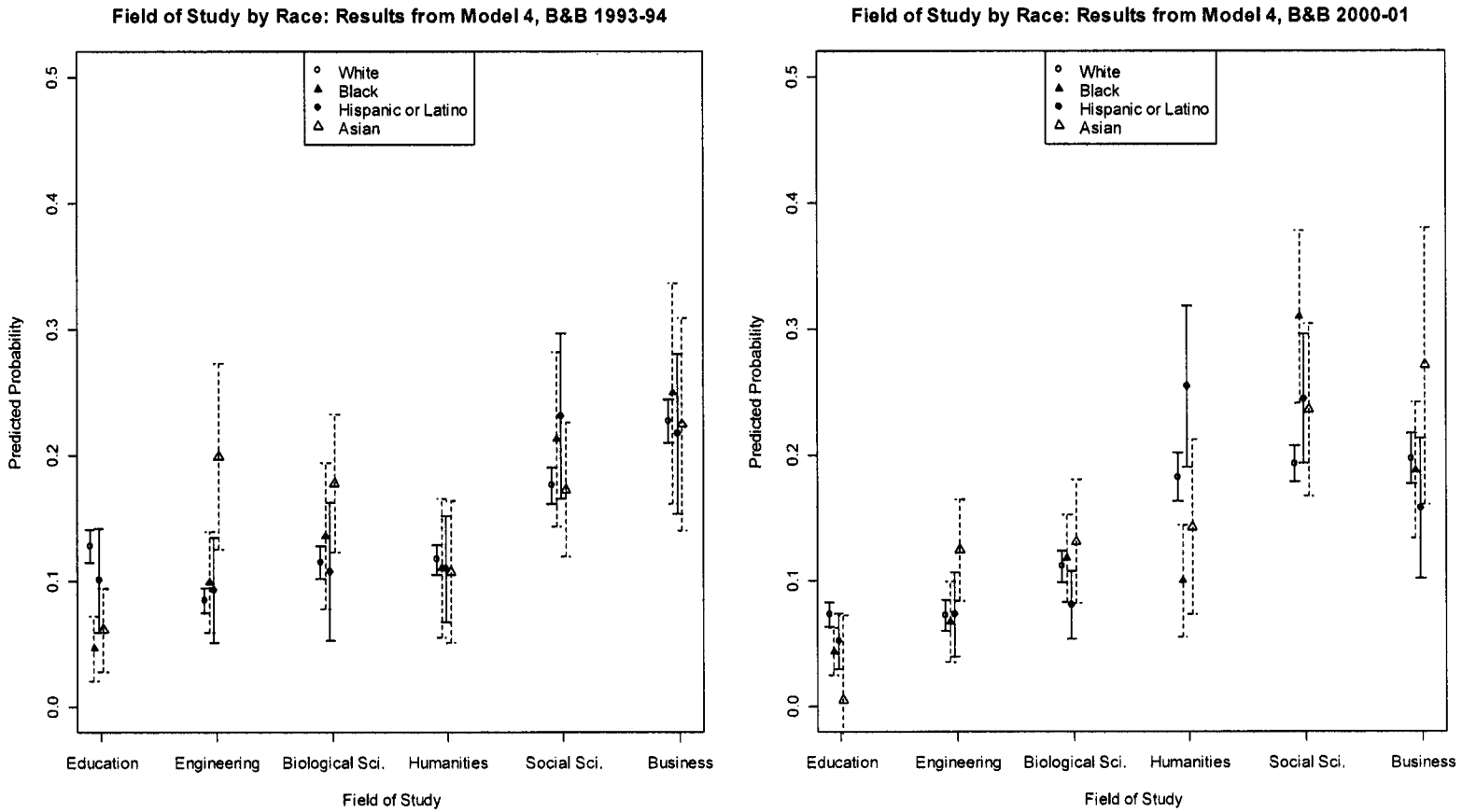
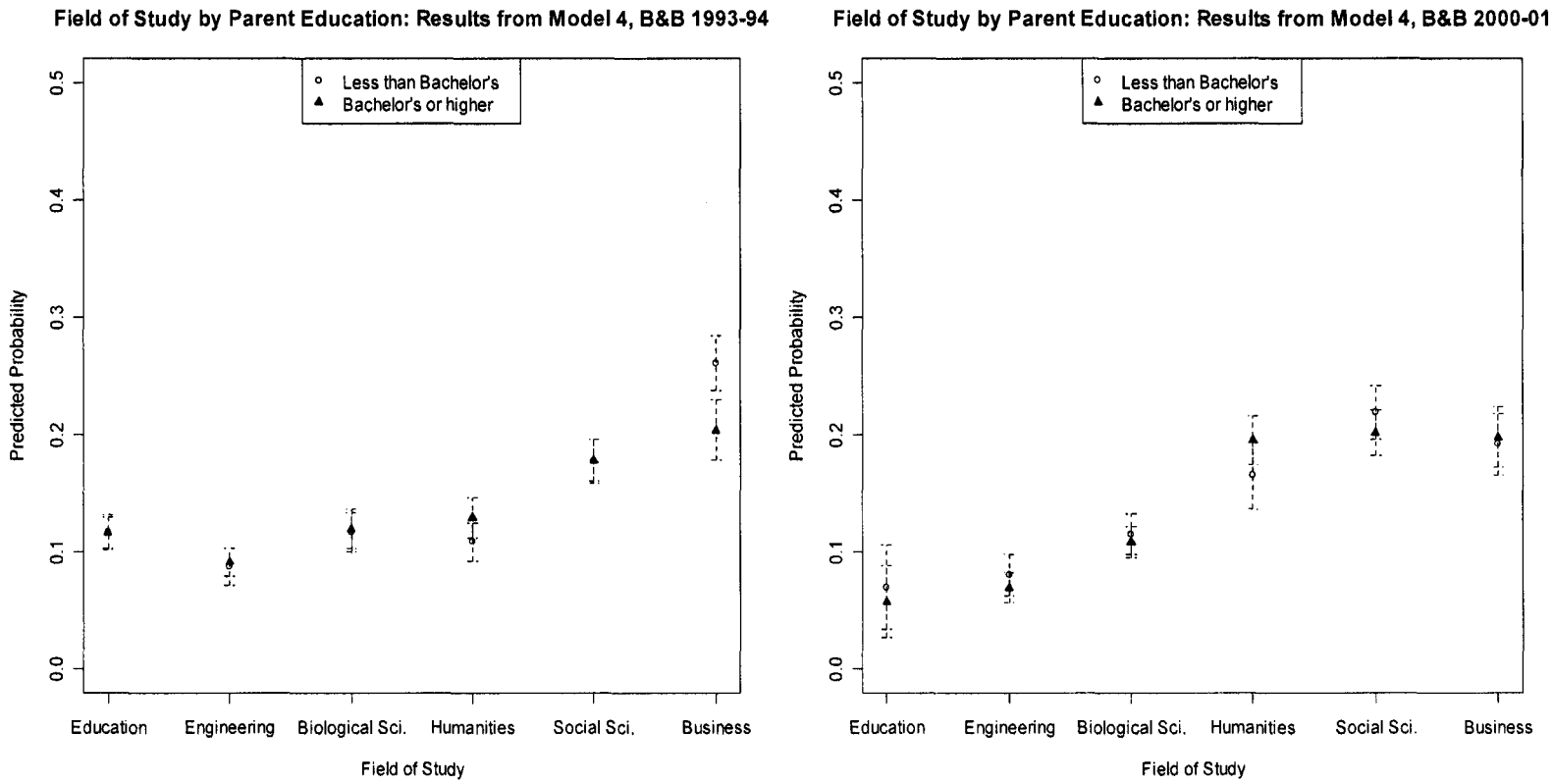

Field of Study by Race: Results from Model 4, B&B 1993-94
White
Black
Hispanic or Latino
Asian
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study
Field of Study by Race: Results from Model 4, B&B 2000-01
White
Black
Hispanic or Latino
Asian
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

Figure 5.4


Field of Study by Parent Education: Results from Model 4, B&B 1993-94
Less than Bachelor's
Bachelor's or higher
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study
Field of Study by Parent Education: Results from Model 4, B&B 2000-01
Less than Bachelor's
Bachelor's or higher
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

probabilities of entering engineering and business and management (though the engineering gap is shrinking slightly), while women have a greater chance of entering education, biological sciences and health professions, and the social sciences. The humanities are perhaps one area where men and women have fairly equal probabilities of attending.

For racial effects, the most notable difference is the disappearance of the positive Asian effect on engineering, math and physical sciences that was so highly significant in the 1993-94 cohort. In addition, there are also some emerging positive significant effects on pursuing a social science degree over a business degree for Blacks and Hispanics. Figure 5.3 displays the predicted probabilities by race from the full models without interactions. It is quite evident that the engineering, math and physical sciences probability gap between Asian students ($p = 0.1993$) and other races in 1993-94 narrowed slightly in the 2000-01 cohort ($p = 0.1241$). In addition, the probabilities for Blacks and Hispanics illustrate the significant differences found in the model output, as the probabilities of entering the social sciences for each of these groups relative to those of business and management increase substantially in the 2000-01 cohort.

Family Background, Ability and Aspirations

The impact of income remains negative on students' choice of majoring in any field other than business and management. The effects appear to have shrunk somewhat over the short time frame, given the declining level of statistical significance and size of the regression coefficients. Nevertheless, individuals from more privileged backgrounds are still more likely to major in business and management than those from less privileged backgrounds. The impact of parental education on field choices remained fairly constant over the time period. One noticeable difference can be seen in Figure 5.4, however. In the 1993-94 cohort, students with highly educated parents were more likely to shy away from degrees in business than those with less educated parents. In the most recent cohort, however, these differences by parents' level of education no longer exist.

When examining student ability and aspirations (see Tables 5.4 and 5.5 in Appendix C), the effects remain largely the same. Students with higher SAT scores remain less likely to enter education and more likely to enter any other field before business. Most of the aspiration effects on field choices also remain the same with one exception. In the more recent cohort, students with higher aspirations are no longer significantly more likely to major in engineering, math and physical science over business.

With respect to high school type, the first cohort found students who attended a non-religious private high school were more likely to choose the humanities over business. In the more recent cohort, however, high school type no longer had a significant impact on field choices.

Interactions with Income

Table 5.6 OLS Regression Models of Lucrative Field Choices for the 1993-94 Cohort of University Graduates in the U.S.

	Model 1			Model 2			Model 3			Model 4			Model 5		
Constant	19000.380	(1202.753)		18630.700	(1313.457)		18240.060	(1428.741)		16806.910	(2045.054)		16847.710	(3420.048)	
Marital Status															
Single/Previously Married	---	---		---	---		---	---		---	---		---	---	
Married	479.588	(231.532)		493.966	(233.525)		506.889	(238.250)		497.882	(233.505)		501.152	(235.428)	
Log(Age)	3017.323	(868.564)	**	3231.2	(832.183)	***	3242.550	(850.768)	***	3549.138	(800.675)	***	3536.903	(800.037)	***
Gender			***			***			***			***			***
Male	---	---		---	---		---	---		---	---		---	---	
Female	-1347.916	(177.864)		-1345.132	(177.988)		-1259.168	(171.639)		-1236.658	(167.562)		-1238.403	(168.040)	
Race															
White	---	---		---	---		---	---		---	---		---	---	
Black	-261.790	(366.248)		-227.225	(381.912)		-49.743	(384.944)		-93.886	(379.603)		-75.949	(381.039)	
Hispanic or Latino	-142.324	(525.665)		-97.554	(541.322)		-11.560	(544.088)		-27.028	(542.642)		-26.970	(533.887)	
Asian	963.813	(323.682)		973.027	(328.672)		957.247	(334.849)		873.353	(348.077)		878.574	(352.236)	
Other	-276.446	(378.048)		-250.735	(374.963)		-275.619	(389.345)		-243.049	(375.741)		-240.868	(377.536)	
Parent Education															
Less than bachelor's	---	---		---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		154.102	(152.808)		79.460	(151.090)		69.195	(152.282)		71.567	(151.128)	
Log (Income)	---	---		0.049	(189.950)		-35.561	(193.634)		-50.006	(198.391)		-53.944	(589.082)	
SAT Score	---	---		---	---		278.207	(90.092)	**	240.783	(86.128)	**	692.185	(747.780)	
Aspirations															
Below Master's	---	---		---	---		---	---		---	---		---	---	
Master's or higher	---	---		---	---		-189.360	(207.996)		-161.007	(208.136)		-1526.677	(2215.814)	
High School Type															
Public	---	---		---	---		---	---		---	---		---	---	
Private, Catholic	---	---		---	---		93.247	(389.998)		55.351	(383.537)		44.965	(380.049)	
Private, not religious	---	---		---	---		-500.199	(381.721)		-486.447	(362.204)		-481.116	(364.113)	
Private, other religious	---	---		---	---		-242.724	(354.633)		-240.080	(336.970)		-246.026	(338.824)	
Enrolment Size	---	---		---	---		---	---		179.420	(379.303)		175.648	(381.474)	
Institution Type															
Public, 4 year non-PhD	---	---		---	---		---	---		---	---		---	---	
Public, 4 year PhD	---	---		---	---		---	---		577.260	(270.656)		576.084	(272.787)	
Private, 4 year non-PhD	---	---		---	---		---	---		482.393	(333.157)		483.764	(334.045)	
Private, 4 year PhD	---	---		---	---		---	---		508.089	(314.602)		511.586	(313.206)	
Income * SAT Score	---	---		---	---		---	---		---	---		-99.872	(167.562)	
Income * Below Master's	---	---		---	---		---	---		---	---		---	---	
Income * Master's or higher	---	---		---	---		---	---		---	---		305.451	(473.853)	
n	7126			7126			7126			7126			7126		
R^2	0.022			0.022			0.025			0.027			0.028		

* p<.05; ** p<.01; *** p<.001; Multiple-df tests are reported for sets of dummy regressors. BRR standard errors for complex survey designs are in parentheses. Missing categories (not shown) were created for categorical variables. Additional models included interactions between income and gender, race, parent education, and high school type, but none of these additional terms significantly improved the overall model fit.

Table 5.7 OLS Regression Models of Lucrative Field Choices for the 2000-01 Cohort of University Graduates in the U.S.

	Model 1			Model 2			Model 3			Model 4			Model 5		
Constant	28883.390	(1521.684)		26545.570	(2059.559)		25503.640	(2174.248)		21467.730	(3018.666)		13435.370	(6648.653)	
Marital Status			*			*			*			*			*
Single/Previously Married	---	---		---	---		---	---		---	---		---	---	
Married	524.160	(229.006)		524.019	(231.022)		536.837	(233.686)		579.863	(236.731)		561.892	(241.237)	
Log(Age)	3229.302	(1116.640)	**	-937.221	(1093.928)	**	3651.399	(1183.739)	**	3954.449	(1198.849)	**	3895.131	(1194.287)	**
Gender			***			***			***			***			***
Male	---	---		---	---		---	---		---	---		---	---	
Female	-2773.810	(187.935)		-2783.018	(188.836)		-2744.860	(187.106)		-2724.245	(187.011)		-2726.885	(186.979)	
Race			**			**			**			*			*
White	---	---		---	---		---	---		---	---		---	---	
Black	362.507	(408.488)		465.891	(417.556)		637.514	(421.211)		570.639	(408.229)		612.948	(410.485)	
Hispanic or Latino	-555.445	(422.063)		-446.873	(415.178)		-334.905	(414.460)		-465.042	(412.098)		-455.491	(415.285)	
Asian	1686.705	(515.402)		1727.777	(503.617)		1660.530	(512.465)		1463.820	(517.373)		1469.411	(515.237)	
Other	-669.554	(524.238)		-626.760	(523.192)		-508.841	(517.518)		-545.033	(547.384)		-554.199	(543.639)	
Parent Education															
Less than bachelor's	---	---		---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		155.167	(213.021)		65.838	(225.764)		-1.301	(221.802)		2.428	(222.946)	
Log (Income)	---	---		332.611	(204.119)		302.105	(205.504)		322.771	(212.269)		2106.453	(1289.987)	
SAT Score	---	---		---	---		1.667	(0.724)	*	1.294	(0.721)		8.896	(5.634)	
Aspirations									*			*			
Below Master's	---	---		---	---		---	---		---	---		---	---	
Master's or higher	---	---		---	---		-651.979	(206.703)		-622.612	(209.032)		-558.786	(1764.807)	
High School Type															
Public	---	---		---	---		---	---		---	---		---	---	
Private, Catholic	---	---		---	---		29.339	(268.341)		-1.480	(265.003)		-8.701	(265.166)	
Private, not religious	---	---		---	---		-873.210	(438.238)		-863.403	(440.980)		-862.666	(431.971)	
Private, other religious	---	---		---	---		-599.077	(560.971)		-425.450	(555.884)		-452.181	(551.589)	
Enrolment Size	---	---		---	---		---	---		868.002	(436.260)		855.699	(436.400)	
Institution Type															
Public, 4 year non-PhD	---	---		---	---		---	---		---	---		---	---	
Public, 4 year PhD	---	---		---	---		---	---		423.059	(307.582)		443.782	(306.185)	
Private, 4 year non-PhD	---	---		---	---		---	---		486.174	(476.221)		486.934	(478.864)	
Private, 4 year PhD	---	---		---	---		---	---		687.457	(339.334)		722.938	(338.930)	
Income * SAT Score	---	---		---	---		---	---		---	---		-1.657	(1.186)	
Income * Below Master's	---	---		---	---		---	---		---	---		---	---	
Income * Master's or higher	---	---		---	---		---	---		---	---		-14.514	(383.515)	
n	7133			7133			7133			7133			7133		
R^2	0.055			0.056			0.060			0.065			0.065		

* p<.05; ** p<.01; *** p<.001; Multiple-df tests are reported for sets of dummy regressors. BRR standard errors for complex survey designs are in parentheses. Missing categories (not shown) were created for categorical variables. Additional models included interactions between income and gender, race, parent education, and high school type, but none of these additional terms significantly improved the overall model fit.

The most notable difference between cohorts arises when comparing the final models which include interaction terms with SES. In the 1993-94 cohort, virtually none of the interaction terms were statistically significant. But, in 2000-01, the family income and SAT score interaction was statistically significant. High ability students from more affluent backgrounds appear to be more likely to enter engineering, math or physical sciences and the humanities (see Tables 5.4 and 5.5 in Appendix C). Significant interactions between ability and SES and a weakening of the income effect in 2000-01 provides some evidence in support of the Hypothesis 2 in the theory chapter that predicted the effects of family background on field of study choices may be growing less direct over time (Mullen et al. 2003; Ethington and Smart 1986).

5.1.8 Regression Results for Lucrative Field of Study, B&B 1993-94

The multinomial logits predicting one's field of study choices provide an interesting picture of which students are heading into which fields. To uncover how these choices may be stratified and may yield unequal returns, unaggregated fields of study are scored by their average labour market earnings in the first year following their graduation. Thus, the response variable becomes a numeric measure of how lucrative one's college field of study choice turns out to be upon early entry into the labour market.

Model 1 (in Table 5.6) regresses this measure for lucrative fields on only students' demographic characteristics. Several significant effects are worthy of note. Married individuals graduate from more lucrative fields ($p<.05$) on average than single individuals. Similarly, older respondents are also graduating from more lucrative fields of study ($p<.01$). Not surprisingly, the effect for women is negative, indicating that, on average, males hold degrees from more lucrative fields of study ($p<.001$). The wage gap women encounter in their labour market becomes less surprising when we consider that men are graduating from programs with higher immediate earnings. Finally, in terms of racial effects, only one significant effect emerges. Asians are entering more lucrative fields of study than Whites ($p<.01$). This finding is consistent with other research that claims Asian Americans may be more calculating in their educational decisions, since they are more cognisant of the supply and demands of the market (Xie and Goyette 2003).

As in the multinomial logits above, Model 2 includes parents' education and income as indicators of family background. The significant demographic effects are evident in this model as well, but neither of the family background terms aid in explaining students' lucrative field of study choices. In fact, the low R^2 of 0.022 for the first model does not change with the addition of family background variables.

In the third model, measures of ability, aspirations, and high school type are included in the analysis. Once again, all of the previous relationships between demographic characteristics and lucrative fields of study emerge in this model. As in Model 2, neither income nor parents' level of education have a significant influence on lucrative field choices. However, SAT scores exhibit a strong positive influence on one's choice of lucrative field ($p<.01$). Taken together, these findings (or lack thereof) for income and parent education and the evidence of a strong ability effect lend some support

to research that suggests much of the selection effects may occur at post-secondary entry. Once students get inside the higher education system, a more meritocratic process may be at work (e.g., Mare 1980; Stolzenberg 1994).

Model 4 includes a number of institutional characteristics to measure whether or not they impact one's choice of lucrative major, but no additional statistically significant effects were found. Finally, two theoretically interesting interactions are added in Model 5 to test for the presence of combinational or indirect income effects, but neither of these higher order terms is statistically significant.[44] Overall, in these models, family background seems to have little direct or indirect effects on lucrative field choices.

5.1.9 Regression Results for Lucrative Field of Study, B&B 2000-01

For the 2000-01 cohort of the B&B, similar models were estimated (see Table 5.7). The demographic effects are quite similar to those of the 1993-94 cohort. In the first model, married ($p<.05$) and older students ($p<.001$) were more likely to make more lucrative field choices. As well, the strong gender effect from the previous cohort remains. Women remain significantly less likely to enter into lucrative fields of study ($p<.001$). Finally, a strong positive effect also remains for Asians ($p<.01$). That is, Asian Americans are more likely than White respondents to enter more lucrative fields of study.

In the second model, lucrative field choices was also regressed on parent education and family income. In this model, marital status, age, gender and race maintain their influence. However, as in the previous cohort, the addition of family background indicators did not contribute significantly in explaining students' field choices when ordered by their early labour market returns. As in the previous cohort, the R^2 for models 1 and 2 were nearly identical (0.055 vs. 0.056), though the models in the 2000-01 cohort did explain more of the variation in lucrative field choices.

In Model 3, ability, aspirations and high school type are added to the analysis. High school type did not significantly improve the overall model fit. But, once again, students' combined SAT scores were positively related to lucrative field choices ($p<.05$). Unlike the 1993-94 cohort, individuals with 'high aspirations' are now significantly less likely to enter lucrative undergraduate fields ($p<.05$). This finding is not surprising when taking a closer look at the situation. Often times students choose to enter the humanities or social sciences at the undergraduate level with the intention of moving on to graduate school (see Goyette and Mullen 2006). Thus, students may opt out from entering a certain field with a known immediate payoff to the bachelor's degree, since their educational career plans may involve degrees beyond the undergraduate level (e.g., graduate or professional school).

In Models 4 and 5, institutional characteristics and a couple of interactions were included to further explain lucrative field choices. Multiple-df tests indicate that none of

[44] As in the multinomial logit models, Model 6 (not shown) includes a term to control for institutional selectivity. This allows us to examine the effects on lucrative field choices separating out the effects of selective institutions. Not much changes when this final term is included. In fact, the coefficients and standard errors differ very little from those in the previous model.

these additional terms significantly contribute in explaining lucrative field of study choices. In Model 4, however, the addition of these institutional characteristics weakens the effect of ability. In fact, outside of the demographic variables, only student aspirations had a significant impact on lucrative field choices.

5.1.10 Comparisons of Lucrative Field of Study Results

Overall, the demographic effects on lucrative field choices remain similar across cohorts. The most notable difference is the growing influence of educational aspirations on students' field of study choices over time. In the second cohort, students who are planning on pursuing a Master's degree are less likely to choose an undergraduate major with high economic returns. This change in effect over time may represent the growing trend among students to pursue graduate studies (or at least heightened expectations of doing so).

The lack of family background effects was consistent across cohorts. Unlike the results of the multinomial logits, the lucrative field of study models showed little evidence for the presence of direct family background effects. For the most part, academic ability was found to have a positive influence on lucrative field choices, but even this effect weakened in the second cohort. The noticeable differences in the factors which influence field choices across models uncover a profound reality in the extant sociological literature. In addition to the varied points in time when college major or institution choices are analysed, it would seem that part of the confusion and lack of consistent effects in existing studies on field choices may also be explained by the way fields of study are operationalized. While the findings in the multinomial logits and OLS models do not produce wildly different results, this project does illustrate the difficulty in clearly establishing the relationship between family background and field choices as either direct, indirect, or greatly minimized because of prior selection.

Part 2: National Graduates Survey Analyses

5.2.1 Descriptives: Comparing the 1995 and 2000 NGS Cohorts

Table 5.8 provides descriptives statistics for variables from the 1995 and 2000 cohorts of Canadian graduates. No major differences in terms of marital status, age, or gender exist between the two cohorts. That is, the majority of graduates are single, complete their degree at 27 years of age (on average), and are predominantly women. As well, the great majority of new graduates also identify themselves as non visible minorities, though there appears to be a slight increase (0.05) in the proportion of visible minorities from 1995 to 2000. Father's education and mother's education exhibit similar changes over time, as the proportion of those with less than a bachelor's education shrinks over time (0.70 to 0.65), and the proportion with bachelor's or higher degrees increases gradually (0.30 to 0.35). For SES, greater proportions of students are obtaining

government approved needs-based loans over time – with the greatest influx in the 'loans above $15,000' category. This suggests that access may be improving for individuals from less favourable economic backgrounds, but overall there is still much inequality at play. The scholarship situation exhibits a similar pattern, as a greater share of the 2000 NGS graduates appear to obtain scholarships compared to their counterparts in the previous cohort. As one might expect given the recent patterns of credential inflation (see Brown 2001 for a review), students' aspirations or educational expectations are also increasing slightly over time. Over 13% more students in the 2000 cohort are planning on pursuing a Master's degree after the completion of their undergraduate programme.

Finally, the distribution of students across fields of study remains fairly constant over time. There are, however, two notable changes. Students appear to be moving out of the field of education. At the same time, a greater proportion of students (10% increase) are heading into the biological sciences and health professions.

5.2.2 Multinomial Logits for Field of Study, NGS 1995

In Model 1, field of study is regressed on demographic characteristics (see Table 5.9 in Appendix C). For marital status, two significant effects occur. Married students are significantly less likely to chose a field in the humanities ($p<.05$) or social sciences ($p<.05$) over business and management in comparison to single students. In terms of age effects, older students are significantly more likely to major in the humanities than business and management ($p<.01$). In fact, the odds of entering the humanities are over 25 times greater than the odds of entering business and management. As in the U.S. analyses above, the strongest effects arise when examining the relationship between gender and field of study choices. Women, in comparison to men, are significantly more likely to graduate with degrees in education ($p<.001$; odds ratio=2.732), biological and health professions ($p<.001$; odds ratio=2.477), the humanities ($p<.001$; odds ratio=2.416), and the social sciences ($p<.001$; odds ratio=2.100). At the same time, women have a significantly lower probability of entering engineering, math or physical science over business and management compared to men ($p<.001$; odds ratio=0.329). These gender patterns are quite similar to those found in the U.S. analyses above (see Tables 5.4 and 5.5 in Appendix C). Finally, students who identified themselves as visible minorities were significantly less likely to enter education ($p<.001$; odds ratio=0.223), the humanities ($p<.01$; odds ratio=0.406), and the social sciences ($p<.01$; odds ratio=0.423) over business than were non visible minority students.

In Model 2, several variables for family background are added to the analysis. The demographic effects evident in Model 1 change only minimally with the addition of these terms. For parental education, only father's education exhibits a significant effect on field choices ($p<.05$). Specifically, students with more educated fathers are 1.551 times more likely chose a field in the biological sciences and health professions ($p<.05$) and 1.640 times more likely to major in the humanities ($p<.05$) rather than business and

management. For income, the effects on field choices are quite strong ($p<.001$).[45] Students from moderate backgrounds (i.e., 'loans of $15,000 or less') are more likely to major in the social sciences over business and management ($p<.05$; odds ratio=1.600) in comparison to those from high income backgrounds (i.e., 'no loans'). Students from low income backgrounds are significantly more likely than those from high income origins to major in education ($p<.05$; odds ratio=2.081), biological sciences and health professions ($p<.001$; odds ratio=4.023), the humanities ($p<.001$; odds ratio=3.728), and the social sciences ($p<.001$; odds ratio=3.600). Though limitations in the NGS data require that family income is measured differently, these patterns are similar to those found among U.S. students, as individuals from more affluent family backgrounds choose business over other fields of study.

In the third model, additional terms for academic ability and aspirations are included. The demographic effects remain largely the same, despite the addition of these new terms. The effects of father's education also hold, even controlling for these new factors. Moreover, both academic ability and aspirations show strong significant effects on field choices ($p<.001$).

In terms of academic ability, only one proxy measure is available in the NGS surveys.[46] Those with moderate levels of skill (i.e., 'scholarships of $5,000 or less') are significantly less likely to graduate with degrees in education ($p<.05$; odds ratio=0.610) or the social sciences ($p<.01$; 0.566) and more likely to enter the biological sciences and health professions ($p<.05$; odds ratio=1.451) than those with lower levels of skill. Those with high levels of skill (i.e., 'scholarships above $5,000') are 3.139 times more likely to major in engineering, math or the physical sciences ($p<.01$) and 2.732 times more likely to choose a field in the biological sciences and health professions ($p<.01$) over business in comparison to those with low skill levels. Taken together, these patterns very closely resemble the SAT effects found in the U.S. analyses above, as individuals with higher ability head into engineering, math or physical sciences and the biological sciences and health professions and shy away from education in comparison to business and management.

For aspirations, students who plan on pursuing a Master's degree are significantly more likely to chose education ($p<.05$; odds ratio=1.502) as their undergraduate degree over business, compared to students with lower aspirations (i.e., 'below Master's degree' plans). This finding is also similar to the 'stepping-stone' logic found in the U.S. cohorts, as students who seek more advanced degrees are more likely to graduate with a degree in education than one in business and management.

In the final model, interactions between income and ability and income and aspirations were included. Similar to the results found in the 2000-01 B&B analyses, the interaction between income and academic ability is statistically significant ($p<.001$). In

[45] Recall from the methods chapter that government sponsored student loans are used as a proxy for family income.

[46] Unfortunately, Canada lacks a standardized measure of student ability comparable to the SAT or ACT scores readily used in the U.S. Thus, students' abilities are measured indirectly through their total dollar amount of achievement-based scholarships, awards, and fellowships.

Table 5.8 **Descriptive Statistics for Variables from the 1995 and 2000 Cohorts of the National Graduates Surveys in Canada.**

	1995 Mean/Prop. (SE)	2000 Mean/Prop. (SE)
Marital Status		
Single/Previously Married	0.66 (0.010)	0.72 (0.007)
Married	0.33 (0.010)	0.28 (0.007)
Age	27 (0.113)	27 (0.094)
Gender		
Male	0.39 (0.010)	0.38 (0.008)
Female	0.61 (0.010)	0.62 (0.008)
Race		
Not Visible Minority	0.89 (0.008)	0.84 (0.007)
Visible Minority	0.11 (0.118)	0.16 (0.006)
Father's Education		
Less than bachelor's	0.70 (0.010)	0.65 (0.008)
Bachelor's or higher	0.30 (0.009)	0.35 (0.008)
Mother's Education		
Less than bachelor's	0.79 (0.009)	0.73 (0.008)
Bachelor's or higher	0.21 (0.008)	0.27 (0.007)
Income		
No Loans	0.65 (0.010)	0.56 (0.008)
Loans of $15,000 or less	0.26 (0.009)	0.21 (0.006)
Loans above $15,000	0.09 (0.006)	0.22 (0.007)
Ability		
No Scholarships	0.73 (0.009)	0.63 (0.008)
Scholarships of $5,000 or less	0.20 (0.007)	0.28 (0.007)
Scholarships above $5,000	0.06 (0.004)	0.09 (0.004)
Aspirations		
No Master's degree	0.67 (0.010)	0.54 (0.008)
Master's degree plans	0.33 (0.009)	0.46 (0.008)
Field		
Business and Management	0.14 (0.008)	0.16 (0.006)
Education	0.13 (0.008)	0.08 (0.004)
Engineering, Math and Physical Science	0.13 (0.005)	0.11 (0.004)
Biological Sciences and Health Professions	0.13 (0.005)	0.23 (0.006)
Humanities	0.17 (0.008)	0.17 (0.006)
Social Sciences	0.27 (0.010)	0.25 (0.008)
Other	0.03 (0.002)	0.01 (0.001)
Field (scored)	21661.77(116.253)	27944.90 (150.011)
n	6232	9835

other words, Canadian field of study choices are influenced by a combination of family income and academic ability.

5.2.3 Multinomial Logits for Field of Study, NGS 2000

In Table 5.10 (see Appendix C), the results of similar models for the 2000 NGS cohort are shown. Model 1 regresses field of study on several demographic background characteristics. In addition to their higher probabilities of entering the humanities ($p<.01$) and the social sciences ($p<0.05$) over business and management degrees, married individuals are now 1.451 times more likely than single individuals to graduate with a degree in education ($p<.01$). Further, older students are less likely to major in engineering, math or physical sciences ($p<.001$) and biological sciences and health professions ($p<.05$) than younger students. Once again, gender emerges as an extremely important determinant of field of study choices. Women are shown to be significantly more likely than men to major in education ($p<.001$), biological sciences and health professions ($p<.001$), the humanities ($p<.001$), and the social sciences ($p<.001$) rather than business and management. Moreover, they are also 0.369 times as likely as men to major in engineering, math or the physical sciences ($p<.001$). Only two racial effects emerge. Visible minorities are about half (0.517 times) as likely as non visible minorities to major in education ($p<.01$), and 0.688 times as likely to major in the humanities ($p<.05$).

In Model 2, the demographic effects from Model 1 remain. The multiple-df tests reported in Table 5.10 indicate that father's education ($p<.01$), mother's education ($p<.05$), and income ($p<.01$) all have significant effects on field of study choices. Unlike the previous cohort, students with highly educated fathers are more 1.429 times more likely than those with less educated fathers to major in engineering, math or the physical sciences ($p<.05$) over business. For income, students from moderate backgrounds are much more likely than those from affluent backgrounds to major in education ($p<.001$) and engineering, math or physical sciences ($p<.05$) rather than business and management. As we found in the previous NGS cohort, the odds of low income individuals majoring in any field over business are significantly higher than high income students. That is, high income students have greater odds of entering business and management than low income students. Interestingly, this finding is similar to what was found among students in the first cohort of the B&B in the U.S. In Canada, however, the effect does not diminish slightly across cohorts, as we noticed in the U.S. models.

In the third model, academic ability and educational aspirations are added to the mix. Both sets of variables have a strong and significant impact on field choices ($p<.001$). Moreover, students with moderate skill levels were 0.702 times as likely as low skill individuals to major in education ($p<.05$) and 1.391 times as likely to major in engineering, math or physical sciences ($p<.05$). For high skill individuals, engineering, math or physical sciences ($p<.001$), biological sciences and health professions ($p<.001$), and the humanities ($p<.001$) are chosen significantly more than business in relation to

choices made by low skill individuals. Finally, as in the previous cohort, educational aspirations have a statistically significant effect on field of study choices in 2000.

In the final model, additional terms were added to the analyses to explore the possibility of interactions between SES and ability and SES and aspirations. Similar to the previous NGS cohort and the B&B 2000-01, the interaction between academic ability and family income was highly statistically significant ($p<.001$).

5.2.4 Comparisons of Multinomial Logits for Field of Study

Age, Gender and Race

Figure 5.5 illustrates the predicted probabilities for each cohort, holding all variables at their sample means or proportions. Comparing the two cohorts, students' probabilities of graduating with bachelor's degrees in education and engineering, math and physical sciences decreased significantly over across cohorts, while students' probabilities of graduating with a business degree stayed approximately the same over time ($p=0.1578$ to $p=0.1611$). On the other hand, in the 2000 cohort, students were more likely to graduate from the humanities, social sciences, and most noticeably the biological sciences and health professions. These dramatic increases may be explained in part by the growing demands for health care workers in Canada's publicly funded health care system. As evident in the U.S. analyses, students' are becoming more and more likely to enter into the humanities and social sciences.

Many of the demographic effects remain constant over the two cohorts. Older individuals are now significantly more likely to major in engineering, math and physical sciences over business and are no longer as likely to enter the humanities as in 1995. The gender differences remain similar across cohorts. As in 1995, women remain significantly less likely than men to major in engineering, math and physical sciences and business and management and more likely to major in education, the biological sciences and health professions, the humanities and the social sciences (see Figure 5.6). The narrowing engineering gap does provide some evidence that women are making inroads into more mathematically- or quantitative-based fields of study, but the differences remain quite large.

In terms of race, visible minority students in the 2000 cohort are no longer significantly less likely to enter into the social sciences compared to non minorities. While the racial dynamic is quite different in Canada, these trends are similar to the increasing likelihoods of Blacks and Hispanics entering the social sciences and humanities found in the most recent B&B cohort. Moreover, racial gaps across all fields of study have narrowed substantially in the 2000 NGS cohort (see Figure 5.7).

Family Background, Ability and Aspirations

The effects of parents' education do not change much over time (see Tables 5.9 and 5.10 in Appendix C). In the more recent cohort, mother's level of education has a

Figure 5.5

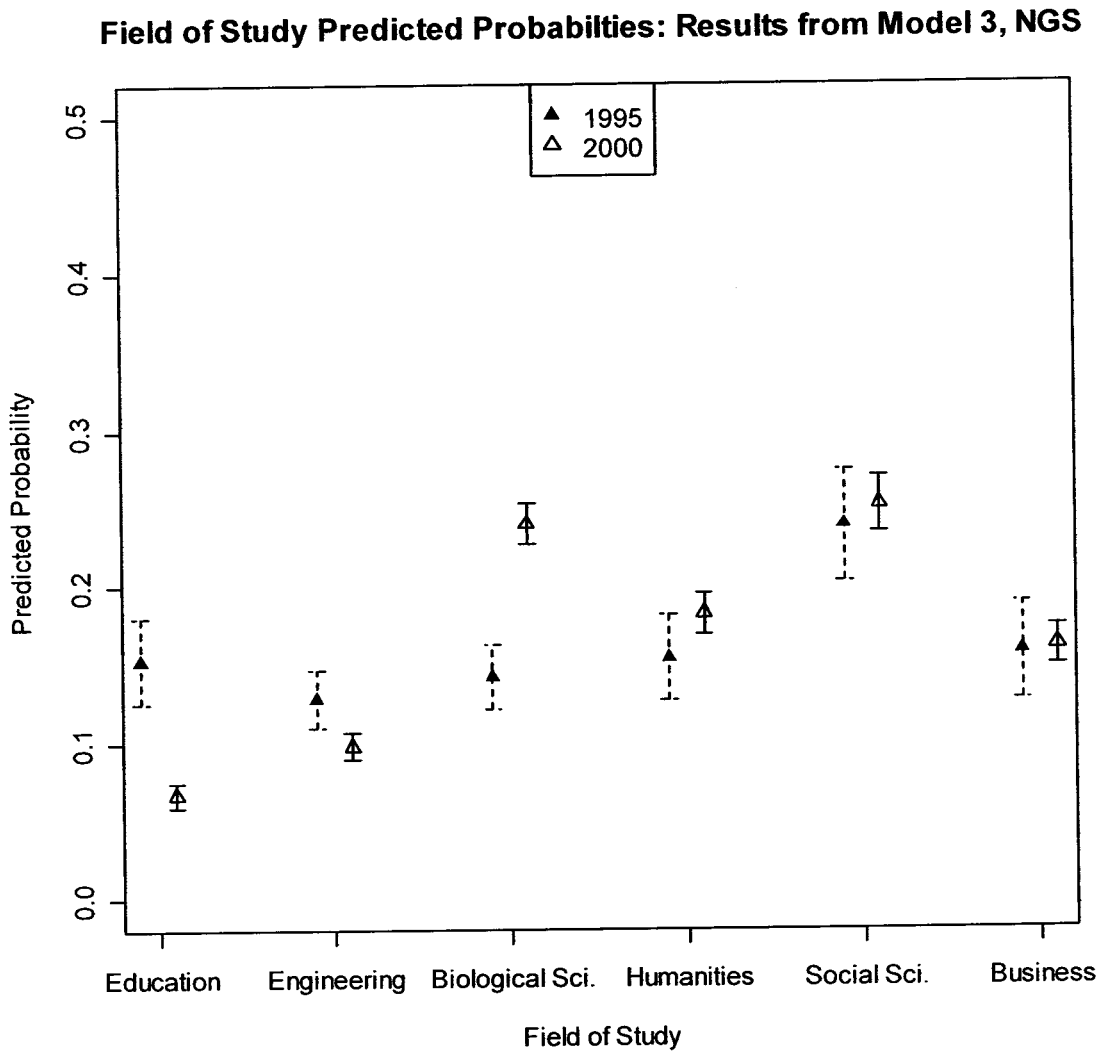

Field of Study Predicted Probabilties: Results from Model 3, NGS
1995
2000
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

Figure 5.6

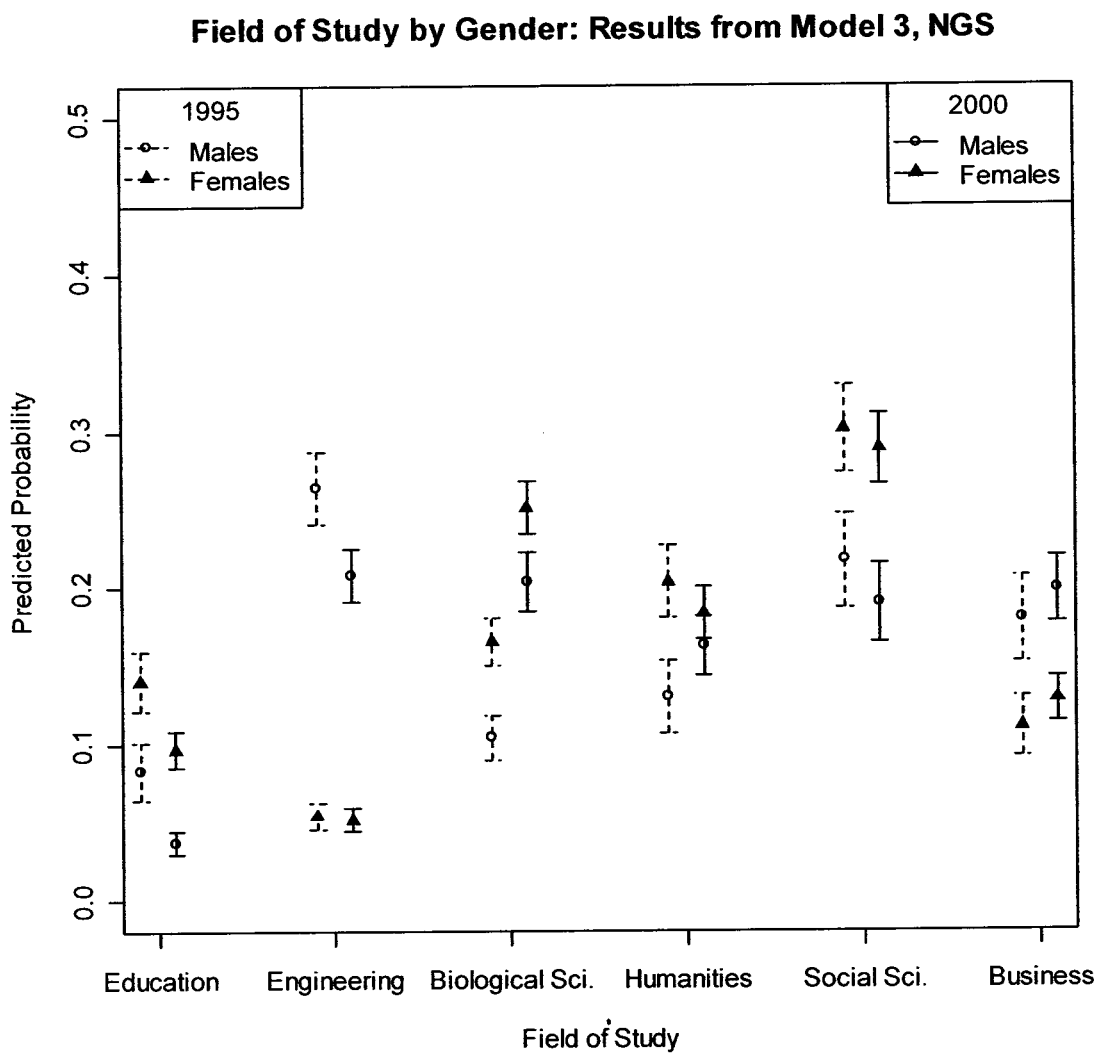
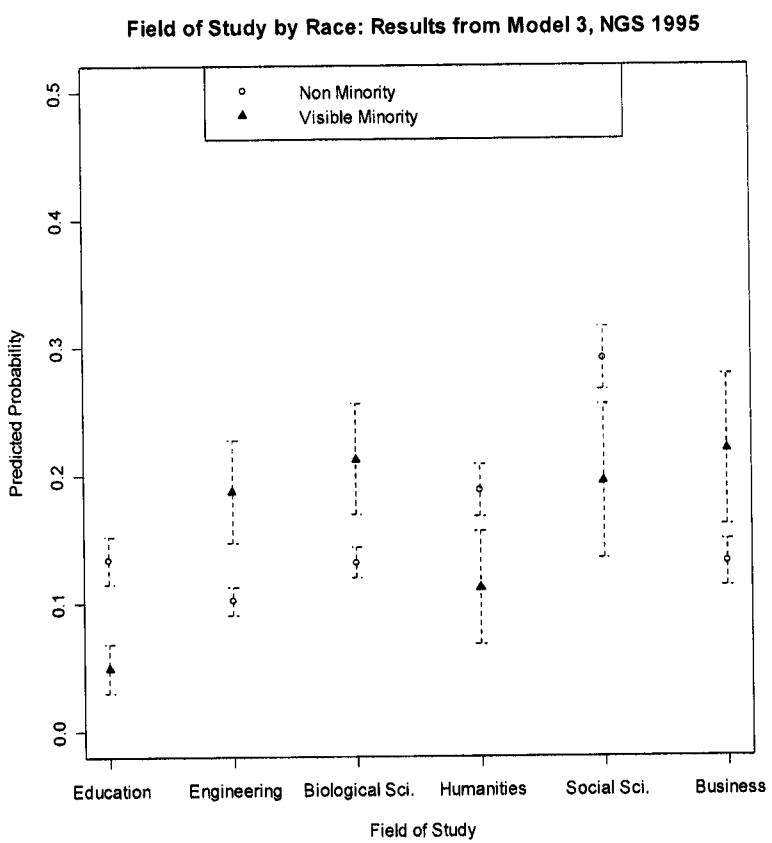

Field of Study by Gender: Results from Model 3, NGS
1995
Males
Females
2000
Males
Females
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

Figure 5.7


Field of Study by Race: Results from Model 3, NGS 1995
Non Minority
Visible Minority
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

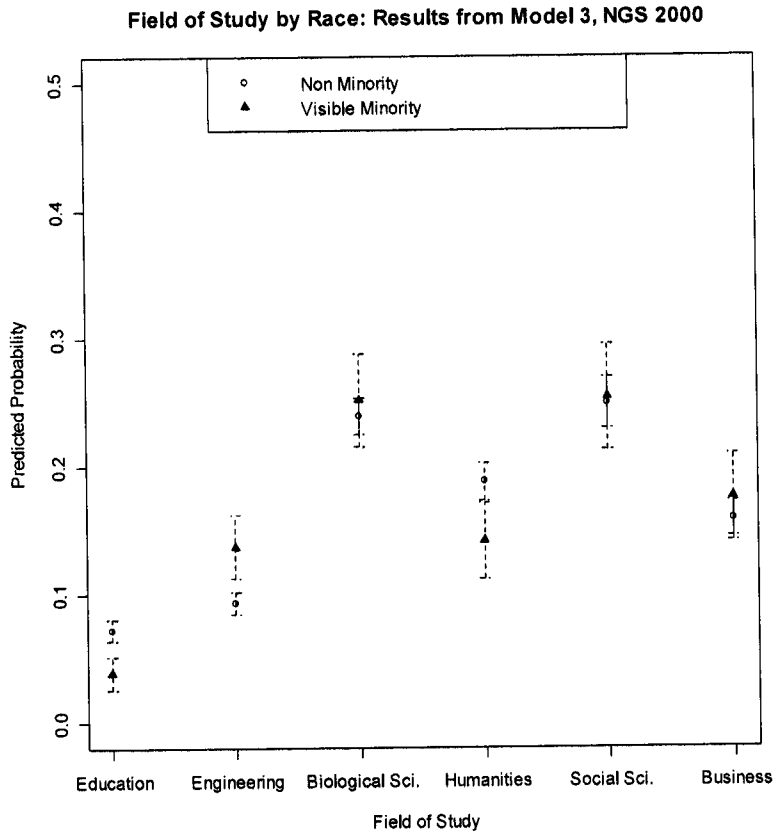
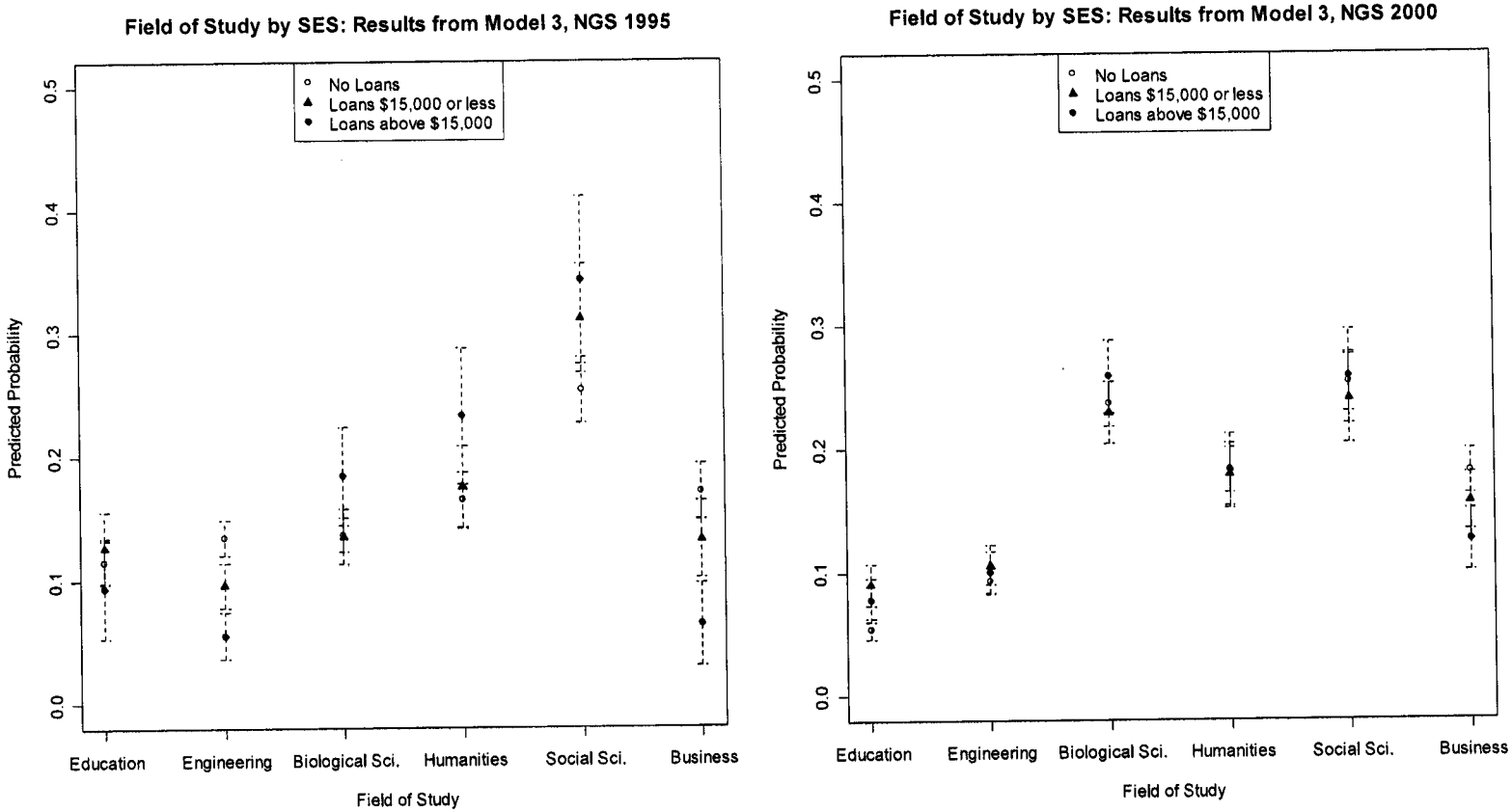

Field of Study by Race: Results from Model 3, NGS 2000
Non Minority
Visible Minority
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

Figure 5.8


Field of Study by SES: Results from Model 3, NGS 1995
No Loans
Loans $15,000 or less
Loans above $15,000
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study
Field of Study by SES: Results from Model 3, NGS 2000
No Loans
Loans $15,000 or less
Loans above $15,000
Predicted Probability
0.0
0.1
0.2
0.3
0.4
0.5
Education
Engineering
Biological Sci.
Humanities
Social Sci.
Business
Field of Study

significant impact on field of study decisions. Further, having a highly educated father no longer increases one's chance of entering the biological sciences or humanities but makes one more likely to choose engineering, math and physical science over business. For income, several new effects emerge in 2000. Students from moderate backgrounds are now more likely to enter education and engineering programs over business programs than high income students. As well, these individuals remain more likely to enter the social sciences over business. For low income students, the effects remain similar to those in the 1995 cohort, but the level of significance weakens slightly in 2000. Taking a look at the predicted probabilities by income, there is some evidence to suggest that differences by income are narrowing in all fields. But, it seems business and management remains one field that high income students have greater probabilities of entering relative to others from moderate and low income backgrounds.

In terms of academic ability, few effects change over time (see Tables 5.9 and 5.10 in Appendix C). Students with greater academic ability are less likely than those with lower levels of skill to enter into business and management. These results are quite similar to those found in the U.S. analyses, as individuals with high SAT scores were also more likely to enter all fields (with the exception of education) over business and management. Finally, in terms of aspirations, the strong effects found in 1995 remain constant in 2000. That is, educational aspirations have a strong influence on which field of study a student will choose.

5.2.5 Regression Results for Lucrative Field of Study, NGS 1995

To examine the stratification of students into various fields with unequal returns, OLS models predicting the average earnings of graduates by unaggregated fields of study were estimated. The results are presented in Table 5.11. Model 1 includes only demographic characteristics of the respondents in our sample. The results indicate that married, older, and visible minorities are significantly more likely to enter more lucrative fields of study compared to single ($p<.001$), younger ($p<.05$), and non visible minorities ($p<.01$). In terms of gender, women are less likely to enter lucrative fields than men ($p<.001$).

Model 2 includes a number of family background characteristics. With the addition of these new terms, the demographic effects from Model 1 change only minimally. Father's education does not have an impact on field choices, but mother's education exhibits a negative effect on lucrative field choices ($p<.01$). That is, students whose mothers' obtained a bachelor's degree or higher are less likely to pursue a lucrative undergraduate major. In terms of income, students from moderate backgrounds ($p<.001$) and students from low income backgrounds ($p<.001$) are significantly less likely to pursue lucrative fields of study relative to students without government sponsored student loans (i.e., high income). Put differently, students who came from disadvantaged economic backgrounds are less likely to enter lucrative undergraduate fields of study than those from more affluent family backgrounds.

Table 5.11 OLS Regression Models of Lucrative Field Choices for the 1995 Cohort of University Graduates in Canada

	Model 1			Model 2			Model 3			Model 4		
Constant	15707.820	(2465.202)		17470.540	(2816.405)		17571.310	(2592.854)		17838.380	(2606.199)	
Marital Status			***			***			***			***
Single/Previously Married	---	---		---	---		---	---		---	---	
Married	1568.019	(259.747)		1601.944	(273.649)		1497.501	(254.823)		1540.544	(254.132)	
Log(Age)	4406.270	(1746.388)	**	3808.714	(1969.692)		3628.321	(1805.982)	*	3360.291	(1813.912)	*
Gender			***			***			***			***
Male	---	---		---	---		---	---		---	---	
Female	-1719.897	(233.118)		-1841.133	(252.765)		-1741.495	(229.565)		-1757.719	(228.284)	
Race			*			*			**			**
Not Visible Minority	---	---		---	---		---	---		---	---	
Visible Minority	1356.847	(409.595)		1294.790	(437.444)		1429.460	(405.572)		1423.537	(405.333)	
Father's Education												
Less than bachelor's	---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		289.757	(304.886)		167.031	(279.899)		140.268	(280.533)	
Mother's Education						*			*			*
Less than bachelor's	---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		-846.598	(344.085)		-835.770	(315.420)		-793.477	(315.146)	
Income						***			***			***
No Loans	---	---		---	---		---	---		---	---	
Loans of $15,000 or less	---	---		-1473.957	(289.189)		-1284.403	(265.232)		-1181.746	(411.073)	
Loans above $15,000	---	---		-3886.342	(357.860)		-3616.229	(337.022)		-2788.865	(568.834)	
Ability									*			*
No Scholarships	---	---		---	---		---	---		---	---	
Scholarships of $5,000 or less	---	---		---	---		929.412	(274.275)		1243.182	(354.319)	
Scholarships above $5,000	---	---		---	---		478.424	(504.450)		359.426	(648.481)	
Aspirations												
Below Master's	---	---		---	---		---	---		---	---	
Master's or higher	---	---		---	---		-386.994	(261.793)		-517.572	(335.259)	
Income * Ability												***
No Loans * No Scholarships	---	---		---	---		---	---		---	---	
Loans $15,000 or less * No Scholarships	---	---		---	---		---	---		---	---	
Loans above $15,000 * No Scholarships	---	---		---	---		---	---		---	---	
No Loans * Scholarships $5,000 or less	---	---		---	---		---	---		---	---	
Loans $15,000 or less * Scholarships $5,000 or less	---	---		---	---		---	---		-583.549	(649.013)	
Loans above $15,000 * Scholarships $5,000 or less	---	---		---	---		---	---		-1531.182	(753.821)	
Loans * Scholarships above $5,000	---	---		---	---		---	---		---	---	
Loans $15,000 or less * Scholarships above $5,000	---	---		---	---		---	---		1054.465	(1402.776)	
Loans above $15,000 * Scholarships above $5,000	---	---		---	---		---	---		-876.473	(1026.797)	
Income * Aspirations												

No Loans * Below Master's	---	---	---	---	---	---	---	---
Loans $15,000 or less * Below Master's	---	---	---	---	---	---	---	---
Loans above $15,000 * Below Master's	---	---	---	---	---	---	---	---
No Loans * Master's or higher	---	---	---	---	---	---	---	---
Loans $15,000 or less * Master's or higher	---	---	---	---	---	---	411.232	(594.551)
Loans above $15,000 * Master's or higher	---	---	---	---	---	---	335.357	(868.787)
n	6232		6232		6232		6232	
R^2	0.036		0.056		0.072		0.076	

* p<.05; ** p<.01; *** p<.001; Robust standard errors are in parentheses. Multiple-df tests are reported for sets of dummy regressors. 'Missing' categories (not shown) were created for categorical variables. Additional models included interactions between income and gender, race, father's education, and mother's education, but none of these additional terms significantly improved the overall model fit.

Table 5.12 OLS Regression Models of Lucrative Field Choices for the 2000 Cohort of University Graduates in Canada

	Model 1			Model 2			Model 3			Model 4		
Constant	12730.900	(3489.681)		15254.220	(3570.890)		15616.610	(3568.400)		15290.980	(3565.342)	
Marital Status			***			***			***			***
Single/Previously Married	---	---		---	---		---	---		---	---	
Married	2086.640	(348.556)		2063.442	(348.264)		1983.013	(346.820)		1978.071	(345.648)	
Log(Age)	11329.590	(842.541)	***	9964.299	(2498.544)	***	10048.28	(2486.474)	***	10233.240	(2467.844)	***
Gender			***			***			***			***
Male	---	---		---	---		---	---		---	---	
Female	-2582.088	(312.909)		-2678.802	(313.139)		-2821.814	(310.864)		-2798.079	(310.295)	
Race												
Not Visible Minority	---	---		---	---		---	---		---	---	
Visible Minority	644.053	(423.109)		638.010	(424.114)		593.540	(422.093)		634.047	(425.568)	
Father's Education												
Less than bachelor's	---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		-288.918	(353.667)		-146.776	(351.800)		-147.017	(351.450)	
Mother's Education						**			**			**
Less than bachelor's	---	---		---	---		---	---		---	---	
Bachelor's or higher	---	---		-1136.394	(371.590)		-1035.93	(367.430)		-1025.854	(367.778)	
Income												
No Loans	---	---		---	---		---	---		---	---	
Loans of $15,000 or less	---	---		-63.769	(352.808)		-58.122	(350.310)		136.554	(599.496)	
Loans above $15,000	---	---		-645.653	(384.009)		-774.628	(380.501)		-664.464	(588.545)	
Ability									*			
No Scholarships	---	---		---	---		---	---		---	---	
Scholarships of $5,000 or less	---	---		---	---		732.494	(354.756)		383.105	(511.398)	
Scholarships above $5,000	---	---		---	---		-912.958	(524.701)		-800.322	(674.864)	
Aspirations									***			***
Below Master's	---	---		---	---		---	---		---	---	
Master's or higher	---	---		---	---		-105.854	(336.002)		230.222	(482.575)	
Income * Ability												
No Loans * No Scholarships	---	---		---	---		---	---		---	---	
Loans $15,000 or less * No Scholarships	---	---		---	---		---	---		---	---	
Loans above $15,000 * No Scholarships	---	---		---	---		---	---		---	---	
No Loans * Scholarships $5,000 or less	---	---		---	---		---	---		---	---	
Loans $15,000 or less * Scholarships $5,000 or less	---	---		---	---		---	---		447.165	(829.215)	
Loans above $15,000 * Scholarships $5,000 or less	---	---		---	---		---	---		988.077	(873.806)	
No Loans * Scholarships above $5,000	---	---		---	---		---	---		---	---	
Loans $15,000 or less * Scholarships above $5,000	---	---		---	---		---	---		29.037	(1244.280)	
Loans above $15,000 * Scholarships above $5,000	---	---		---	---		---	---		-1415.151	(1463.846)	
Income * Aspirations												

No Loans * Below Master's	---	---	---	---	---	---	---	---
Loans $15,000 or less * Below Master's	---	---	---	---	---	---	---	---
Loans above $15,000 * Below Master's	---	---	---	---	---	---	---	---
No Loans * Master's or higher	---	---	---	---	---	---	---	---
Loans $15,000 or less * Master's or higher	---	---	---	---	---	---	-856.610	(791.069)
Loans above $15,000 * Master's or higher	---	---	---	---	---	---	-841.184	(827.962)
n	9835		9835		9835		9835	
R^2	0.035		0.036		0.053		0.055	

* p<.05; ** p<.01; *** p<.001; Robust standard errors are in parentheses. Multiple-df tests are reported for sets of dummy regressors. 'Missing' categories (not shown) were created for categorical variables. Additional models included interactions between income and gender, race, father's education, and mother's education, but none of these additional terms significantly improved the overall model fit.

In the third model, a proxy measure for academic ability and an additional indicator for educational aspirations are added to the model. Once again, all of the previous demographic effects remain unchanged in this model. With respect to academic ability or skill, individuals who obtained a scholarship of $5,000 or less are more likely to enter lucrative fields of study than those without a scholarship ($p<.01$). In other words, more talented individuals (as indicated by the amount of scholarships) are more likely to enter lucrative fields of study. Interestingly, aspirations did not exhibit any significant effects on lucrative field choices.

In the final model, several interactions with income were included in the models. As in the multinomial logits, the interaction between income and academic ability was shown to be highly statistically significant ($p<.001$).

5.2.6 Regression Results for Lucrative Field of Study, NGS 2000

Similar models were estimated for the 2000 NGS cohort. Taking a look at Model 1, once again married ($p<.001$) and older ($p<.001$) students are more likely to enter fields with higher immediate earnings. As well, the gender effects are similar across cohorts. Women remain significantly less likely than men to enter lucrative fields of study ($p<.001$). Finally, no significant racial differences are evident between visible minorities and non minorities.

As in the previous cohort, Model 2 includes measures for parents' education and income. Similar to the results for the 1995 models, students in the 2000 cohort whose mothers obtained a bachelor's degree or higher are also entering less lucrative fields of study compared to those with less educated mothers ($p<.01$). In terms of income, however, the relationships seem to weaken slightly across cohorts. No longer are students from moderate incomes more likely than low income students to enter more lucrative fields. Although students from lower income families remain less likely to enter lucrative fields of study than those from high income backgrounds ($p<.05$), the relationship is not as strong as in 1995.

In the third model, additional background characteristics, skill, and aspirations terms are included. All of the previous family background and demographic effects emerge in this model as well. For academic ability, individuals with moderate levels of skill remain significantly more likely to enter lucrative fields of study than those with lower skill levels ($p<.05$), though the effect has weakened slightly over time. Contrary to the findings in 1995, a strong, negative educational aspirations effect emerges in the 2000 cohort. In other words, students with high educational aspirations are significantly less likely than those with low aspirations to pursue a lucrative undergraduate major ($p<.001$).

Finally, in Model 4, several interaction terms with income are included in the analyses. Unlike the previous cohort, the results from the 2000 cohort indicate that neither of the interactions with income is significant.

5.2.7 Comparisons of Lucrative Field of Study Results

Overall, many of the demographic effects on lucrative field choices remain similar across cohorts. Older, married, male students remain more likely to enter lucrative fields of study. However, the positive relationship between visible minorities and lucrative field choices that was evident in the 1995 cohort weakens over time and is no longer statistically significant in the most recent cohort. In addition to this demographic change, there is also some evidence to suggest that the impact of family income on lucrative field choices may be weakening slightly over time. In the most recent NGS cohort, only those from low income backgrounds are significantly less likely to enter lucrative fields compared to those from high income backgrounds.

Part 3: Cross-national Comparisons

The descriptive results for the Canadian and U.S. analyses are quite similar. In both countries, about two-thirds of the students are single. Graduates in Canada are a couple years older on average, but this is to be expected since some provinces in Canada traditionally offered an extra year of high school (i.e., grade 13 or OAC). In terms of gender, women are graduating in the greatest proportions in both countries, but in the United States, the differences are slightly greater. In terms of race, even though the racial dynamic differs between the two countries, we can still see that the great majority of students are either White or non visible minorities. One area where the two countries differ is the level of educational expectations. Specifically, in the U.S. the proportion of students who wish to obtain a Master's degree declined over time, while the proportions in Canada increased.

Overall, the demographic effects in both countries were quite similar across all analyses. Taking a look at results from the multinomial logits in Figures 5.1 and 5.5, Canadians and Americans are both becoming less likely to major in education and engineering, math and physical sciences. In fact, the probabilities of majoring in education are nearly identical in the most recent cohorts ($p=0.0632$ for B&B 2000-01; $p=0.0667$ for NGS 2000). At the same time, Canadian and American students are becoming increasingly likely to enter into the humanities and social sciences. The most notable difference across nations is that Canadian students are also increasingly likely to enter the biological sciences and health professions. As mentioned earlier, one possible explanation for this difference may be the known shortage of health care workers in Canada's public health care system. Widespread calls for shorter emergency wait times and nursing shortages may have inspired some students to enter the health sector.

The pattern of gender inequality is also quite similar in Canada and the United States. In both countries, women are less likely to major in engineering, math or physical sciences as well as business and management. In Canada, the gender gap in engineering appears to be shrinking, but still remains much wider than that of the United States. Yet, the gender gap in business and management in the U.S. remains slightly larger than Canada's. In other words, women have made substantial gains in entering engineering programs in the U.S., but business and management remains largely segregated. In

Canada, women are chipping away at the gap in business and management, but engineering remains highly segregated by gender.

The racial compositions between Canada and the United States are quite different. Yet, a couple of findings are worth mentioning here. In Canada, many of the racial gaps across fields shrink substantially in the 2000 cohort (see Figure 5.3), while in the United States, few of the gaps show significant changes across cohorts (see Figure 5.7). In addition, Canadian visible minorities are becoming increasingly likely to enter into the social sciences over time. In the U.S., a similar trend is also emerging. Blacks and Hispanics or Latinos also greatly increased their likelihoods of entering the social sciences and humanities in the most recent B&B survey.

In both nations, the effect of parents' education on field of study choices remains quite similar over time. In the first Canadian cohort, students with more educated fathers and mothers were more likely to enter the biological sciences or humanities over business and management. Similarly, in the U.S., students in the 1993-94 cohort were more likely to enter any field over business, if their parents had a bachelor's degree or higher. In the most recent cohorts for both nations, these effects changed slightly, but parents' education still had significant effects on field choices.

The impact of income on field of study choices is also similar over time and across nations. Despite some weakening of the effects in 2000, the Canadian results indicate that students from moderate SES backgrounds are more likely than those from high SES backgrounds to major in education and engineering programs rather than business programs. Similarly, those from low SES backgrounds are significantly more likely to major in any field over business when compared to those from high SES backgrounds. In the United States, the impact of SES was consistently negative on students' likelihood of entering any field over business and management. In both nations, it seems that individuals from more privileged economic backgrounds are heading into business and management more so than those from less privileged backgrounds.

When comparing the effects of ability and aspirations cross-nationally, several similarities also emerge. In both nations, the effects of ability on field of study choices remain similar across cohorts. Students with higher academic abilities (SAT) in the U.S. remained more likely to enter any field before business, with the exception of education. Similarly, in Canada, students with higher levels of skill were found to be less likely than those with lower levels of skill to enter into business and management. In terms of aspirations, the strong effects found among Canadians in 1995 were also evident in the 2000 cohort. In the U.S., the same is true. Over time, aspirations have remained an important determinant of her/his college major decision. Students who wished to pursue a Master's degree were less likely to head down the business and management path.

Finally, there is some evidence to suggest that the right combination of family income and academic ability may have an impact on students' college major choices and that this relationship holds cross-nationally. In both cohorts of the Canadian analyses and in the 2000-01 B&B cohort of the U.S. analyses, significant interaction effects were found between income and academic ability.

If we take a look at the lucrative fields models, in both nations, married individuals were more likely than single individuals to enter into lucrative fields of study.

As well, older Canadians and Americans are increasingly likely to enter more lucrative fields of study. The inequalities by gender are also similar across nations, as women continue to enter less lucrative fields than men. In terms of race, Asian Americans were more likely to enter lucrative fields of study in both cohorts. In Canada, a similar trend was found among the 1995 cohort, as visible minorities were graduating from more lucrative fields of study. But, in 2000, this effect was no longer significant. For Canadian students, having a mother with a bachelor's degree or higher had a negative impact on entering lucrative fields of study. In the U.S., no significant effects for parents' education were evident. The two nations are also quite similar in their relationships between academic ability and lucrative fields. Both nations show signs that increased academic ability has a positive influence on graduating from a lucrative field of study.

With respect to income, however, a slightly different picture emerges across nations. In Canada, individuals from higher income backgrounds were more likely to enter lucrative fields of study than those from low income backgrounds. Though these effects weaken and are no longer significant in the most recent cohort, no significant effects of family income on lucrative field choices were found in either cohort in the United States. It is possible that this lack of effect may be explained by the strong tendencies for privileged Americans to enter business and management degrees (as noted above) – a field that often yields moderate immediate economic returns to its degrees in the labour market.

When comparing the effects of educational aspirations, an interesting cross-national trend emerges from the results. In both of the newest cohorts, students with plans for pursuing a Master's degree were significantly less likely to obtain a lucrative undergraduate major. The increasing influence of student aspirations on lucrative field choices lends some support to previous studies who have argued that students may enter particular degrees that may have lower immediate economic returns at the bachelor's level with the intention of pursuing graduate studies ('stepping stone logic'; see Goyette and Mullen 2006).

Part 4: Summary of Results and Broader Implications

The analyses in this chapter provide an in-depth empirical investigation of who gets sorted and selected into particular postsecondary institutions and fields of study. Even though a wider variety of students from varied social backgrounds are entering into higher education, it is clear from these analyses that a significant degree of inequality exists, even among those privileged students who enter higher education. Table 5.13 summarizes the models estimated in this project. On the left hand side of the table, the results from each of the models are presented. For the OLS models (i.e., selectivity and lucrative fields), the direction and strength of the relationships are displayed. For the multinomial logits (i.e., field choices), the column indicates whether or not an effect was found and the strength of the effect. On the right hand side of the table are two columns which summarize cohort and cross-national differences for each of the three sets of models (S=selectivity; F=field choices; LF=lucrative fields). 'no' indicates that the effects

summarized on the right hand side of the table were constant across cohorts or nations, and 'yes' indicates that noticeable differences emerged over time or cross-nationally.

Consistent with existing research, gender remains an important and consistent predictor of school (in the United States) and field of study choices. In both Canadian and American universities, women greatly outnumber men at the undergraduate level. Decades of school reform, increased access, and normative change have led to significant representation of women in higher education. However, this increasingly skewed gender composition (in women's favour) has not translated into disproportionate representation in more selective schools or more lucrative fields of study. In fact, quite the opposite is true. Women are still entering traditionally 'female' fields of study (e.g., education). Even when academic factors are included in the analyses, gender maintains its significant impact on postsecondary decisions. In Canada, the analyses show some evidence that the gender gap for business and management is shrinking, but the engineering and mathematics gap remains significant. In the U.S. the situation was reversed, as the engineering gap shrunk and the business and management gap did not change across cohorts.

For the most part, the effects of social origins did not greatly subside once students entered higher education as some researchers have suggested (Stolzenberg 1994; Mare 1980). There was some support for the possibility of prior selection if we consider the results of the U.S. models predicting lucrative fields of study. Recall that in those models no significant family background effects emerged. In the rest of the models, however, educational decisions were indeed influenced by family background effects.

In particular, the impact of family status on selectivity choices was highly stable across cohorts in the United States. Both parental education and income exhibited positive and strong influences on institutional selectivity decisions. Since the selection of an institution occurs early on in one's postsecondary career, it is not particularly surprising to uncover relationships similar to those at the K-12 level.

For field of study choices, family background effects were much more variable. While there is some evidence to suggest that family income influences the particular field a student will enter, the relationships between parents' education and field choices did change slightly over time and across nations. When stratifying fields by their labour market returns, no significant family background effects were found in the U.S. analyses. On the other hand, in Canada, family status appears to have a greater influence on field of study decisions, as both income (in 1995 cohort only) and parent education exhibit significant effects on lucrative field decisions. Of course, these strong family background effects may be a function of the lack of clear measure for academic ability in the Canadian data. That is, since the Canadian models contain only a crude measure of skill or ability, the direct effects of family background may be more prominent.

To fully understand these family background effects, it is important to also consider the impact of ability on these educational choices. If we consider the strong and consistent academic ability effects found across all analyses and the increasingly important influence of academic aspirations, it would seem that the effects of family background on higher education choices may be direct *and* indirect. As suggested in previous research, the relationship between privileged individuals and educational

Table 5.13 Summary of Individual Level Findings

	Response Variables			Differences	
	Selectivity (S)	***Fields (F)***	***Lucrative Fields (LF)***	***Cohort (S; F; LF)***	***Cross-national (S; F; LF)***
I. Main Effects					
Age	negative; strong	yes; strong	positive; strong	no; no; no	n/a; no; no
Gender	no effect	yes; strong	negative; strong	no; no; no	n/a; no; no
Race	mixed; mixed	yes; weak	mixed; moderate	yes; yes; yes	n/a; yes; yes
Income	positive; strong	yes; weak †	no effect *	no; yes; no	n/a; no; no
Parent Education	positive; strong	yes; moderate	no effect	no; yes; no	n/a; no; yes
Aspirations	no effect	yes; strong	negative; weak	no; no; yes	n/a; no; no
Ability	positive; strong	yes; strong	positive; strong	no; no; no	n/a; no; no
Institutional Characteristics	n/a	yes; strong	no effect	n/a; no; yes	n/a; n/a; n/a
II. Interactions					
*Income *Ability*	positive; strong	yes; moderate†	no effect *	no; yes; no	n/a; no; no
*Income *Aspirations*	no effect	no effect	no effect	no; no; no	n/a; no; no

Notes: The direction and strength of effects are based on the results from the B&B analyses. The column for cross-national differences indicates whether or not the relationships differ in the Canadian models. * Only the 1995 NGS results show some significant income effects as well as a significant interaction with ability. † The effects of family income and the interaction with ability are slightly stronger in Canada, which is possibly a reflection of the lack of good ability measures in the NGS data. That is, more direct family background effects may arise, since the control for ability is a proxy measure.

outcomes may be quite complex. Indeed, in both cohorts of the Canadian analyses and in the 2000-01 B&B cohort of the U.S. analyses, significant interaction effects were found between income and academic ability, indicating that the right mixture of family background and academic ability has a significant impact on field of study decisions.

Given the strong and consistent ability effects observed across all models, cohorts, and nations and the significant interactions with family income, it appears that parents cannot simply reproduce their advantages by virtue of their level of income or education. While family income may produce some direct advantages to students, other parental influences appear to operate indirectly through students' measured ability on institutionalized standards of assessment. In the U.S., the results also suggest that these effects must operate through the institutional characteristics of the university.

Surprisingly, Canadian and American field of study trends were quite comparable. Despite the varying levels of institutional stratification in each nation's postsecondary system that this project found at the institutional level, students appear to be sorted and selected in higher education in a similar manner. At the same time, data limitations prevented any exploration of postsecondary school choices. As such, it remains unclear whether school selectivity decisions differ for Canadian students. It is possible that the steeper, well-established hierarchy and high-stakes competition for prestige, selectivity, and resources prevalent among U.S. institutions may translate into noticeable cross-national differences in the choice of university. Certainly, some researchers suggest that in Canada fields of study may play a more important stratifying role than institutions (Davies and Hammack 2005).

More generally, the results of these statistical analyses serve to broaden our understanding of how individuals from unfavourable socio-economic circumstances remain at a distinct disadvantage and students from middle-class families continue to excel in their educational experiences (Shavit and Blossfeld 1993). The unequal selection of students across schools and fields of study also sheds some light on how inequalities across socio-economic groups remain 'maximally maintained' (see Gamoran 2001; Raftery and Hout 1993). Institutional selectivity and fields of study represent two 'qualitative' ways in which inequality is 'effectively maintained' (see Lucas 2001).

This next chapter discusses the major findings of this dissertation in relation to the formal hypotheses stated in Chapter 2. The limitations of this research are also discussed and serve to set the stage for several important areas for future research.

Chapter 6: Discussion and Conclusions

Summary and Chapter Outline

With a combination of longitudinal and cohort analyses, the previous chapters have provided an extensive examination of the nature of postsecondary stratification among Canadian and American universities and students in this era of unprecedented postsecondary expansion, institutional diversification, and rising competition for external sources of research funding (e.g., Pell grants, Spencer grants, SSHRC fellowships or Canada Research Chairs). Multiple statistical methods and a range of data sources were employed to reveal new and increasingly important forms of stratification. The changing climate of higher education has implications for both the structure of higher education as well as the experiences of students who confront new challenges in an evolving postsecondary system. Schools have become increasingly stratified in their prestige, selectivity and resources, while students' school and field of study choices are becoming increasingly important points of selection. Though the consequences of this change may look quite different at each level of analysis, actions and experiences at the individual level are often influenced by structural changes. Equally, individual actions may also prompt universities to change. For those reasons, this project compared various forms of stratification at two levels of analysis: the structural, where schools increasingly compete for greater prestige, reputation, and resources, and the individual, where students compete for entry into top schools and rewarding fields. In tandem, a systematic exploration of institutional and individual inequality provides a comprehensive account of stratification in higher education.

In this final chapter, I will discuss the major findings and the significant contributions of this research, and outline several areas for future enquiry. This chapter is divided into two main parts. The first part discusses the results of the structural level analyses and demonstrates how these findings contribute to the existing empirical and theoretical literature. The second part of this chapter revisits the individual level analyses, emphasizing their contribution to previous research on field and institution choices. In both parts, the discussions will revert back to the formal research questions and hypotheses stated earlier in the dissertation. As well, these sections will consider the limitations encountered in the analyses. Finally, the broader implications of the results are presented and unexplored areas for future enquiry are discussed briefly.

Part 1: Institutional Stratification

6.1.1 Revisiting the Institutional Level Hypotheses

Existing research has emphasized the relative prestige or reputation of universities, but until this point, the level and character of economic stratification among postsecondary institutions has largely been ignored. Despite a proliferation in commercial ranking systems and league tables around the globe, no existing research has

sought to empirically measure the degree of inequality among post-secondary institutions, nor has anyone sought to explore and compare these inequalities cross-nationally and look for changes over time. In its innovative examination of institutional stratification, the structural component of this dissertation answered three major research questions. First, are universities in Canada becoming more stratified over time (since the early 1970s)? Second, are there any key differences in the economic stratification of Canadian and American universities? Finally, have cross-national differences changed over time?

In Chapter 2, three possible scenarios were developed, drawing on several theories from the existing organization, education and stratification literature. Recall that Hypothesis 1 predicted that the populations of Canadian and American universities are becoming more homogeneous over time. Drawing on New Institutional Theory, this perspective sees universities as becoming more similar around the world (Schofer and Meyer 2005; Meyer and Ramirez 2000). Global markets have fostered the growth of international benchmarks of postsecondary quality, leading to a surge in national ranking systems (Finnie and Usher 2005; Dill and Soo 2005). Explicit reputational hierarchies such as *Maclean's* rankings put pressure on schools to maintain legitimacy in the eyes of their constituents, resulting in the convergence of institutions around a template of the modern university. Path-dependency theories emphasize that despite the spread of rationalizations, these pressures are often mediated by a nation's unique cultural, historic or economic conditions.

A second hypothesis proposed that the two populations of schools have become more stratified over the last thirty years. Drawing largely on the work of Trow (1984) and Brint (2006, 2005) and some organization theorists (e.g., Kraatz and Zajac 1996), this perspective predicted greater stratification among universities. In other words, the higher education systems would become more heterogeneous over time. At the top end of the distribution, larger and more established schools fiercely compete for top students, top faculty, prestigious awards, and research monies. At the same time, lower ranked institutions may opt out of such competition and attempt to carve out a new niche and redefine 'excellence'.

Finally, Hypothesis 3 predicted that the levels of inequality among American and Canadian universities have not changed over the last thirty years. In the United States, this would translate into the stability of a steep hierarchy of institutions in a system of substantial differentiation (see Geiger 2004). In Canada, the level of inequality among institutions has traditionally been much lower. If little change is observed over the last thirty years, some authors have suggested that market pressures, in a predominantly public system, may be channelled differently (Davies and Hammack 2005; McLaughlin 2005). That is, more inequality may be occurring within institutions, as certain fields more than others answer the market call. Put differently, the situation may be one of vertical parity among schools and horizontal stratification across disciplines.

The structural level analyses have shown that the degree of institutional inequality in Canada and the United States is quite different. Moreover, both nations have become more stratified over time. In recent years, the two neighbouring post-secondary systems are experiencing similar market pressures to compete for external awards, expand enrolments, diversify, and become more entrepreneurial, yet the level of institutional

inequality and rate of growth since the early 1970's appears to be much higher in the U.S. These findings lend some support to Neoinstitutional Theory (Hypothesis 1), as some mild convergence occurred over the last thirty years. This trend was particularly salient for predominantly private-funded resources (e.g., donations, endowments, CFI grants, CRC grants), areas that are less formally regulated. However, the distribution of Canadian universities was shown to be fairly symmetric for the great majority of measures, indicating a significant degree of parity within the system relative to the skewness found among U.S. schools. While it is unclear from these analyses, this relatively mild, "creeping" form of stratification in Canada may be reflective of the tight reigns governments hold on universities in a public postsecondary system. More recently, however, governments have been encouraging faculty and universities to garner more external research dollars, supporting and in many ways encouraging today's increasingly competitive atmosphere. Though the growth of institutional inequality has been slower in Canada, it is certainly possible that market pressures are having more influence at the field level, where regulation is more relaxed. For U.S. schools, the distributions of economic resources were highly positively skewed on most measures, revealing a high degree of institutional inequality, bolstered by a distinct elite group of institutions. At the same time, more parity emerged among lower ranked institutions. Taken together, these findings in the U.S. lend some support to Hypothesis 2, as various strategies for organizational survival may be at play for different segments of the U.S. system.

6.1.2 Broader Implications

These findings contribute to the growing literature on contemporary change in higher education, particularly studies of institutional competition, academic capitalism, and the spreading influence of rankings. Many scholars have written pointed criticisms of these rankings, often decrying their lack of validity (Kong and Veall 2005; Shale and Liu 2002; Page 2001, 1995; Monks and Ehrenberg 1999; McGuire 1995; Stuart 1995). A methodological and in many ways conceptual shortcoming of commercial rankings systems is that they tell us very little about the postsecondary system as a whole. Mentioned in some detail in earlier chapters, rankings provide little information about the shape and character of the entire system of universities. How much inequality exists among schools, and are there particular areas where some schools are obtaining the lion's share of resources? In response, this project offers an original and systematic method for comparing systems of higher education. Using core measures of institutional resources and employing a recognized measure of inequality, the Gini coefficient, it systematically analyzes entire populations and distributions of universities. To my knowledge, no one has systematically compared higher education systems in this fashion.

The major findings of this research underscore the importance of considering institutional change in analyses of stratification. That is, any analysis of stratification among universities must take such institutional change into account. Traditionally, New Institutionalism has not been concerned with exploring inequalities that emerge either between students or between institutions. Rather, Institutional Theory emerged as a

criticism of stratification analyses. Scholars, most prominently John Meyer, sought to improve traditional stratification approaches that often times saw schools as functional and static entities (Meyer and Rowan 1978). Stratification theories often treated class disparities as constant and deemphasized the importance of institutional context. Whether schools were seen as mechanisms for reproducing inequality (e.g., traditional Marxist approaches) or maintaining the status quo (e.g., structural functionalist approaches), New Institutionalism saw both approaches as either missing or ignoring profound change in the very social settings in which those inequalities emerge, including the great expansion of schooling, its evolving norms and expectations, and the worldwide "revolution" in education over the 20th century (see Hurn 1993). As sociologists, it is important to recognize that educational inequality is embedded in an institutional and organizational context. To understand temporal trends in stratification, researchers should acknowledge that universities are quite different places than they were even just a few decades ago. Far larger proportions of the populace now attend post secondary institutions. More jobs are seen to "require" higher education and its credentials. Universities continue to expand their menu of courses, majors, and research institutes. Human capital rationales and their championing of limitless development through higher education are stronger than ever.

New Institutionalism offers an understanding of the broad template - the changing rules of the game - in which stratification is generated. Consider the role of world cultural norms, since the demand for higher education is fuelled by the diffusion of educational norms among both state officials and the mass populace. What is interesting is that notions of expanding higher education to attain goals of individual and economic development, human rights, and wealth creation are spreading *without* an associated norm of organizational parity, at least one as entrenched as that at the k-12 level. At the k-12 level, the emphasis has largely been on maintaining a relatively homogenous, standardized, formally equal school system. To the contrary, at the post-secondary level, strong international notions are emerging in which every country is seen to "need" elite institutions to drive their domestic economies and spark technological innovation. Throughout the developed world, there appears to be an emerging credo in which every nation should push a university to nurture its own Silicon Valley. Such thinking legitimates notions of privileging some universities over others, or allowing top institutions to utilize their advantages. Thus, normative diffusion in higher education may have a stronger competitive element than at the k-12 level, likely due to a series of institutional conditions that decentralize higher education and give it more intimate links to labour markets. Contrary to equalizing mandates at the k-12 level, competition is not only accepted but encouraged at the postsecondary level. While New Institutionalism's emphasis explains global similarities, path-dependency approaches become particularly useful in explaining why market pressures, albeit similar in their rationalizations, operate quite differently in various social settings. Indeed, there is a growing world-wide consensus of what constitutes a system of higher education, but path-dependent approaches shed some light on national characteristics which account for idiosyncrasies. For example, among U.S. public institutions, institutional inequality within the public sector has largely been state-driven. Schools such as the University of California have

delegated one affiliate to act as their flagship institution (e.g., Berkeley). In Canada, we have seen this in only a mild way. There is some indication that the University of Western Ontario main campus acts informally as the flagship among King's College, Brescia College and Huron College. But, this distinction is informal and not delegated by the state. In Canada, there is some evidence to suggest that certain fields rather than institutions have become centres of 'excellence' as a response to market pressures.

6.1.3 Limitations and Future Research

To keep a manageable scope, this study focuses on the entire populations of Canadian and American universities. In doing so, this project has established a firm foundation for future work on institutional inequality. I turn now to four unexplored but important directions for future inquiry.

One limitation of this study is the truncated time frame available for data analysis. Many of the structural changes in higher education have occurred within the last ten years. As a result, the analyses may have underemphasized the degree of inequality in the Canadian postsecondary system, since much of the market pressure is relatively recent. Unfortunately, this means that the period of time analysed in this study may not capture stratification trends that have occurred in Canada. In other words, the path-dependent processes (e.g., public regulation) may have some lasting effects or staying power. It may be too early to tell from these analyses, but Canada may be converging (and more rapidly) on the U.S. model in the last few years. In addition to extending the time frame for the analyses, it would also be beneficial to increase the number of countries in the analyses to examine institutional stratification in countries where higher education has traditionally been more exclusive or class-based (e.g., Britain, France or Germany).

A second area that would extend the analyses in this project would focus on the relationship between institutional age and institutional stratification. Does the emergence of new institutions account for greater institutional stratification in the United States? It is quite possible that higher education systems with relatively few newer, less-established schools will exhibit higher levels of parity. On the other hand, systems with many new schools and a highly established elite sector of schools such as in the United States, may look more disparate in terms of economic resources. Older institutions have established a reputation that will allow them to attract top faculty and students (Brint 2006). Endowments and alumni donations will also be significantly higher for obvious reasons. Unfortunately, the founding year of institutions is not currently available in the IPEDS data, making cross-national comparisons difficult. Furthermore, much of the growth among U.S. institutions has been in the for-profit private sector – institutions that have already been filtered out of the analyses. One could run analyses for the Canadian data, but the results would change very little, as only a handful of new institutions exist in Canada.

Third, future analyses of institutional stratification could examine the level of inequality within particular sectors of the U.S. higher education system. In this project, the main focus was to compare overall system differences. Future analyses may seek to

go one step further and examine institutional inequality across the Carnegie Classifications of Institutions. Are there certain sectors of the U.S. system that more closely resemble the level of parity found among Canadian schools? In Canada, breaking down the schools by sectors is not practical. There is no Canadian equivalent to the Carnegie classifications. One could use the *Maclean's* rankings categories, but the number of institutions per category would be quite small and estimates less stable, given the small size of Canada's entire population of institutions and sensitivity of Gini indices to group size.

Finally, this project has focused on inter-institutional inequalities, but future research could examine the inequality of resources by fields or faculties. Several authors have suggested that although Canada exhibits a significant degree of institutional parity among universities and relative lack of competition, the level of disparity that exists among faculties or disciplines may be much greater (Davies and Hammack 2005; McLaughlin 2005). That is, much more inequality may exist among disciplines than among schools. In a publicly regulated system, fields may be granted more autonomy or discretion than universities as a whole, paving the way for increased competition and stratification across campuses. Part of this may be explained by more formal regulation at the school level, but greater discretion that has been conferred to particular disciplines (e.g., tuition deregulation). Thus, a logical extension of this project would be to expand the analyses to look at inequalities among fields. There is some evidence to suggest that professional schools such as engineering and business are growing increasingly prosperous in many Canadian schools while the Arts and Social Sciences are struggling financially. Part of this can be explained by the fundraising and establishment of strong ties with industry that certain fields are actively pursuing (e.g., business, health and engineering). Ironically, tuition revenues from the social sciences are often much greater than those other fields, due to substantially higher and expanding enrolments. Yet, in many universities, this revenue does not feed back to these disciplines and gets transferred to centres of 'excellence' across campus.

Part 2: Individual Stratification

6.2.1 Revisiting the Individual Level Hypotheses

At the individual level, this dissertation moves beyond the traditional 'black-box' focus on access to higher education to establish who enters certain institutions and fields. We know a great deal about the unequal labour market returns to attending schools and fields of varying selectivity or prestige but significantly less about who enters particular institutions or fields of study. For U.S. analyses, selectivity was measured by ordering institutions by the average SAT scores of their entering students. For both countries, field choices were examined nominally with discrete choice (i.e., multinomial logit) models and by ranking fields by the average early workforce earnings of their graduates. Previous studies have opted for one approach or the other. Here, both discrete and continuous measures of fields were employed to provide a more comprehensive

examination of this critical point of selection. Prior to this dissertation, no existing studies have examined field choices in Canada, with the exception of a handful of studies that only marginally look at the gender and field relationship and do not control for other factors such as ability or aspirations. In the U.S., existing evidence has been largely inconsistent (especially for fields) and somewhat dated. Inconsistency, for family background effects in particular, has stemmed from the different points of examining the issue (e.g., applications of students, initial choice of major, entrance to graduate school). Since students often drop out and change their majors several times during the course of their undergraduate careers, this study has systematically explored the selectivity and field of study choices of students who successfully completed their undergraduate degree.

The analyses were guided by three major research questions. First, as postsecondary accessibility and student competition continue to increase, are individuals from more privileged socio-demographic backgrounds (e.g., according to race, gender, socioeconomic status) more likely to obtain degrees from particular fields of study and selective institutions? Second, have these patterns changed over time? That is, are socio-demographic effects consistent across cohorts? Finally, are there any cross-national differences in any of the aforementioned relationships?

To answer these research questions, a number of hypotheses were formulated in the theory chapter of this dissertation. Recall that for the impact of family background on selectivity and field of study choices, three possibilities emerged from the existing literature in the U.S. Hypothesis 1 in the theory chapter predicted that family background would have strong *direct* effects on the field of study and college selectivity decisions of students. This perspective claimed that students with highly educated parents and privileged socio-economic backgrounds have significant levels of cultural capital (Bourdieu 1984, 1988; Bourdieu and Passeron 1990). These advantaged individuals have the ability to spot avenues of advantage (Lareau and Weininger 2003). In an expanding postsecondary system, attending a highly selective school, entering a rewarding field, and continuing on to graduate studies are ways these individuals may be setting themselves apart from the masses. In the analyses, this rationale would take the form of strong effects of parent's education and income on school and field choices, even when controlling for all other factors.

A second possibility saw family background characteristics as operating *indirectly* through academic ability and aspirations (Mullen et al. 2003; Davies and Guppy 1997; Hearn 1991; Ethington and Smart 1986). The emphasis here is on student performance and motivation. It is not enough for students to come from wealthy families or have highly educated parents; students must also do their part by performing well in school. As well, students need to be sufficiently motivated to make the most of their postsecondary careers.

Finally, developing largely out of status attainment studies, Hypothesis 3 proposed that selectivity and field of study choices may be 'uncontaminated' by social origin effects (Stolzenberg 1994; Mare 1980). The logic behind this perspective is that everyone who is in a college or university program has roughly the same skill set, and most of the selection effects (e.g., by SES) occur when students enter into the postsecondary system. As students obtain more and more experiences during college, the effects of status origins

decline. In other words, aspirations and goals are formulated at a time when social origins have declined or even subsided.

Despite a wider variety of students from varied social backgrounds entering higher education, significant inequality exists, even among those privileged students who enter higher education. Despite some notable cross-national and longitudinal differences in the structural analyses, the individual level findings changed very little across nations and cohorts. In fact, the story seems to be one of similarity and stability. Unfortunately, this means that students in both Canada and the United States are unequally sorted and selected into schools, often by non-meritocratic characteristics.

The results revealed that educational decisions were indeed influenced by family background effects. The effects were not greatly reduced as Hypothesis 3, which emphasized prior selection, would predict. Overall, a mixture of support for Hypotheses 1 and 2 emerged from the analyses. For the selectivity models in the U.S., both parent income and education exhibited strong, positive effects over time. That is, students' choice of institution was shown to be directly affected by their social origins. At the same time, considerable evidence for indirect effects emerged, as ability had a significant impact on selectivity decisions. In addition, the interaction of ability and income was shown to have significant effect on selectivity choices. For field choices in both Canada and the United States, family background effects were less consistent, as measures for SES and parent education exhibited more varied effects across cohorts. Still, in Canada, there was somewhat stronger evidence for the presence of direct effects. Moreover, strong and consistent academic ability effects and weaker evidence for aspiration effects were also found across all analyses, lending support to the predicted indirect effects of social background operating through student performance and motivation. As in the selectivity analyses for the U.S., the interaction between income and ability also had a strong impact on field choices in both countries. Taken together, parents cannot simply reproduce their advantages by virtue of their level of income or education. Students must also succeed and perform well in school. That is, SES has some *direct* effects but stronger *indirect* effects on field of study choices.

Hypothesis 4 predicted that women will be less likely to enter selective schools in the U.S. and lucrative fields of study in both countries. Despite substantial gains in enrolment and completion rates (see Andres and Adamuti-Trache 2007), previous findings indicated that women are at a distinct disadvantage when it comes to entry into more selective schools and/or certain fields. A number of studies indicate that gender disparities are particularly salient when considering field of study decisions (Goyette and Mullen 2006; Bradley and Charles 2004; Jacobs 1999, 1995; Davies and Guppy 1997; Maple and Stage 1991). Women remain less likely to graduate from traditionally male fields such as engineering and math, while men remain less likely to obtain traditionally female degrees in education, nursing or social work (Turner and Bowen 1999; Solnick 1995). Moreover, there is also some evidence that the aforementioned 'male' fields like engineering are more often found in highly selective schools than 'female' fields such as education, which has serious implications for the proportion of women found in more selective schools (Brint et al. 2005).

Overall, gender remains an important predictor of educational decisions in both Canada and the United States. In line with Hypothesis 4 and existing studies on fields of study, gender remains an important and arguably the most consistent predictor of field of study choices, even when academic factors are included in the mix. Women are still significantly more likely to enter fields such as education or the social sciences, but there is some evidence that the gender gap in engineering and business may be declining. Still, much of the decline in this gap across cohorts is attributable to a lower probability of men entering these fields rather than an influx of women. When looking at selectivity choices, the situation is much more positive for women, as the effects of gender greatly reduce when controlling for ability and aspirations. That is, in both cohorts in the U.S., the significant impact of gender on selectivity was no longer statistically significant when student educational aspirations, SAT scores, and high school type were included in the models.

Finally, in terms of race, no formal hypotheses were formulated in Chapter 2, since no clear predictions could be derived from existing studies. Some U.S. studies revealed significant disadvantages for Blacks, while others have found advantages for Asian Americans. Moreover, some studies found few consistent racial effects on college choices. More importantly, the two nations are quite different in their racial compositions, making racial effects even more difficult to predict. Indeed, this study revealed that the effects of race/ethnicity on higher education choices remains quite complex. The analyses did uncover some evidence to support existing studies that found Asian Americans to be more likely to enter lucrative fields of study and remain more likely across cohorts. It is unclear from this study, but others have suggested that Asian Americans, compared to other racial groups, are more likely to enter fields that are in high demand in the economy (Xie and Goyette 2003; Simpson 2001). If this is the case, then it is not surprising that the fields they are entering are quite lucrative.

6.2.2 Broader Implications

This study has underscored the importance of exploring those internal mechanisms in higher education that serve to unequally distribute students in the labour market. The results enhance our knowledge about the forms and character of stratification in higher education and broaden our understanding of the process of social mobility. For the last thirty years, sociologists have been primarily concerned with improving access to higher education. Indeed, the decision to attend or not attend postsecondary education remains an extremely important point of selection. A significant body of research indicates that those who do not attend postsecondary institutions experience less favourable outcomes and these inequalities are undoubtedly larger than differences among fields and institutions (Krahn 1996). In fact, access to postsecondary education remains one of the cornerstones of social mobility and class reproduction in post-industrial societies. Solely focusing on the point of higher education entry, however, may no longer be sufficient. As sociologists, it is important to understand that with more and more students continuing on to higher education, students are being sorted and

selected later on in their educational careers. That is, in a previous era, students were largely streamed within high schools (e.g., tracking), but greater enrolments at the postsecondary level has opened the door for sorting and selection to occur, albeit informally, within higher education. As such, fields of study and institution choices have become more important in the process of social mobility.

Previous studies have long established that field of study choices have a profound impact on one's experiences in the labour market (Zarifa and Walters 2008; Walters 2004; Finnie and Frenette 2003; Finnie 1999; Betts et al. 2000). But, until this point, *who* entered particular fields of study was largely underexplored, particularly in Canada. There are two key points that need to be stressed. First, the individual level analyses of this dissertation have shown that school and field choices are the product of a number of factors, both ascribed and achieved. Second, it is quite evident that a significant degree of selection is now occurring *within* higher education.

This study broadens our understanding of how individuals from unfavourable socio-economic circumstances remain at a distinct disadvantage from middle-class students (Shavit et al. 2007; Shavit and Blossfeld 1993). As mentioned earlier, one of the key tenets of 'maximally maintained inequality' is that the level of inequality will decline at various points of selection when entry becomes less exclusive and becomes more saturated (e.g., higher education entry). In other words, inequality presents itself when entry is exclusive rather than open to the masses. Therefore, inequality becomes 'maximally maintained' (Gamoran 2001; Raftery and Hout 1993). Despite an opening of the doors to higher education, however, social class still plays a significant role. In response, some researchers have turned their sights on the way inequality persists through qualitative, less obvious ways (i.e., 'Effectively Maintained Inequality'; see Lucas 2001). The results of this study lend some support to these theories. As this study has shown, in an expansionary era, a sizeable amount of inequality remains 'effectively maintained' through unequal field of study choices. While, in a previous era, students were largely sorted by their entry into postsecondary education, today's students must set themselves apart from the masses by qualitative modes of differentiation (i.e., enter a prestigious field or selective school).

6.2.3 Limitations and Future Research

A number of limitations to this research occurred as a function of data restrictions and survey changes across cohorts. It is important to briefly consider some of these limits before discussing some avenues for future exploration. First, the National Graduates Surveys do not contain conventional measures of social class (i.e., income) or ability (i.e., standardized test scores), making international comparisons to data sets such as the Baccalaureate and Beyond more difficult. As mentioned in some detail in Chapter 3, government sponsored student loans and scholarships were used as proxy measures for income and ability. Unfortunately, these proxies (and other important variables such as aspirations) only exist in the two newest cohorts of the NGS, eliminating the option of making cohort comparisons across a longer period of time. It is certainly possible that the

absence of a concrete and comparable measure of academic ability may have had an impact on the findings. Stronger effects of parents' education on student choices in Canada may have emerged because of the lack of standardized ability measures in the Canadian data. As a more general issue, there is no Canadian equivalent to the SAT score indicators so readily available in the U.S. data, which is likely to have underestimated the presence of indirect family background effects in the Canadian analyses.

Another limitation that is common in both the Canadian and American data is related to parents' education. Currently, both sets of surveys contain measures on parents' level of education. While this information is quite useful for a wide range of analyses, it is possible that the models predicting field choices could have been improved had there been additional measures on parents' college major or postsecondary field of study. Studies in other nations such as the Netherlands have found a significant relationship between parent and child fields of study (see van de Werfhorst et al. 2001). Should the NGS and/or B&B surveys include such measures in the future, it would be beneficial for researchers to further explore this relationship in the North American context.

Finally, this dissertation was unable to estimate models predicting selectivity choices for Canadian students. Unlike the B&B data, for confidentiality reasons, the NGS data do not include information about students' postsecondary institutions. Unfortunately, since institutional identifiers are not available, this limited not only the estimation of selectivity models, but it also prevented the estimation of any multi-level analyses. I am hopeful that Statistics Canada will consider making this information available at their Research Data Centres in the future.

While this dissertation has answered a number of important theoretical and empirical questions, several related avenues for future exploration are worth mentioning here. First, in Canada, the factors influencing one's choice of institution remain largely unexplored, and remain an important topic for future analyses. That is, who enters more reputable postsecondary institutions? Scholars have suggested that there is less competition for entry into particular Canadian universities when compared to the high-stakes competition in the U.S. In the U.S., there is a well-established national market for education credentials (see Geiger 2002). Students will travel across the country just to get their BA or BSc from Harvard or Stanford. In Canada, the market for credentials is much smaller and seems to be more regionally defined (see Davies and Hammack 2005). Indeed, research universities have become increasingly prized in the eyes of students. Students in Ontario may choose Queen's University over Lakehead University for their undergraduate education, but movement across the nation just for the sake of attending a research university is much less common in Canada. At the graduate level, however, it would appear that a national market does exist, as out-of-province relocation is much more common. To confirm these speculations, a systematic exploration of the situation is highly warranted. Institutional choices (i.e., selectivity) represent a mode of differentiation (i.e., another way inequality is effectively maintained) that students encounter in their post-secondary careers. As it stands, the characteristics of students who enter particular universities in Canada remains unexplored. At the same time, we know very little about the impact of these school choices on labour market outcomes.

The labour market advantages of attending a highly selective school have been well-documented in the United States (for a recent example, see Thomas 2003), but in Canada this is not the case. Unfortunately, these gaps in the existing literature are largely a product of the data limitations on identifying institutions noted above.

A second key extension of the individual level analyses of this dissertation would be to examine who goes to graduate school in Canada. In other words, do the effects that this project found on choices at the undergraduate level hold until graduate school in Canada? In the United States, there is some existing evidence to suggest that family background effects weaken and become more indirect by the time students pursue graduate studies (see Mullen et al. 2003; Stolzenberg 1994; Hearn 1991). That is, as students enter higher and higher levels of education, the effects of social origins may decline. This topic remains a particularly important and unexplored area in Canada.

Finally, research has long showed that those who obtain a degree experience higher paying and more stable jobs and experience shorter bouts of unemployment (see Krahn 1996). But, in this expansionary and highly competitive era, to what extent does the strength of the education-job linkage vary across fields of study? The imagery of the 'knowledge economy' expresses a dire need for technical and scientific skills in the labour market. However, increasing numbers of students are majoring in the social sciences, with only a fraction of students entering more technical and applied disciplines such as engineering or computer science (Statistics Canada 2005). As a result, it is increasingly important to investigate whether or not those with 'knowledge economy' degrees experience significant employment advantages and if so, to see if these inequalities are consistent across indicators of employment success (e.g., earnings, satisfaction).

It would also be useful to explore whether or not these relationships differ cross-nationally. Certain fields may have greater currency in some economies over others. The structural level findings above indicated that the amount of economic stratification is moderately increasing in both countries, but much greater inequalities exist among U.S. universities. It is possible that students in 'knowledge economy' fields will benefit more from their degree in countries where the level of institutional and individual competition and stratification is high (i.e., a winner-take-all market). Recent research points in this direction, as Canadian university graduates from engineering, computer science, and health related professions experience significantly higher earnings by taking their degrees to the United States (Zarifa and Walters 2008). Still, fields of study may have a stronger impact on the labour market outcomes of Canadian graduates, since few employers regard the name-brand of a particular Canadian university as being more valuable than another (Davies and Hammack 2005).

Concluding Remarks

Higher education's great expansion over the latter half of the twentieth century and early twenty-first century has not reduced social inequality. This dissertation has shown that in some ways, it may have even increased the level of inequality. Several

emerging forms of stratification were explored over time and across nations. At the structural level, the analyses uncovered a trend of increasing economic stratification over the last 30 years. Postsecondary institutions in Canada and the United States have become increasingly stratified in their incomes, endowments, scholarship aid, educational and operating expenditures. While there was a much steeper hierarchy evident among U.S. universities and colleges, there is some evidence that Canada may be following suit, albeit on a much smaller scale. In a nation where university operations are largely governed by the state, global pressures to privatize and generate revenue have only mildly affected the relative distribution of economic resources. Still, as this norm of institutional competition spreads worldwide, accompanied by a norm of higher education expansion, the degree of inequality among universities and colleges may continue to grow. There is no shortage of commercial ranking systems to make explicit their relative position in the pecking order. Though some lower ranked schools may bow out gracefully from competing for the top spots and adopt alternative strategies for organizational survival (e.g., 'interdisciplinary excellence'), the reality is that older, more prestigious, selective and established universities may continue to widen the distance from newer, less renowned schools. The Canadian results provide some evidence that publicly governed higher education systems may stave off market pressures in the short term, but may eventually resemble hybrid postsecondary systems (i.e., both public and private sectors). Without similar analyses for other publicly regulated postsecondary systems around the globe, this pattern remains only speculative.

At the same time, a great degree of inequality emerged from the individual level analyses. Neither Canadian nor American students are encountering a situation of equality of opportunity. Decades of proliferating enrolments have not alleviated social inequalities. Across two recent cohorts, graduating from a selective school in the United States or obtaining a particular degree in either nation has been greatly influenced by social origins. In most cases, students are unequally slotted into these various educational outcomes by a combination of family background, demographics, ability and aspirations. For decades, sociologists have documented the importance of higher education in the process of social mobility, calling numerous times for governments and policymakers to improve access to colleges and universities. While postsecondary education is now more accessible to a range of socio-demographic groups, students are still being sorted by less formal channels of distinction. As enrolments continue to expand, a more inclusive postsecondary system seems unlikely in the near future. Among institutions, even in a public system such as Canada's, tuition fees for many professional programs have increased dramatically, as governments deregulate at the field level. As higher education becomes nearly a universal stage in the life course for today's youth, a new challenge emerges on the horizon – how to expand higher education and increase access in ways that promote and facilitate equality of opportunity.

Appendix A. List of Data Sources for the U.S. Institutional Analyses

HEGIS

1971
- Fall Enrollment
- Finance
- Degrees Earned
- Faculty Salaries

1976
- College and University Libraries
- Finance
- Fall Enrollment
- Earned Degrees

1981
- Fall Enrollment
- Finance
- Faculty Salaries
- Earned Degrees

IPEDS

1986
- Completions
- Enrollments
- Finance
- Institutional Characteristics

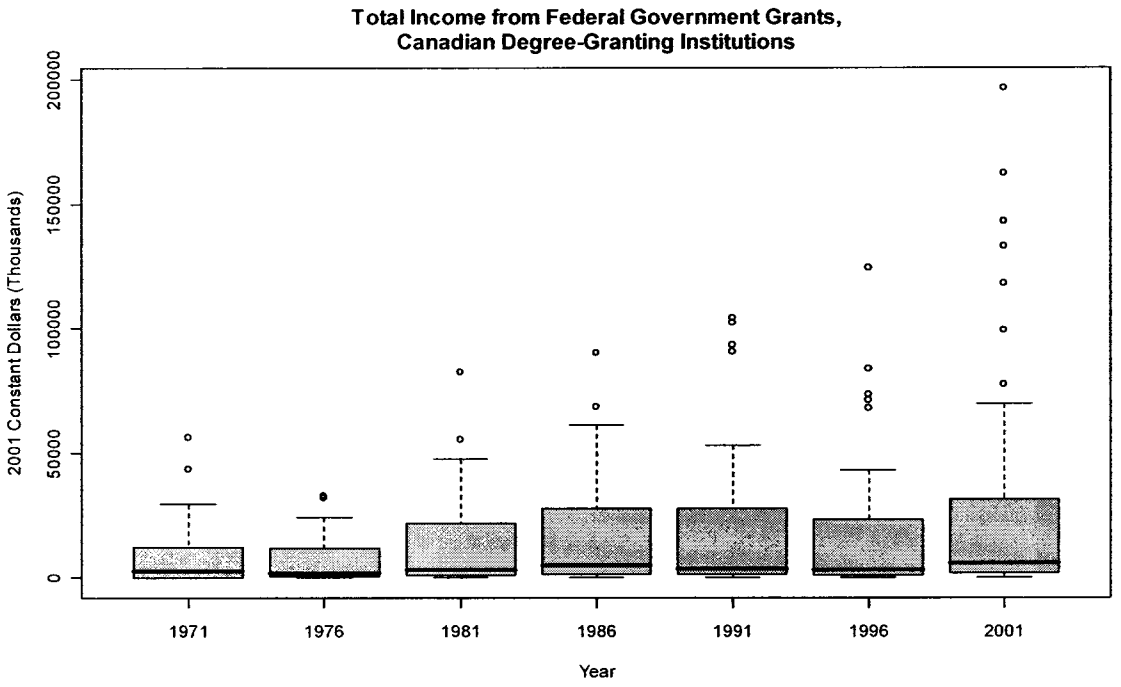
1991
- Completions
- Enrollments
- Faculty Salaries
- Fall Staff
- Finance
- Institutional Characteristics

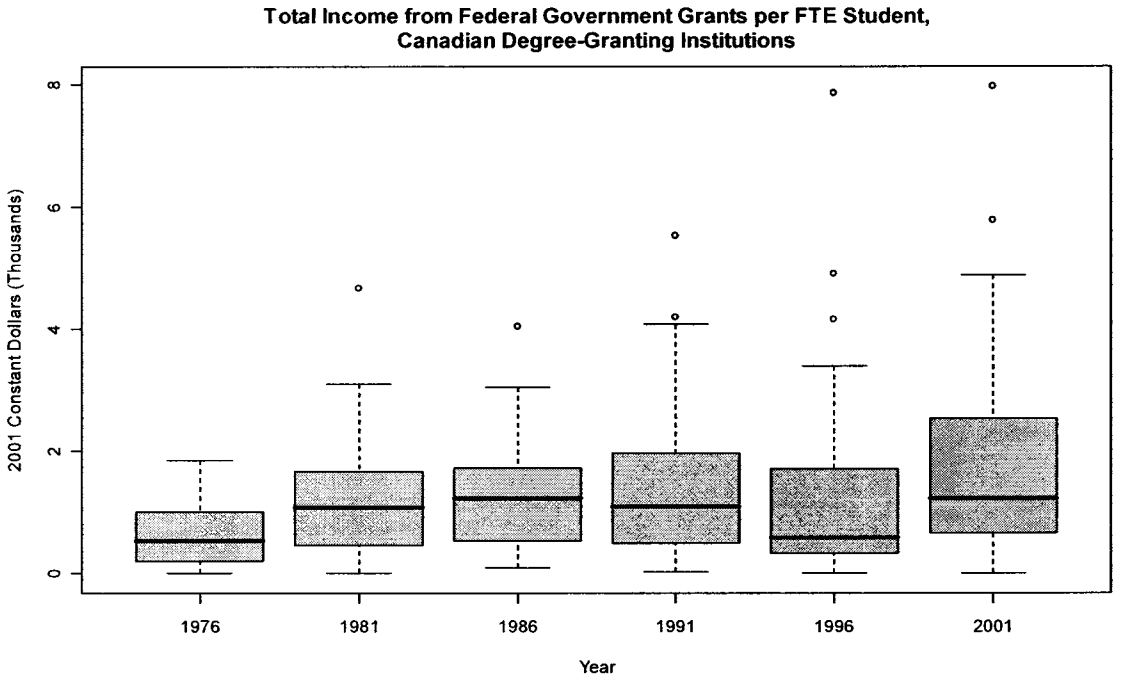
1996
- Completions
- Enrollments
- Faculty Salaries
- Finance
- Institutional Characteristics

2001
- Completions
- Employees Assigned by Position
- Enrollments
- Faculty Salaries
- Fall Staff
- Finance
- Institutional Characteristics
- Student Financial Aid

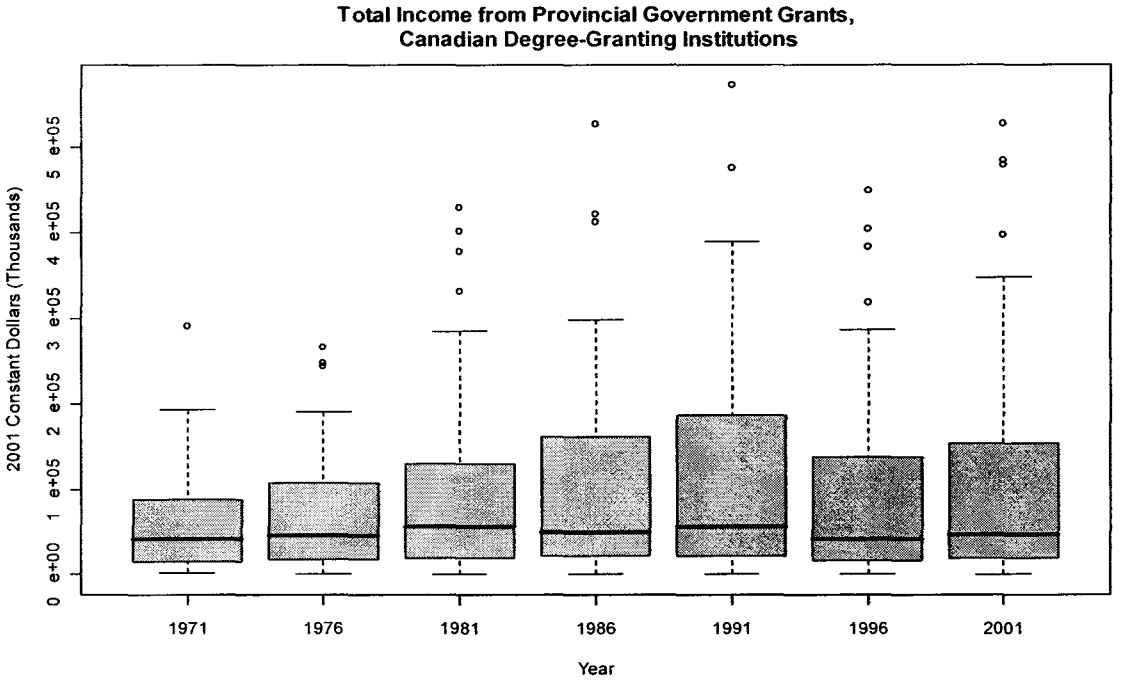
Appendix B. Additional Institutional Level Graphs

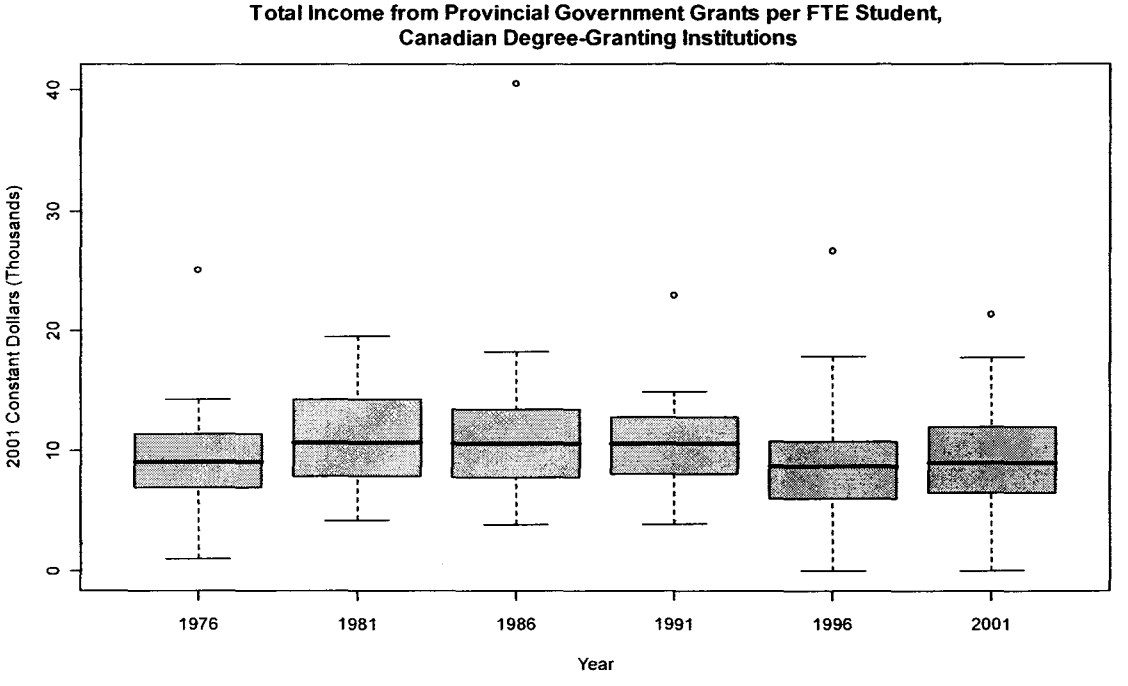
B.1 Canadian Boxplots and Medians



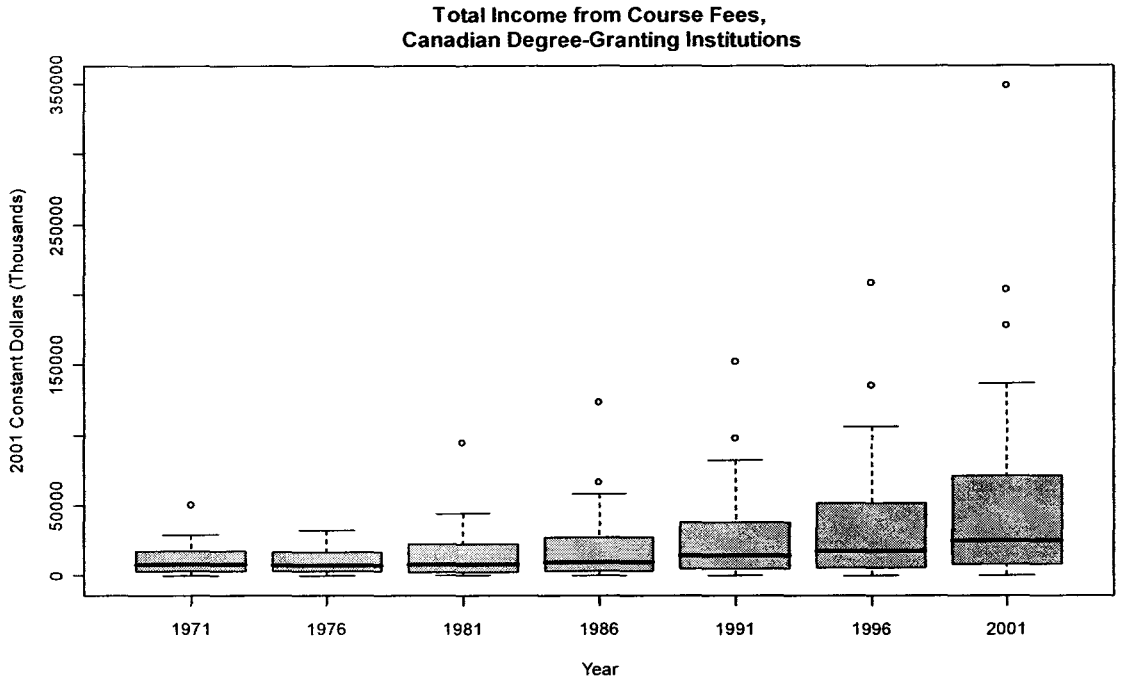


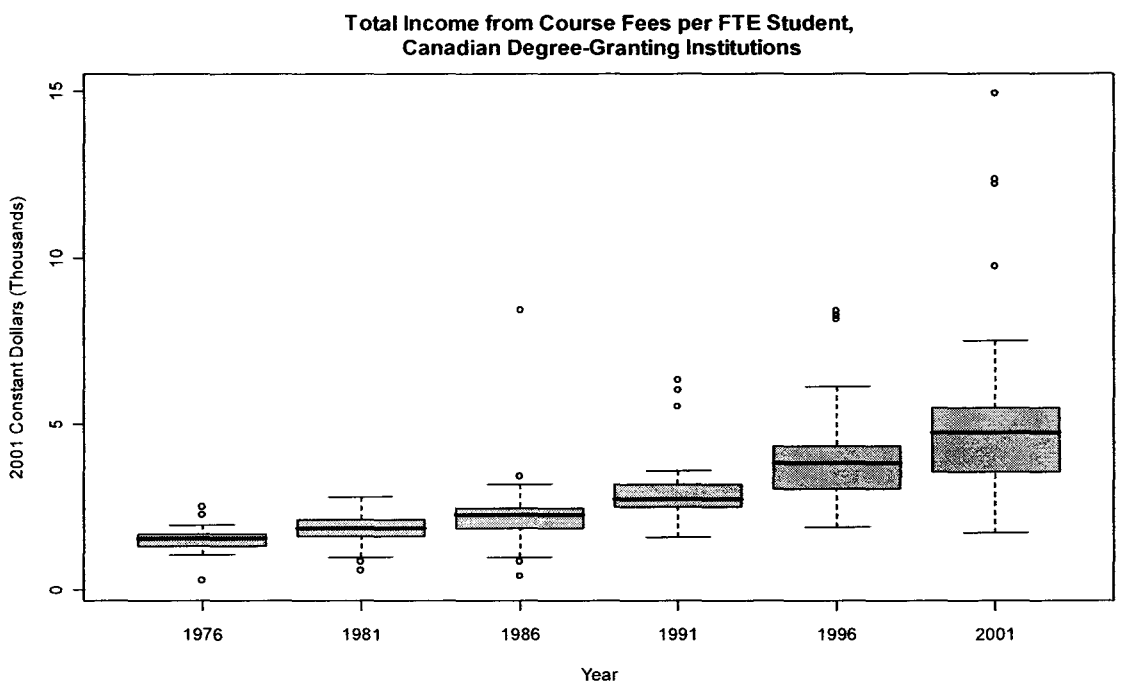
Total Income from Federal Government Grants							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	2924	2103	3335	5094	3986	3417	5888
Median Per FTE Student	—	0.533	1.08	1.24	1.11	0.59	1.23
N	45	50	52	55	62	64	69





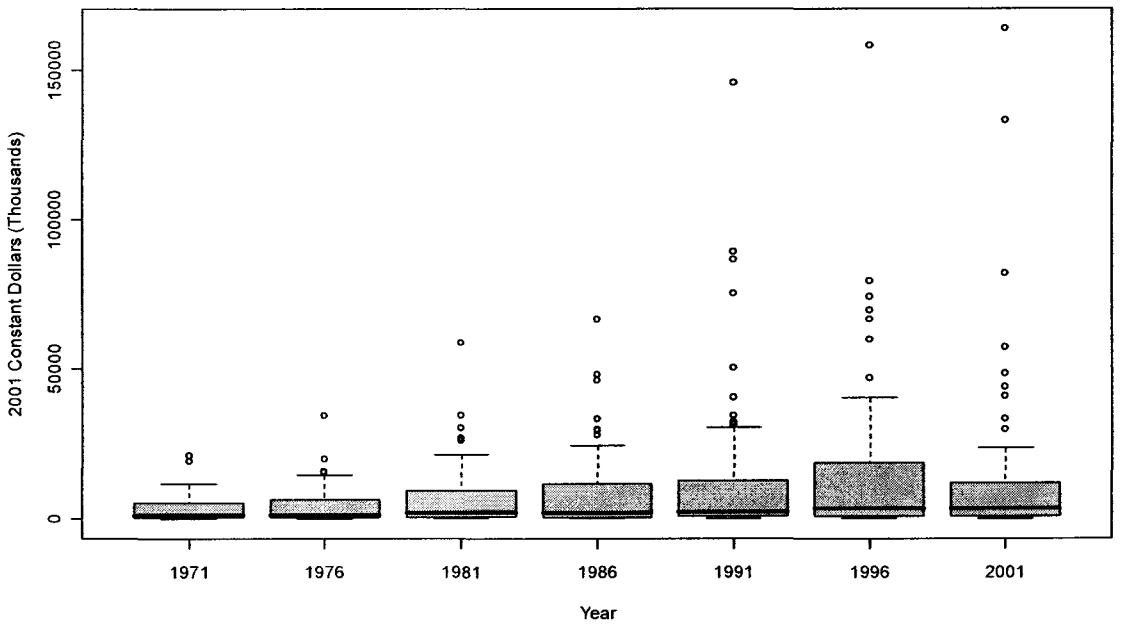
Total Income from Provincial Government Grants							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	41300	45640	55740	48750	55430	41820	47060
Median Per FTE Student	—	9.04	10.71	10.57	10.56	8.71	9.00
N	48	54	59	61	63	67	72



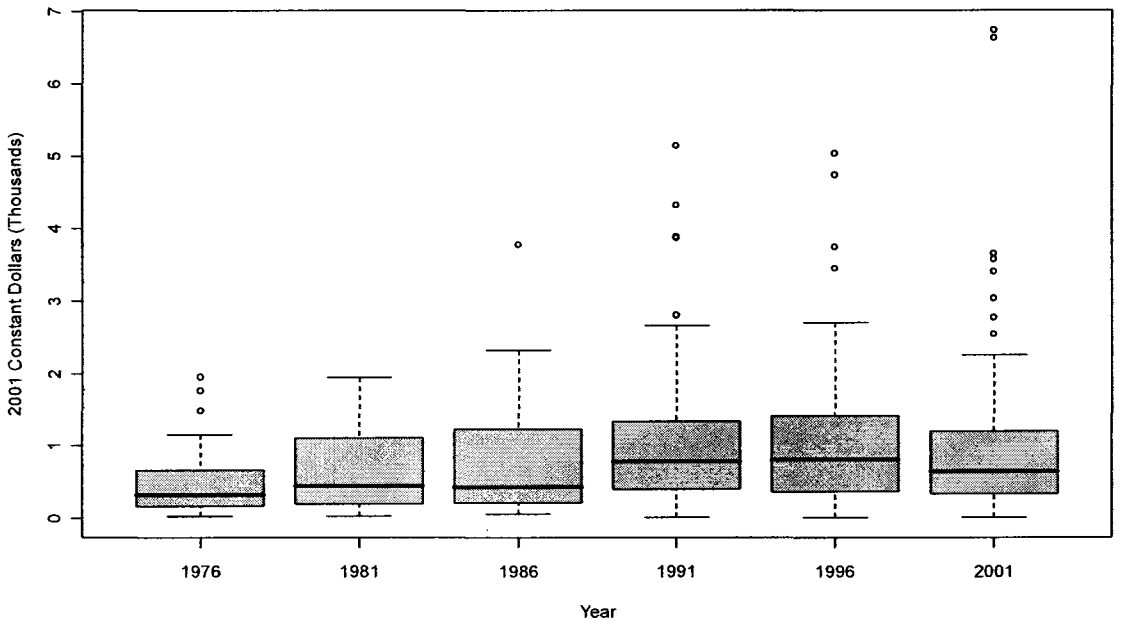


Total Income from Course Fees							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	7963	7840	7940	10010	14460	18210	24930
Median Per FTE Student	—	1.56	1.85	2.26	2.72	3.82	4.71
N	48	53	58	61	65	67	72

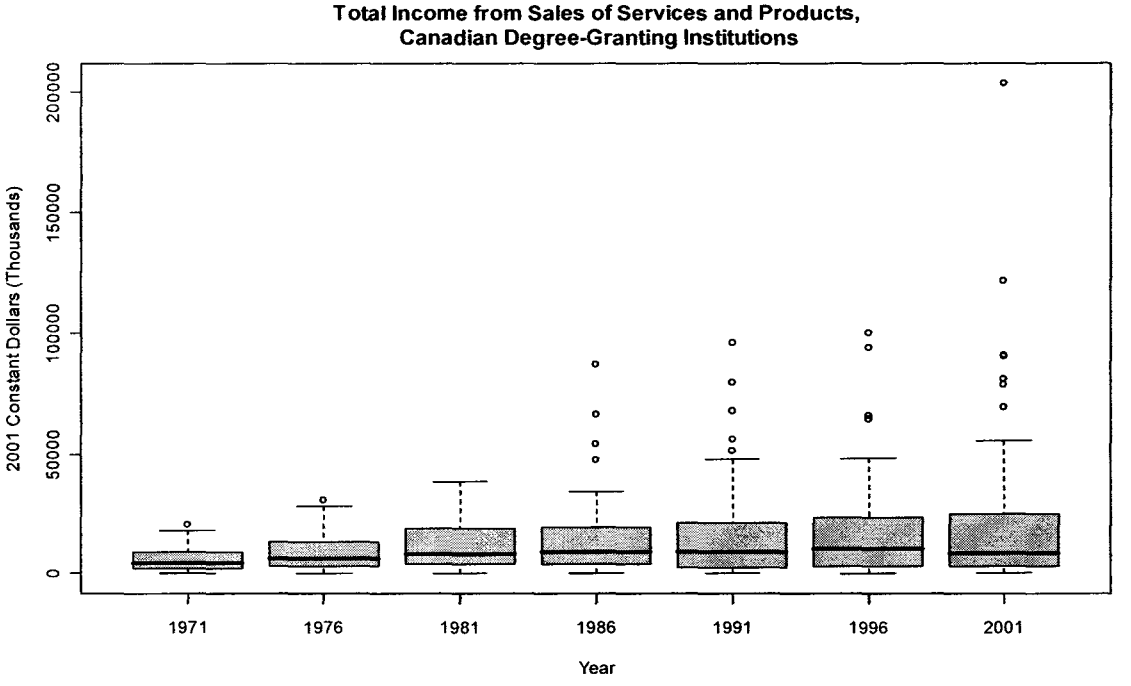
Total Income from Bequests, Donations and Non-Government Grants, Canadian Degree-Granting Institutions

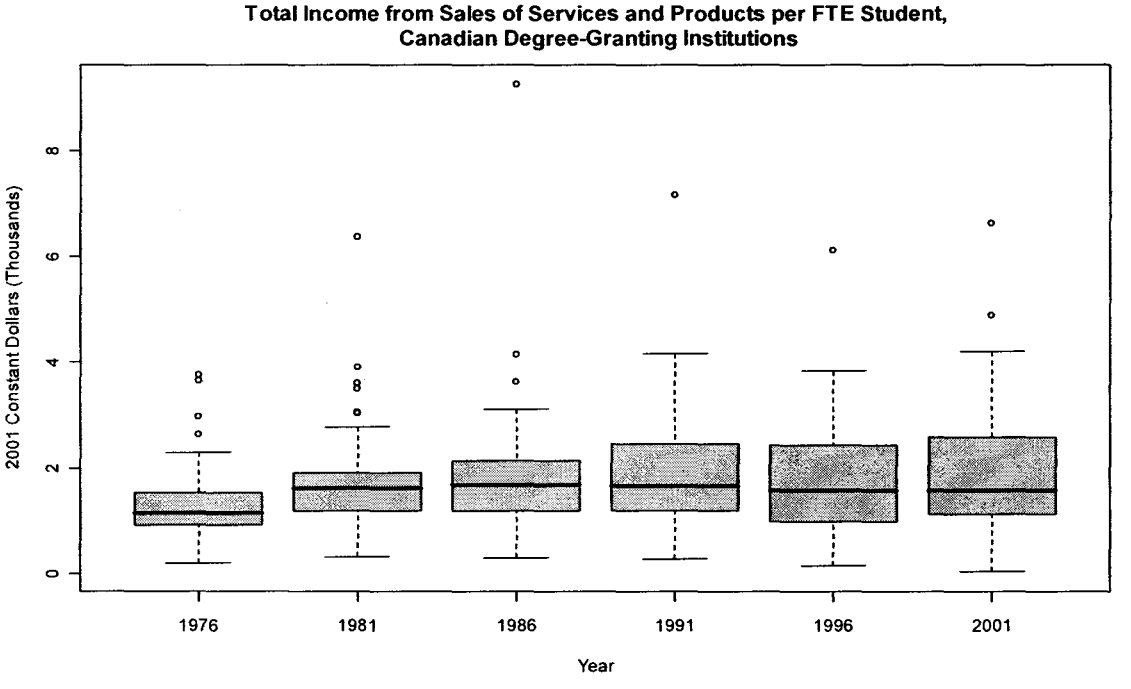


Total Income from Bequests, Donations and Non-Government Grants per FTE Student, Canadian Degree-Granting Institutions

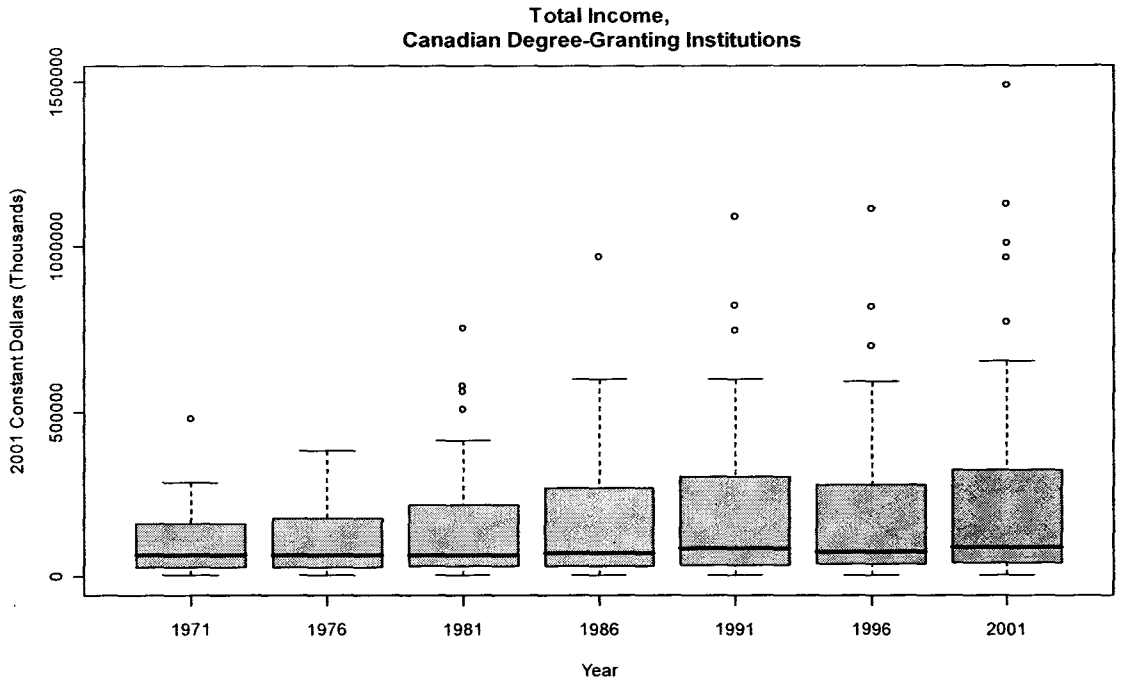


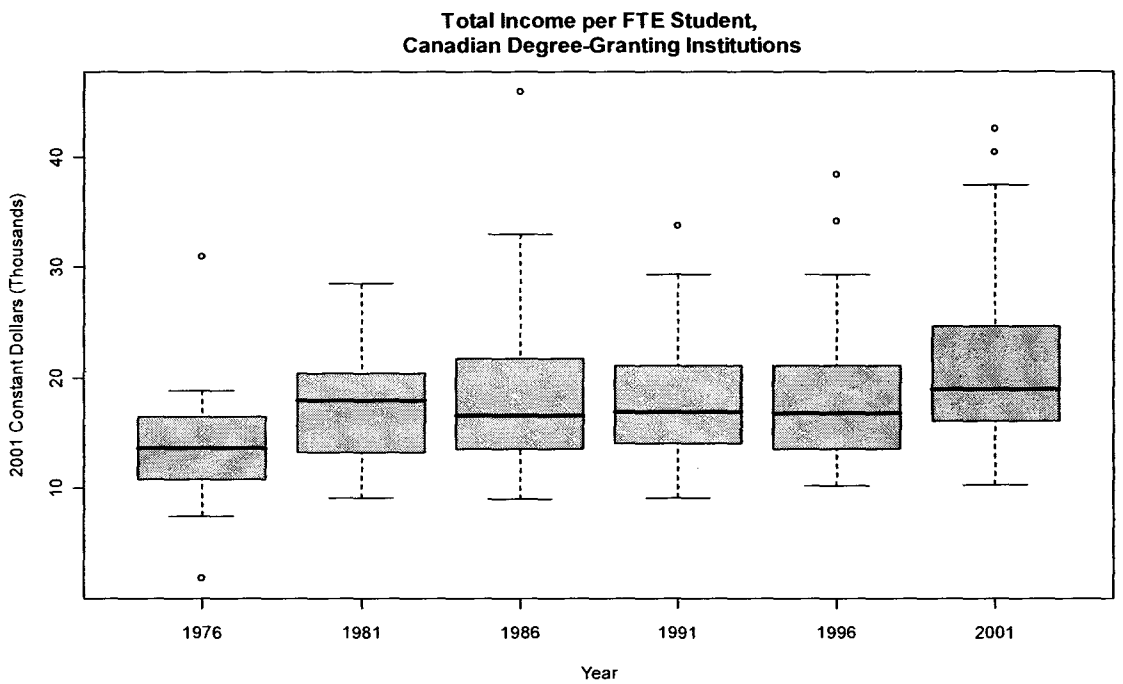
Total Income from Bequests, Donations and Non-Government Grants							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	1209	1419	1869	1965	2443	3482	3608
Median Per FTE Student	—	0.31	0.45	0.43	0.78	0.81	0.65
N	43	49	51	61	66	66	67





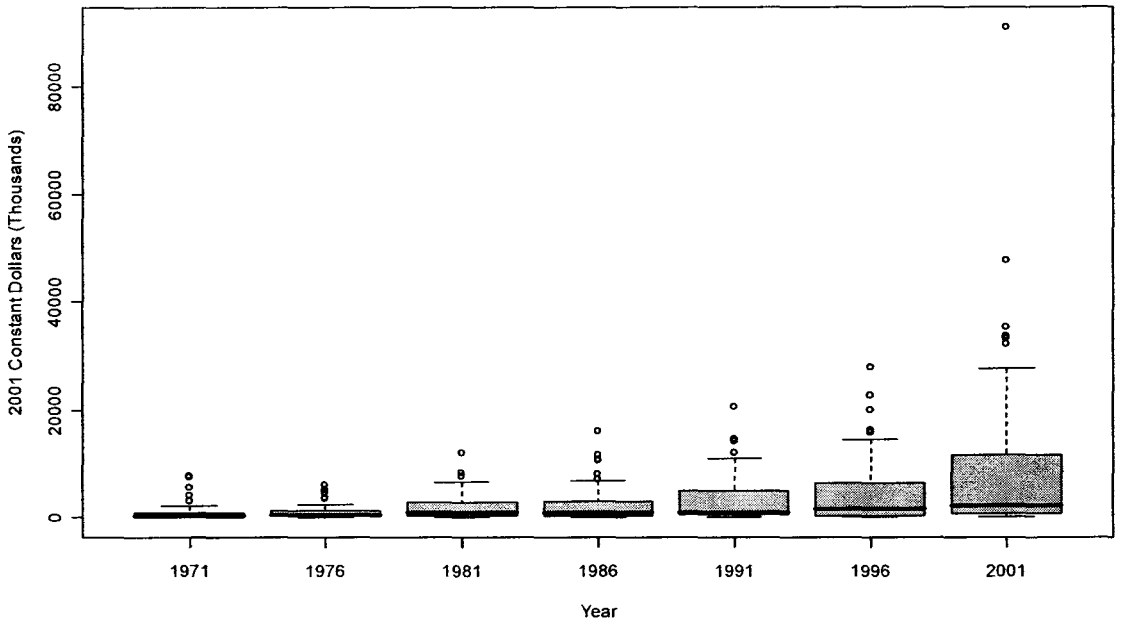
Total Income from Sales of Services and Products							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	4322	6168	7964	9222	9231	10610	8488
Median Per FTE Student	—	1.15	1.61	1.67	1.65	1.57	1.58
N	46	48	51	57	62	62	72



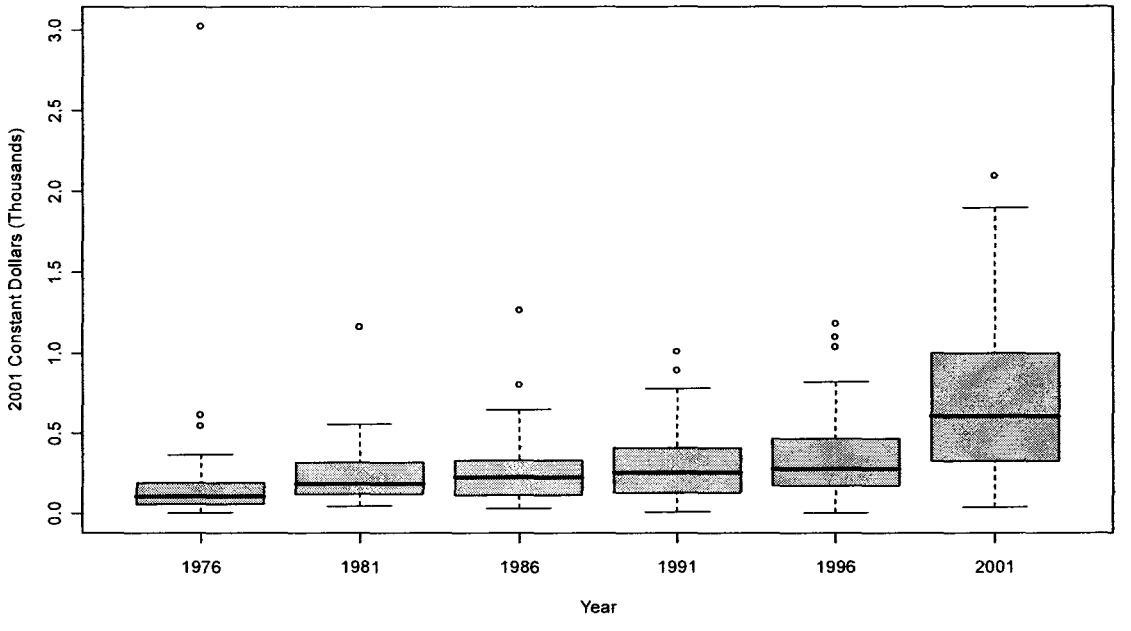


Total Income							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	65080	62700	65080	70930	84740	75410	87620
Median Per FTE Student	—	13.72	17.96	16.59	16.9	16.82	18.99
N	48	54	59	62	66	68	73

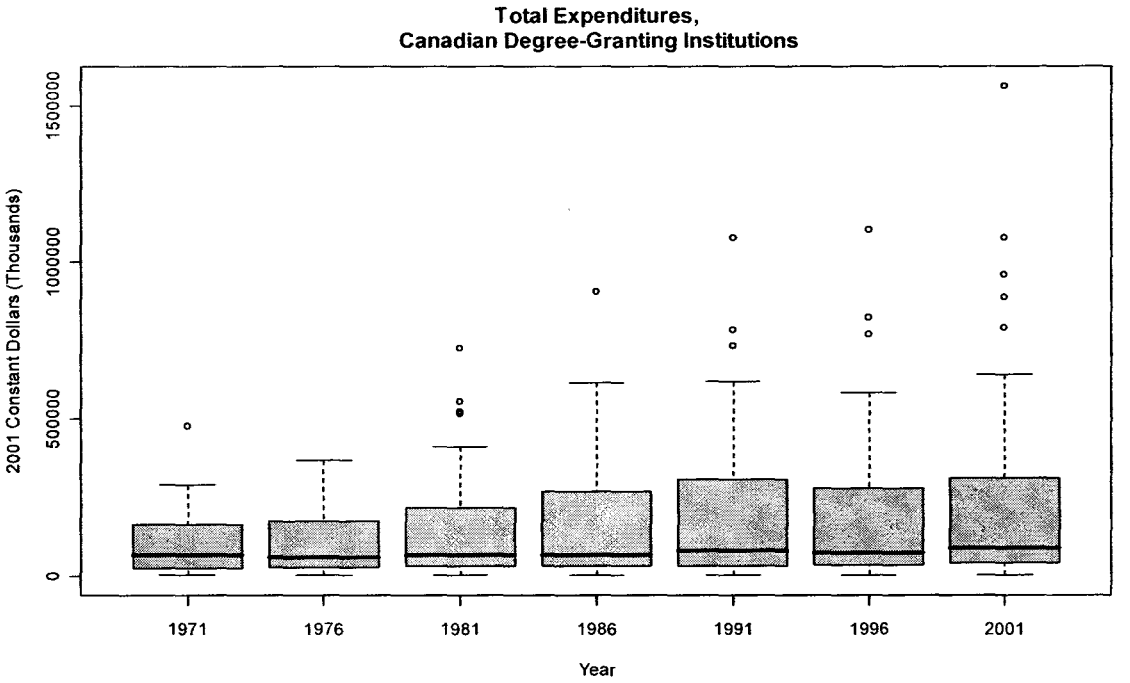
Total Expenditures on Scholarships, Bursaries and Prizes, Canadian Degree-Granting Institutions

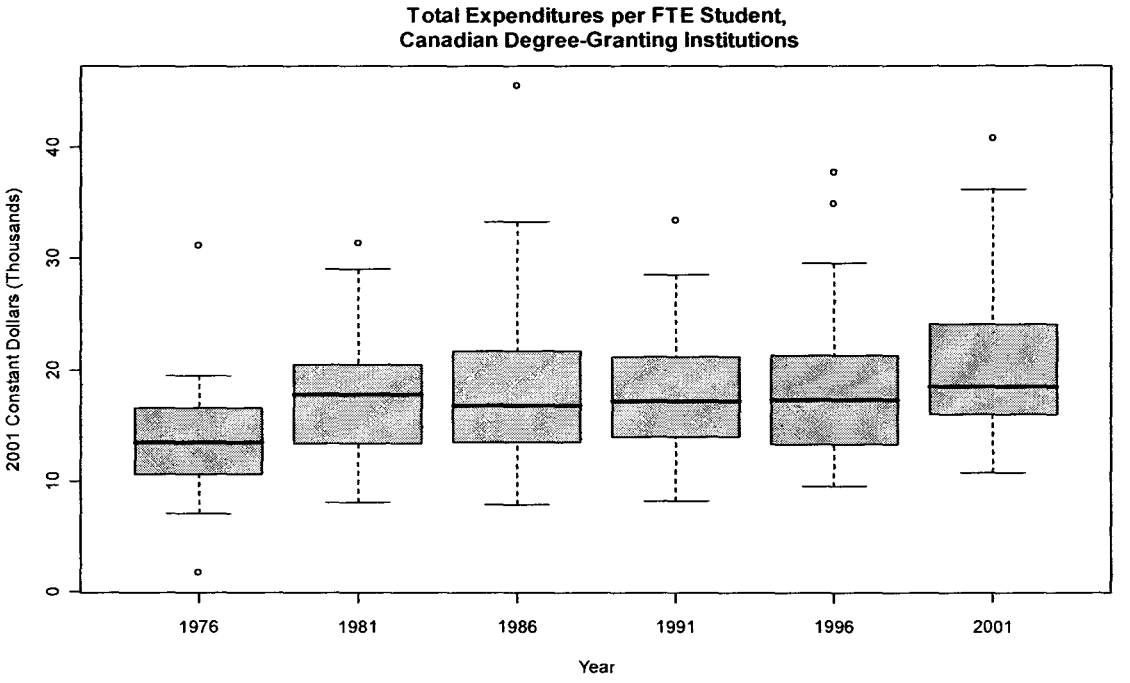


Total Expenditures on Scholarships, Bursaries and Prizes per FTE Student, Canadian Degree-Granting Institutions

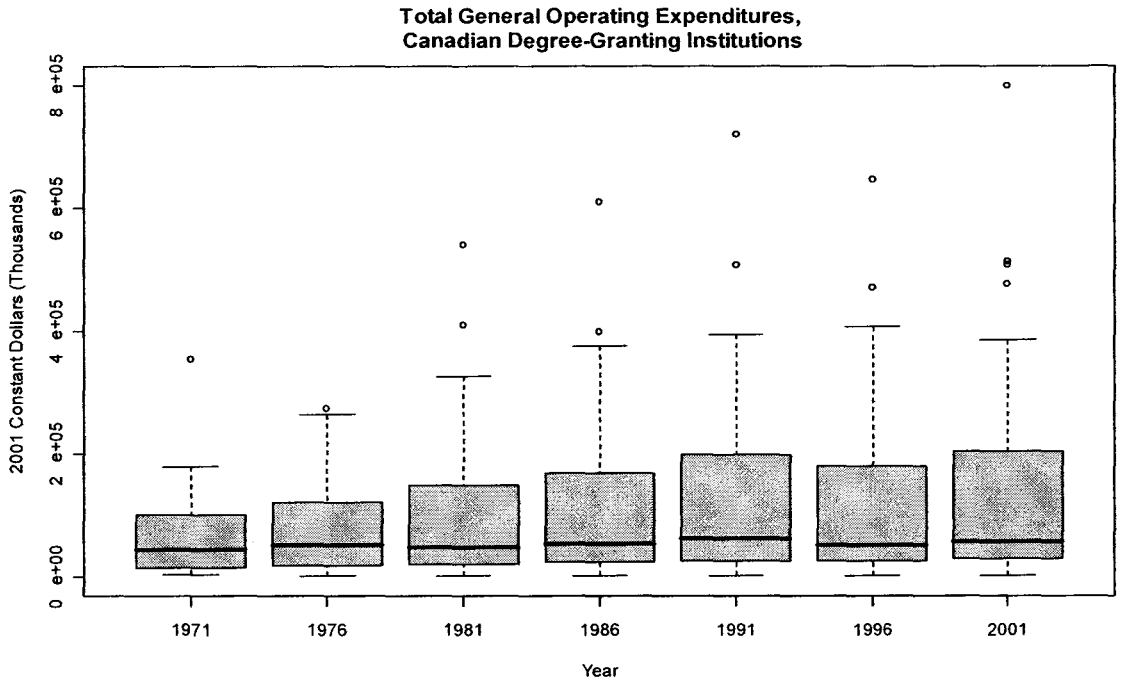


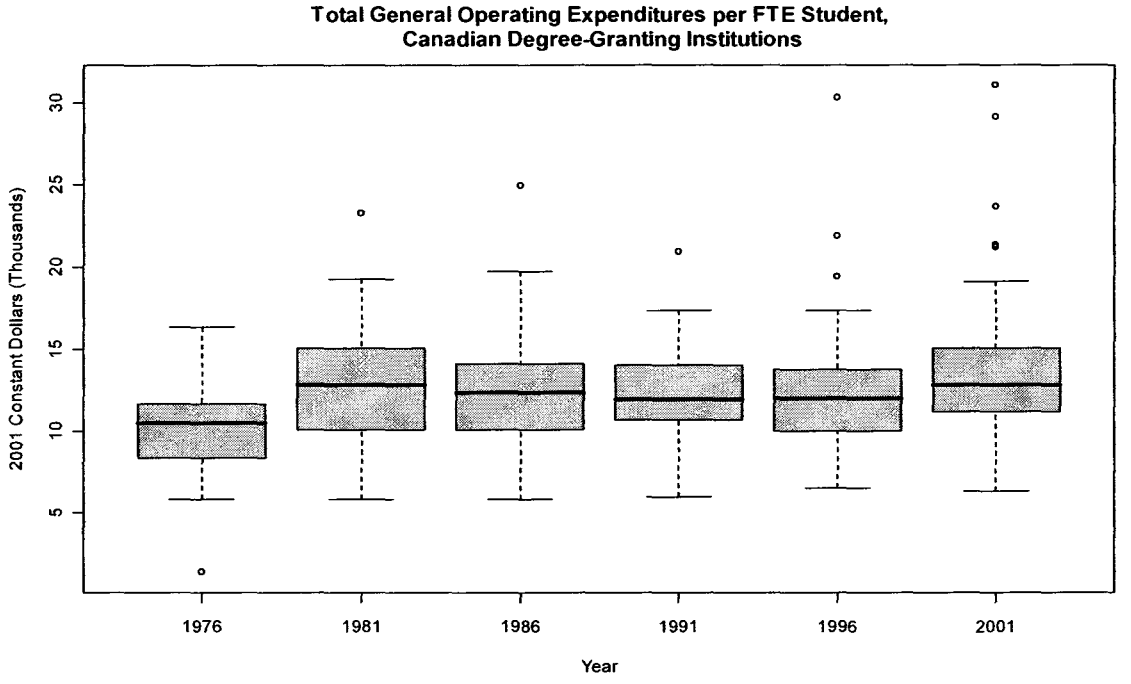
Total Expenditures on Scholarships, Bursaries and Prizes							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	305.6	450.7	964.8	938.6	950	1505	2132
Median Per FTE Student	—	0.10	0.18	0.23	0.25	0.27	0.60
N	46	49	52	58	61	65	72





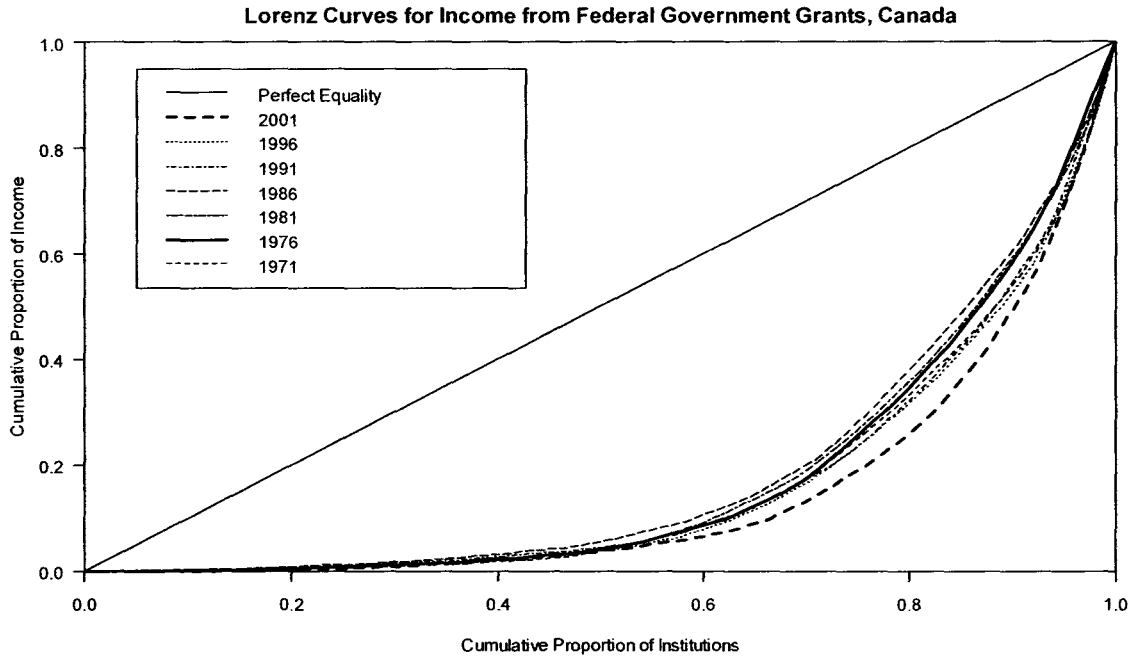
Total Expenditures							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	65090	60800	65070	68280	82710	74700	87320
Median Per FTE Student	—	13.41	17.73	16.76	17.18	17.25	18.43
N	48	54	59	62	66	68	73

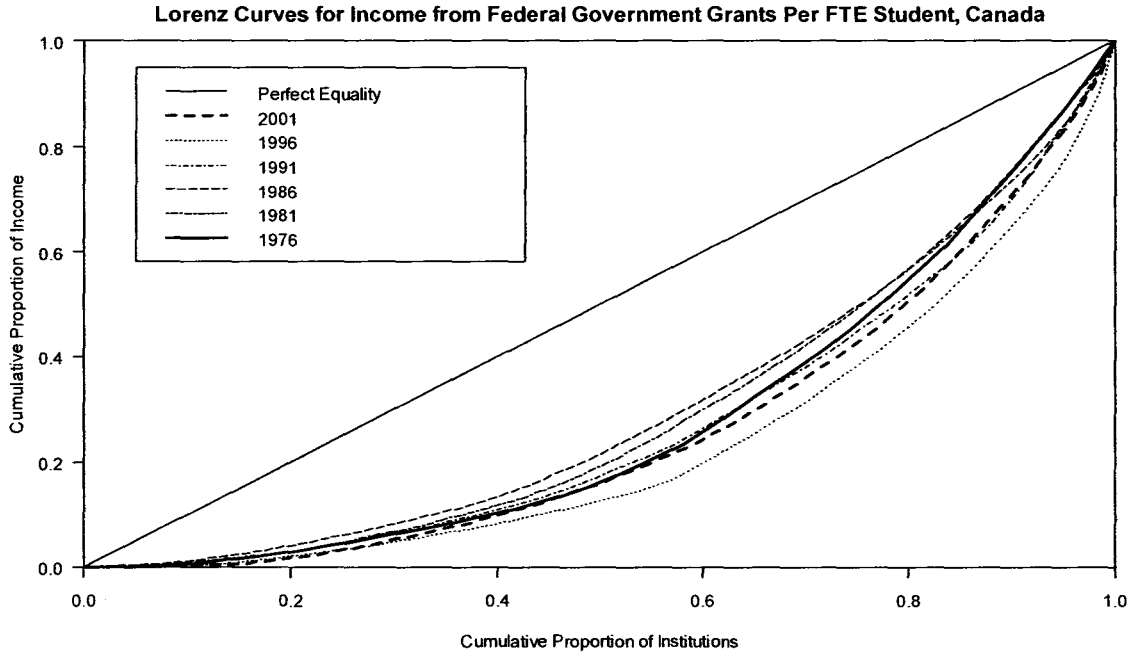


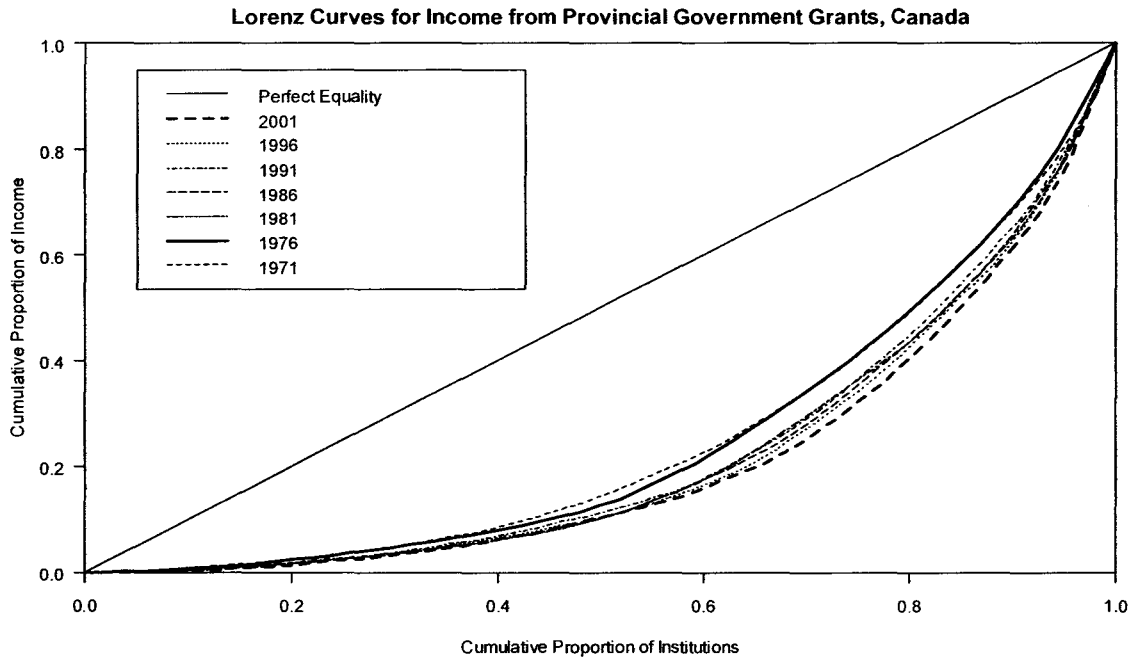


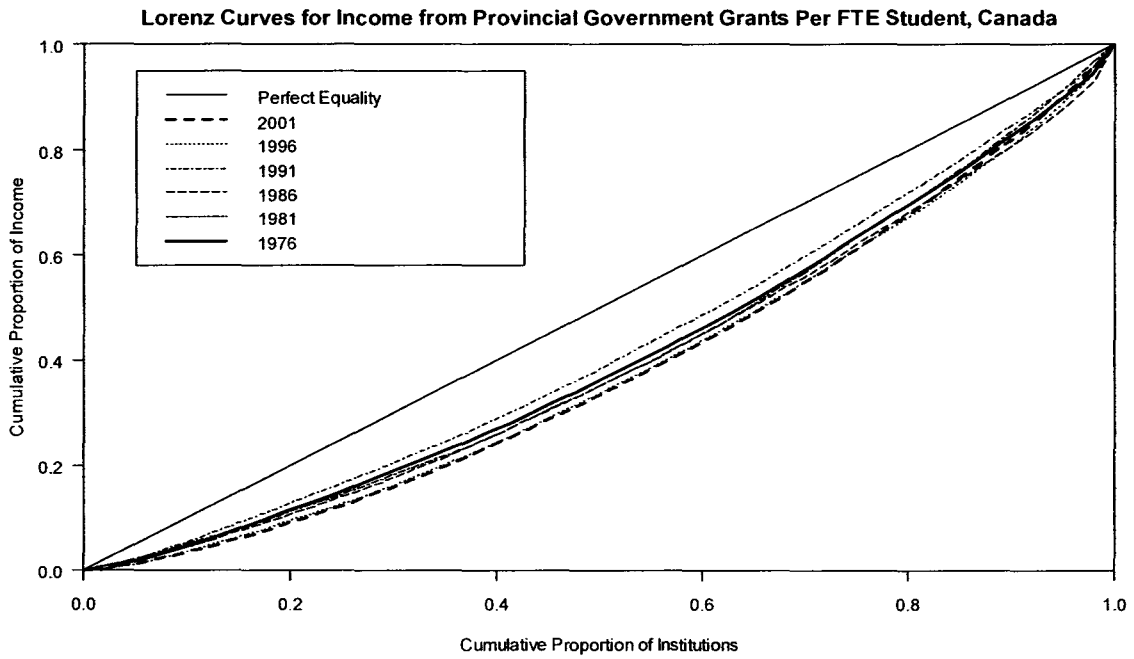
Total General Operating Expenditures							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	43770	49940	47300	51610	61710	50540	56860
Median Per FTE Student	—	10.46	12.77	12.31	11.94	11.97	12.77
N	48	54	59	62	66	68	73

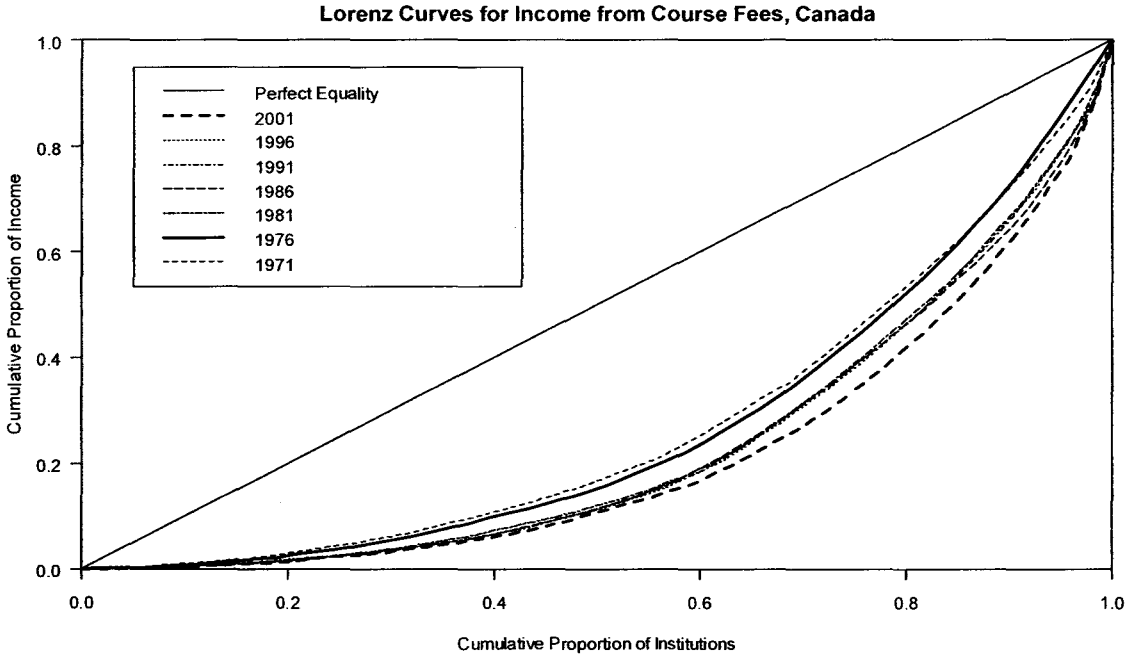
B.2 Canadian Lorenz Curves

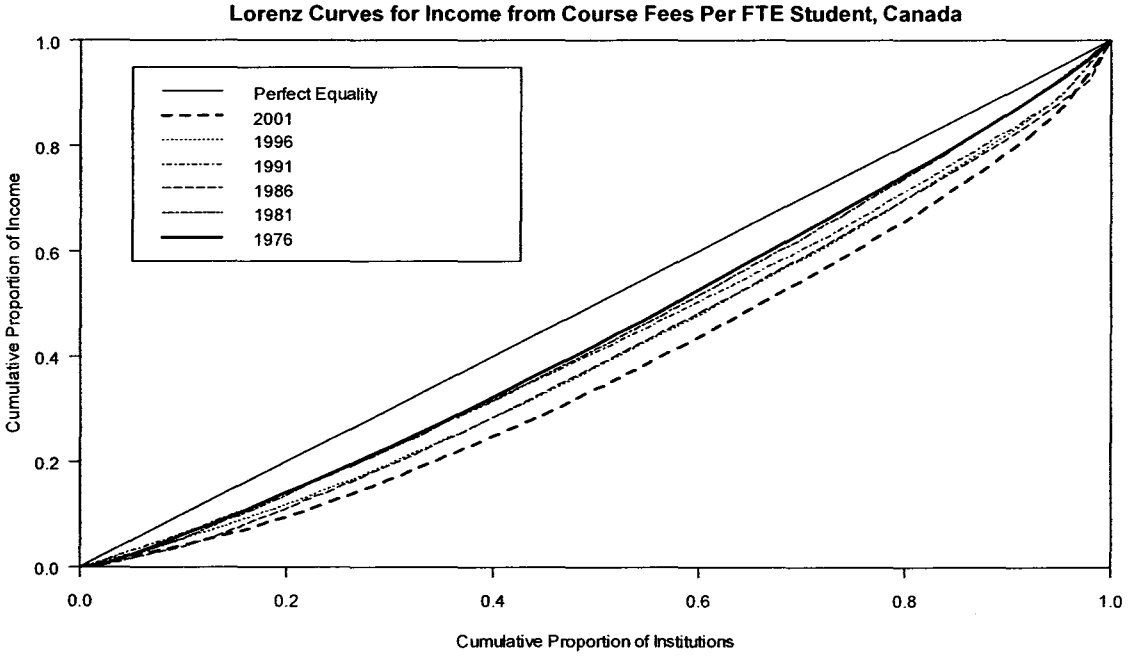




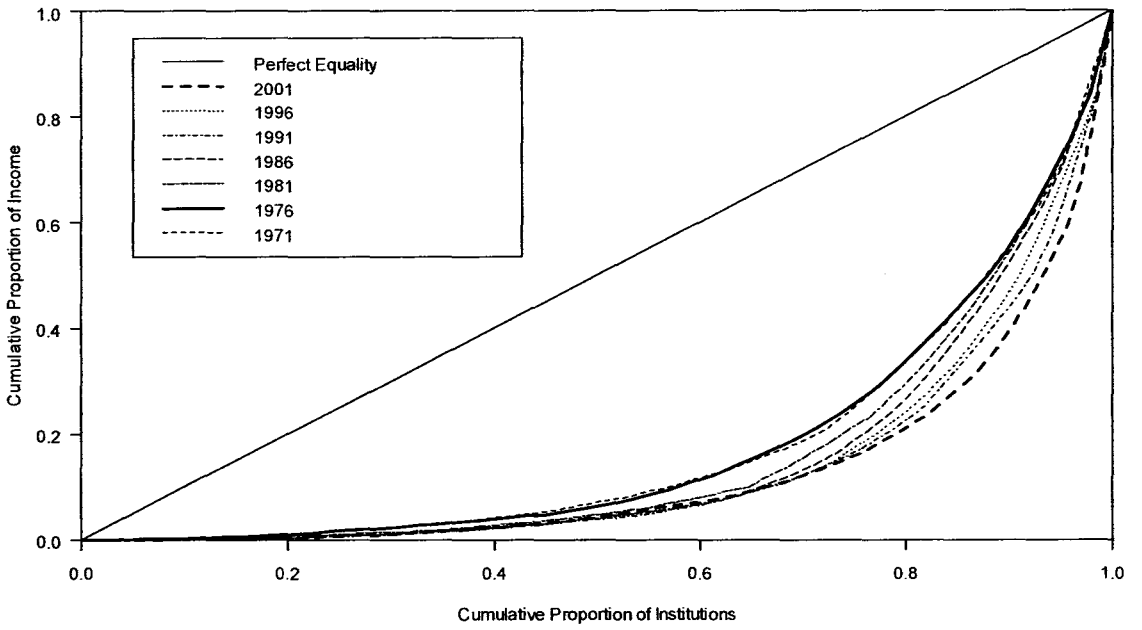

Lorenz Curves for Income from Provincial Government Grants, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Income from Provincial Government Grants Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

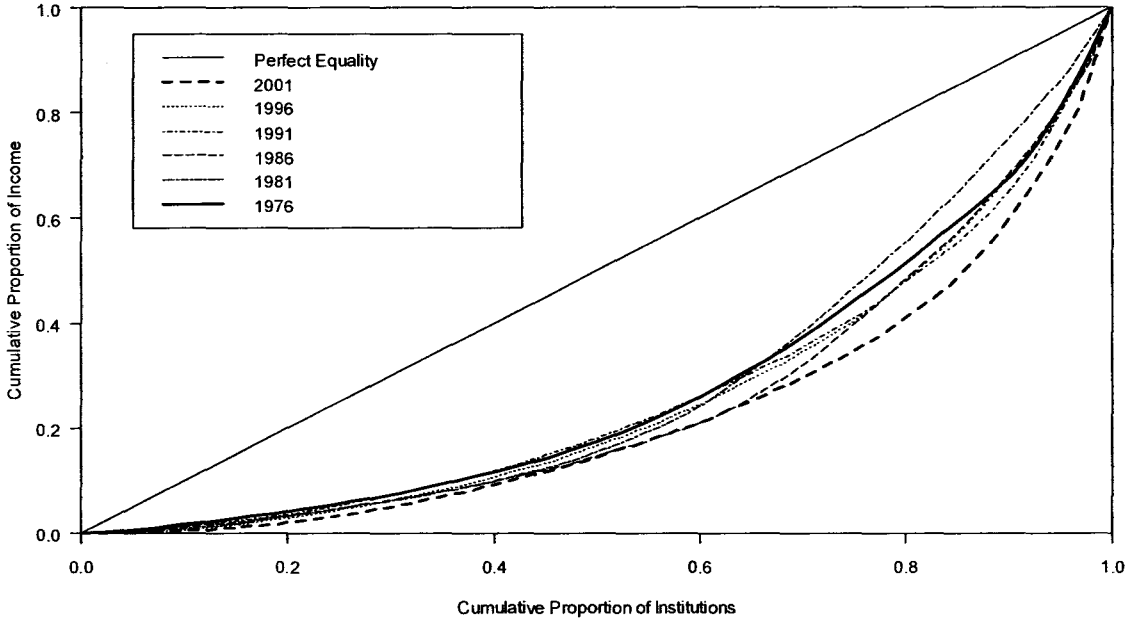

Lorenz Curves for Income from Course Fees, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

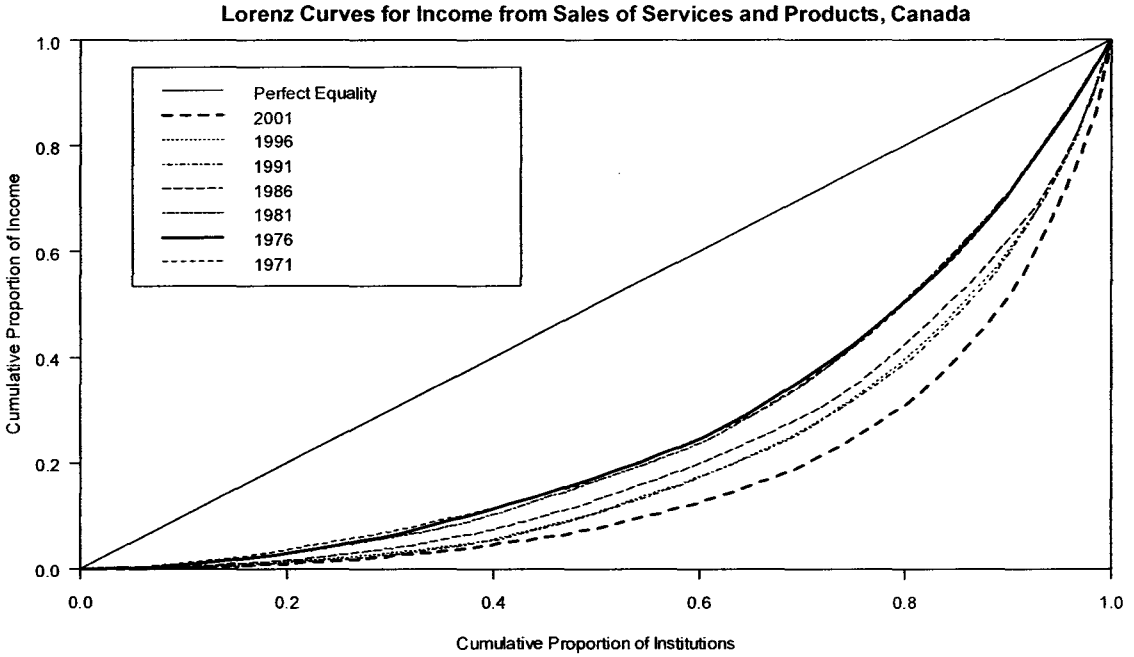

Lorenz Curves for Income from Course Fees Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

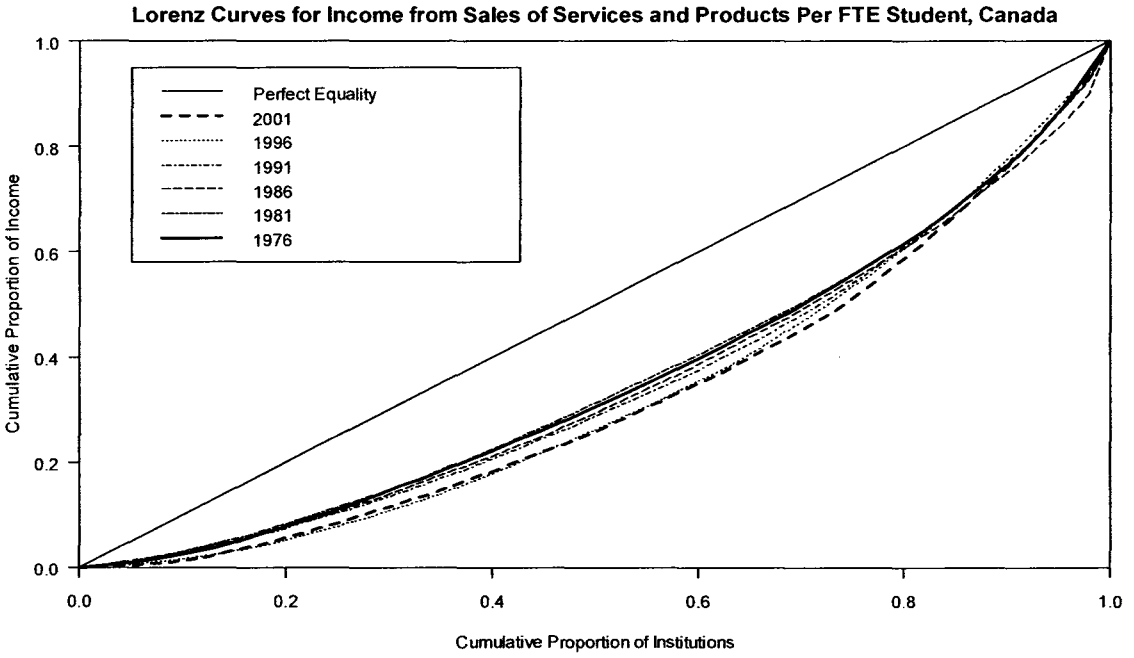
Lorenz Curves for Income from Bequests, Donations and Non-Government Grants, Canada

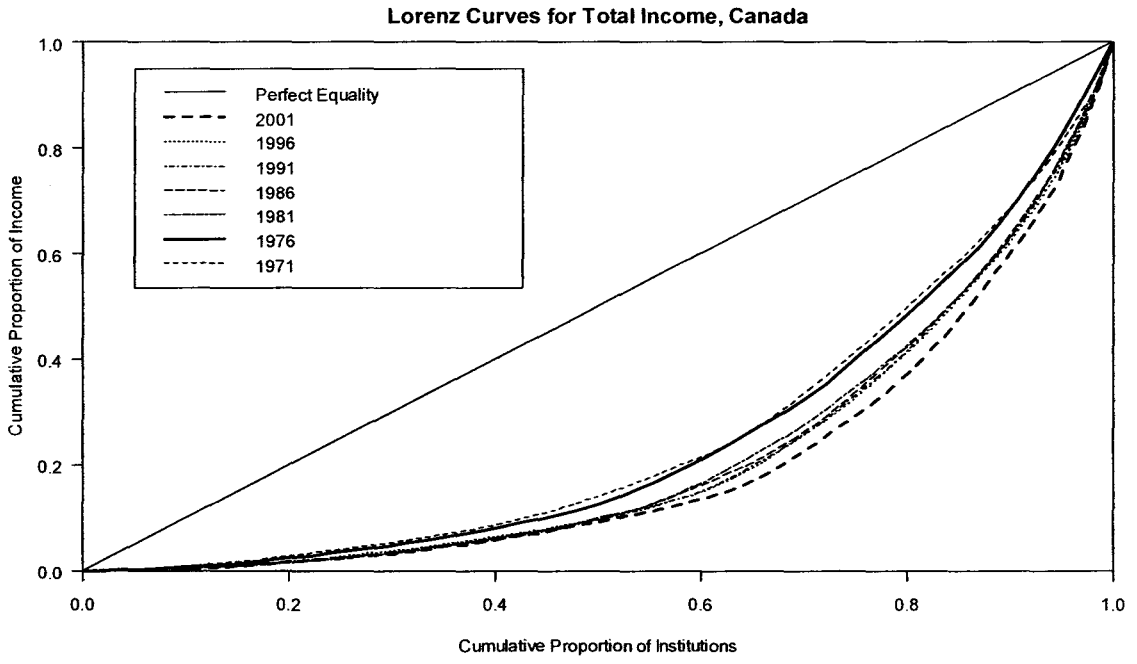


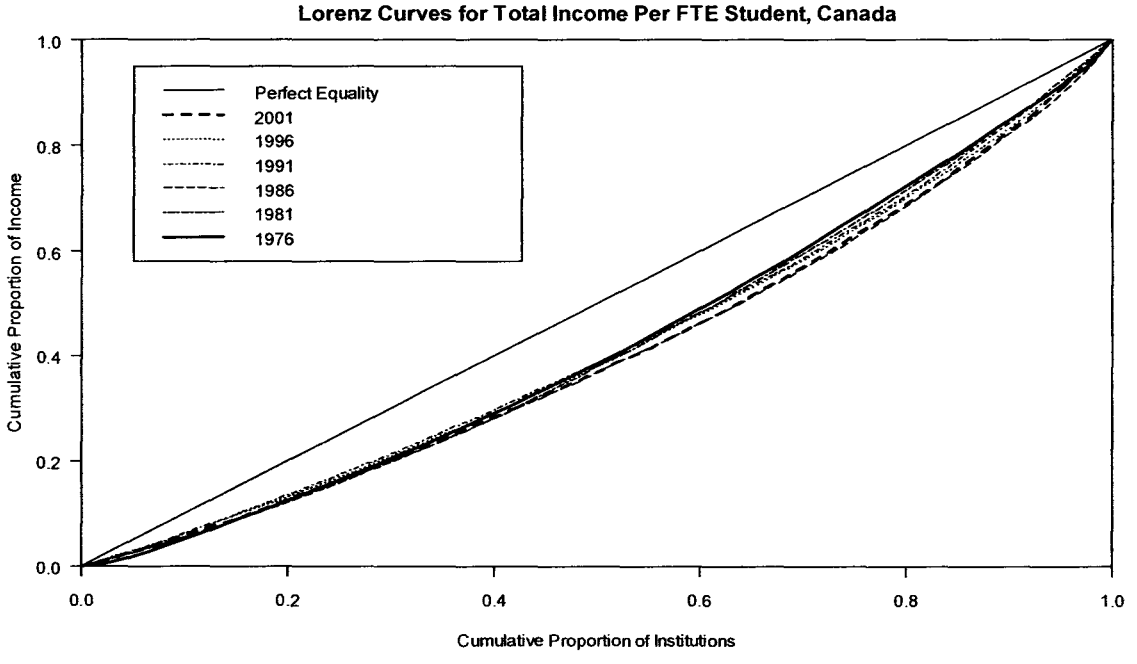
Lorenz Curves for Income from Bequests, Donations and Non-Government Grants Per FTE Student, Canada

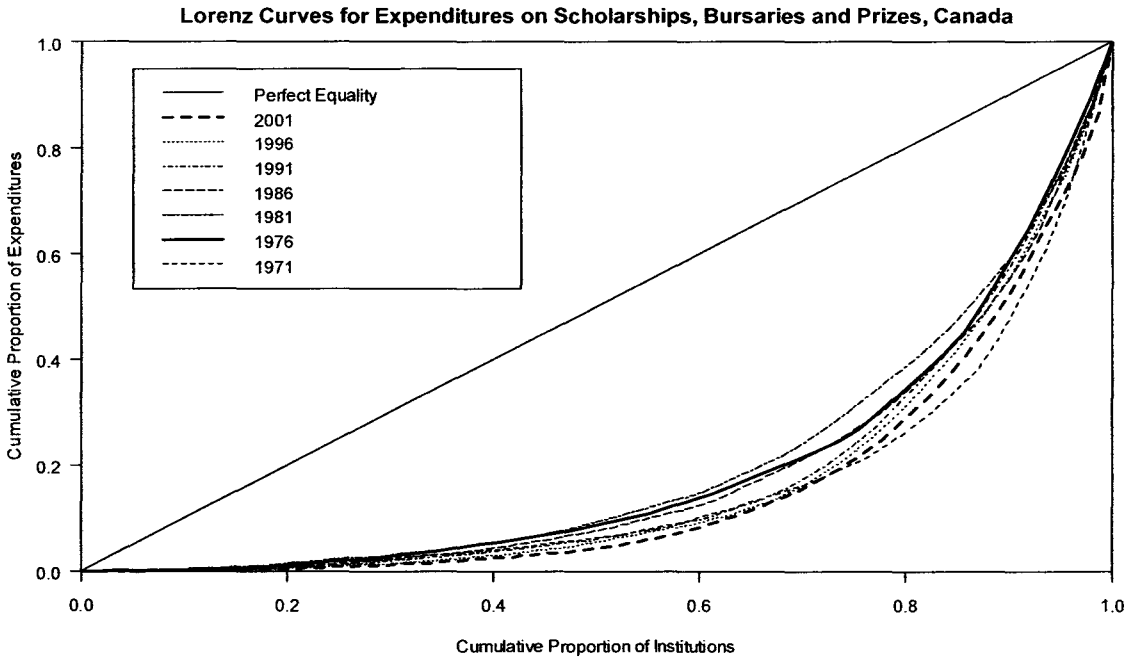


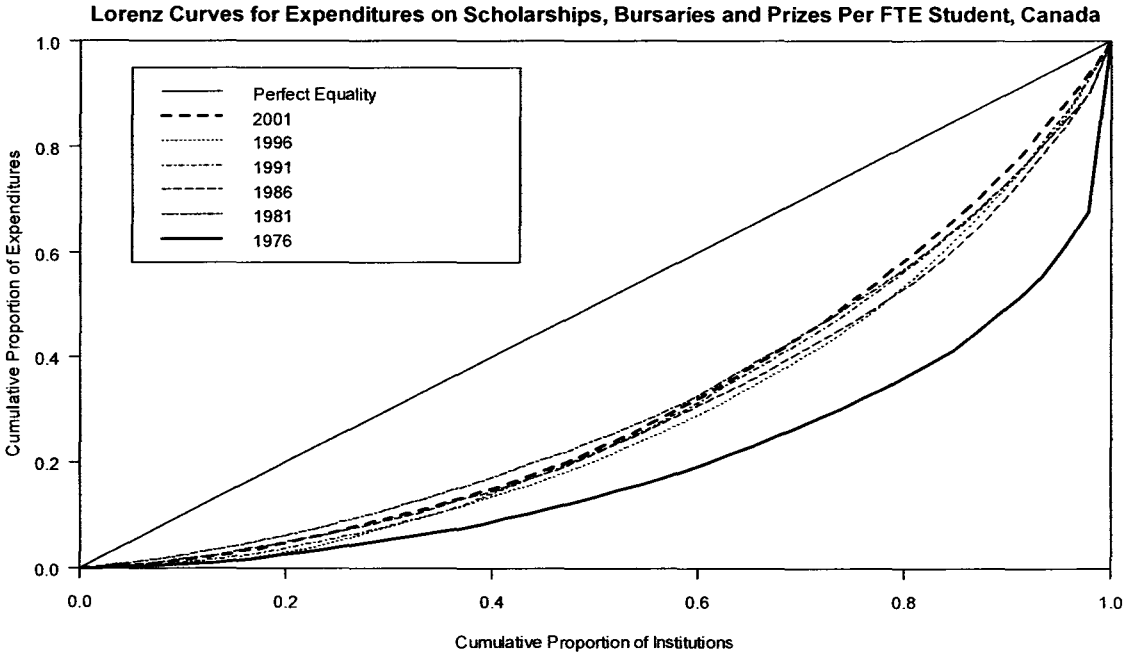

Lorenz Curves for Income from Sales of Services and Products, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

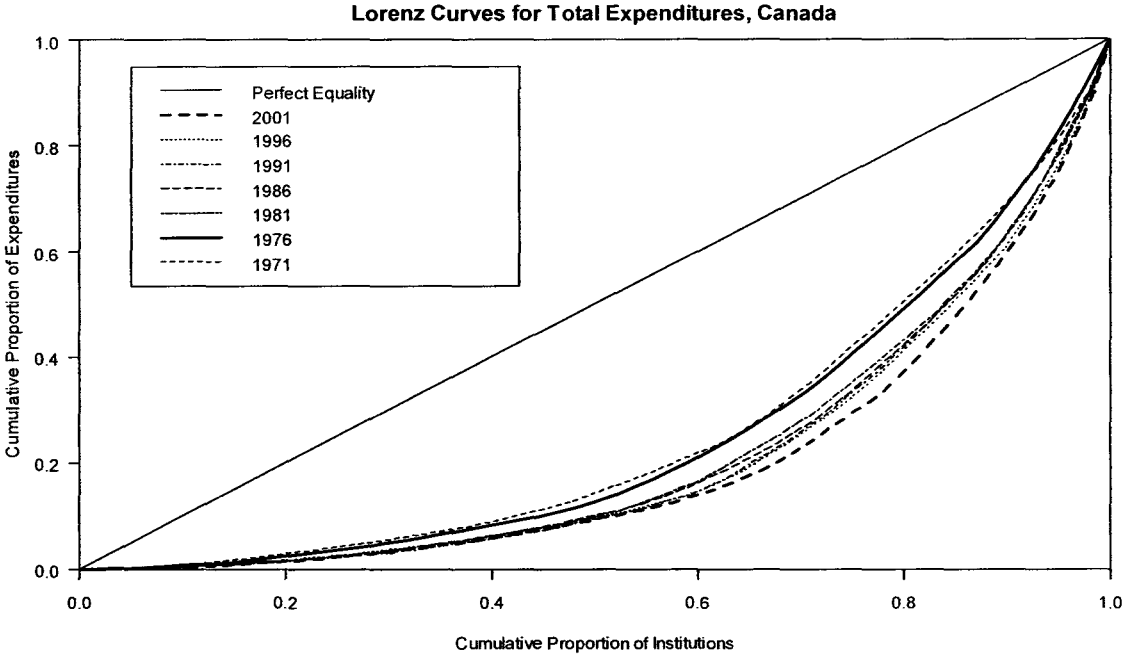

Lorenz Curves for Income from Sales of Services and Products Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

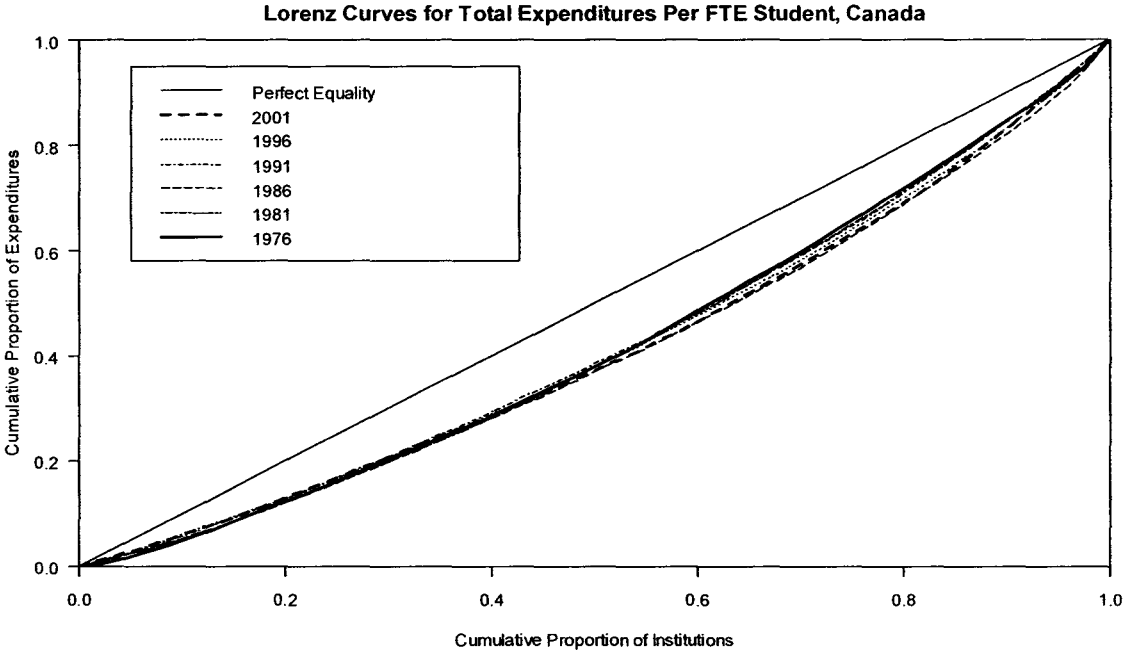

Lorenz Curves for Total Income, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

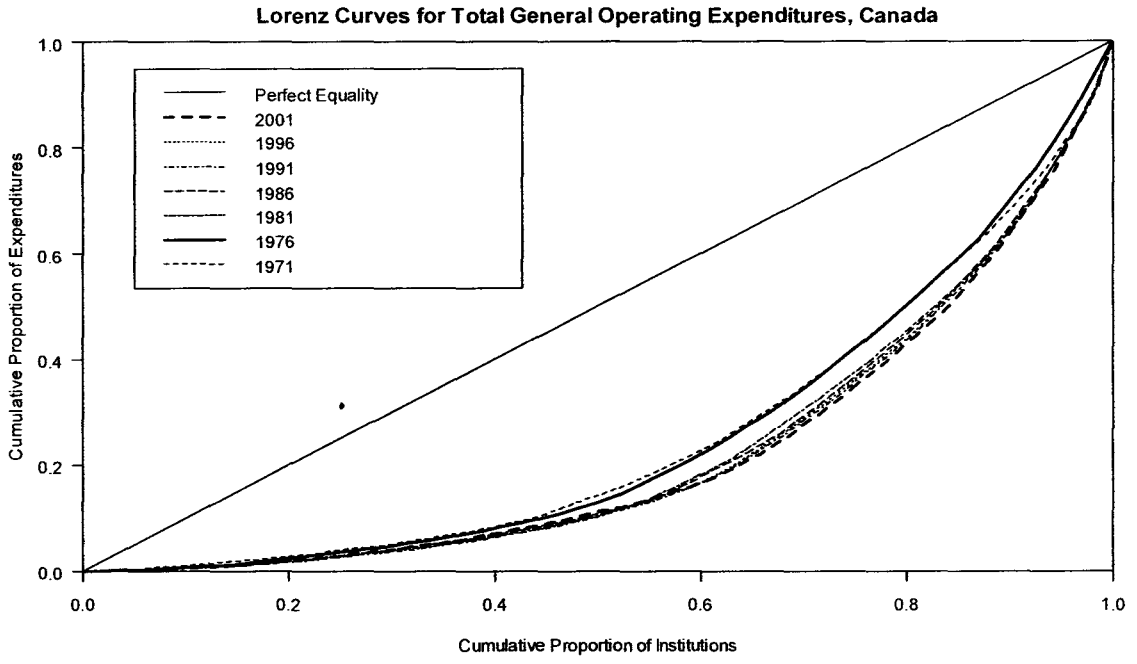

Lorenz Curves for Total Income Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

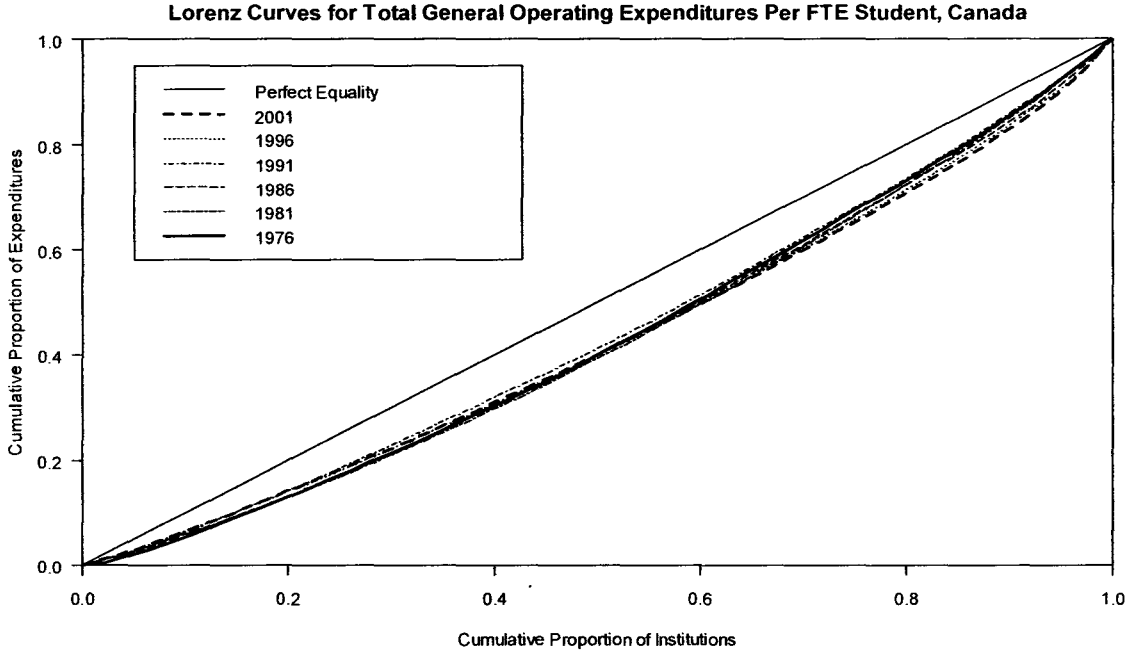

Lorenz Curves for Expenditures on Scholarships, Bursaries and Prizes, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Expenditures on Scholarships, Bursaries and Prizes Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

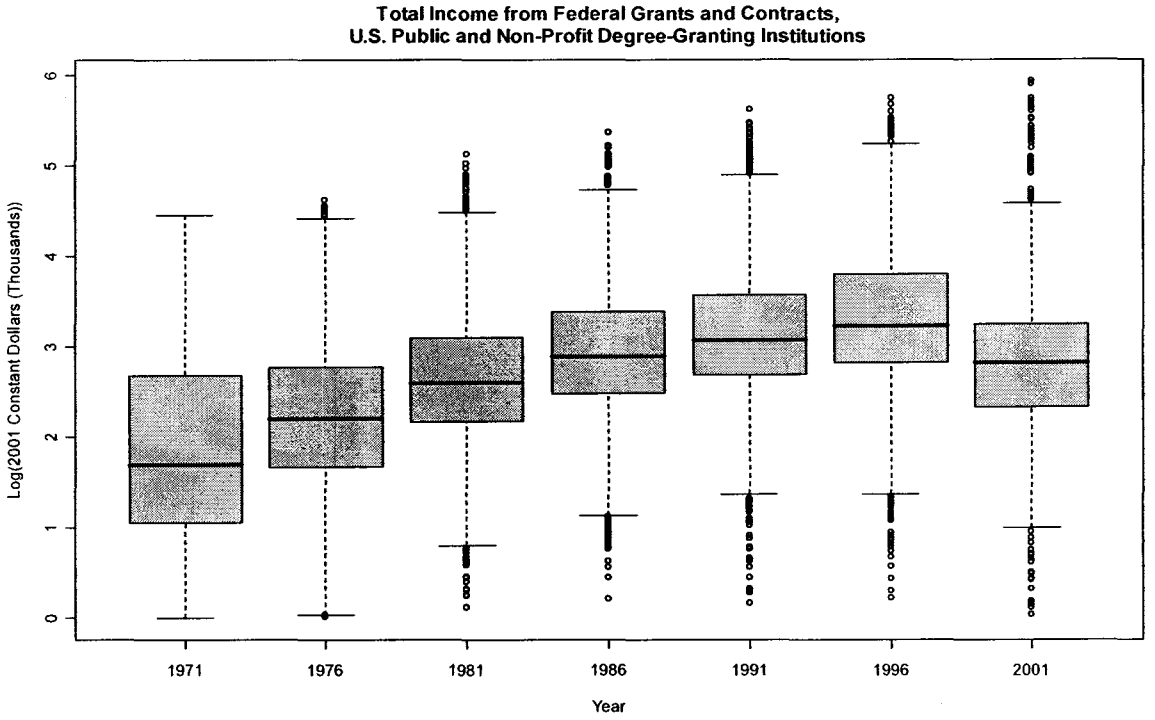

Lorenz Curves for Total Expenditures, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

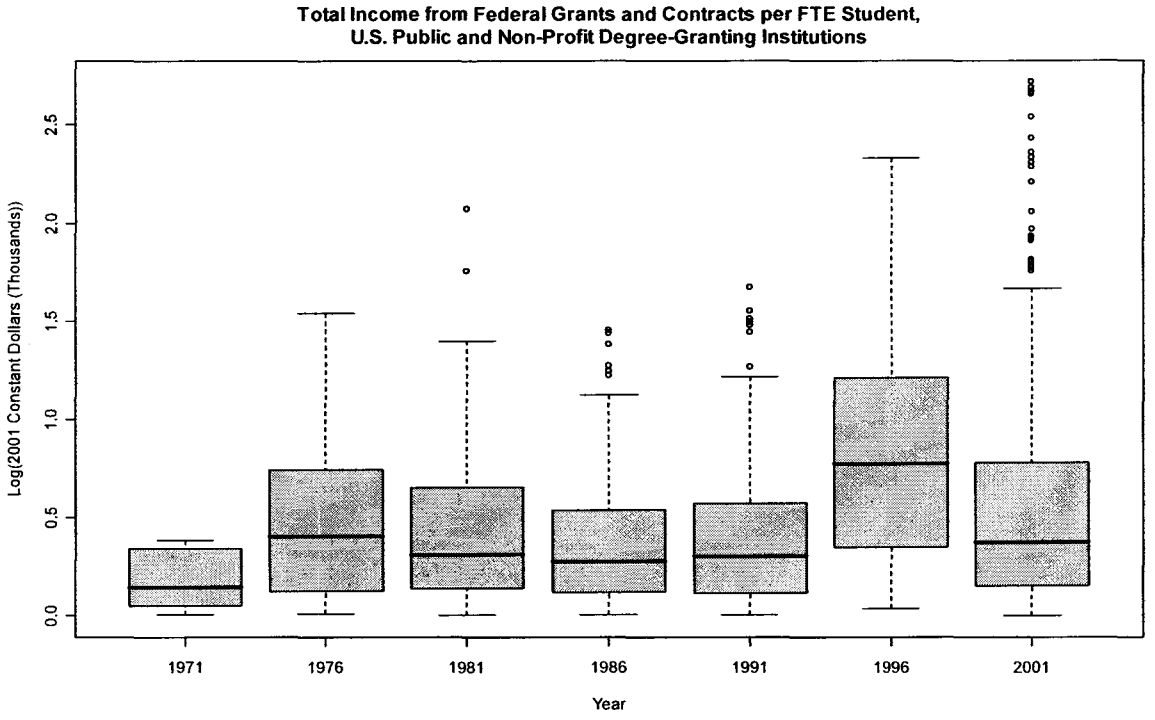

Lorenz Curves for Total Expenditures Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Total General Operating Expenditures, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

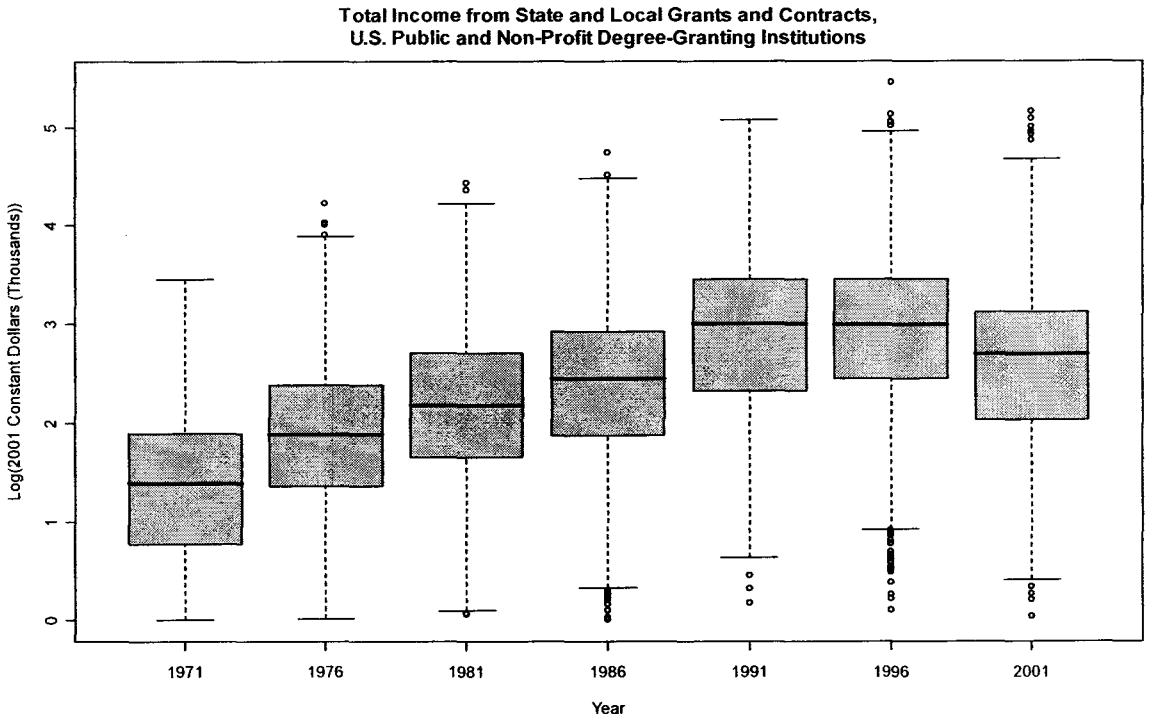

Lorenz Curves for Total General Operating Expenditures Per FTE Student, Canada
Perfect Equality
2001
1996
1991
1986
1981
1976
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

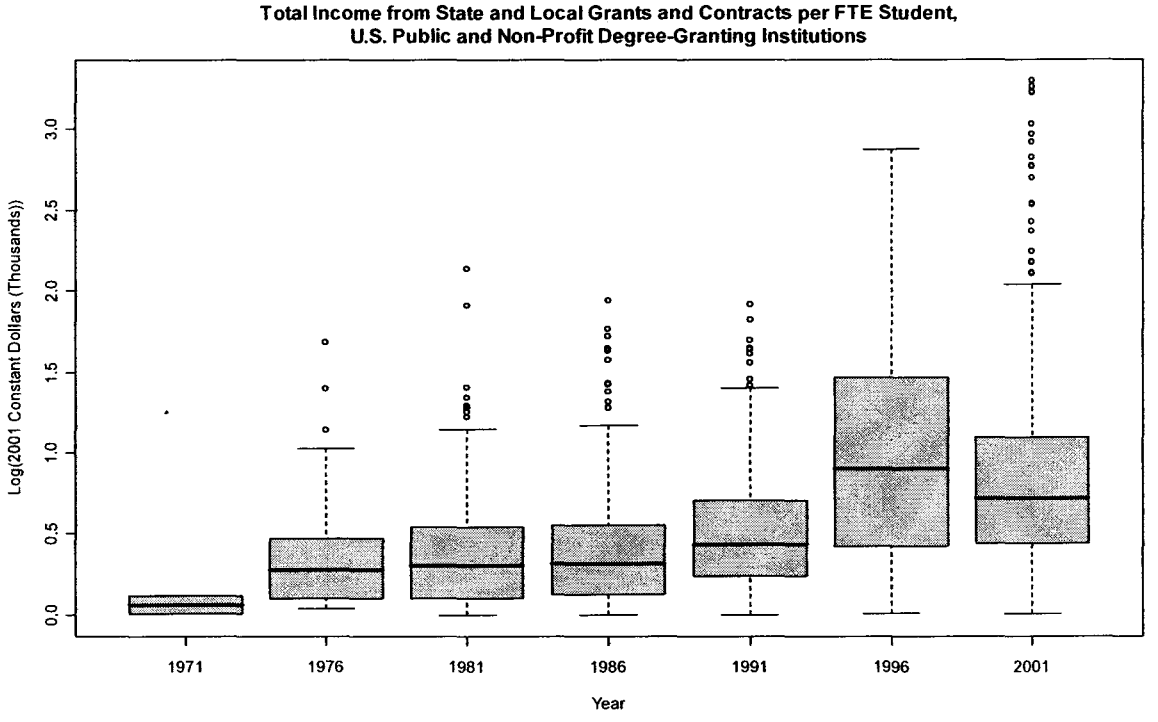
B.3 American Boxplots and Medians





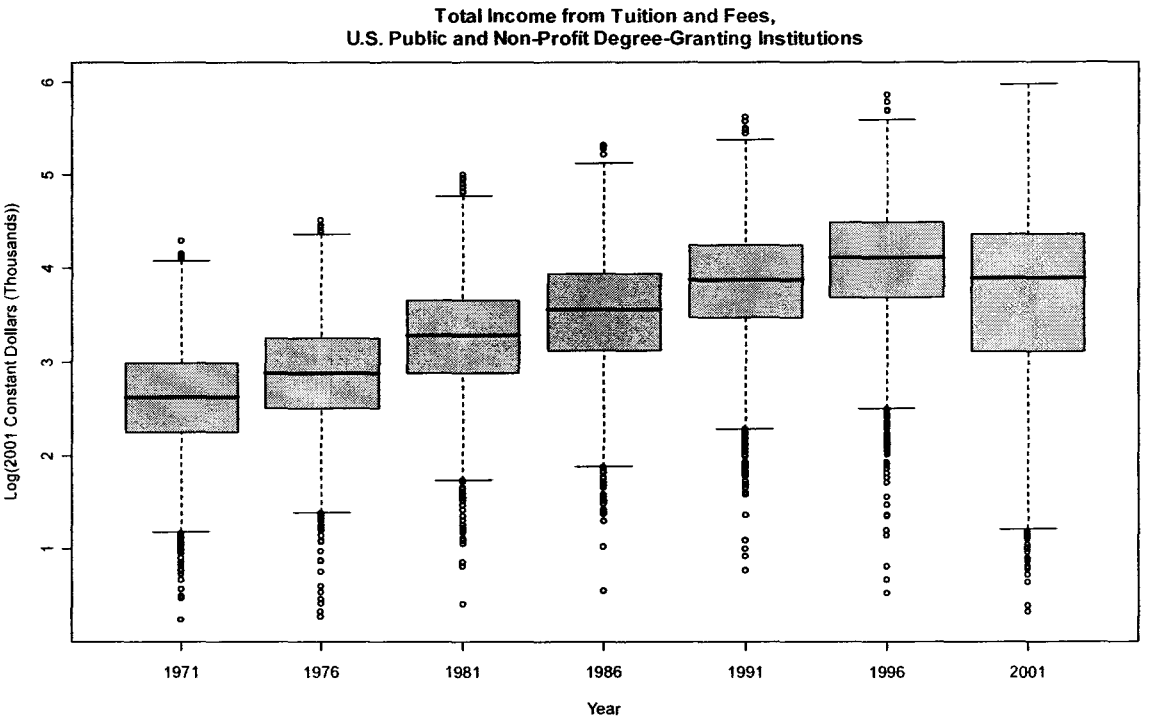
Total Income from Federal Grants and Contracts (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	40.13	160.3	397.3	776.5	1163	1676	646.6
Median Per FTE Student	0.11	0.12	0.32	0.56	0.77	0.67	0.89
N	600	1417	1528	1797	1820	1736	1377

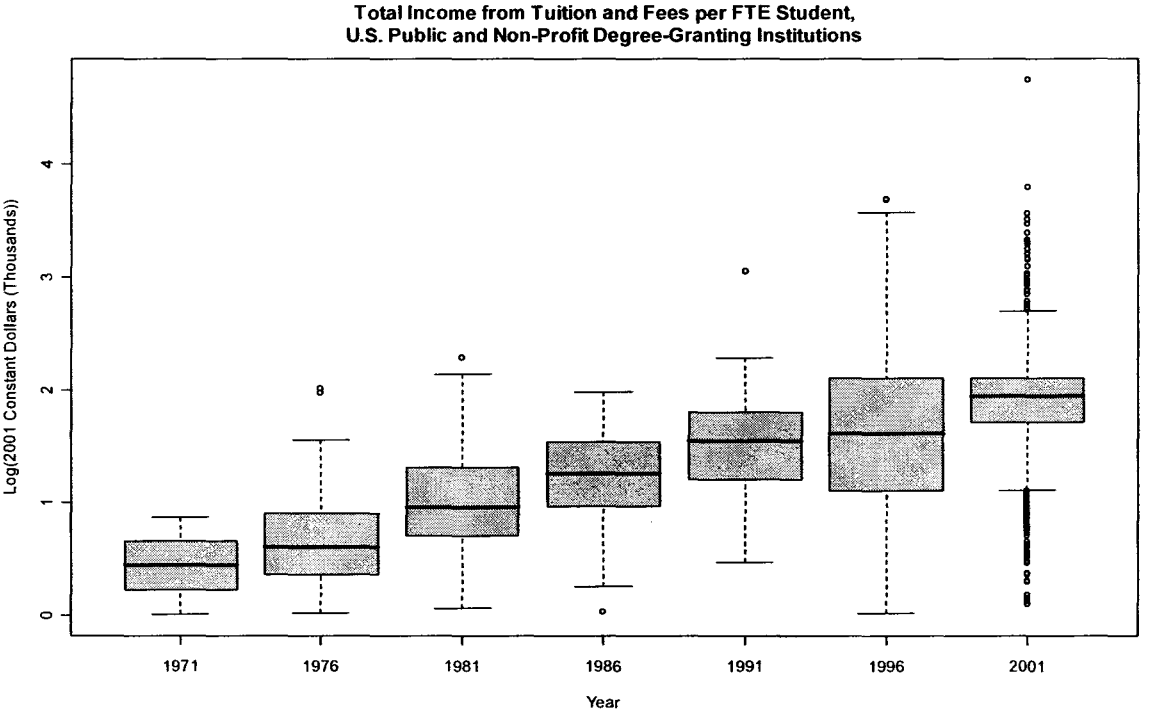




Total Income from State and Local Grants and Contracts (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	17.69	69.71	141.4	275.2	992.2	988.3	477.8
Median Per FTE Student	0.005	0.03	0.07	0.12	0.26	0.35	0.47
N	276	896	1028	1171	664	1404	856

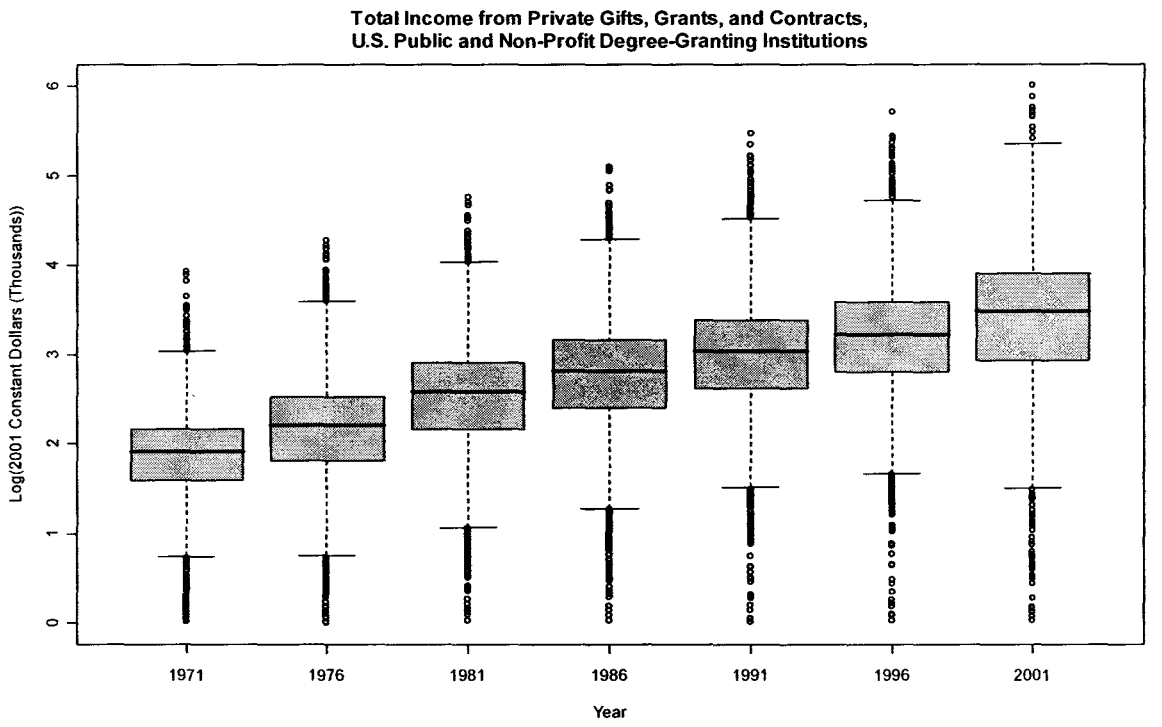
Note: A constant of 0.85 was added to each FTE measure before graphing the logged dollar values.

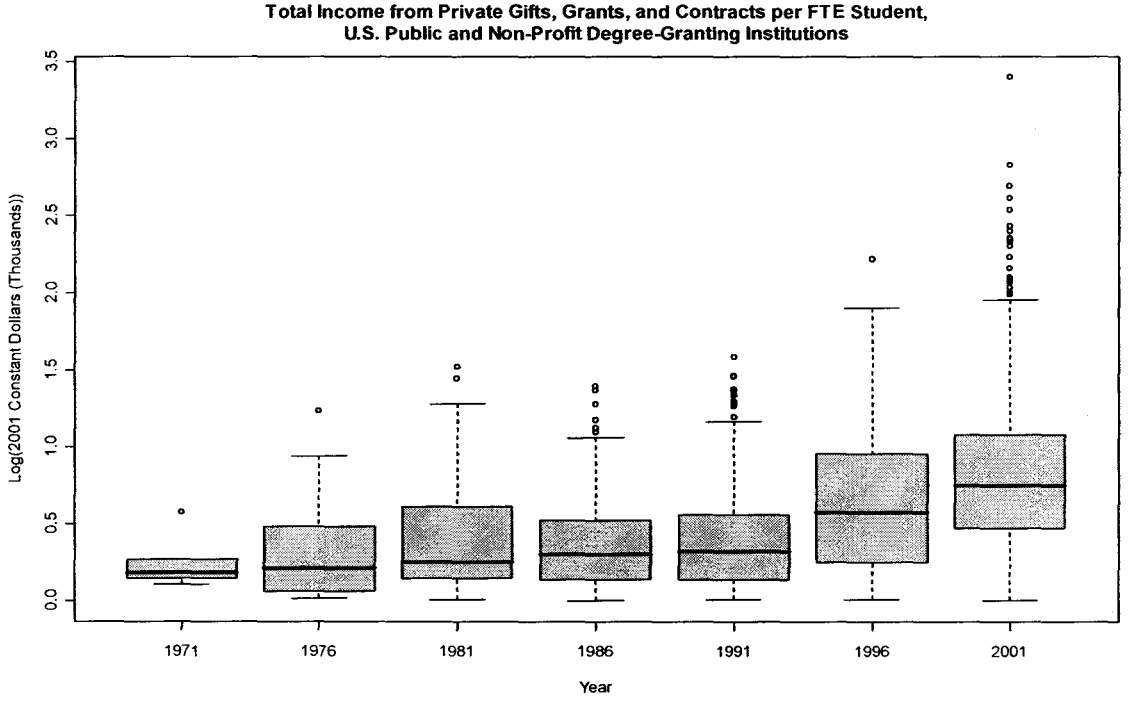




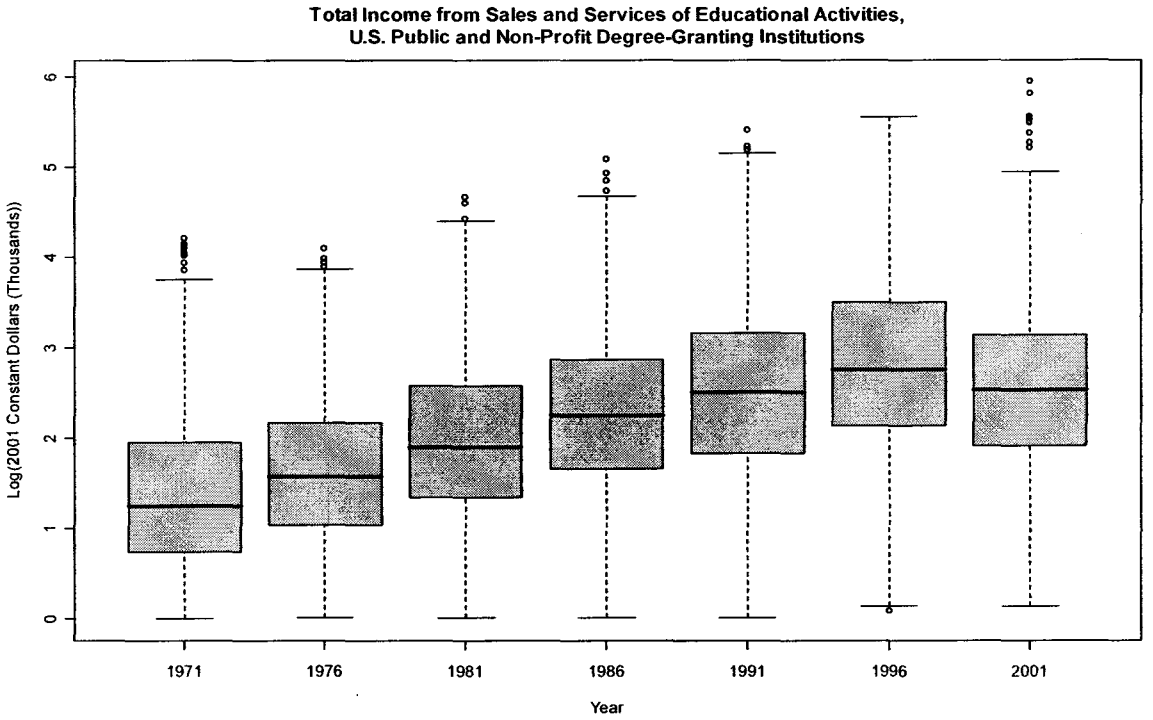
Total Income from Tuition and Fees (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	417.3	744.7	1923	3604	7361	13000	7784
Median Per FTE Student	0.33	0.54	1.28	2.55	4.92	5.15	12.28
N	1645	1817	1924	1981	2009	1911	1868

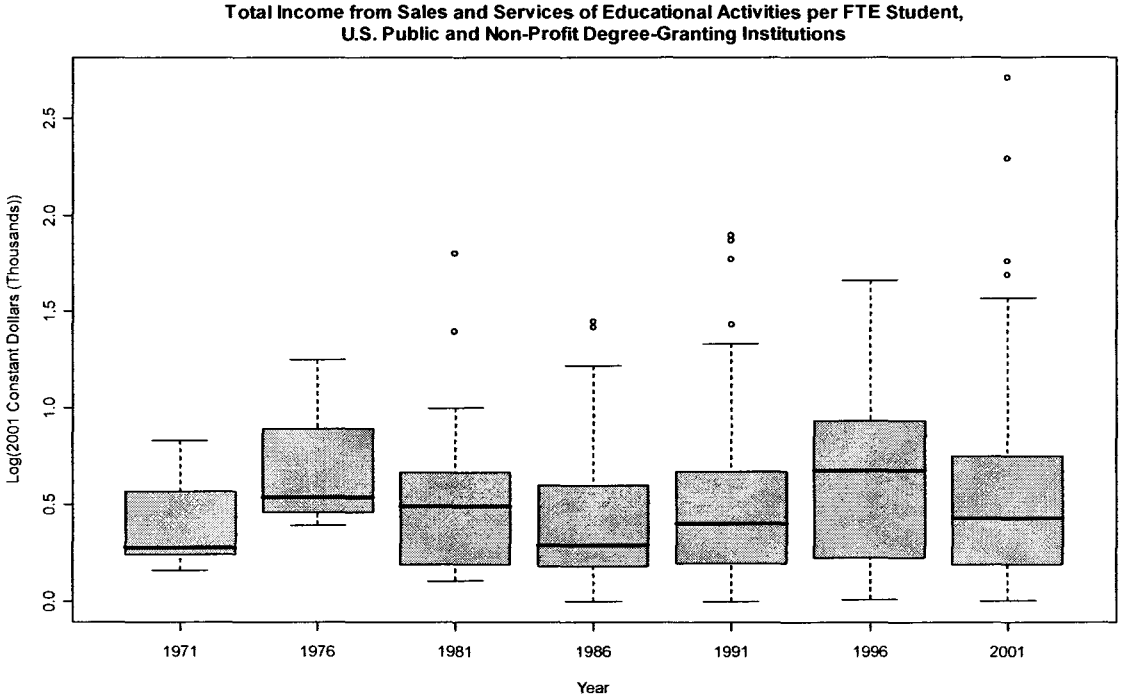
Note: A constant of 0.85 was added to each FTE measure before graphing the logged dollar values.



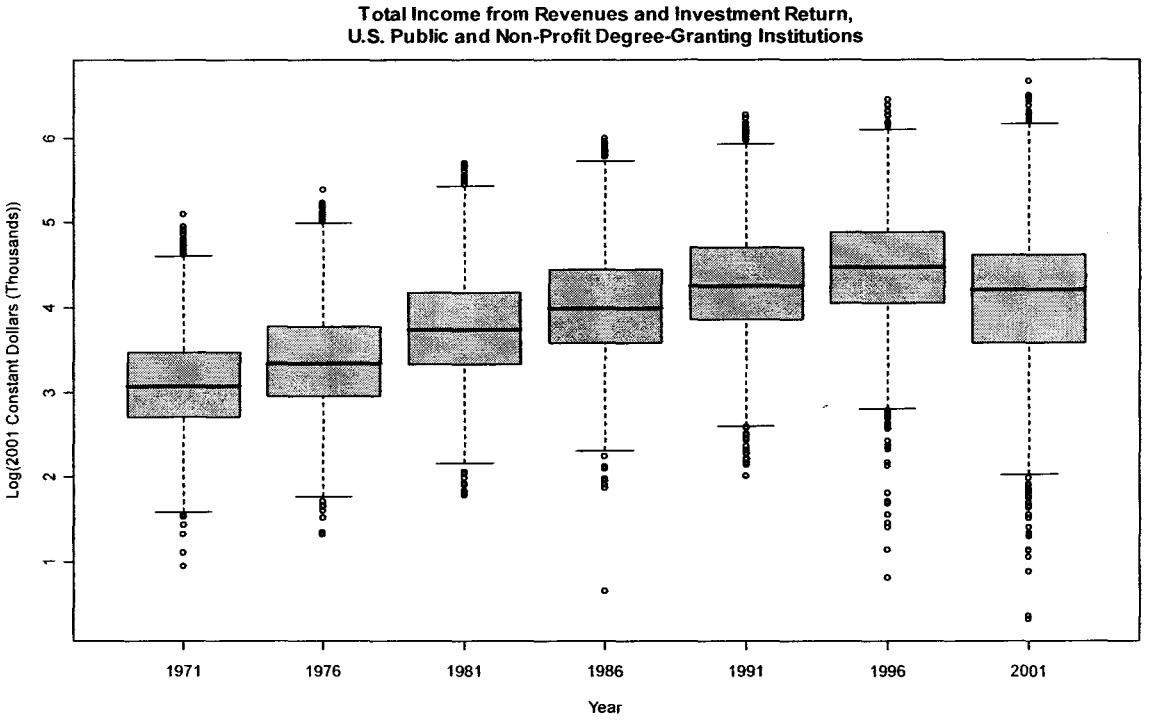


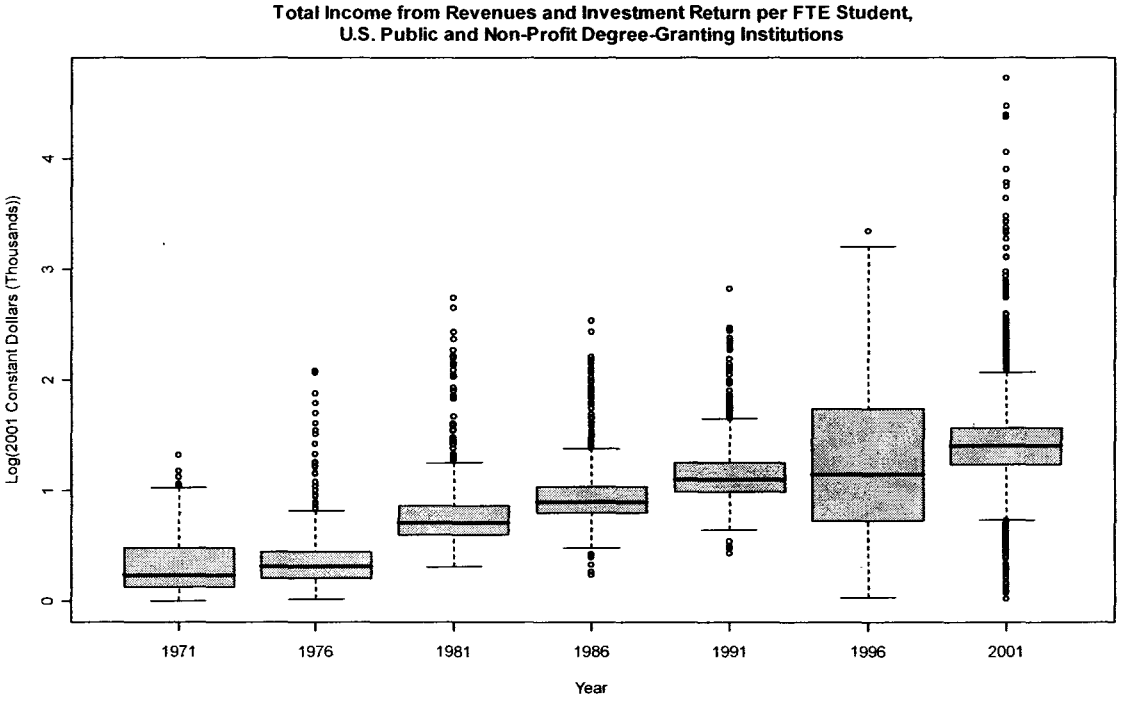
Total Income from Private Gifts, Grants, and Contracts (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	77.3	158.9	381.3	660.5	1092	1646	2942
Median Per FTE Student	0.04	0.09	0.21	0.40	0.62	0.63	4.52
N	1354	1705	1823	1899	1924	1840	1641



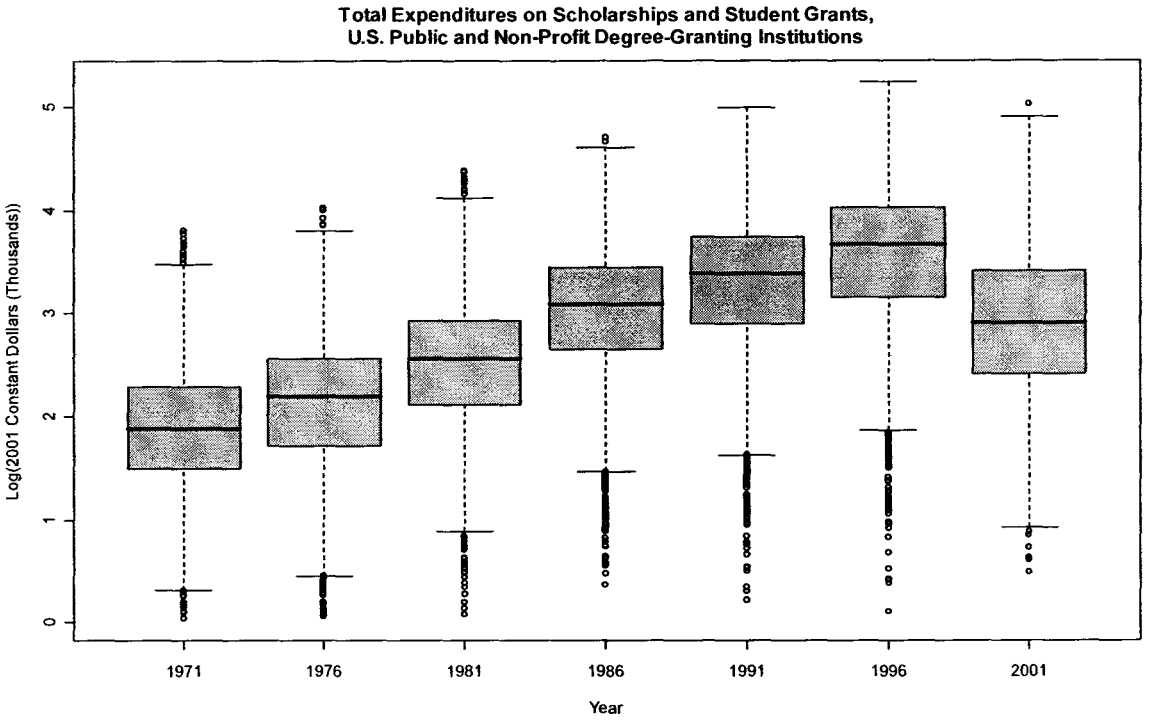


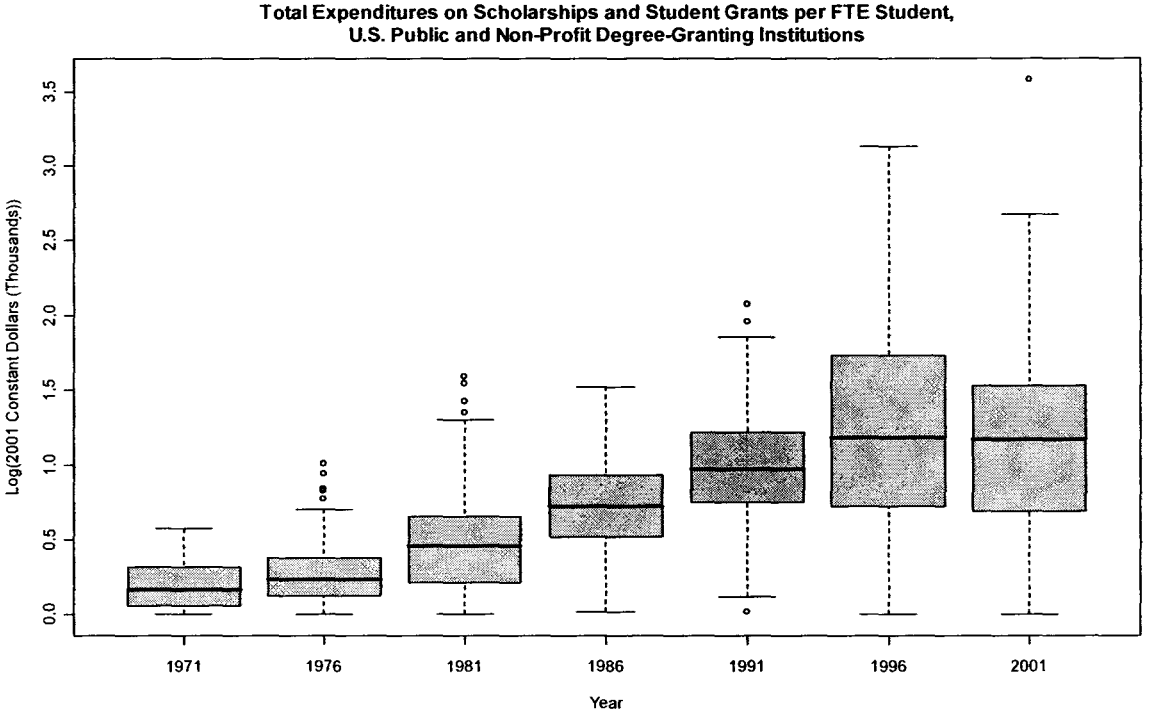
Total Income from Sales and Services of Educational Activities (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	14.6	31	73.8	170	308.7	558.3	322.8
Median Per FTE Student	0.03	0.02	0.05	0.10	0.15	0.23	0.47
N	763	792	905	928	921	839	605





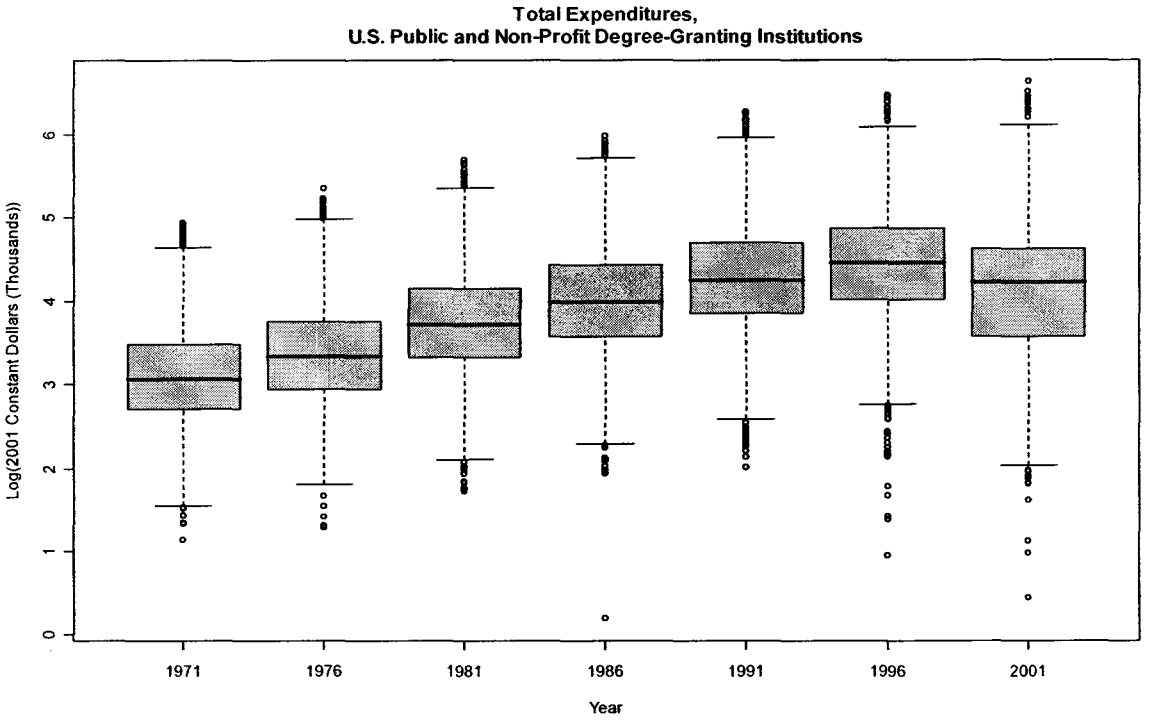
Total Income from Revenues and Investment Return (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	1174	2167	5361	9818	17750	29310	15930
Median Per FTE Student	1.39	2.05	5.12	7.98	12.64	10.88	25.25
N	1656	1833	1939	1995	2021	1922	1870

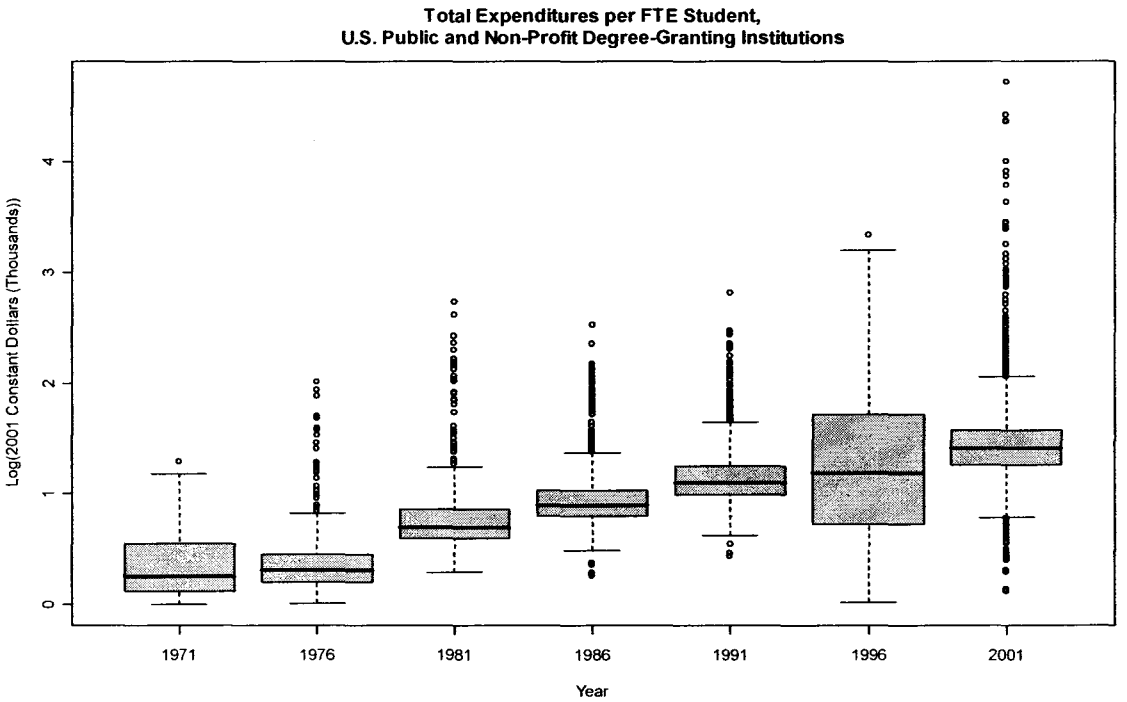




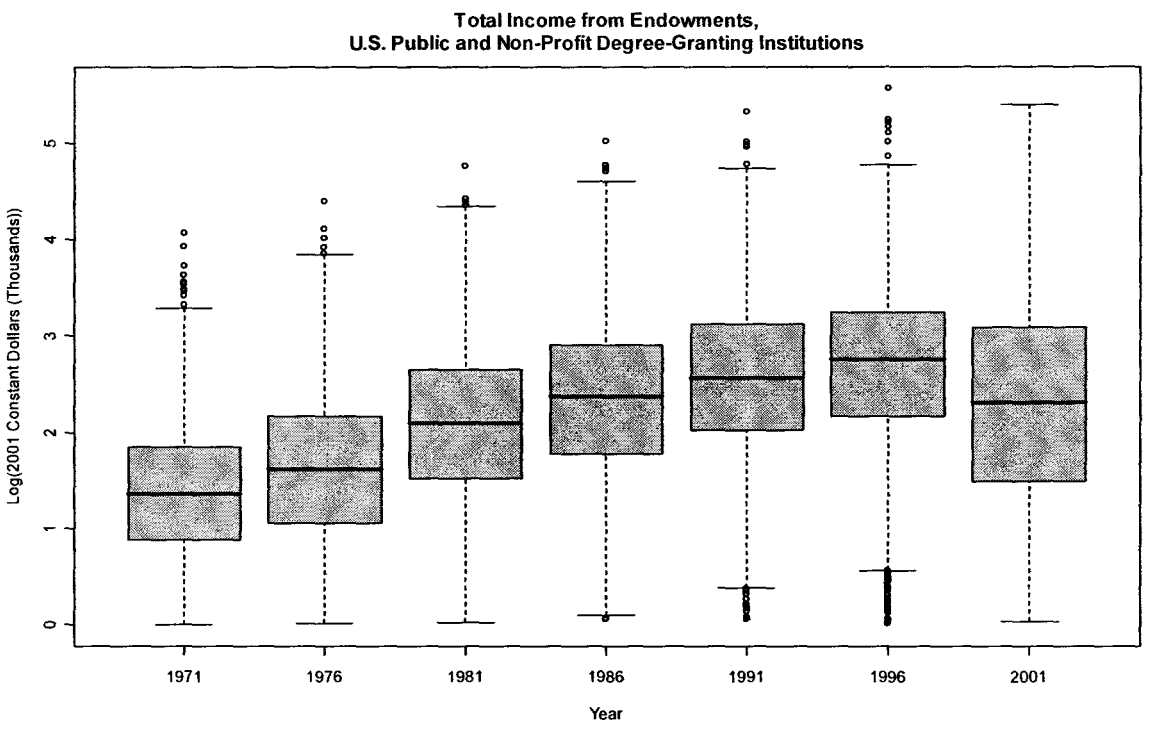
Total Expenditures on Scholarships and Student Grants (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	75.6	150	360	1214	2425	4615	800.8
Median Per FTE Student	0.07	0.10	0.22	0.73	1.32	1.49	1.83
N	1559	1700	1777	1918	1973	1861	568

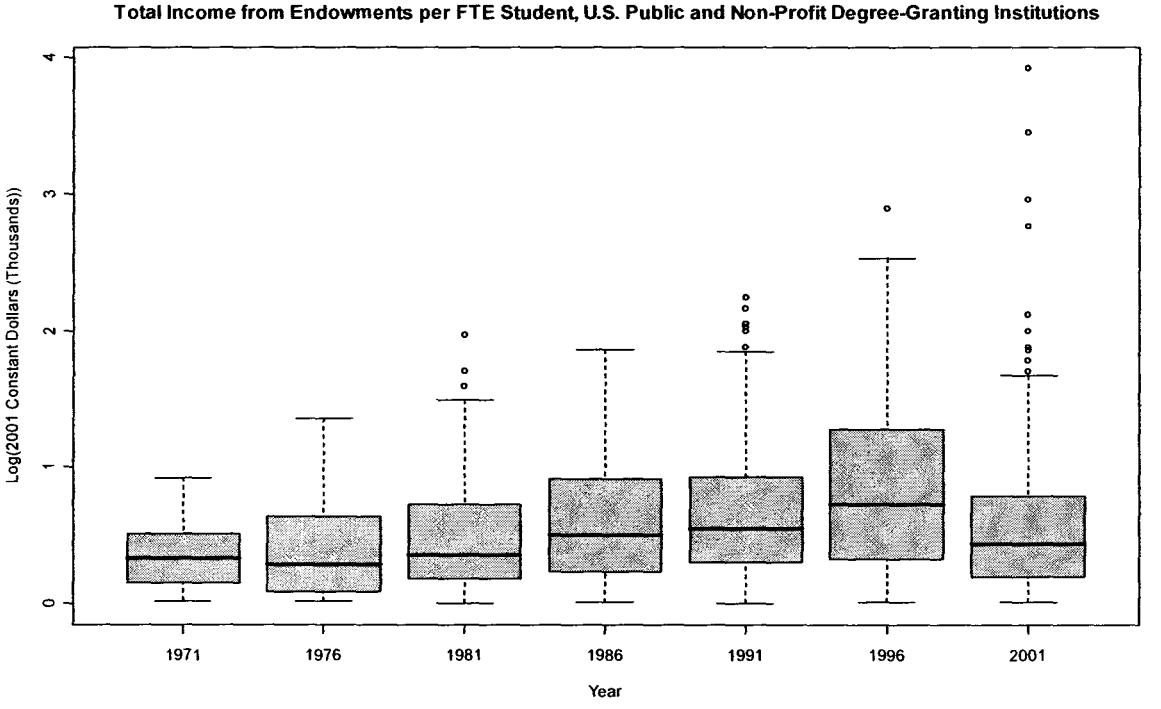
Note: A constant of 0.85 was added to each FTE measure before graphing the logged dollar values.





Total Expenditures (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	1156	2132	5202	9760	17620	28030	16560
Median Per FTE Student	1.37	2.04	4.98	7.88	12.7	10.25	25.95
N	1671	1833	1939	1995	2021	1920	1882

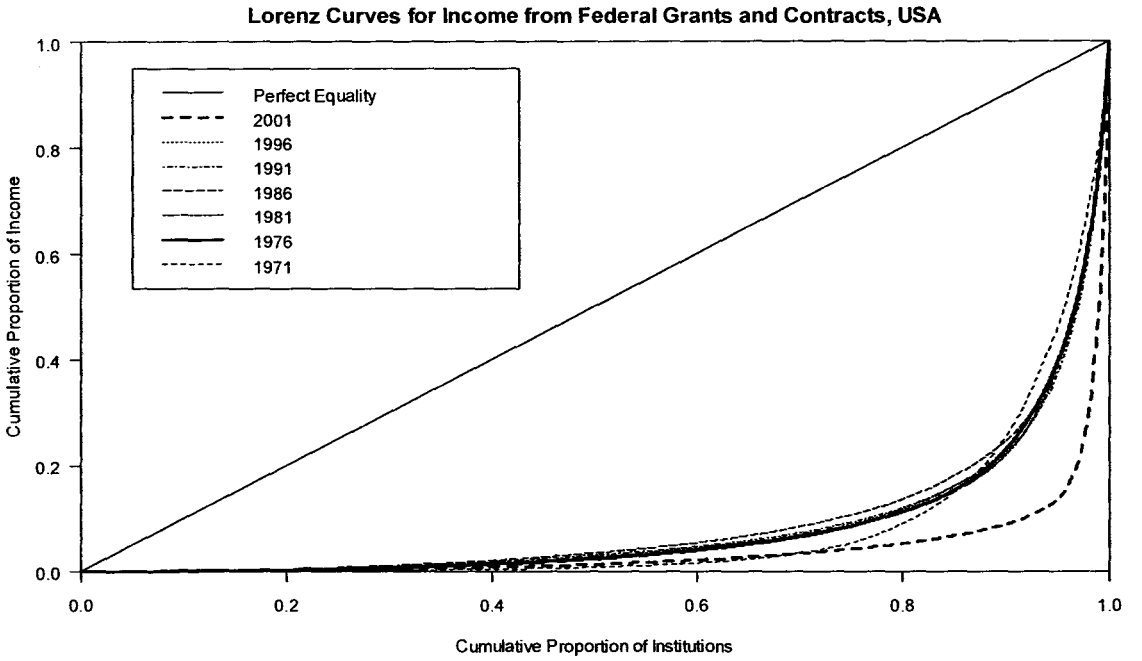


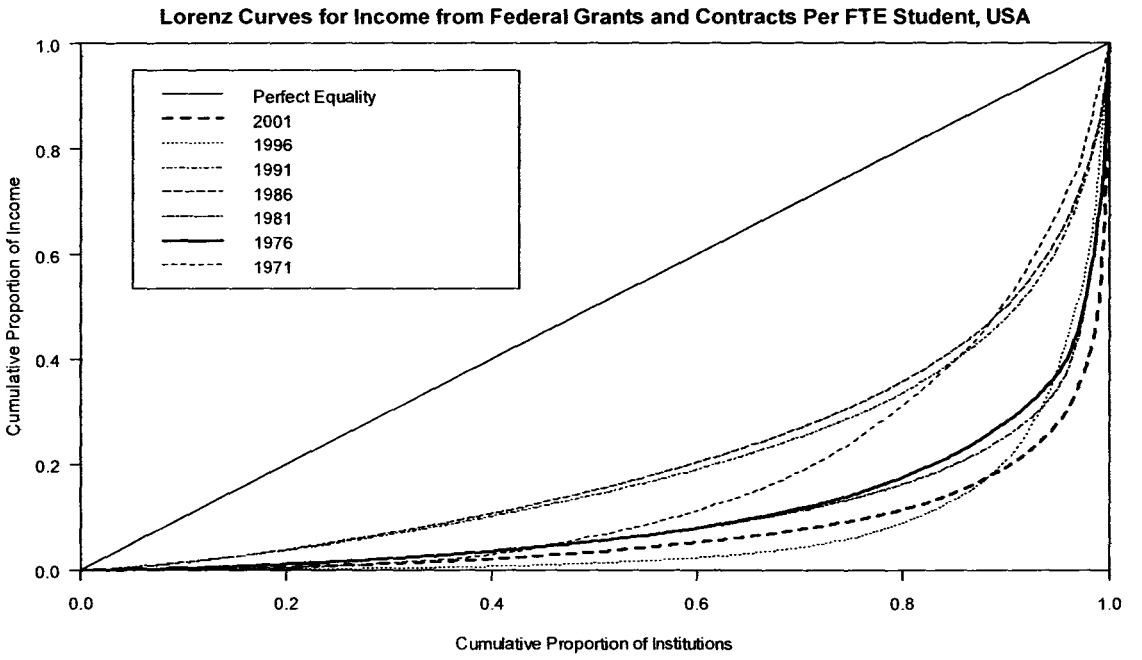


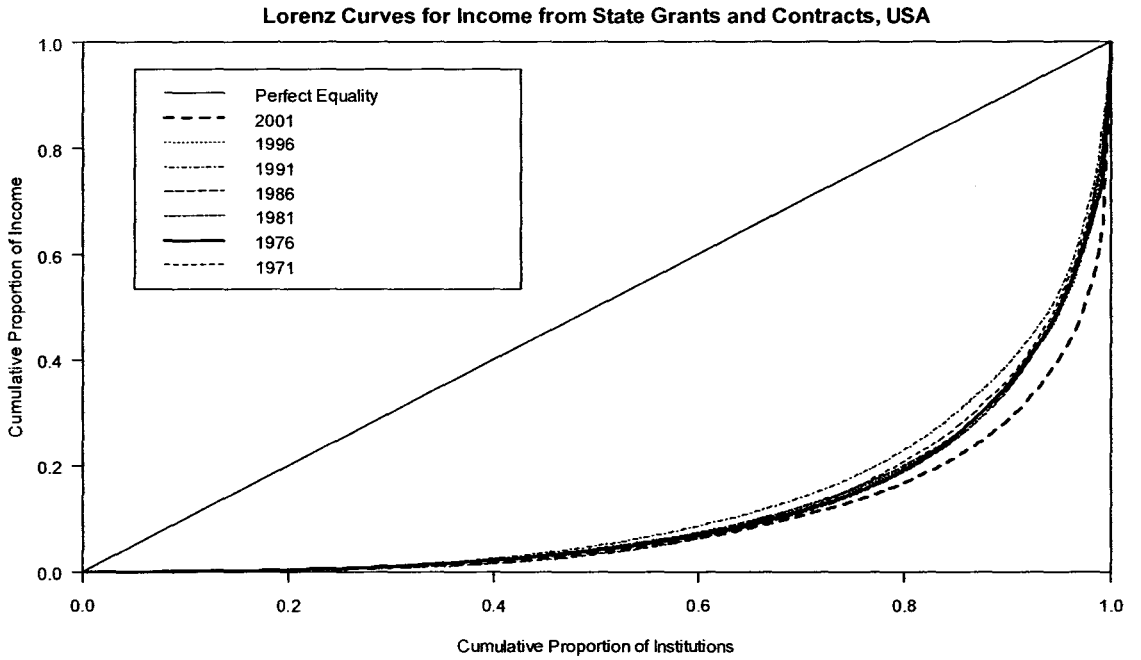
Total Income from Endowments (Thousands)							
Year	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
Median	19.4	32	112.4	224.2	361.5	563.3	179.3
Median Per FTE Student	0.01	0.01	0.05	0.12	0.20	0.21	0.06
N	1022	1225	1356	1442	1524	1436	631

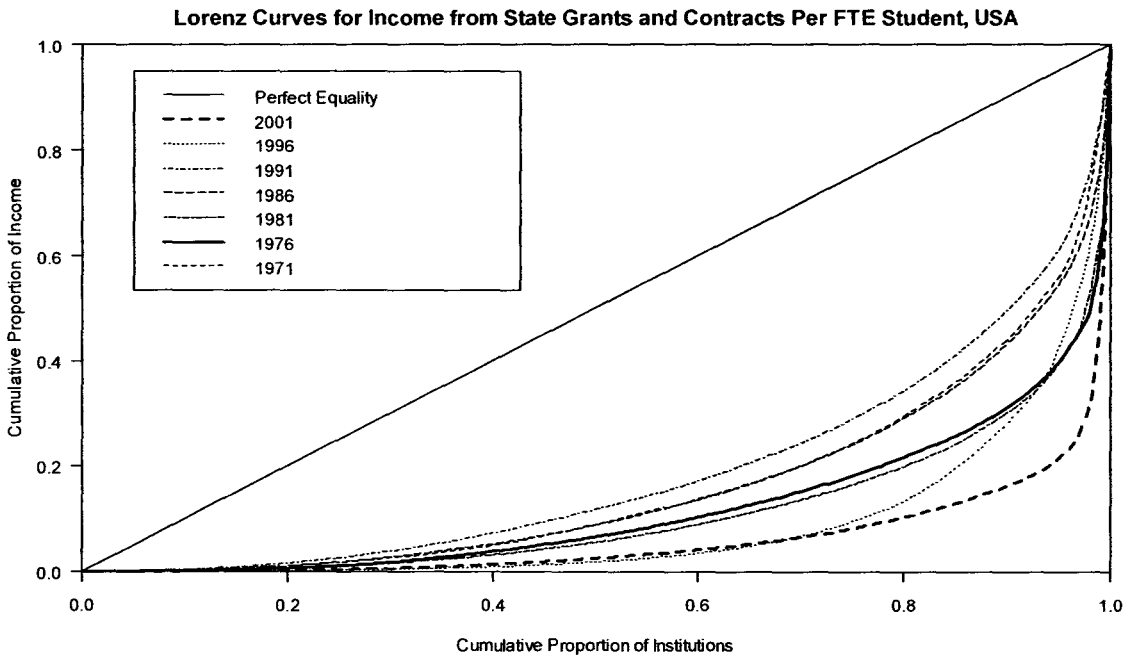
Note: A constant of 0.85 was added to each FTE measure before graphing the logged dollar values.

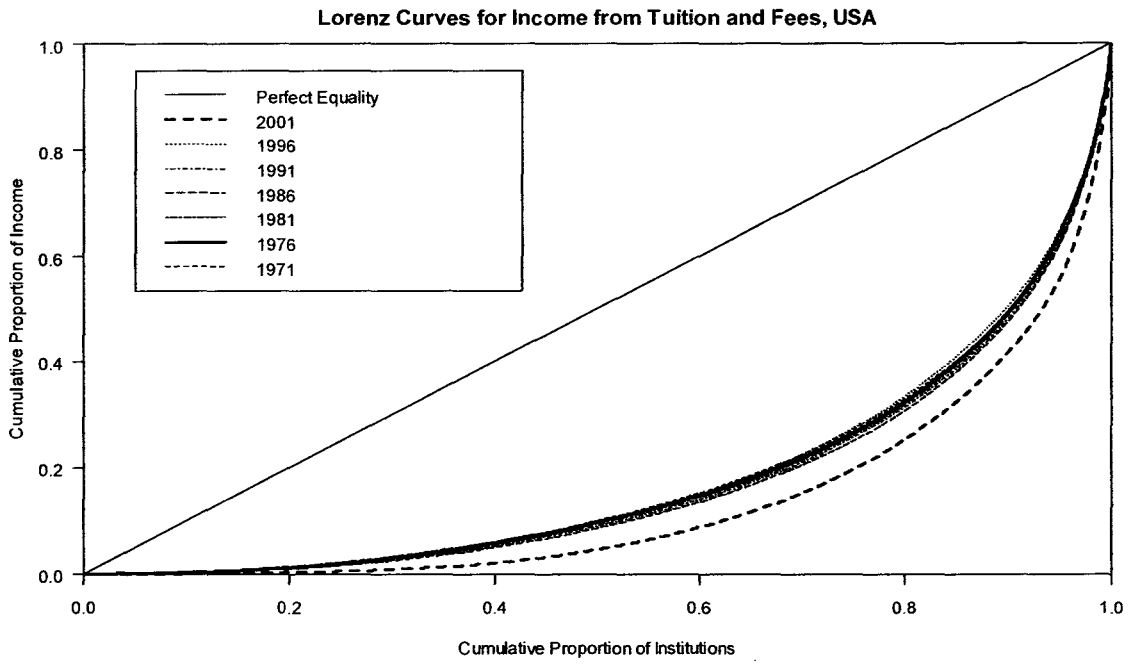
B.4 American Lorenz Curves

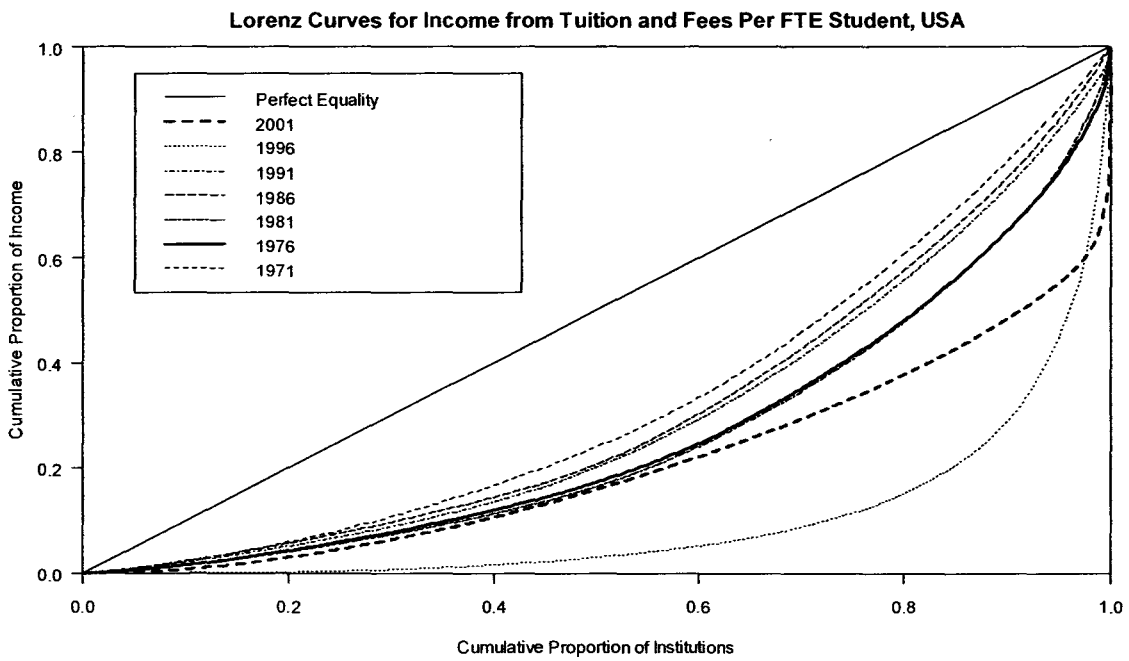


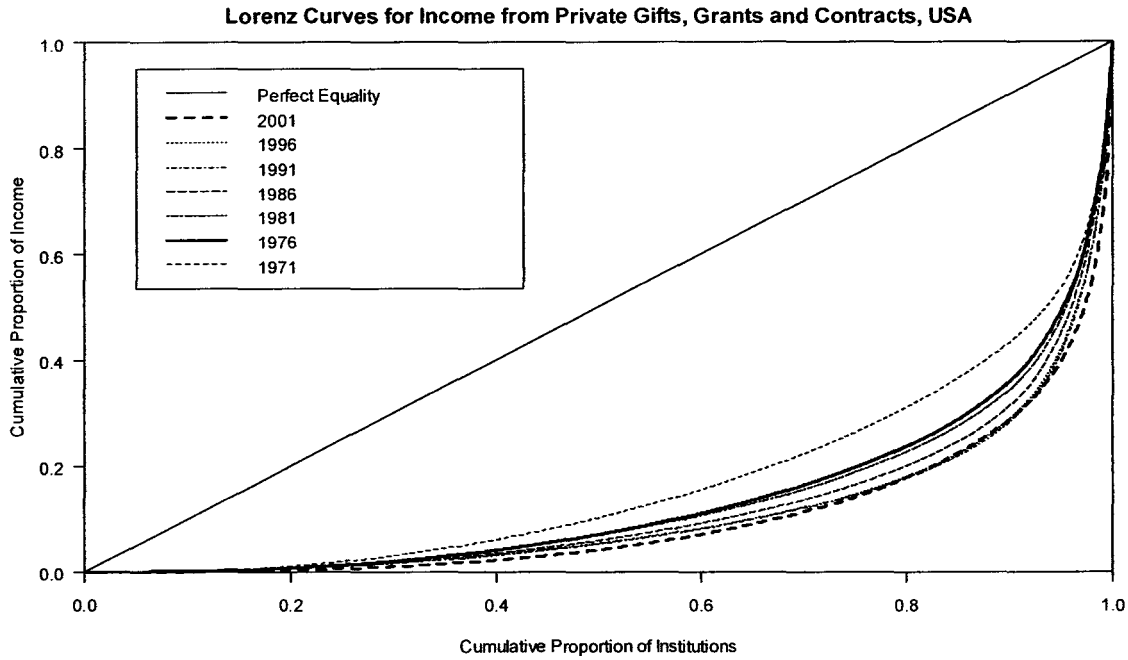


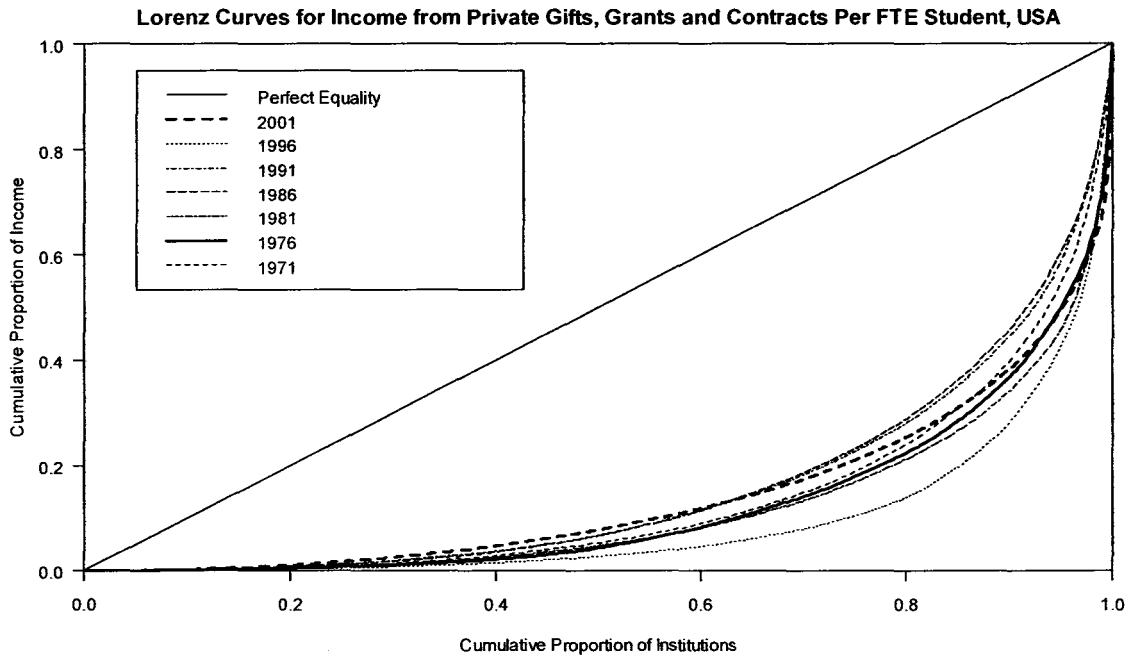

Lorenz Curves for Income from State Grants and Contracts, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

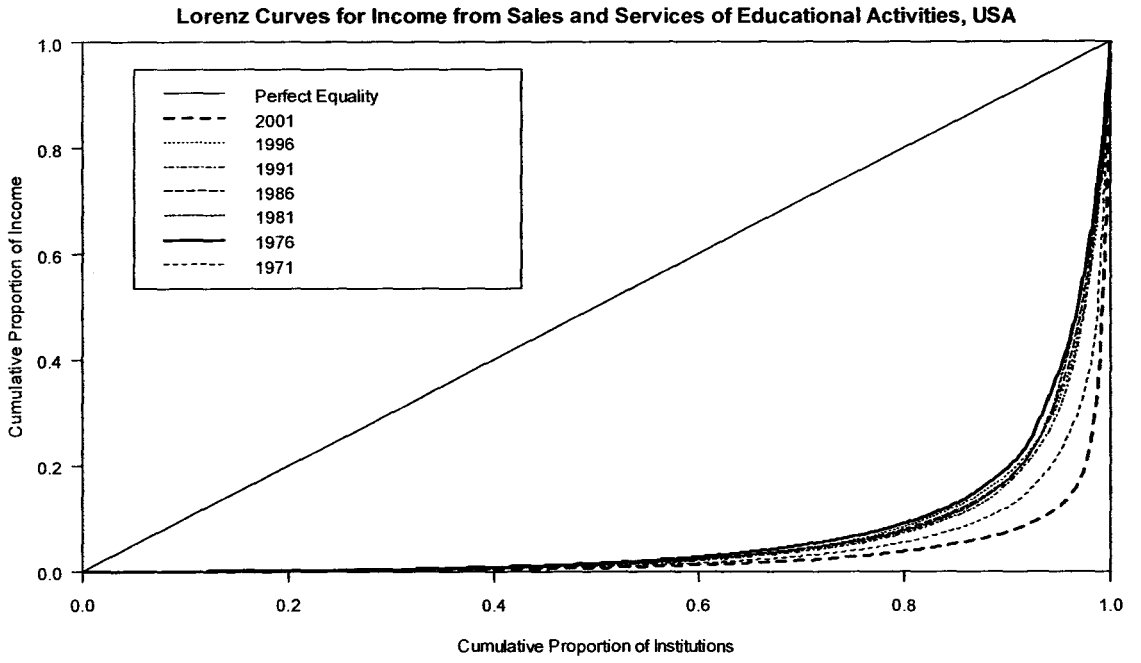

Lorenz Curves for Income from State Grants and Contracts Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

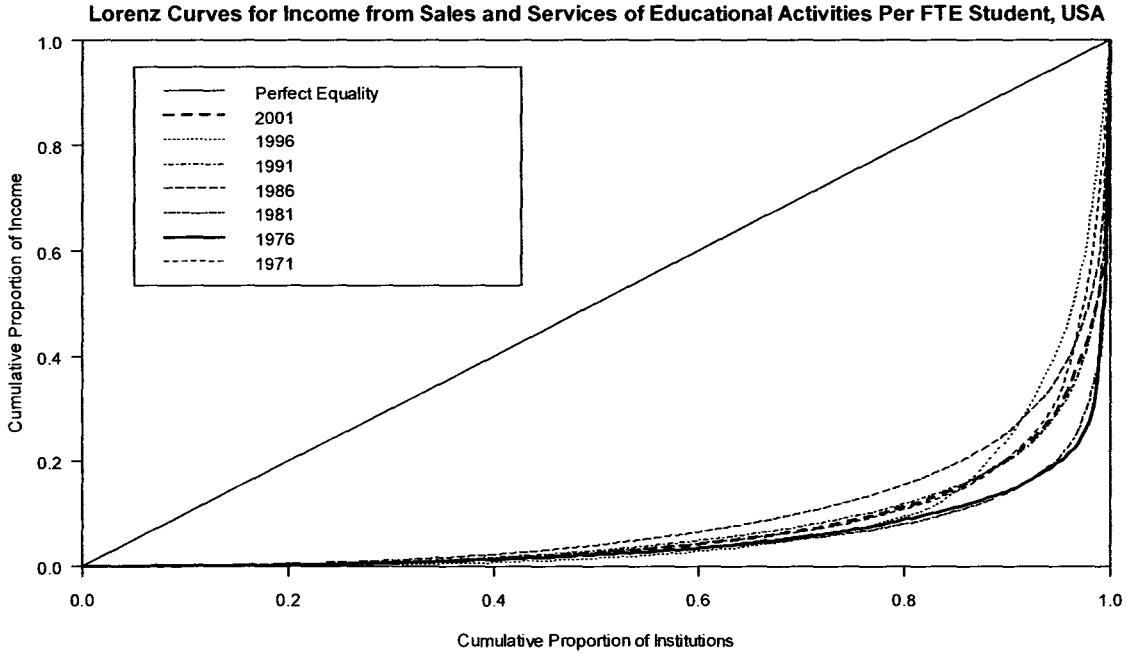

Lorenz Curves for Income from Tuition and Fees, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

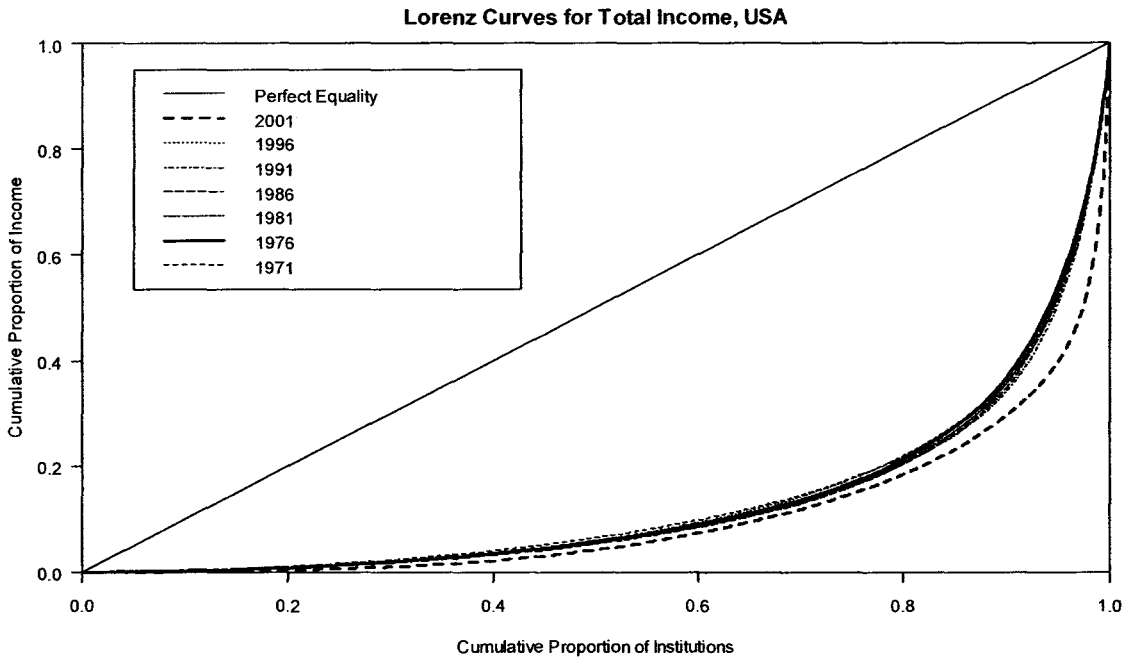

Lorenz Curves for Income from Tuition and Fees Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

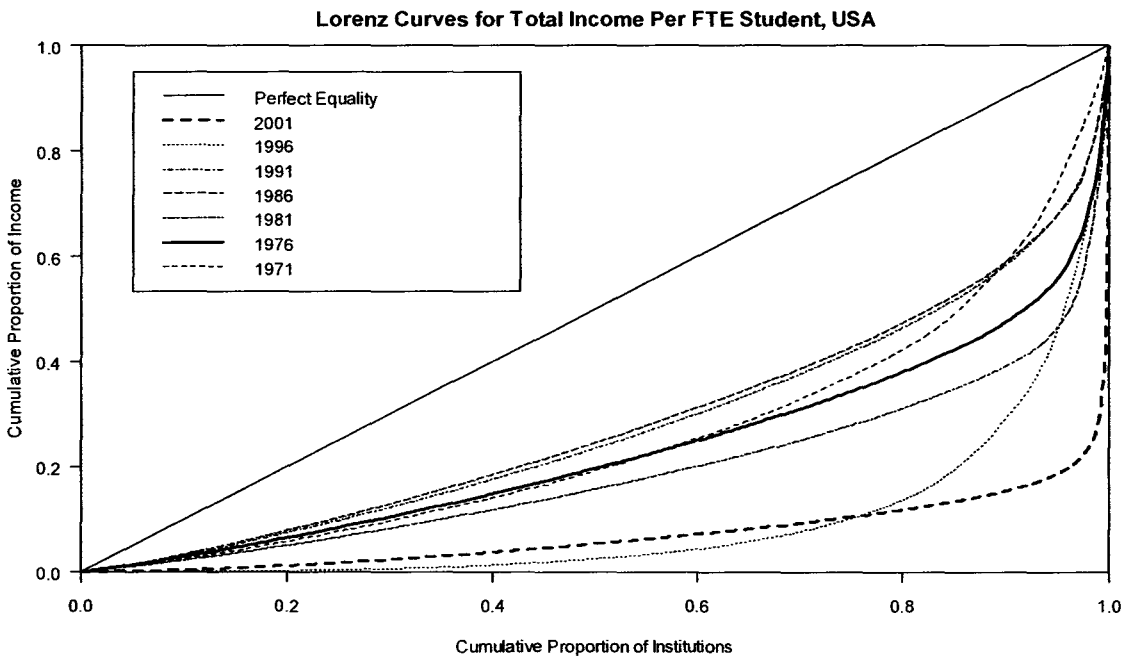

Lorenz Curves for Income from Private Gifts, Grants and Contracts, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

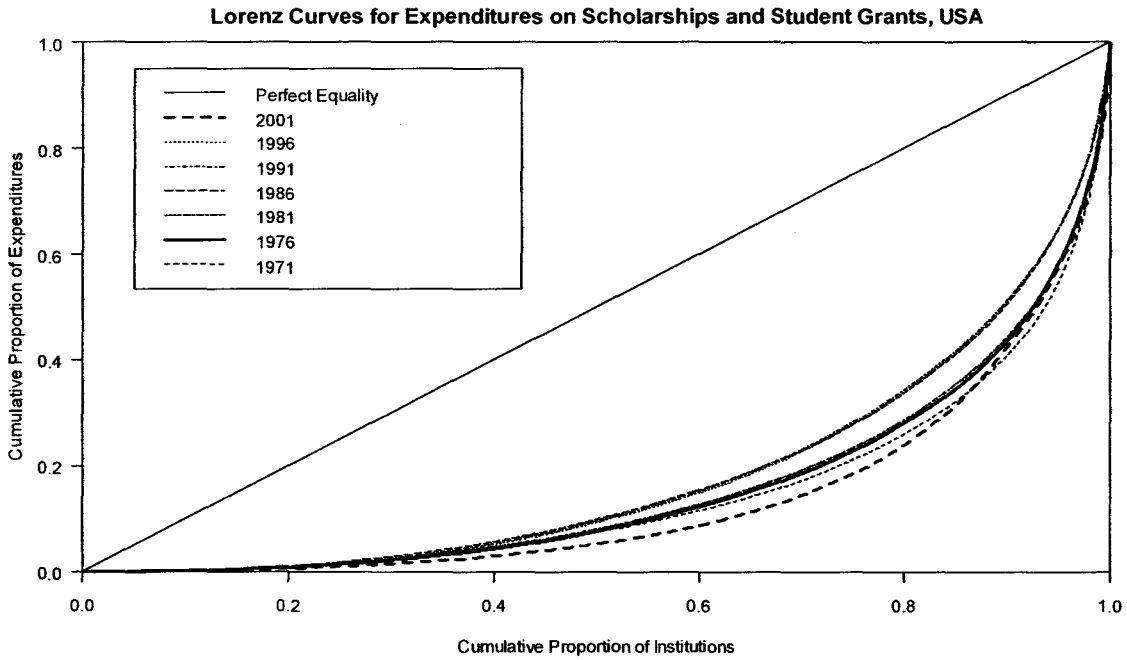

Lorenz Curves for Income from Private Gifts, Grants and Contracts Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

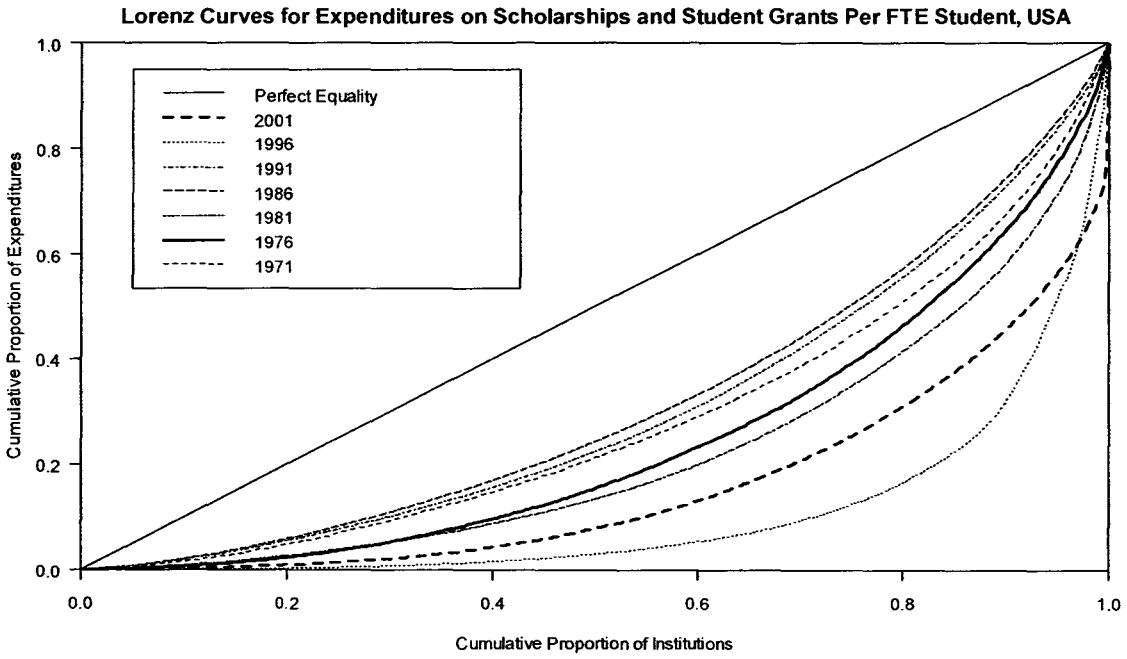

Lorenz Curves for Income from Sales and Services of Educational Activities, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

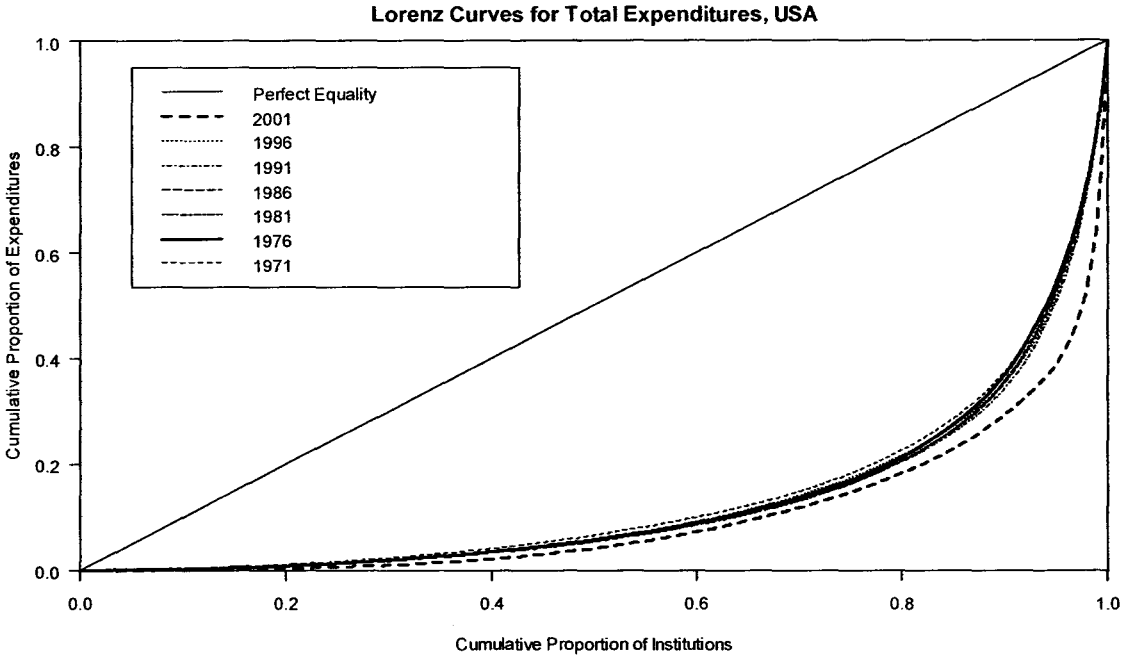

Lorenz Curves for Income from Sales and Services of Educational Activities Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

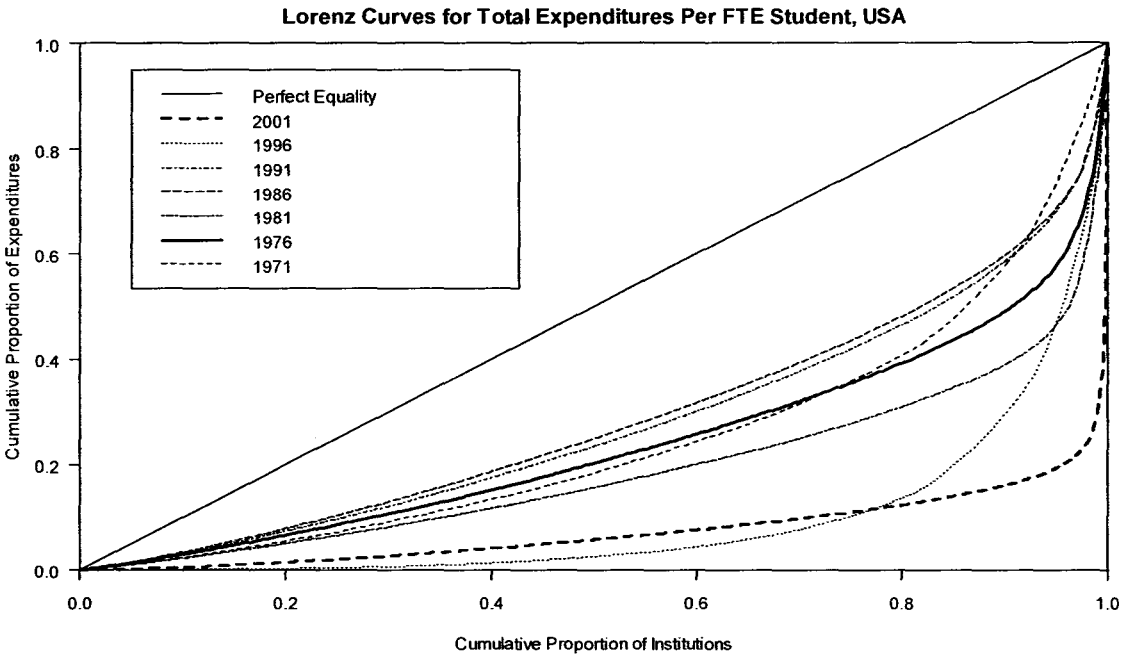

Lorenz Curves for Total Income, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

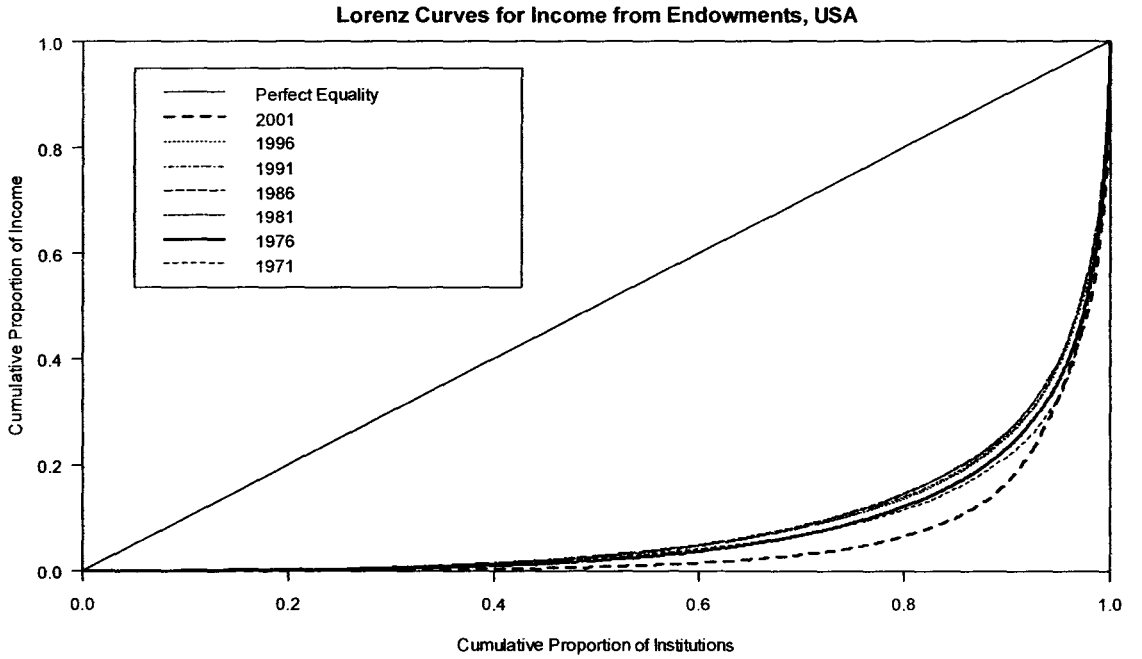

Lorenz Curves for Total Income Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

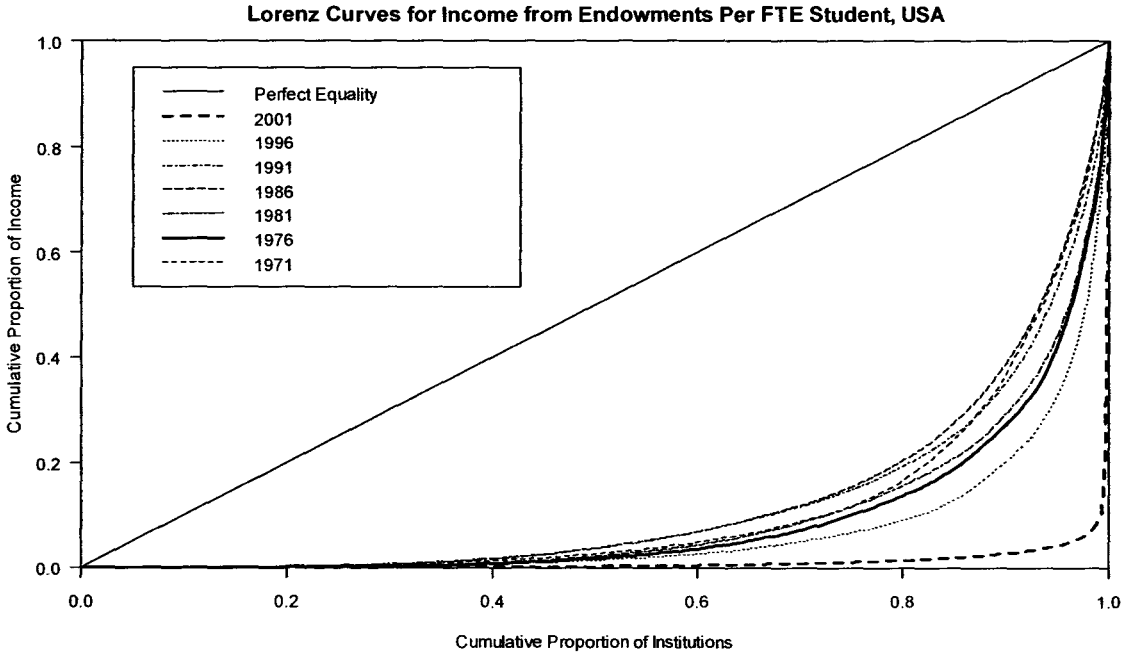

Lorenz Curves for Expenditures on Scholarships and Student Grants, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Expenditures on Scholarships and Student Grants Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

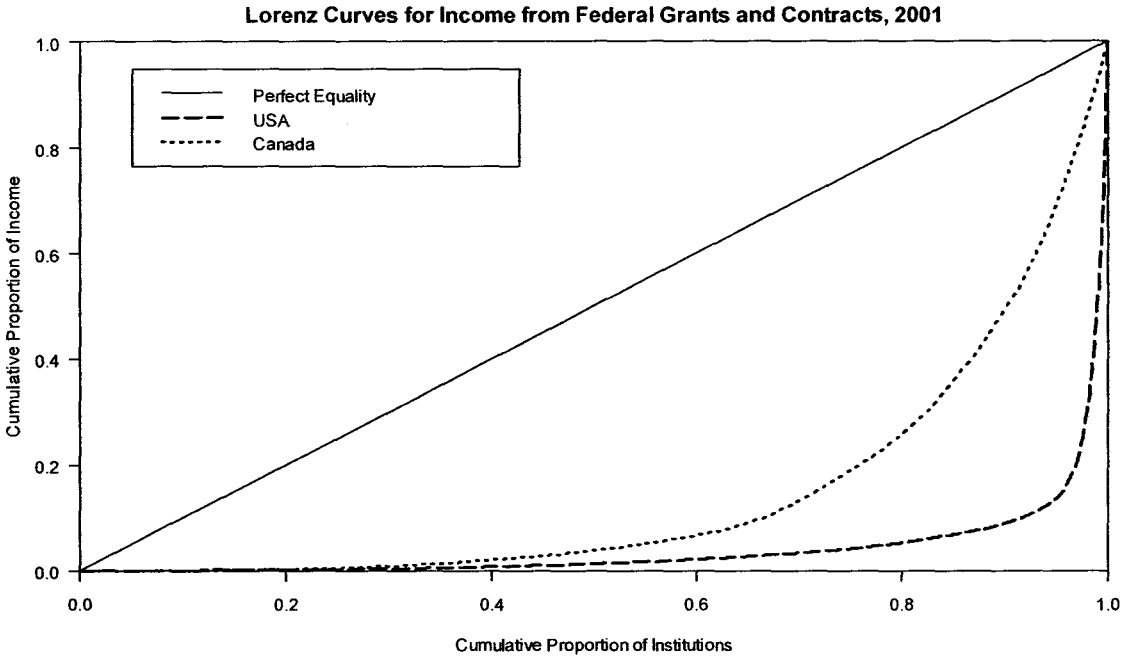

Lorenz Curves for Total Expenditures, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

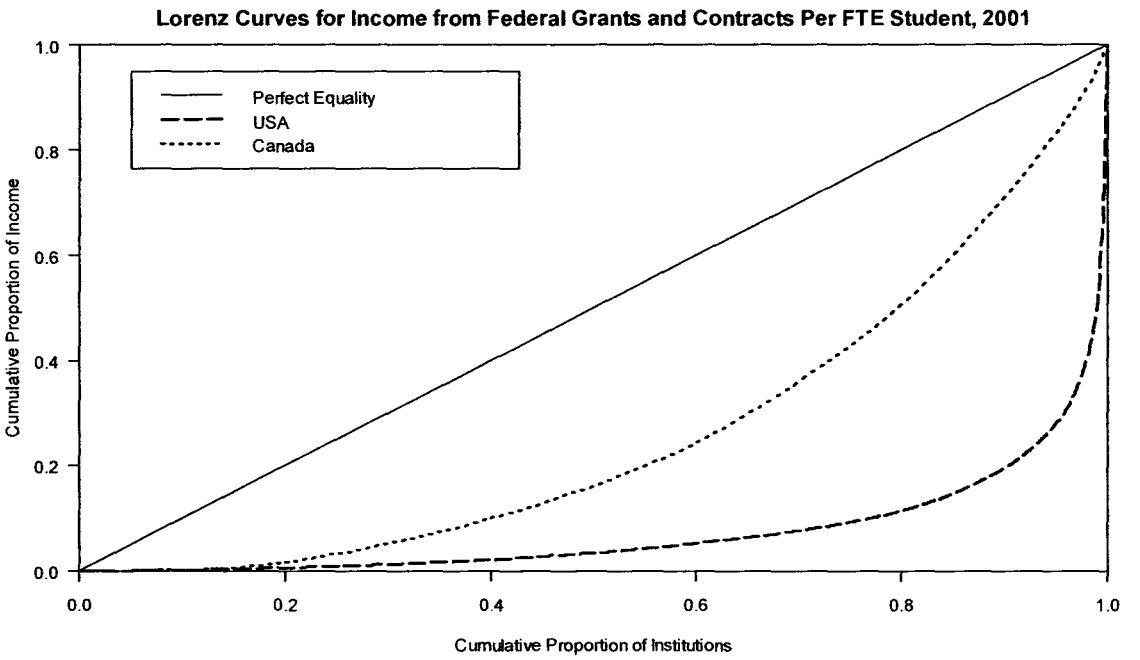

Lorenz Curves for Total Expenditures Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Income from Endowments, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

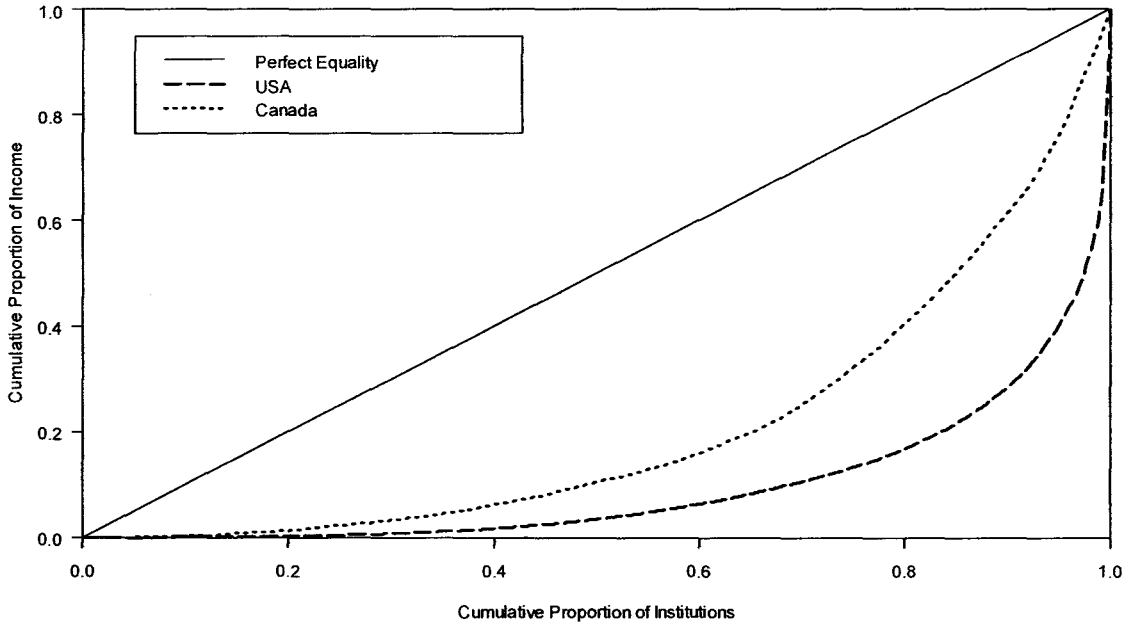

Lorenz Curves for Income from Endowments Per FTE Student, USA
Perfect Equality
2001
1996
1991
1986
1981
1976
1971
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

B.5 Canada and USA Comparative Lorenz Curves

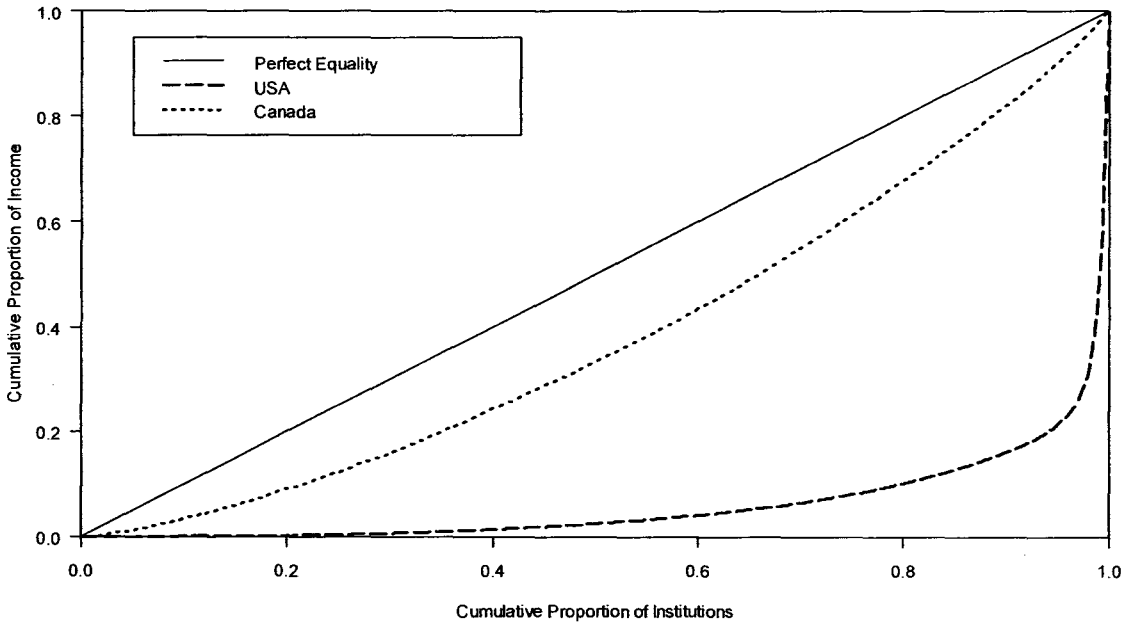


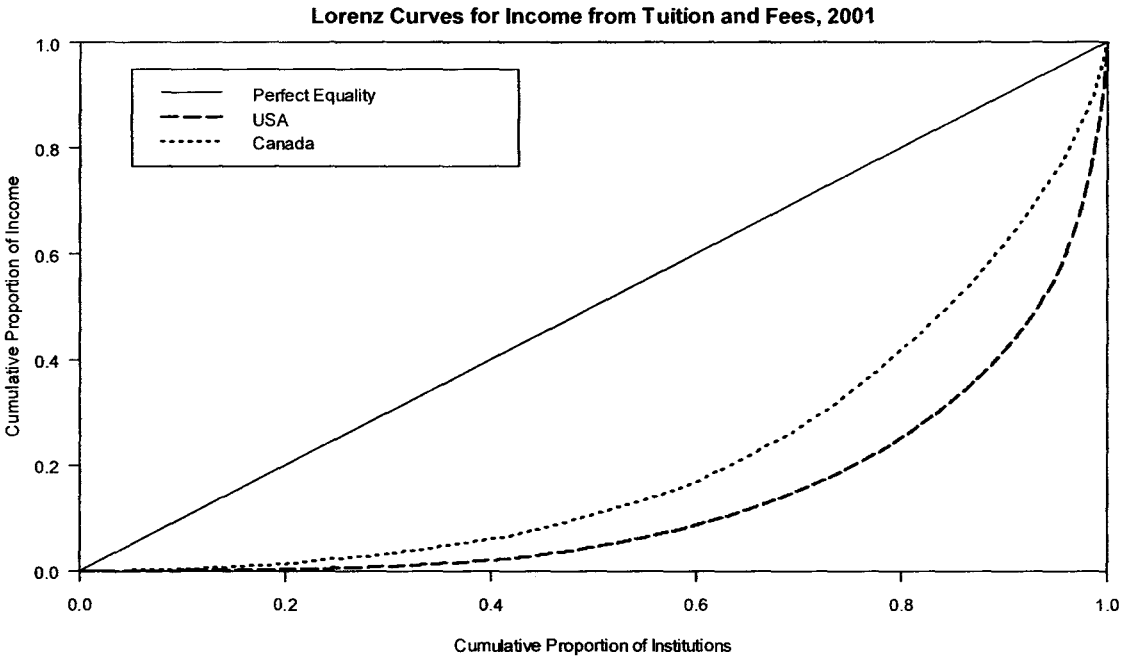


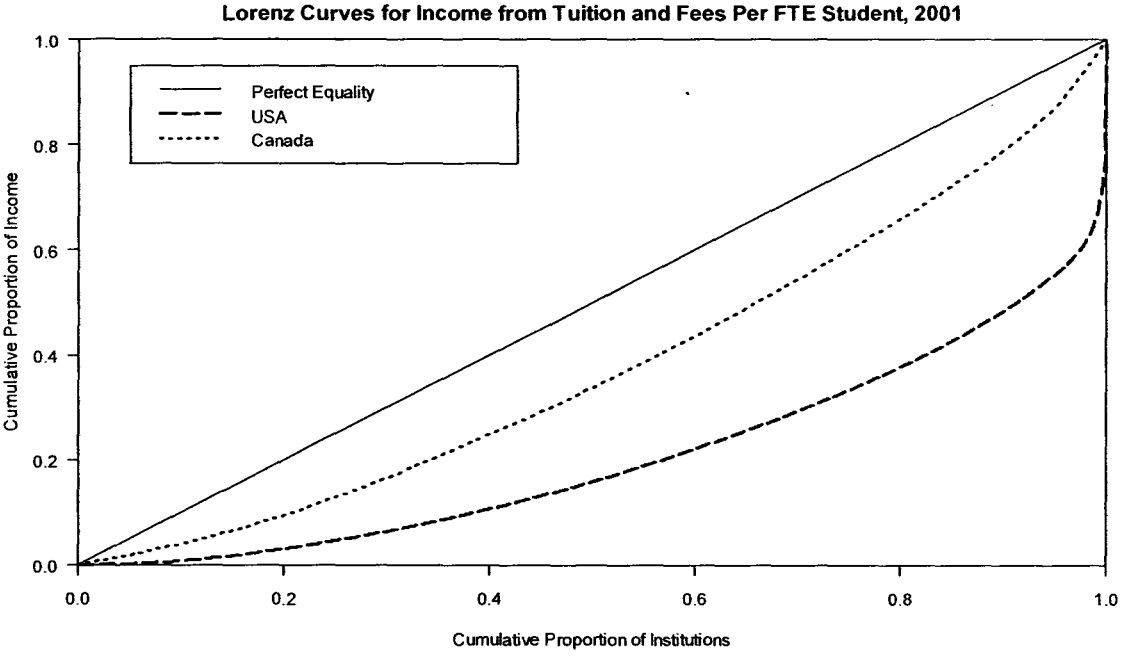
Lorenz Curves for Income from State or Provincial Grants and Contracts, 2001

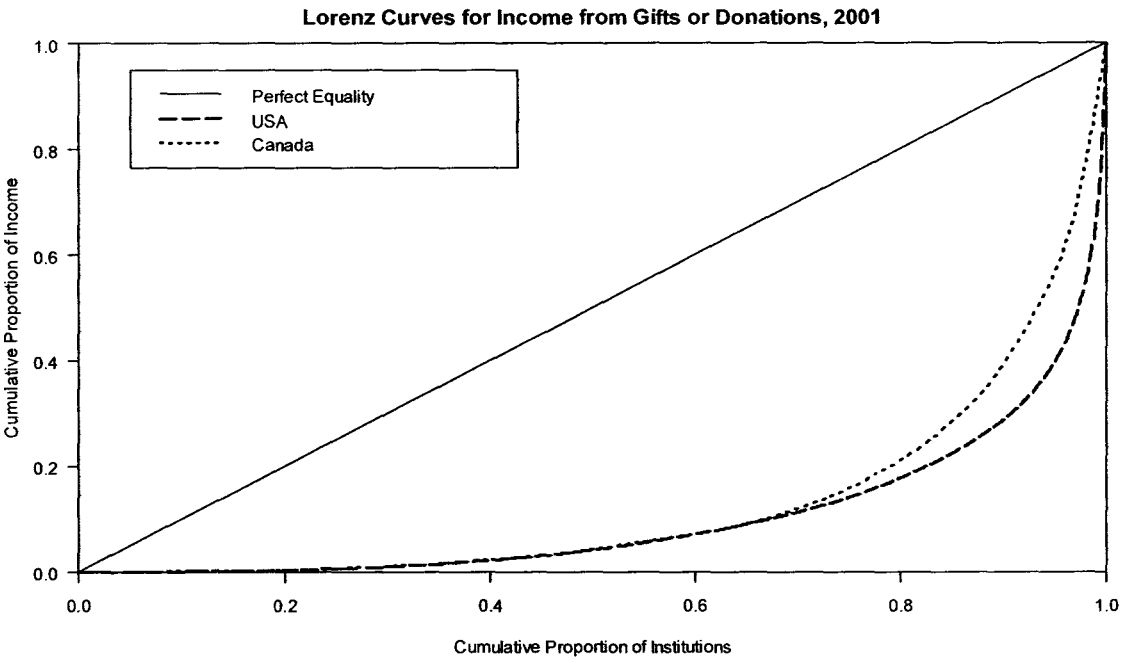


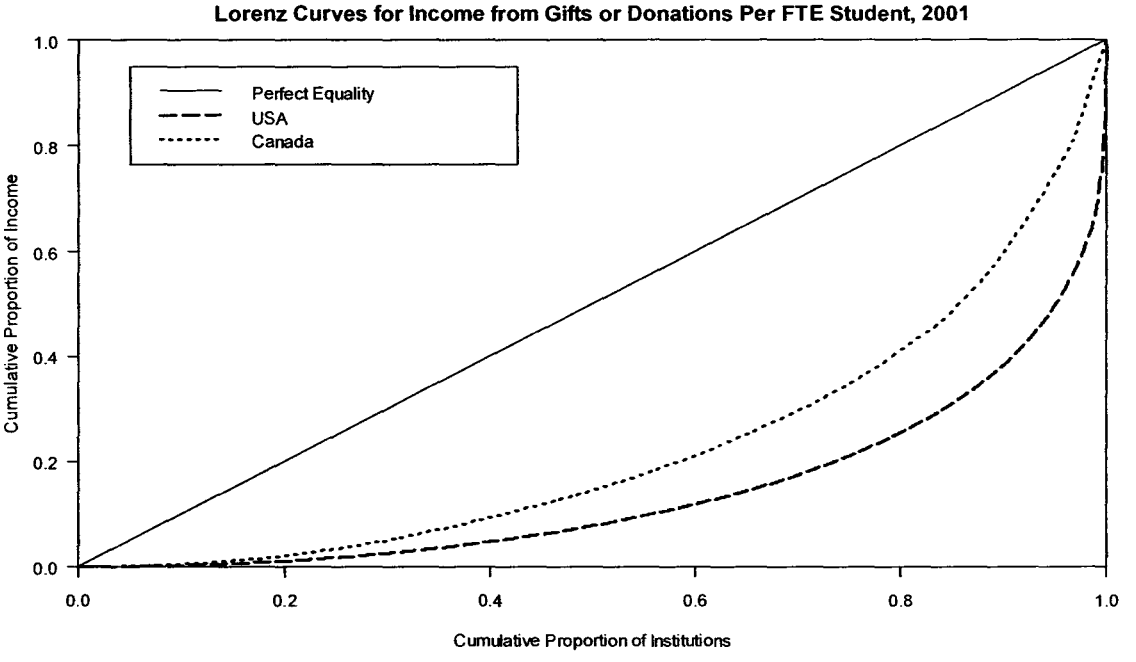
Lorenz Curves for Income from State or Provincial Grants and Contracts Per FTE Student, 2001

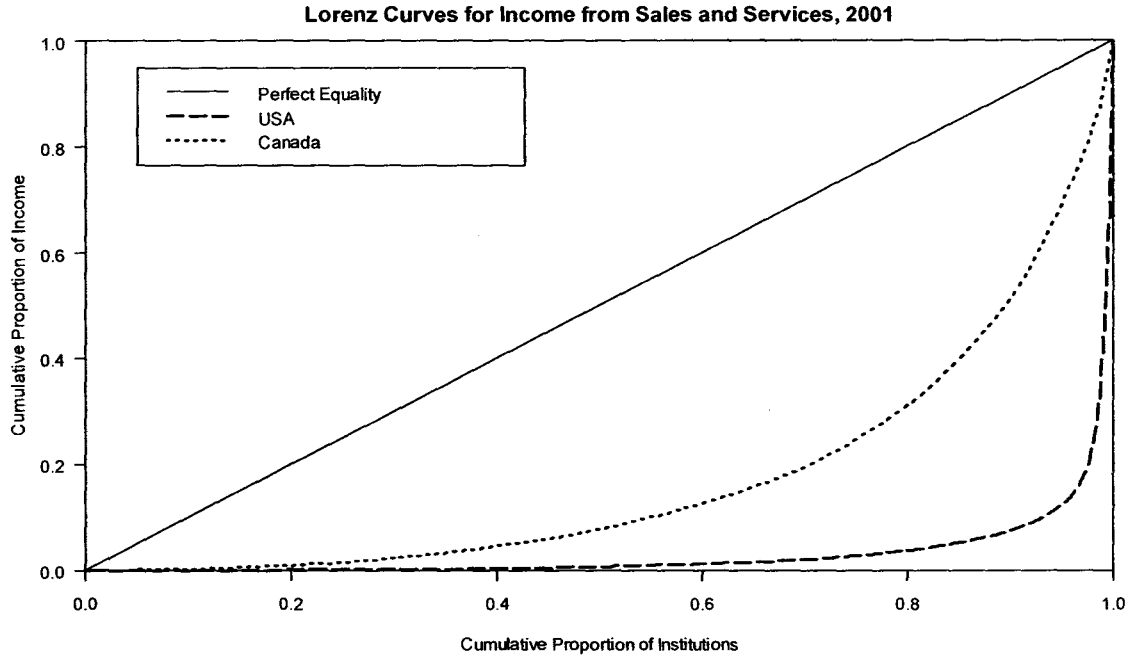


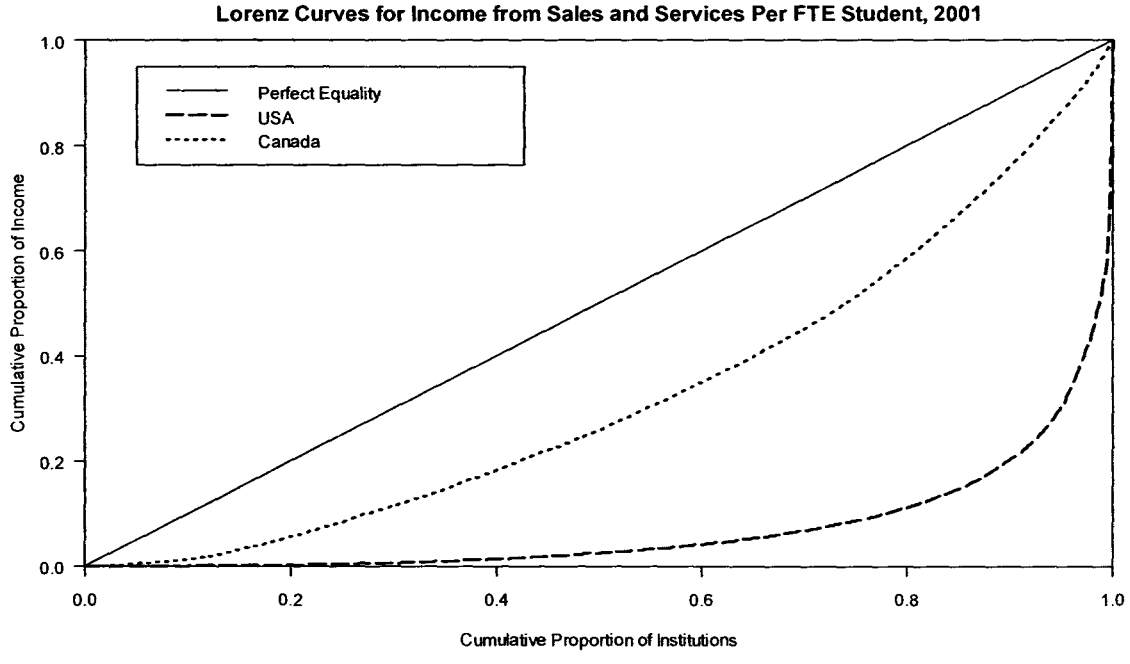

Lorenz Curves for Income from Tuition and Fees, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

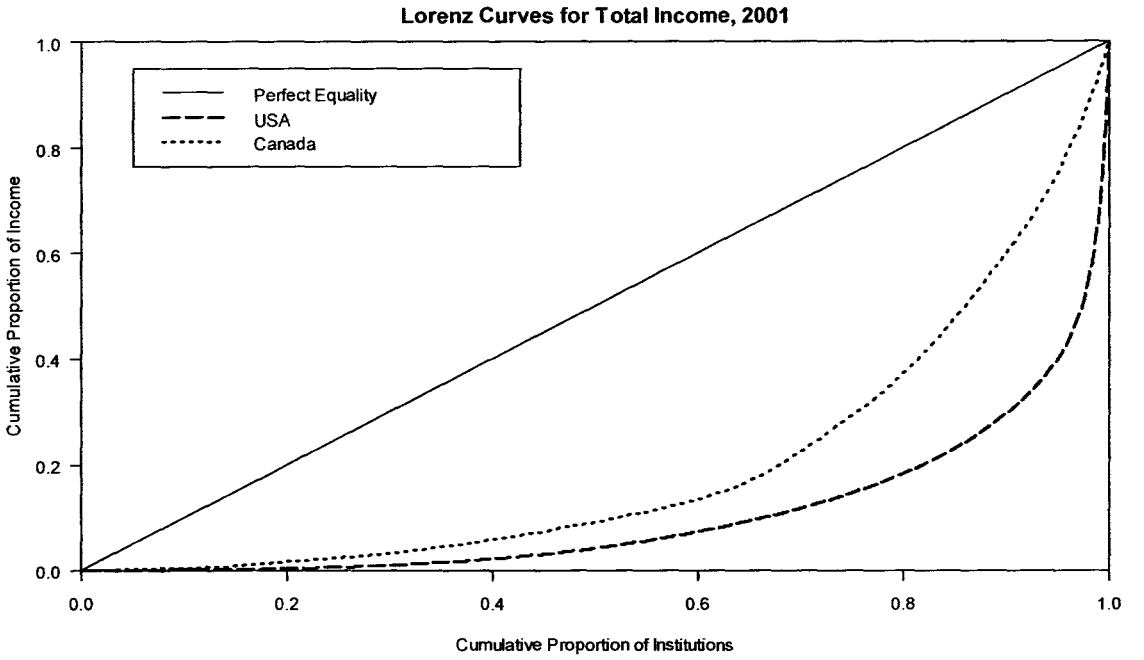

Lorenz Curves for Income from Tuition and Fees Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

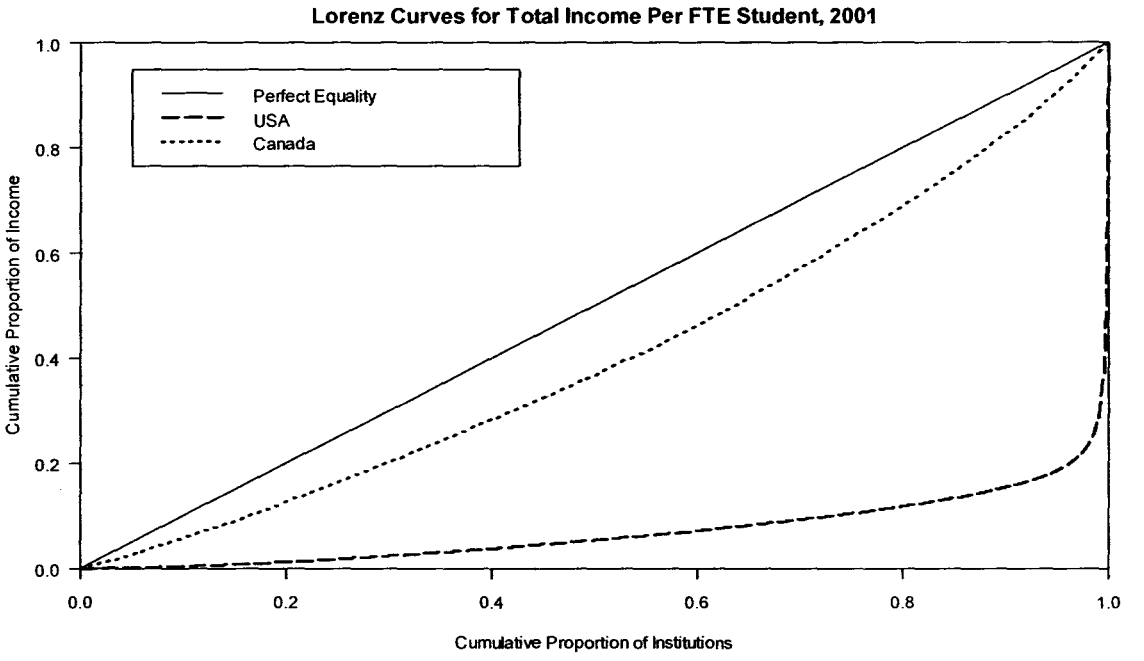

Lorenz Curves for Income from Gifts or Donations, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

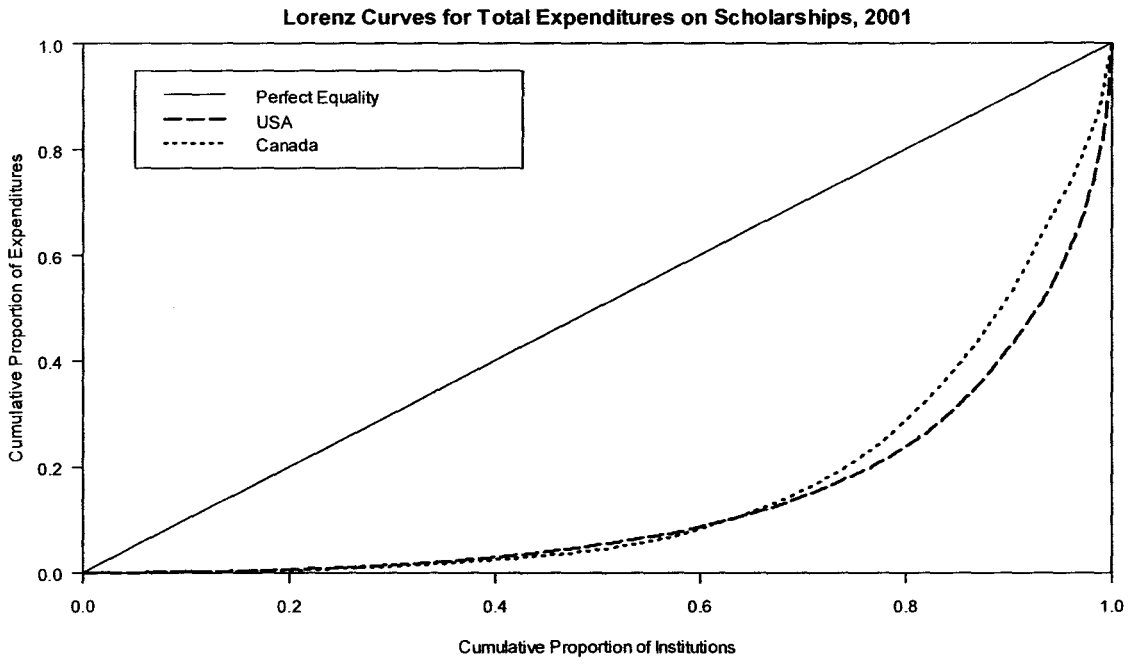

Lorenz Curves for Income from Gifts or Donations Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

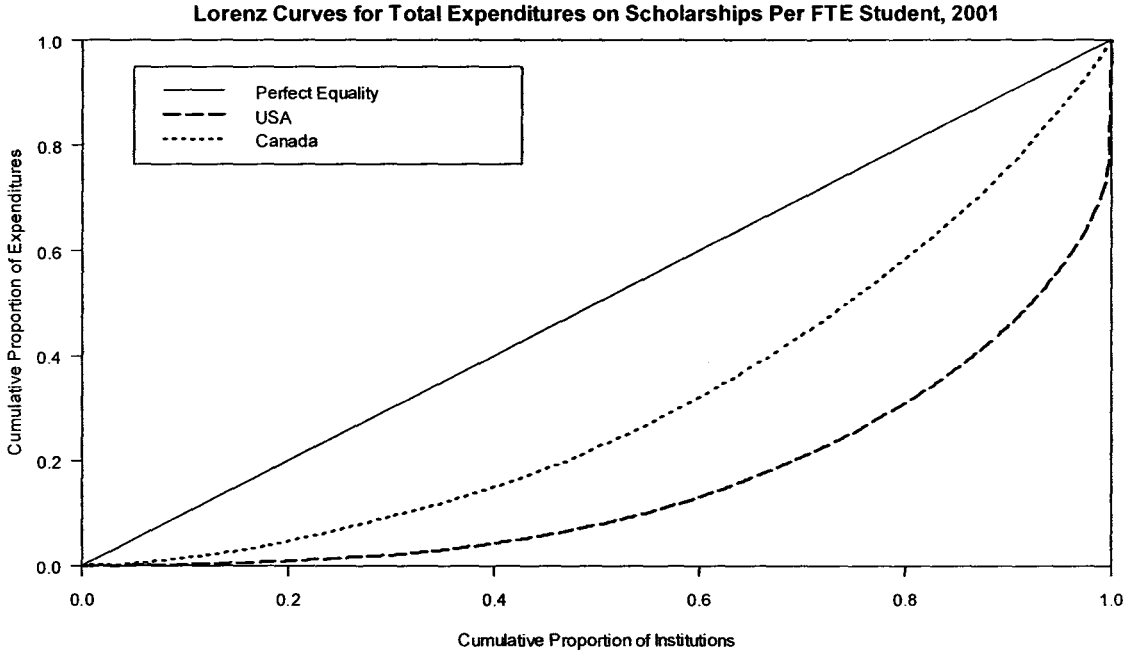

Lorenz Curves for Income from Sales and Services, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

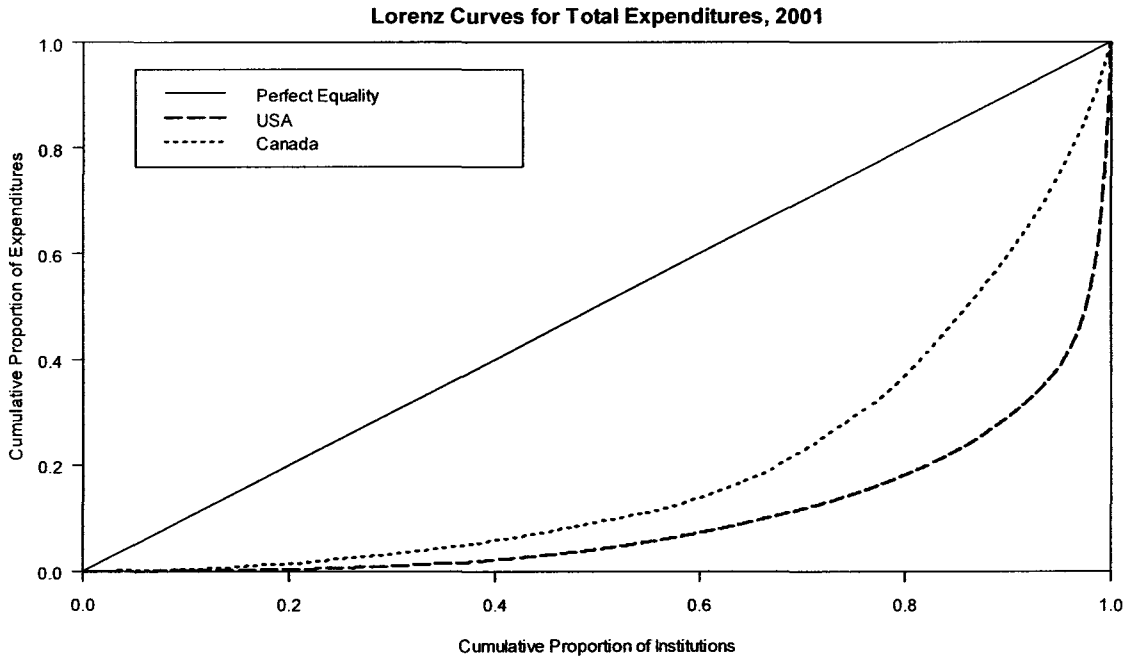

Lorenz Curves for Income from Sales and Services Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

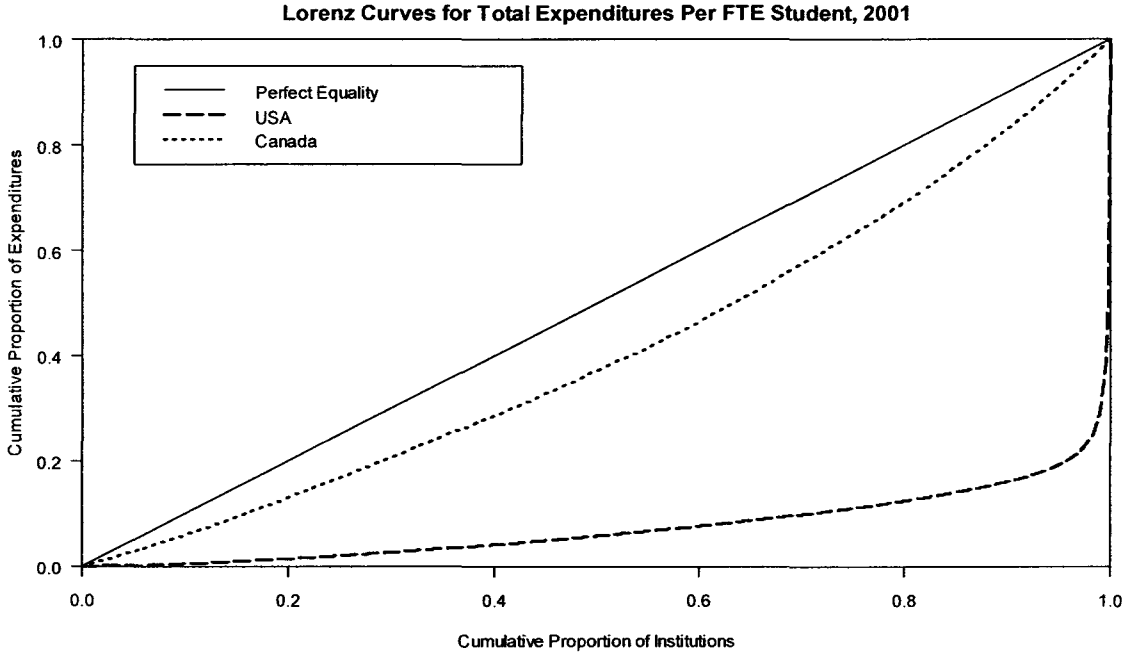

Lorenz Curves for Total Income, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Total Income Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Income
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Total Expenditures on Scholarships, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Total Expenditures on Scholarships Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Total Expenditures, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0


Lorenz Curves for Total Expenditures Per FTE Student, 2001
Perfect Equality
USA
Canada
Cumulative Proportion of Expenditures
Cumulative Proportion of Institutions
0.0
0.2
0.4
0.6
0.8
1.0

Appendix C. Additional Individual Level Tables

Table 5.4 Multinomial Logistic Regression Models of Field of Study Choices for the 1993-94 Cohort of University Graduates in the U.S.

	Model 1		Model 2		Model 3		Model4		Model5	
	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)
Constant										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	1.094	---	3.544	---	2.734	---	3.284	---	1.494	---
	(0.951)		(1.204)		(1.340)		(1.485)		(1.901)	
Engineering, Math and Physical Science	2.843	---	4.862	---	2.709	---	3.017	---	3.594	---
	(0.927)		(1.384)		(1.436)		(1.833)		(2.465)	
Biological Sciences and Health Professions	-1.668	---	-0.307	---	-1.251	---	-1.626	---	-1.647	---
	(0.868)		(1.106)		(1.142)		(1.482)		(2.242)	
Humanities	0.354	---	0.393	---	-0.471	---	-0.149	---	-0.460	---
	(1.238)		(1.425)		(1.524)		(2.116)		(2.968)	
Social Sciences	1.925	---	2.725	---	1.930	---	0.601	---	-0.834	---
	(0.869)		(1.179)		(1.212)		(1.594)		(2.208)	
Other	1.560	---	3.214	---	3.607	---	1.268	---	-0.532	---
	(1.027)		(1.460)		(1.522)		(2.074)		(2.877)	
Marital Status		***		**		**		*		
Single/Previously Married	---	---	---	---	---	---	---	---	---	---
Married										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	0.222	1.249	0.225	1.252	0.250	1.284	0.240	1.271	0.235	1.265
	(0.106)		(0.109)		(0.109)		(0.108)		(0.109)	
Engineering, Math and Physical Science	0.126	1.134	0.150	1.162	0.189	1.208	0.179	1.196	0.179	1.196
	(0.161)		(0.164)		(0.167)		(0.175)		(0.177)	
Biological Sciences and Health Professions	-0.096	0.908	-0.070	0.932	-0.031	0.969	-0.031	0.969	-0.031	0.969

	(0.120)		(0.126)		(0.125)		(0.130)		(0.130)	
Humanities	-0.451	0.637	-0.416	0.660	-0.336	0.715	-0.326	0.722	-0.330	0.719
	(0.143)		(0.149)		(0.152)		(0.149)		(0.150)	
Social Sciences	-0.436	0.647	-0.424	0.654	-0.384	0.681	-0.375	0.687	-0.376	0.687
	(0.126)		(0.129)		(0.132)		(0.140)		(0.139)	
Other	-0.316	0.729	-0.291	0.748	-0.318	0.728	-0.310	0.733	-0.311	0.733
	(0.144)		(0.146)		(0.146)		(0.166)		(0.167)	
Log(Age)		**		**		**		*		*
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	-1.840	0.159	-1.997	0.136	-1.720	0.179	-1.501	0.223	-1.517	0.219
	(0.738)		(0.755)		(0.796)		(0.681)		(0.695)	
Engineering, Math and Physical Science	-2.351	0.095	-2.354	0.095	-1.754	0.173	-1.115	0.328	-1.087	0.337
	(0.703)		(0.782)		(0.783)		(0.783)		(0.781)	
Biological Sciences and Health Professions	0.423	1.527	0.527	1.694	0.748	2.113	1.179	3.251	1.186	3.274
	(0.616)		(0.640)		(0.662)		(0.598)		(0.595)	
Humanities	-0.846	0.429	-0.352	0.703	-0.167	0.846	0.090	1.094	0.094	1.099
	(0.917)		(0.904)		(0.952)		(0.934)		(0.933)	
Social Sciences	-1.709	0.181	-1.630	0.196	-1.407	0.245	-1.106	0.331	-1.069	0.343
	(0.648)		(0.686)		(0.710)		(0.652)		(0.655)	
Other	-1.588	0.204	-1.539	0.215	-1.608	0.200	-1.146	0.318	-1.187	0.305
	(0.770)		(0.825)		(0.843)		(0.798)		(0.796)	
Gender		***		***		***		***		***
Male	---	---	---	---	---	---	---	---	---	---
Female										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	1.440	4.221	1.466	4.332	1.415	4.116	1.438	4.212	1.443	4.233
	(0.154)		(0.154)		(0.162)		(0.159)		(0.161)	
Engineering, Math and Physical Science	-0.825	0.438	-0.794	0.452	-0.684	0.505	-0.650	0.522	-0.648	0.523

	(0.116)		(0.117)		(0.125)		(0.131)		(0.130)	
Biological Sciences and Health Professions	0.752 (0.130)	2.121	0.775 (0.130)	2.171	0.796 (0.134)	2.217	0.819 (0.138)	2.268	0.820 (0.137)	2.270
Humanities	0.511 (0.119)	1.667	0.533 (0.119)	1.704	0.600 (0.123)	1.822	0.573 (0.133)	1.774	0.576 (0.133)	1.779
Social Sciences	0.503 (0.118)	1.654	0.520 (0.119)	1.682	0.515 (0.124)	1.674	0.538 (0.123)	1.713	0.544 (0.123)	1.723
Other	0.564 (0.116)	1.758	0.592 (0.116)	1.808	0.576 (0.123)	1.779	0,593 (0.134)	1.809	0.593 (0.134)	1.809
Race		**		**		**		*		*
White	---	---	---	---	---	---	---	---	---	---
Black										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	-0.875 (0.362)	0.417	-0.944 (0.361)	0.389	-1.100 (0.372)	0.333	-1.107 (0.408)	0.331	-1.122 (0.409)	0.326
Engineering, Math and Physical Science	-0.192 (0.266)	0.825	-0.195 (0.268)	0.823	0.091 (0.282)	1.095	0.070 (0.284)	1.073	0.051 (0.279)	1.052
Biological Sciences and Health Professions	0.083 (0.288)	1.087	0.085 (0.295)	1.089	0.108 (0.306)	1.114	0.078 (0.344)	1.081	0.074 (0.342)	1.077
Humanities	-0.248 (0.270)	0.780	-0.170 (0.284)	0.844	-0.086 (0.295)	0.918	-0.149 (0.337)	0.862	-0.163 (0.335)	0.850
Social Sciences	0.162 (0.268)	1.176	0.173 (0.273)	1.189	0.114 (0.280)	1.121	-0.098 (0.311)	0.907	0.076 (0.304)	1.079
Other	-0.051 (0.273)	0.950	-0.047 (0.280)	0.954	-0.102 (0.286)	0.903	-0.142 (0.298)	0.868	-0.127 (0.299)	0.881
Hispanic or Latino										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	0.021	1.021	-0.059	0.943	-0.138	0.871	-0.193	0.824	-0.197	0.821

	(0.267)		(0.278)		(0.272)		(0.273)		(0.277)	
Engineering, Math and Physical Science	0.126	1.134	0.104	1.110	0.222	1.249	0.141	1.151	0.123	1.131
	(0.273)		(0.273)		(0.292)		(0.286)		(0.289)	
Biological Sciences and Health Professions	0.039	1.040	0.026	1.026	0.032	1.033	-0.023	0.977	-0.040	0.961
	(0.340)		(0.350)		(0.361)		(0.337)		(0.346)	
Humanities	-0.082	0.921	-0.018	0.982	-0.021	0.979	-0.020	0.980	-0.037	0.964
	(0.278)		(0.287)		(0.292)		(0.262)		(0.266)	
Social Sciences	0.460	1.584	0.445	1.560	0.392	1.480	0.319	1.376	0.289	1.335
	(0.279)		(0.291)		(0.282)		(0.260)		(0.268)	
Other	0.100	1.105	0.076	1.079	0.050	1.051	-0.033	0.968	-0.017	0.983
	(0.244)		(0.264)		(0.264)		(0.239)		(0.239)	
Asian										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	-0.626	0.535	-0.668	0.513	-0.682	0.506	-0.726	0.484	-0.727	0.483
	(0.427)		(0.426)		(0.433)		(0.419)		(0.420)	
Engineering, Math and Physical Science	1.000	2.718	0.944	2.570	0.966	2.627	0.870	2.387	0.860	2.363
	(0.264)		(0.259)		(0.266)		(0.252)		(0.248)	
Biological Sciences and Health Professions	0.574	1.775	0.537	1.711	0.540	1.716	0.450	1.568	0.448	1.565
	(0.256)		(0.257)		(0.256)		(0.278)		(0.282)	
Humanities	-0.049	0.952	-0.081	0.922	-0.089	0.915	-0.074	0.929	-0.078	0.925
	(0.376)		(0.372)		(0.385)		(0.380)		(0.379)	
Social Sciences	0.141	1.151	0.092	1.096	0.086	1.090	-0.006	0.994	-0.017	0.983
	(0.294)		(0.293)		(0.293)		(0.294)		(0.297)	
Other	-0.802	0.448	-0.857	0.424	-0.865	0.421	-0.985	0.373	-0.966	0.381
	(0.349)		(0.353)		(0.348)		(0.376)		(0.376)	
Other										
Business and Management	---	---	---	---	---	---	---	---	---	---

Education	-1.286	0.276	-1.340	0.262	-1.379	0.252	-1.501	0.223	-1.523	0.218
	(0.600)		(0.611)		(0.611)		(0.676)		(0.677)	
Engineering, Math and Physical Science	-0.340	0.712	-0.367	0.693	-0.439	0.645	-0.488	0.614	-0.497	0.608
	(4.679)		(4.681)		(6.299)		(5.800)		(5.969)	
Biological Sciences and Health Professions	-0.868	0.420	-0.882	0.414	-0.953	0.386	-0.990	0.372	-1.001	0.368
	(0.646)		(0.656)		(0.661)		(0.719)		(0.726)	
Humanities	0.371	1.449	0.391	1.478	0.255	1.290	0.235	1.265	0.219	1.245
	(0.417)		(0.440)		(0.493)		(0.499)		(0.495)	
Social Sciences	-0.238	0.788	-0.261	0.770	-0.304	0.738	-0.369	0.691	-0.382	0.682
	(0.609)		(0.612)		(0.605)		(0.640)		(0.642)	
Other	-0.746	0.474	-0.774	0.461	-0.741	0.477	-0.796	0.451	-0.808	0.446
	(0.651)		(0.659)		(0.652)		(0.561)		(0.560)	
Parent Education				**		*				
Less than bachelor's	---	---	---	---	---	---	---	---	---	---
Bachelor's or higher										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education			0.215	1.240	0.227	1.255	0.240	1.271	0.240	1.271
			(0.113)		(0.113)		(0.108)		(0.109)	
Engineering, Math and Physical Science			0.512	1.669	0.286	1.331	0.295	1.343	0.291	1.338
			(0.123)		(0.130)		(0.128)		(0.129)	
Biological Sciences and Health Professions			0.359	1.432	0.282	1.326	0.269	1.309	0.270	1.310
			(0.136)		(0.136)		(0.138)		(0.139)	
Humanities			0.585	1.795	0.426	1.531	0.421	1.523	0.421	1.523
			(0.148)		(0.142)		(0.148)		(0.149)	
Social Sciences			0.300	1.350	0.263	1.301	0.252	1.287	0.249	1.283
			(0.112)		(0.114)		(0.115)		(0.115)	
Other			0.452	1.571	0.468	1.597	0.449	1.567	0.450	1.568
			(0.123)		(0.122)		(0.124)		(0.125)	

Log(Income)				**		***		**		
Business and Management	---	---	---	---	---	---	---	---	---	---
Education			-0.518	0.596	-0.528	0.590	-0.499	0.607	-0.097	0.908
			(0.119)		(0.118)		(0.129)		(0.329)	
Engineering, Math and Physical Science			-0.508	0.596	-0.634	0.590	-0.600	0.607	-0.742	0.908
			(0.142)		(0.141)		(0.153)		(0.400)	
Biological Sciences and Health Professions			-0.373	0.602	-0.417	0.530	-0.405	0.549	-0.404	0.476
			(0.109)		(0.110)		(0.112)		(0.282)	
Humanities			-0.230	0.689	-0.331	0.659	-0.314	0.667	-0.244	0.668
			(0.135)		(0.133)		(0.147)		(0.417)	
Social Sciences			-0.238	0.795	-0.272	0.718	-0.250	0.731	-0.317	0.783
			(0.131)		(0.134)		(0.141)		(0.395)	
Other			-0.436	0.788	-0.426	0.762	-0.391	0.779	0.021	0.728
			(0.133)		(0.139)		(0.156)		(0.431)	
SAT Score Combined						***		***		
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					-0.112	0.894	-0.096	0.908	-0.316	0.729
					(0.056)		(0.057)		(0.423)	
Engineering, Math and Physical Science					0.615	1.850	0.604	1.829	0.044	1.045
					(0.079)		(0.079)		(0.507)	
Biological Sciences and Health Professions					0.165	1.179	0.144	1.155	0.013	1.013
					(0.069)		(0.070)		(0.493)	
Humanities					0.313	1.368	0.291	1.338	-0.057	0.945
					(0.060)		(0.063)		(0.542)	
Social Sciences					0.043	1.044	0.037	1.038	-0.679	0.507
					(0.064)		(0.068)		(0.431)	
Other					-0.104	0.901	-0.126	0.882	0.436	1.547
					(0.066)		(0.061)		(0.529)	

Aspirations						***		***		
Below Master's	---	---	---	---	---	---	---	---	---	---
Master's or higher										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					0.904	2.469	0.926	2.524	3.600	36.598
					(0.176)		(0.143)		(1.293)	
Engineering, Math and Physical Science					0.400	1.492	0.441	1.554	1.516	4.554
					(0.115)		(0.118)		(1.238)	
Biological Sciences and Health Professions					0.522	1.685	0.552	1.737	0.930	2.535
					(0.195)		(0.199)		(1.257)	
Humanities					0.226	1.254	0.211	1.235	1.594	4.923
					(0.165)		(0.157)		(1.347)	
Social Sciences					0.622	1.863	0.652	1.919	2.210	9.116
					(0.170)		(0.173)		(1.590)	
Other					-0.118	0.889	-0.079	0.924	0.680	1.974
					(0.141)		(0.143)		(1.284)	
High School Type						**				
Public	---	---	---	---	---	---	---	---	---	---
Private, Catholic										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					0.211	1.235	0.288	1.334	0.299	1.349
					(0.237)		(0.232)		(0.232)	
Engineering, Math and Physical Science					-0.474	0.623	-0.432	0.649	-0.421	0.656
					(0.242)		(0.247)		(0.252)	
Biological Sciences and Health Professions					-0.052	0.949	-0.059	0.943	-0.060	0.942
					(0.227)		(0.227)		(0.229)	
Humanities					0.269	1.309	0.225	1.252	0.233	1.262
					(0.248)		(0.266)		(0.266)	

Social Sciences					0.192	1.212	0.230	1.259	0.239	1.270
					(0.232)		(0.233)		(0.236)	
Other					-0.178	0.837	-0.128	0.880	-0.138	0.871
					(0.276)		(0.272)		(0.270)	
Private, not religious										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					0.345	1.412	0.392	1.480	0.395	1.484
					(0.380)		(0.388)		(0.388)	
Engineering, Math and Physical Science					-0.510	0.600	-0.430	0.651	-0.422	0.656
					(0.483)		(0.463)		(0.462)	
Biological Sciences and Health Professions					0.228	1.256	0.224	1.251	0.232	1.261
					(0.497)		(0.463)		(0.460)	
Humanities					1.112	3.040	1.001	2.721	1.007	2.737
					(0.360)		(0.362)		(0.360)	
Social Sciences					0.331	1.392	0.387	1.473	0.390	1.477
					(0.457)		(0.449)		(0.446)	
Other					0.436	1.547	0.490	1.632	0.498	1.645
					(0.431)		(0.435)		(0.434)	
Private, other religious										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					-0.066	0.936	0.010	1.010	-0.002	0.998
					(0.230)		(0.244)		(0.247)	
Engineering, Math and Physical Science					-0.244	0.783	-0.192	0.825	-0.201	0.818
					(0.249)		(0.249)		(0.253)	
Biological Sciences and Health Professions					0.126	1.134	0.147	1.158	0.131	1.140
					(0.268)		(0.289)		(0.294)	
Humanities					0.379	1.461	0.305	1.357	0.289	1.335
					(0.193)		(0.167)		(0.167)	

Social Sciences					0.236 (0.191)	1.266	0.295 (0.183)	1.343	0.276 (0.182)	1.318
Other					0.163 (0.210)	1.177	0.227 (0.215)	1.255	0.224 (0.218)	1.251
Enrolment Size										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.197 (0.207)	0.821	-0.192 (0.210)	0.825
Engineering, Math and Physical Science							-0.320 (0.225)	0.726	-0.318 (0.225)	0.728
Biological Sciences and Health Professions							-0.083 (0.310)	0.920	-0.082 (0.309)	0.921
Humanities							-0.163 (0.264)	0.850	-0.164 (0.266)	0.849
Social Sciences							0.233 (0.206)	1.262	0.242 (0.211)	1.274
Other							0.407 (0.298)	1.502	0.407 (0.299)	1.502
Institution Type								***		***
Public, 4 year non-PhD	---	---	---	---	---	---	---	---	---	---
Public, 4 year PhD										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.117 (0.145)	0.890	-0.114 (0.144)	0.892
Engineering, Math and Physical Science							0.258 (0.196)	1.294	0.256 (0.196)	1.292
Biological Sciences and Health Professions							0.278 (0.205)	1.320	0.277 (0.203)	1.319

Humanities							-0.030 (0.163)	0.970	-0.031 (0.162)	0.969
Social Sciences							-0.087 (0.093)	0.917	-0.091 (0.093)	0.913
Other							-0.009 (0.165)	0.991	-0.007 (0.163)	0.993
Private, 4 year non-PhD										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.900 (0.252)	0.407	-0.896 (0.253)	0.408
Engineering, Math and Physical Science							-1.293 (0.197)	0.274	-1.295 (0.197)	0.274
Biological Sciences and Health Professions							-0.447 (0.313)	0.640	-0.444 (0.314)	0.641
Humanities							-0.285 (0.340)	0.752	-0.285 (0.340)	0.752
Social Sciences							-0.448 (0.240)	0.639	-0.444 (0.240)	0.641
Other							-0.432 (0.301)	0.649	-0.427 (0.301)	0.652
Private, 4 year PhD										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.323 (0.187)	0.724	-0.320 (0.187)	0.726
Engineering, Math and Physical Science							0.120 (0.238)	1.127	0.114 (0.240)	1.121
Biological Sciences and Health Professions							0.365	1.441	0.364	1.439

							(0.192)		(0.196)	
Humanities							0.371 (0.222)	1.449	0.368 (0.221)	1.445
Social Sciences							-0.019 (0.189)	0.981	-0.027 (0.189)	0.973
Other							0.074 (0.234)	1.077	0.082 (0.232)	1.085
Income * SAT Score Combined										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education									0.049 (0.096)	1.050
Engineering, Math and Physical Science									0.125 (0.113)	1.133
Biological Sciences and Health Professions									0.029 (0.111)	1.029
Humanities									0.076 (0.118)	1.079
Social Sciences									0.157 (0.096)	1.170
Other									-0.124 (0.114)	0.883
Income * Below Master's	---	---	---	---	---	---	---	---	---	---
Income * Master's or higher										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education									-0.598 (0.289)	0.550
Engineering, Math and										

Physical Science				-0.239 (0.274)	0.787
Biological Sciences and Health Professions				-0.082 (0.283)	0.921
Humanities				-0.307 (0.297)	0.736
Social Sciences				-0.347 (0.342)	0.707
Other				-0.168 (0.284)	0.845
n	7126	7126	7126	7126	7126
Log likelihood	-13332.553	-13286.819	-13053.461	-12951.219	-12869.186
LR chi2	943.271	1501.450	1501.454	1705.938	1870.005
Prob > chi2	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.034	0.038	0.054	0.062	0.062
D	26665.105	25573.639	26106.923	25902.438	25738.371

* p<.05; ** p<.01; *** p<.001; Business and management is the base outcome for the response. Multiple-df tests are reported for sets of dummy regressors. BRR standard errors for complex survey designs are in parentheses. Missing categories (not shown) were created for categorical variables. Additional models included interactions between SES and gender, race, parent education, and high school type, but none of these additional terms significantly improved the overall model fit.

Table 5.5 Multinomial Logistic Regression Models of Field of Study Choices for the 2000-01 Cohort of University Graduates in the U.S.

	Model 1		Model 2		Model 3		Model4		Model5	
	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)
Constant										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	1.018	---	3.725	---	4.282	---	5.777	---	8.082	---
	(1.104)		(1.390)		(1.535)		(2.078)		(4.813)	
Engineering, Math and Physical Science	3.468	---	4.376	---	-2.166	---	-3.070	---	6.769	---
	(0.871)		(1.335)		(1.451)		(1.829)		(5.175)	
Biological Sciences and Health Professions	1.147	---	2.594	---	0.213	---	0.277	---	7.715	---
	(0.805)		(1.177)		(1.361)		(1.552)		(4.177)	
Humanities	2.022	---	2.729	---	-0.545	---	0.894	---	9.960	---
	(0.935)		(1.280)		(1.415)		(1.605)		(4.288)	
Social Sciences	2.847	---	3.848	---	1.375	---	1.727	---	6.152	---
	(0.774)		(1.194)		(1.347)		(1.310)		(4.443)	
Other	3.345	---	4.610	---	4.526	---	3.711	---	5.706	---
	(0.940)		(1.501)		(1.653)		(1.771)		(5.096)	
Marital Status		***		***		***		***		***
Single/Previously Married	---	---	---	---	---	---	---	---	---	---
Married										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	0.523	1.687	0.517	1.677	0.514	1.672	0.483	1.621	0.483	1.621
	(0.131)		(0.134)		(0.136)		(0.146)		(0.145)	
Engineering, Math and Physical Science	0.254	1.289	0.273	1.314	0.363	1.438	0.367	1.443	0.392	1.480
	(0.147)		(0.149)		(0.160)		(0.165)		(0.162)	
Biological Sciences and Health Professions	0.162	1.176	0.179	1.196	0.226	1.254	0.240	1.271	0.251	1.285
	(0.139)		(0.141)		(0.140)		(0.140)		(0.140)	
Humanities	-0.213	0.808	-0.178	0.837	-0.119	0.888	-0.095	0.909	-0.076	0.927

	(0.135)		(0.138)		(0.138)		(0.136)		(0.135)	
Social Sciences	-0.402	0.669	-0.390	0.677	-0.368	0.692	-0.351	0.704	-0.348	0.706
	(0.126)		(0.130)		(0.127)		(0.122)		(0.123)	
Other	-0.192	0.825	-0.192	0.825	-0.188	0.829	-0.165	0.848	-0.166	0.847
	(0.141)		(0.144)		(0.142)		(0.146)		(0.149)	
Log(Age)		***		**		**		*		*
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	-2.102	0.122	-2.732	0.065	-2.571	0.076	-2.652	0.071	-2.602	0.074
	(0.819)		(0.827)		(0.855)		(0.887)		(0.889)	
Engineering, Math and Physical Science	-2.816	0.060	-2.706	0.067	-1.883	0.152	-1.525	0.218	-1.478	0.228
	(0.624)		(0.722)		(0.723)		(0.767)		(0.770)	
Biological Sciences and Health Professions	-1.671	0.188	-1.808	0.164	-1.687	0.185	-1.510	0.221	-1.443	0.236
	(0.581)		(0.623)		(0.633)		(0.666)		(0.671)	
Humanities	-1.708	0.181	-1.418	0.242	-1.167	0.311	-1.136	0.321	-1.077	0.341
	(0.690)		(0.714)		(0.716)		(0.717)		(0.707)	
Social Sciences	-2.334	0.097	-2.412	0.090	-2.316	0.099	-2.231	0.107	-2.184	0.113
	(0.554)		(0.595)		(0.600)		(0.599)		(0.602)	
Other	-2.751	0.064	-3.043	0.048	-3.208	0.040	-3.027	0.048	-3.016	0.049
	(0.677)		(0.811)		(0.811)		(0.767)		(0.771)	
Gender		***		***		***		***		***
Male	---	---	---	---	---	---	---	---	---	---
Female										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	1.501	4.486	1.515	4.549	1.529	4.614	1.527	4.604	1.531	4.623
	(0.160)		(0.164)		(0.164)		(0.153)		(0.153)	
Engineering, Math and Physical Science	-0.639	0.527	-0.621	0.537	-0.491	0.612	-0.479	0.619	-0.481	0.618
	(0.125)		(0.126)		(0.133)		(0.146)		(0.147)	
Biological Sciences and Health Professions	1.112	3.040	1.128	3.089	1.189	3.284	1.194	3.300	1.199	3.317

	(0.098)		(0.100)		(0.102)		(0.102)		(0.104)	
Humanities	0.564	1.758	0.583	1.791	0.667	1.948	0.653	1.921	0.657	1.929
	(0.120)		(0.121)		(0.120)		(0.127)		(0.128)	
Social Sciences	0.811	2.250	0.815	2.259	0.858	2.358	0.859	2.361	0.867	2.380
	(0.114)		(0.114)		(0.114)		(0.116)		(0.119)	
Other	0.671	1.956	0.695	2.004	0.711	2.036	0.716	2.046	0.716	2.046
	(0.116)		(0.121)		(0.121)		(0.123)		(0.124)	
Race		***		***		***		***		***
White	---	---	---	---	---	---	---	---	---	---
Black										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	-0.192	0.825	-0.333	0.717	-0.519	0.595	-0.477	0.621	-0.481	0.618
	(0.260)		(0.257)		(0.265)		(0.270)		(0.269)	
Engineering, Math and Physical Science	-0.339	0.712	-0.372	0.689	-0.042	0.959	-0.029	0.971	-0.086	0.918
	(0.279)		(0.287)		(0.133)		(0.301)		(0.304)	
Biological Sciences and Health Professions	0.088	1.092	0.029	1.029	0.109	1.115	0.105	1.111	0.069	1.071
	(0.241)		(0.244)		(0.244)		(0.238)		(0.238)	
Humanities	-0.734	0.480	-0.750	0.472	-0.582	0.559	-0.557	0.573	-0.596	0.551
	(0.301)		(0.305)		(0.312)		(0.263)		(0.286)	
Social Sciences	0.563	1.756	0.815	2.259	0.538	1.713	0.519	1.680	0.502	1.652
	(0.224)		(0.114)		(0.246)		(0.239)		(0.241)	
Other	0.101	1.106	0.039	1.040	0.088	1.092	0.073	1.076	0.068	1.070
	(0.248)		(0.257)		(0.255)		(0.249)		(0.249)	
Hispanic or Latino										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	0.033	1.034	-0.107	0.899	-0.202	0.817	-0.123	0.884	-0.128	0.880
	(0.324)		(0.317)		(0.327)		(0.299)		(0.301)	
Engineering, Math and Physical Science	0.567	1.763	0.050	1.051	0.288	1.334	0.227	1.255	0.217	1.242

	(0.312)		(0.302)		(0.306)		(0.328)		(0.331)	
Biological Sciences and Health Professions	-0.078 (0.313)	0.925	-0.120 (0.310)	0.887	-0.055 (0.316)	0.946	-0.099 (0.331)	0.906	-0.103 (0.332)	0.902
Humanities	0.421 (0.241)	1.523	0.441 (0.240)	1.554	0.551 (0.250)	1.735	0.556 (0.263)	1.744	0.549 (0.264)	1.732
Social Sciences	0.523 (0.239)	1.687	0.492 (0.236)	1.636	0.512 (0.235)	1.669	0.461 (0.230)	1.586	0.456 (0.231)	1.578
Other	0.061 (0.263)	1.063	0.028 (0.256)	1.028	0.073 (0.259)	1.076	0.019 (0.281)	1.019	0.020 (0.281)	1.020
Asian										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	-3.113 (7.200)	0.044	-3.168 (8.284)	0.042	-3.179 (8.200)	0.042	-3.093 (7.570)	0.045	-3.107 (9.657)	0.045
Engineering, Math and Physical Science	0.506 (0.269)	1.659	0.473 (0.270)	1.605	0.295 (0.289)	1.343	0.217 (0.309)	1.242	0.213 (0.313)	1.237
Biological Sciences and Health Professions	-0.006 (0.335)	0.994	-0.040 (0.333)	0.961	-0.101 (0.326)	0.904	-0.153 (0.328)	0.858	-0.162 (0.328)	0.850
Humanities	-0.451 (0.328)	0.637	-0.478 (0.326)	0.620	-0.583 (0.330)	0.558	-0.565 (0.361)	0.568	-0.576 (0.364)	0.562
Social Sciences	0.011 (0.293)	1.011	-0.007 (0.120)	0.993	-0.044 (0.285)	0.957	-0.119 (0.286)	0.888	-0.129 (0.292)	0.879
Other	-0.808 (0.388)	0.446	-0.851 (0.382)	0.427	-0.870 (0.378)	0.419	-0.943 (0.371)	0.389	-0.948 (0.374)	0.388
Other										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education	0.800 (0.559)	2.226	0.027 (0.562)	1.027	-0.064 (0.573)	0.938	-0.069 (0.540)	0.933	-0.055 (0.541)	0.946
Engineering, Math and										

Physical Science	0.552 (0.533)	1.737	0.502 (0.536)	1.652	0.637 (0.529)	1.891	0.640 (0.502)	1.896	0.648 (0.505)	1.912
Biological Sciences and Health Professions	1.002 (0.454)	2.724	0.948 (0.459)	2.581	0.970 (0.469)	2.638	0.948 (0.435)	2.581	0.958 (0.435)	2.606
Humanities	0.244 (0.498)	1.276	0.186 (0.504)	1.204	0.204 (0.508)	1.226	0.208 (0.491)	1.231	0.216 (0.496)	1.241
Social Sciences	1.144 (0.473)	3.139	1.118 (0.480)	3.059	1.089 (0.492)	2.971	1.061 (0.460)	2.889	1.072 (0.461)	2.921
Other	1.225 (0.460)	3.404	1.169 (0.466)	3.219	1.197 (0.478)	3.310	1.179 (0.482)	3.251	1.174 (0.482)	3.235
Parent Education				***		***		**		**
Less than bachelor's	---	---	---	---	---	---	---	---	---	---
Bachelor's or higher										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education			-0.349 (0.137)	0.705	-0.269 (0.140)	0.764	-0.225 (0.136)	0.799	-0.222 (0.138)	0.801
Engineering, Math and Physical Science			0.251 (0.128)	1.285	-0.156 (0.140)	0.856	-0.175 (0.147)	0.839	-0.178 (0.145)	0.837
Biological Sciences and Health Professions			0.089 (0.128)	1.093	-0.074 (0.130)	0.929	-0.092 (0.141)	0.912	-0.092 (0.140)	0.912
Humanities			0.379 (0.118)	1.461	0.123 (0.122)	1.131	0.136 (0.118)	1.146	0.139 (0.119)	1.149
Social Sciences			0.007 (0.120)	1.007	-0.094 (0.132)	0.910	-0.115 (0.130)	0.891	-0.115 (0.131)	0.891
Other			0.085 (0.140)	1.089	0.055 (0.138)	1.057	0.031 (0.135)	1.031	0.033 (0.135)	1.034
Log(Income)										*
Business and Management	---	---	---	---	---	---	---	---	---	---

Education			-0.362	0.696	-0.376	0.687	-0.385	0.680	-0.898	0.407
			(0.150)		(0.162)		(0.162)		(0.957)	
Engineering, Math and Physical Science			-0.265	0.767	-0.428	0.652	-0.392	0.676	-2.562	0.077
			(0.150)		(0.166)		(0.170)		(1.009)	
Biological Sciences and Health Professions			-0.288	0.750	-0.074	0.929	-0.343	0.710	-2.002	0.135
			(0.141)		(0.130)		(0.153)		(0.902)	
Humanities			-0.289	0.749	-0.380	0.684	-0.379	0.685	-2.380	0.093
			(0.146)		(0.159)		(0.167)		(0.876)	
Social Sciences			-0.192	0.825	-0.094	0.910	-0.231	0.794	-1.220	0.295
			(0.141)		(0.132)		(0.149)		(0.869)	
Other			-0.217	0.805	-0.055	0.946	-0.215	0.807	-0.652	0.521
			(0.151)		(0.138)		(0.168)		(0.976)	
SAT Score Combined						***		***		
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					-0.001	0.999	-0.001	0.999	-0.003	0.997
					(0.000)		(0.000)		(0.004)	
Engineering, Math and Physical Science					0.006	1.006	0.006	1.006	-0.004	0.996
					(0.000)		(0.000)		(0.004)	
Biological Sciences and Health Professions					0.002	1.002	0.002	1.002	-0.006	0.994
					(0.000)		(0.000)		(0.004)	
Humanities					0.003	1.003	0.003	1.003	-0.006	0.994
					(0.000)		(0.000)		(0.004)	
Social Sciences					0.001	1.001	0.001	1.001	-0.004	0.996
					(0.000)		(0.000)		(0.004)	
Other					0.000	1.000	0.000	1.000	-0.002	0.998
					(0.000)		(0.000)		(0.004)	

Aspirations						***		***		
Below Master's	---	---	---	---	---	---	---	---	---	---
Master's or higher										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					0.965	2.625	0.960	2.612	0.868	2.382
					(0.161)		(0.145)		(1.722)	
Engineering, Math and Physical Science					0.060	1.062	0.090	1.094	0.952	2.591
					(0.142)		(0.139)		(1.177)	
Biological Sciences and Health Professions					0.371	1.449	0.385	1.470	1.185	3.271
					(0.121)		(0.121)		(1.387)	
Humanities					-0.009	0.991	-0.002	0.998	0.778	2.177
					(0.122)		(0.123)		(1.042)	
Social Sciences					0.494	1.639	0.505	1.657	0.988	2.686
					(0.115)		(0.106)		(1.254)	
Other					-0.237	0.789	-0.221	0.802	0.337	1.401
					(0.160)		(0.114)		(1.140)	
High School Type										
Public	---	---	---	---	---	---	---	---	---	---
Private, Catholic										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education					-0.451	0.637	-0.421	0.656	-0.406	0.666
					(0.195)		(0.207)		(0.210)	
Engineering, Math and Physical Science					-0.535	0.586	-0.517	0.596	-0.535	0.586
					(0.242)		(0.251)		(0.253)	
Biological Sciences and Health Professions					-0.222	0.801	-0.217	0.805	-0.213	0.808
					(0.167)		(0.168)		(0.165)	
Humanities					-0.250	0.779	-0.281	0.755	-0.282	0.754
					(0.180)		(0.188)		(0.184)	
Social Sciences					-0.263	0.769	-0.276	0.759	-0.267	0.766

					(0.180)		(0.196)		(0.194)		
Other					-0.139	0.870	-0.141	0.868	-0.141	0.868	
					(0.165)		(0.160)		(0.161)		
Private, not religious											
Business and Management	---	---	---	---	---	---	---	---	---	---	
Education					-0.228	0.796	-0.221	0.802	-0.228	0.796	
					(0.519)		(0.492)		(0.495)		
Engineering, Math and Physical Science					-0.110	0.896	-0.062	0.940	-0.091	0.913	
					(0.498)		(0.506)		(0.510)		
Biological Sciences and Health Professions					0.345	1.412	0.338	1.402	0.345	1.412	
					(0.520)		(0.568)		(0.559)		
Humanities					0.842	2.321	0.777	2.175	0.775	2.171	
					(0.407)		(0.436)		(0.432)		
Social Sciences					0.477	1.611	0.457	1.579	0.461	1.586	
					(0.399)		(0.424)		(0.420)		
Other					0.377	1.458	0.374	1.454	0.366	1.442	
					(0.421)		(0.447)		(0.445)		
Private, other religious											
Business and Management	---	---	---	---	---	---	---	---	---	---	
Education					0.183	1.201	0.176	1.192	0.194	1.214	
					(0.389)		(0.391)		(0.394)		
Engineering, Math and Physical Science					-0.617	0.540	-0.481	0.618	-0.502	0.605	
					(0.457)		(0.487)		(0.487)		
Biological Sciences and Health Professions					-0.100	0.905	0.037	1.038	-0.016	0.984	
					(0.357)		(0.374)		(0.375)		
Humanities					0.148	1.160	0.097	1.102	0.113	1.120	

					(0.353)		(0.349)		(0.347)	
Social Sciences					0.072	1.075	0.139	1.149	0.171	1.186
					(0.363)		(0.360)		(0.353)	
Other					-0.110	0.896	-0.024	0.976	-0.034	0.967
					(0.372)		(0.374)		(0.364)	
Enrolment Size										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.297	0.743	-0.288	0.750
							(0.282)		(0.284)	
Engineering, Math and Physical Science							0.036	1.037	0.037	1.038
							(0.267)		(0.271)	
Biological Sciences and Health Professions							-0.110	0.896	-0.093	0.911
							(0.223)		(0.223)	
Humanities							-0.370	0.691	-0.362	0.696
							(0.218)		(0.219)	
Social Sciences							0.144	1.155	0.155	1.168
							(0.187)		(0.188)	
Other							0.109	1.115	0.111	1.117
							(0.207)		(0.206)	
Institution Type								***		***
Public, 4 year non-PhD	---	---	---	---	---	---	---	---	---	---
Public, 4 year PhD										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.452	0.636	-0.462	0.630
							(0.195)		(0.200)	
Engineering, Math and Physical Science							0.360	1.433	0.349	1.418
							(0.252)		(0.253)	

Biological Sciences and Health Professions							0.272 (0.201)	1.313	0.258 (0.203)	1.294
Humanities							0.137 (0.209)	1.147	0.121 (0.213)	1.129
Social Sciences							0.014 (0.188)	1.014	0.002 (0.190)	1.002
Other							0.208 (0.223)	1.231	0.209 (0.225)	1.232
Private, 4 year non-PhD										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.446 (0.280)	0.640	-0.435 (0.281)	0.647
Engineering, Math and Physical Science							-0.341 (0.292)	0.711	-0.345 (0.293)	0.708
Biological Sciences and Health Professions							-0.260 (0.230)	0.771	-0.250 (0.228)	0.779
Humanities							-0.130 (0.251)	0.878	-0.129 (0.253)	0.879
Social Sciences							-0.173 (0.218)	0.841	-0.163 (0.218)	0.850
Other							-0.146 (0.217)	0.864	-0.142 (0.218)	0.868
Private, 4 year PhD										
Business and Management	---	---	---	---	---	---	---	---	---	---
Education							-0.653 (0.215)	0.520	-0.659 (0.223)	0.517

Engineering, Math and Physical Science							0.146 (0.242)	1.157	0.113 (0.246)	1.120
Biological Sciences and Health Professions							0.226 (0.205)	1.254	0.206 (0.208)	1.229
Humanities							0.362 (0.201)	1.436	0.338 (0.208)	1.402
Social Sciences							0.217 (0.210)	1.242	0.208 (0.210)	1.231
Other							0.247 (0.235)	1.280	0.248 (0.240)	1.281
Income * SAT Score Combined										*
Business and Management	---	---	---	---	---	---	---	---	---	---
Education									0.000 (0.001)	1.000
Engineering, Math and Physical Science									0.002 (0.001)	1.002
Biological Sciences and Health Professions									0.002 (0.001)	1.002
Humanities									0.002 (0.001)	1.002
Social Sciences									0.001 (0.001)	1.001
Other									0.000 (0.001)	1.000
Income * Below Master's	---	---	---	---	---	---	---	---	---	---
Income * Master's or higher										

Business and Management	---	---	---	---	---	---	---	---	---	---
Education									0.024	1.024
									(0.373)	
Engineering, Math and Physical Science									-0.190	0.827
									(0.258)	
Biological Sciences and Health Professions									-0.176	0.839
									(0.289)	
Humanities									-0.171	0.843
									(0.226)	
Social Sciences									-0.106	0.899
									(0.272)	
Other									-0.122	0.885
									(0.242)	
n	7133		7133		7133		7133		7133	
Log likelihood	-13242.070		-13168.947		-12848.687		-12749.767		-12734.255	
LR chi2	901.475		1047.721		1688.240		1886.080		1917.105	
Prob > chi2	0.000		0.000		0.000		0.000		0.000	
Pseudo R2	0.033		0.038		0.062		0.069		0.070	
D	26484.140		26337.894		25697.375		25499.535		25468.510	

* p<.05; ** p<.01; *** p<.001; Business and management is the base outcome for the response. Multiple-df tests are reported for sets of dummy regressors. BRR standard errors for complex survey designs are in parentheses. Missing categories (not shown) were created for categorical variables. Additional models included interactions between SES and gender, race, parent education, and high school type, but none of these additional terms significantly improved the overall model fit.

Table 5.9 Multinomial Logistic Regression Models of Field of Study Choices for the 1995 Cohort of University Graduates in Canada

	Model 1		Model 2		Model 3		Model 4	
	Beta	**Exp (B)**	**Beta**	**Exp (B)**	**Beta**	**Exp (B)**	**Beta**	**Exp (B)**
Constant								
Business and Management	---	---	---	---	---	---	---	---
Education	-2.710	---	-3.169	---	-2.829	---	-2.931	---
	(1.651)		(1.673)		(1.699)		(1.707)	
Engineering, Math and Physical Science	1.511	---	0.836	---	-0.290	---	-0.221	---
	(1.453)		(1.502)		(1.506)		(1.518)	
Biological Sciences and Health Professions	-3.220	---	-4.911	---	-5.692	---	-5.731	---
	(1.452)		(1.497)		(1.503)		(1.518)	
Humanities	-4.639	---	-6.672	---	-6.601	---	-6.815	---
	(1.612)		(1.665)		(1.701)		(1.716)	
Social Sciences	-2.201	---	-3.482	---	-2.843	---	-2.986	---
	(1.557)		(1.621)		(1.648)		(1.649)	
Other	-13.131	---	-14.153		-13.892	---	-13.991	---
	(1.720)		(1.754)		(1.778)		(1.801)	
Marital Status		***		***		***		***
Single/Previously Married	---	---	---	---	---	---	---	---
Married								
Business and Management	---	---	---	---	---	---	---	---
Education	0.205	1.228	0.201	1.223	0.240	1.271	0.231	1.260
	(0.192)		(0.191)		(0.193)		(0.192)	
Engineering, Math and Physical Science	-0.003	0.997	0.025	1.025	0.039	1.040	0.056	1.058
	(0.160)		(0.161)		(0.162)		(0.161)	
Biological Sciences and								

Health Professions	-0.158	0.854	-0.137	0.872	-0.151	0.860	-0.148	0.862
	(0.158)		(0.161)		(0.162)		(0.162)	
Humanities	-0.438	0.645	-0.413	0.662	-0.391	0.676	-0.400	0.670
	(0.180)		(0.183)		(0.184)		(0.184)	
Social Sciences	-0.393	0.675	-0.396	0.673	-0.364	0.695	-0.384	0.681
	(0.173)		(0.175)		(0.176)		(0.176)	
Other	-0.069	0.933	-0.059	0.943	-0.044	0.957	-0.058	0.944
	(0.236)		(0.240)		(0.238)		(0.240)	
Log(Age)		***		***		***		***
Business and Management	---	---	---	---	---	---	---	---
Education	1.486	4.419	1.692	5.430	1.428	4.170	1.502	4.491
	(1.170)		(1.180)		(1.194)		(1.202)	
Engineering, Math and Physical Science	-0.821	0.440	-0.425	0.654	0.236	1.266	0.134	1.143
	(1.029)		(1.056)		(1.055)		(1.063)	
Biological Sciences and Health Professions	1.885	6.586	2.812	16.643	3.289	26.816	3.281	26.602
	(1.024)		(1.046)		(1.046)		(1.058)	
Humanities	3.233	25.356	4.310	74.440	4.217	67.830	4.378	79.679
	(1.140)		(1.161)		(1.182)		(1.190)	
Social Sciences	1.900	6.686	2.569	13.053	2.133	8.440	2.248	9.469
	(1.098)		(1.129)		(1.146)		(1.149)	
Other	7.827	2507.396	8.386	4385.242	8.222	3721.939	8.330	4146.418
	(1.204)		(1.219)		(1.221)		(1.235)	
Gender		***		***		***		***
Male	---	---	---	---	---	---	---	---
Female								
Business and Management	---	---	---	---	---	---	---	---
Education	1.005	2.732	1.020	2.773	1.009	2.743	1.003	2.726

	(0.185)		(0.183)		(0.184)		(0.184)	
Engineering, Math and Physical Science	-1.112	0.329	0.041	1.042	-1.111	0.329	-1.134	0.322
	(0.150)		(0.205)		(0.150)		(0.150)	
Biological Sciences and Health Professions	0.907	2.477	0.949	2.583	0.946	2.575	0.942	2.565
	(0.148)		(0.148)		(0.148)		(0.148)	
Humanities	0.882	2.416	0.934	2.545	0.928	2.529	0.924	2.519
	(0.168)		(0.170)		(0.170)		(0.170)	
Social Sciences	0.742	2.100	0.785	2.192	0.809	2.246	0.824	2.280
	(0.158)		(0.160)		(0.160)		(0.159)	
Other	0.502	1.652	0.530	1.699	0.541	1.718	0.548	1.730
	(0.220)		(0.222)		(0.219)		(0.218)	
Race		***		***		***		***
Not Visible Minority	---	---	---	---	---	---	---	---
Visible Minority								
Business and Management	---	---	---	---	---	---	---	---
Education	-1.458	0.233	-1.477	0.228	-1.513	0.220	-1.532	0.216
	(0.269)		(0.272)		(0.274)		(0.276)	
Engineering, Math and Physical Science	0.064	1.066	0.041	1.042	0.096	1.101	0.091	1.095
	(0.207)		(0.205)		(0.205)		(0.205)	
Biological Sciences and Health Professions	-0.020	0.980	-0.086	0.918	-0.036	0.965	-0.044	0.957
	(0.210)		(0.211)		(0.212)		(0.213)	
Humanities	-0.902	0.406	-1.013	0.363	-1.038	0.354	-1.035	0.355
	(0.284)		(0.284)		(0.287)		(0.290)	
Social Sciences	-0.860	0.423	-0.915	0.401	-0.916	0.400	-0.940	0.391
	(0.257)		(0.258)		(0.262)		(0.262)	
Other	-0.478	0.620	-0.506	0.603	-0.508	0.602	-0.513	0.599
	(0.289)		(0.286)		(0.285)		(0.286)	

Father's Education				*		*		*
Less than bachelor's	---	---	---	---	---	---	---	---
Bachelor's or higher								
Business and Management	---	---	---	---	---	---	---	---
Education			-0.054	0.947	-0.045	0.956	-0.024	0.976
			(0.252)		(0.252)		(0.252)	
Engineering, Math and Physical Science			0.300	1.350	0.231	1.260	0.244	1.276
			(0.188)		(0.191)		(0.190)	
Biological Sciences and Health Professions			0.439	1.551	0.395	1.484	0.407	1.502
			(0.191)		(0.193)		(0.194)	
Humanities			0.495	1.640	0.496	1.642	0.522	1.685
			(0.210)		(0.211)		(0.210)	
Social Sciences			0.097	1.102	0.075	1.078	0.085	1.089
			(0.202)		(0.203)		(0.203)	
Other			0.135	1.145	0.124	1.132	0.160	1.174
			(0.247)		(0.250)		(0.248)	
Mother's Education								
Less than bachelor's	---	---	---	---	---	---	---	---
Bachelor's or higher								
Business and Management	---	---	---	---	---	---	---	---
Education			0.047	1.048	0.075	1.078	0.063	1.065
			(0.285)		(0.284)		(0.282)	
Engineering, Math and Physical Science			0.134	1.143	0.071	1.074	0.062	1.064
			(0.416)		(0.222)		(0.220)	
Biological Sciences and Health Professions			0.318	1.374	0.278	1.320	0.268	1.307
			(0.213)		(0.217)		(0.216)	
Humanities			0.500	1.649	0.507	1.660	0.481	1.618
			(0.232)		(0.233)		(0.231)	

Social Sciences			0.355 (0.224)	1.426	0.376 (0.228)	1.456	0.378 (0.226)	1.459
Other			0.383 (0.271)	1.457	0.397 (0.274)	1.487	0.358 (0.278)	1.430
Income				***		***		**
No Loans	---	---	---	---	---	---	---	---
Loans of $15,000 or less								
Business and Management	---	---	---	---	---	---	---	---
Education			0.361 (0.209)	1.435	0.350 (0.208)	1.419	0.337 (0.318)	1.401
Engineering, Math and Physical Science			-0.103 (0.177)	0.902	-0.085 (0.178)	0.919	0.189 (0.258)	1.208
Biological Sciences and Health Professions			0.221 (0.178)	1.247	0.246 (0.179)	1.279	0.288 (0.257)	1.334
Humanities			0.320 (0.196)	1.377	0.312 (0.196)	1.366	0.333 (0.290)	1.395
Social Sciences			0.470 (0.185)	1.600	0.462 (0.185)	1.587	0.454 (0.272)	1.575
Other			0.168 (0.276)	1.183	0.168 (0.275)	1.183	-0.037 (0.356)	0.964
Loans above $15,000								
Business and Management	---	---	---	---	---	---	---	---
Education			0.733 (0.376)	2.081	0.792 (0.379)	2.208	0.646 (0.620)	1.908
Engineering, Math and Physical Science			0.208 (0.322)	1.231	0.106 (0.327)	1.112	0.100 (0.514)	1.105
Biological Sciences and								

Health Professions			1.392 (0.306)	4.023	1.294 (0.309)	3.647	1.521 (0.479)	4.577
Humanities			1.316 (0.328)	3.728	1.339 (0.332)	3.815	1.134 (0.534)	3.108
Social Sciences			1.281 (0.320)	3.600	1.299 (0.326)	3.666	1.066 (0.513)	2.904
Other			1.091 (0.352)	2.977	1.110 (0.354)	3.034	0.722 (0.543)	2.059
Ability						***		***
No Scholarships	---	---	---	---	---	---	---	---
Scholarships of $5,000 or less								
Business and Management	---	---	---	---	---	---	---	---
Education					-0.494 (0.204)	0.610	-0.323 (0.248)	0.724
Engineering, Math and Physical Science					0.318 (0.167)	1.374	0.559 (0.196)	1.749
Biological Sciences and Health Professions					0.372 (0.165)	1.451	0.366 (0.197)	1.442
Humanities					-0.132 (0.191)	0.876	0.098 (0.233)	1.103
Social Sciences					-0.570 (0.182)	0.566	-0.629 (0.234)	0.533
Other					-0.236 (0.227)	0.790	-0.170 (0.275)	0.844
Scholarships above $5,000								
Business and Management	---	---	---	---	---	---	---	---
Education		---			-0.058	0.944	-0.163	0.850

						(0.450)		(0.529)	
Engineering, Math and Physical Science						1.144	3.139	1.118	3.059
						(0.339)		(0.380)	
Biological Sciences and Health Professions						1.005	2.732	1.038	2.824
						(0.362)		(0.408)	
Humanities						0.081	1.084	-0.134	0.875
						(0.412)		(0.526)	
Social Sciences						-0.551	0.576	-0.702	0.496
						(0.402)		(0.486)	
Other						-0.301	0.740	-0.420	0.657
						(0.466)		(0.556)	
Aspirations							***		**
Below Master's	---	---	---	---	---	---	---	---	---
Master's or higher									
Business and Management	---	---	---	---	---	---	---	---	---
Education						0.407	1.502	0.385	1.470
						(0.204)		(0.252)	
Engineering, Math and Physical Science						-0.123	0.884	-0.058	0.944
						(0.176)		(0.210)	
Biological Sciences and Health Professions						-0.316	0.729	-0.142	0.868
						(0.179)		(0.217)	
Humanities						0.263	1.301	0.308	1.361
						(0.194)		(0.240)	
Social Sciences						0.037	1.038	0.055	1.057
						(0.188)		(0.234)	
Other						-0.034	0.967	-0.005	0.995
						(0.246)		(0.310)	

INCOME * Ability								***
*No Loans * No Scholarships*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * No Scholarships*	---	---	---	---	---	---	---	---
*Loans above $15,000 * No Scholarships*	---	---	---	---	---	---	---	---
*No Loans * Scholarships $5,000 or less*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Scholarships $5,000 or less*								
Business and Management	---	---	---	---	---	---	---	---
Education							-0.421 (0.473)	0.656
Engineering, Math and Physical Science							-0.776 (0.406)	0.460
Biological Sciences and Health Professions							0.066 (0.397)	1.068
Humanities							-0.471 (0.446)	0.624
Social Sciences							-0.206 (0.425)	0.814
Other							-0.183 (0.602)	0.833
*Loans above $15,000 * Scholarships $5,000 or less*								
Business and Management	---	---	---	---	---	---	---	---
Education							-0.191 (0.300)	0.826
Engineering, Math and Physical Science							-0.616 (0.690)	0.540
Biological Sciences and Health Professions							-0.068 (0.639)	0.934

Humanities							-0.588 (0.682)	0.555
Social Sciences							0.732 (0.675)	2.079
Other							0.066 (0.762)	1.068
*No Loans * Scholarships above $5,000*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Scholarships above $5,000*								
Business and Management	---	---	---	---	---	---	---	---
Education							0.338 (1.161)	1.402
Engineering, Math and Physical Science							0.033 (0.992)	1.034
Biological Sciences and Health Professions							-0.050 (1.090)	0.951
Humanities							0.410 (1.152)	1.507
Social Sciences							0.298 (1.132)	1.347
Other							0.057 (1.376)	1.059
*Loans above $15,000 * Scholarships above $5,000*								
Business and Management	---	---	---	---	---	---	---	---
Education							0.821 (1.459)	2.273
Engineering, Math and Physical Science							0.660 (1.015)	1.935

Biological Sciences and Health Professions							0.402 (0.980)	1.495
Humanities							1.030 (1.100)	2.801
Social Sciences							1.162 (1.034)	3.196
Other							1.189 (1.217)	3.284
INCOME * Aspirations								
*No Loans * Below Master's*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Below Master's*	---	---	---	---	---	---	---	---
*Loans above $15,000 * Below Master's*	---	---	---	---	---	---	---	---
*No Loans * Master's or higher*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Master's or higher*								
Business and Management	---	---	---	---	---	---	---	---
Education							0.131 (0.471)	1.140
Engineering, Math and Physical Science							-0.285 (0.416)	0.752
Biological Sciences and Health Professions							-0.363 (0.416)	0.696
Humanities							-0.131 (0.443)	0.877
Social Sciences							0.040 (0.427)	1.041
Other							-0.167 (0.591)	0.846

*Loans above $15,000 * Master's or higher*								
Business and Management	---	---	---	---	---	---	---	---
Education							-0.362	0.696
							(0.846)	
Engineering, Math and Physical Science							0.173	1.189
							(0.736)	
Biological Sciences and Health Professions							-0.745	0.475
							(0.715)	
Humanities							-0.232	0.793
							(0.762)	
Social Sciences							-0.459	0.632
							(0.743)	
Other							0.112	1.119
							(0.817)	
n	6232		6232		6232		6232	
Log likelihood	-10880.349		-10737.961		-10580.169		-10509.202	
LR chi2	977.209		1261.985		1577.569		1719.503	
Prob > chi2	0.000		0.000		0.000		0.000	
Pseudo R2	0.043		0.056		0.069		0.076	
D	21760.699		21475.922		21160.339		21018.405	

* p<.05; ** p<.01; *** p<.001; Business and management is the base outcome for the response. Multiple-df tests are reported for sets of dummy regressors. Robust standard errors are in parentheses. Missing categories (not shown) were created for categorical variables. Additional models included interactions between income and gender, race, father's education, and mother's education, but none of these additional terms significantly improved the overall model fit.

Table 5.10 Multinomial Logistic Regression Models of Field of Study Choices for the 2000 Cohort of University Graduates in Canada

	Model 1		Model 2		Model 3		Model 4	
	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)	Beta	Exp (B)
Constant								
Business and Management	---	---	---	---	---	---	---	---
Education	-1.056	---	-1.671	---	-1.357	---	-1.202	---
	(1.078)		(1.151)		(1.211)		(1.211)	
Engineering, Math and Physical Science	4.151	---	3.677	---	2.593	---	2.642	---
	(1.076)		(1.115)		(1.136)		(1.151)	
Biological Sciences and Health Professions	2.539	---	2.183	---	1.252	---	1.359	---
	(0.971)		(1.006)		(1.033)		(1.041)	
Humanities	-0.540	---	-1.507	---	-2.102	---	-1.901	---
	(1.127)		(1.178)		(1.205)		(1.207)	
Social Sciences	0.809	---	0.464	---	0.457	---	0.474	---
	(1.143)		(1.169)		(1.204)		(1.222)	
Other	-6.548	---	-4.282	---	-5.006	---	-3.785	---
	(2.272)		(3.077)		(3.980)		(3.595)	
Marital Status		***		***		***		***
Single/Previously Married	---	---	---	---	---	---	---	---
Married								
Business and Management	---	---	---	---	---	---	---	---
Education	0.372	1.451	0.322	1.380	0.302	1.353	0.308	1.361
	(0.143)		(0.144)		(0.145)		(0.146)	
Engineering, Math and Physical Science	-0.128	0.880	-0.145	0.865	-0.138	0.871	-0.154	0.857
	(0.122)		(0.124)		(0.124)		(0.125)	
Biological Sciences and Health Professions	-0.149	0.862	-0.161	0.851	-0.148	0.862	-0.148	0.862
	(0.111)		(0.112)		(0.112)		(0.113)	

Humanities	-0.357 (0.134)	0.700	-0.356 (0.135)	0.700	-0.343 (0.135)	0.710	-0.357 (0.134)	0.700
Social Sciences	-0.274 (0.133)	0.760	-0.280 (0.134)	0.756	-0.275 (0.134)	0.760	-0.278 (0.134)	0.757
Other	0.935 (0.646)	2.547	0.887 (0.624)	2.428	0.917 (0.652)	2.502	0.896 (0.665)	2.450
Log(Age)		***		***		**		**
Business and Management	---	---	---	---	---	---	---	---
Education	-0.442 (0.768)	0.643	-0.238 (0.800)	0.788	-0.411 (0.835)	0.663	-0.498 (0.832)	0.608
Engineering, Math and Physical Science	-2.896 (0.759)	0.055	-2.733 (0.776)	0.065	-2.102 (0.786)	0.122	-2.132 (0.793)	0.119
Biological Sciences and Health Professions	-1.727 (0.681)	0.178	-1.585 (0.697)	0.205	-1.092 (0.709)	0.336	-1.133 (0.712)	0.322
Humanities	0.339 (0.793)	1.404	0.836 (0.816)	2.307	1.120 (0.827)	3.065	1.077 (0.823)	2.936
Social Sciences	-0.546 (0.804)	0.579	-0.408 (0.812)	0.665	-0.472 (0.834)	0.624	-0.498 (0.843)	0.608
Other	1.395 (1.379)	4.035	0.107 (1.729)	1.113	0.330 (2.096)	1.391	-0.183 (1.978)	0.833
Gender		***		***		***		***
Male	---	---	---	---	---	---	---	---
Female								
Business and Management	---	---	---	---	---	---	---	---
Education	1.372 (0.148)	3.943	1.388 (0.148)	4.007	1.413 (0.148)	4.108	1.406 (0.148)	4.080
Engineering, Math and								

Physical Science	-0.996	0.369	-0.976	0.377	-0.953	0.386	-0.963	0.382
	(0.119)		(0.119)		(0.120)		(0.119)	
Biological Sciences and Health Professions	0.588	1.800	0.607	1.835	0.653	1.921	0.656	1.927
	(0.105)		(0.105)		(0.108)		(0.107)	
Humanities	0.506	1.659	0.540	1.716	0.560	1.751	0.549	1.732
	(0.118)		(0.118)		(0.120)		(0.119)	
Social Sciences	0.802	2.230	0.820	2.270	0.860	2.363	0.860	2.363
	(0.125)		(0.126)		(0.126)		(0.125)	
Other	0.705	2.024	0.631	1.879	0.637	1.891	0.630	1.878
	(0.621)		(0.668)		(0.655)		(0.665)	
Race		***		***		***		***
Not Visible Minority	---	---	---	---	---	---	---	---
Visible Minority								
Business and Management	---	---	---	---	---	---	---	---
Education	-0.660	0.517	-0.698	0.498	-0.721	0.486	-0.718	0.488
	(0.209)		(0.211)		(0.210)		(0.210)	
Engineering, Math and Physical Science	0.289	1.335	0.274	1.315	0.284	1.328	0.272	1.313
	(0.154)		(0.155)		(0.156)		(0.156)	
Biological Sciences and Health Professions	-0.074	0.929	-0.078	0.925	-0.051	0.950	-0.060	0.942
	(0.147)		(0.148)		(0.150)		(0.150)	
Humanities	-0.374	0.688	-0.382	0.682	-0.383	0.682	-0.384	0.681
	(0.170)		(0.171)		(0.170)		(0.171)	
Social Sciences	-0.053	0.948	-0.080	0.923	-0.086	0.918	-0.110	0.896
	(0.163)		(0.162)		(0.163)		(0.162)	
Other	0.415	1.514	0.402	1.495	0.318	1.374	0.354	1.425
	(0.986)		(0.953)		(0.946)		(0.906)	
Father's Education				**		**		*

Less than bachelor's	---	---	---	---	---	---		
Bachelor's or higher								
Business and Management	---	---	---	---	---	---	---	---
Education			0.083	1.087	0.073	1.076	0.073	1.076
			(0.171)		(0.173)		(0.171)	
Engineering, Math and Physical Science			0.357	1.429	0.316	1.372	0.307	1.359
			(0.136)		(0.137)		(0.138)	
Biological Sciences and Health Professions			0.138	1.148	0.083	1.087	0.085	1.089
			(0.123)		(0.125)		(0.125)	
Humanities			0.203	1.225	0.160	1.174	0.164	1.178
			(0.145)		(0.146)		(0.146)	
Social Sciences			0.103	1.108	0.069	1.071	0.055	1.057
			(0.144)		(0.144)		(0.144)	
Other			-1.892	0.151	-1.918	0.147	-1.785	0.168
			(0.630)		(0.628)		(0.623)	
Mother's Education				*		*		*
Less than bachelor's	---	---	---	---	---	---	---	---
Bachelor's or higher								
Business and Management	---	---	---	---	---	---	---	---
Education			-0.072	0.931	-0.063	0.939	-0.072	0.931
			(0.188)		(0.189)		(0.187)	
Engineering, Math and Physical Science			-0.091	0.913	-0.124	0.883	-0.120	0.887
			(0.149)		(0.150)		(0.151)	
Biological Sciences and Health Professions			0.032	1.033	-0.015	0.985	-0.021	0.979
			(0.134)		(0.136)		(0.135)	
Humanities			0.308	1.361	0.271	1.311	0.287	1.332
			(0.152)		(0.153)		(0.152)	
Social Sciences			0.078	1.081	0.061	1.063	0.050	1.051

			(0.156)		(0.157)		(0.157)	
Other			-0.649	0.523	-0.748	0.473	-0.815	0.443
			(0.553)		(0.564)		(0.591)	
INCOME				**		**		***
No Loans	---	---	---	---	---	---	---	---
Loans of $15,000 or less								
Business and Management	---	---	---	---	---	---	---	---
Education			0.670	1.954	0.654	1.923	0.522	1.685
			(0.158)		(0.158)		(0.232)	
Engineering, Math and Physical Science			0.271	1.311	0.278	1.320	0.409	1.505
			(0.131)		(0.132)		(0.219)	
Biological Sciences and Health Professions			0.109	1.115	0.114	1.121	-0.134	0.875
			(0.122)		(0.123)		(0.202)	
Humanities			0.119	1.126	0.125	1.133	-0.008	0.992
			(0.140)		(0.140)		(0.228)	
Social Sciences			0.096	1.101	0.088	1.092	0.044	1.045
			(0.146)		(0.146)		(0.249)	
Other			0.338	1.402	0.333	1.395	-1.529	0.217
			(0.782)		(0.765)		(1.203)	
Loans above $15,000								
Business and Management	---	---	---	---	---	---	---	---
Education			0.706	2.026	0.720	2.054	0.704	2.022
			(0.180)		(0.182)		(0.260)	
Engineering, Math and Physical Science			0.388	1.474	0.436	1.547	0.326	1.385
			(0.156)		(0.157)		(0.236)	
Biological Sciences and Health Professions			0.396	1.486	0.454	1.575	0.409	1.505
			(0.143)		(0.144)		(0.214)	

Humanities			0.319 (0.164)	1.376	0.361 (0.164)	1.435	-0.223 (0.261)	0.800
Social Sciences			0.344 (0.164)	1.411	0.380 (0.163)	1.462	0.544 (0.248)	1.723
Other			-0.774 (0.701)	0.461	-0.751 (0.716)	0.472	-1.074 (0.996)	0.342
Ability						***		***
No Scholarships	---	---	---	---	---	---	---	---
Scholarships of $5,000 or less								
Business and Management	---	---	---	---	---	---	---	---
Education					-0.354 (0.179)	0.702	-0.421 (0.277)	0.656
Engineering, Math and Physical Science					0.330 (0.132)	1.391	0.481 (0.182)	1.618
Biological Sciences and Health Professions					0.229 (0.121)	1.257	0.309 (0.163)	1.362
Humanities					0.059 (0.137)	1.061	0.040 (0.183)	1.041
Social Sciences					-0.263 (0.140)	0.769	-0.168 (0.184)	0.845
Other					-0.016 (0.889)	0.984	-1.578 (0.829)	0.206
Scholarships above $5,000								
Business and Management	---	---	---	---	---	---	---	---
Education					-0.061 (0.346)	0.941	-0.348 (0.406)	0.706
Engineering, Math and								

Physical Science					1.011	2.748	1.044	2.841
					(0.224)		(0.287)	
Biological Sciences and Health Professions					1.073	2.924	1.056	2.875
					(0.218)		(0.280)	
Humanities					0.889	2.433	0.666	1.946
					(0.247)		(0.314)	
Social Sciences					0.357	1.429	0.548	1.730
					(0.257)		(0.321)	
Other					0.623	1.865	-1.184	0.306
					(0.872)		(1.170)	
Aspirations						***		***
Below Master's	---	---	---	---	---	---	---	---
Master's or higher								
Business and Management	---	---	---	---	---	---	---	---
Education					0.063	1.065	0.104	1.110
					(0.151)		(0.223)	
Engineering, Math and Physical Science					-0.160	0.852	-0.270	0.763
					(0.124)		(0.173)	
Biological Sciences and Health Professions					-0.163	0.850	-0.286	0.751
					(0.114)		(0.155)	
Humanities					0.114	1.121	-0.059	0.943
					(0.130)		(0.171)	
Social Sciences					0.081	1.084	0.028	1.028
					(0.130)		(0.172)	
Other					0.789	2.201	0.562	1.754
					(0.681)		(1.016)	
INCOME * Ability								***
*No Loans * No Scholarships*	---	---	---	---	---	---	---	---

*Loans $15,000 or less * No Scholarships*	---	---	---	---	---	---	---	---
*Loans above $15,000 * No Scholarships*	---	---	---	---	---	---	---	---
*No Loans * Scholarships $5,000 or less*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Scholarships $5,000 or less*								
Business and Management	---	---	---	---	---	---	---	---
Education							-0.051 (0.406)	0.950
Engineering, Math and Physical Science							-0.277 (0.294)	0.758
Biological Sciences and Health Professions							-0.107 (0.277)	0.899
Humanities							0.154 (0.310)	1.166
Social Sciences							0.032 (0.338)	1.033
Other							3.154 (1.288)	23.430
*Loans above $15,000 * Scholarships $5,000 or less*								
Business and Management	---	---	---	---	---	---	---	---
Education							0.119 (0.453)	1.126
Engineering, Math and Physical Science							-0.466 (0.345)	0.628
Biological Sciences and Health Professions							-0.275 (0.320)	0.760
Humanities							-0.001 (0.363)	0.999

Social Sciences							-0.476 (0.369)	0.621
Other							1.196 (1.249)	3.307
*No Loans * Scholarships above $5,000*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Scholarships above $5,000*								
Business and Management	---	---	---	---	---	---	---	---
Education							0.167 (0.681)	1.182
Engineering, Math and Physical Science							0.127 (0.504)	1.135
Biological Sciences and Health Professions							0.343 (0.489)	1.409
Humanities							0.597 (0.571)	1.817
Social Sciences							-0.641 (0.572)	0.527
Other							2.171 (1.690)	8.767
*Loans above $15,000 * Scholarships above $5,000*								
Business and Management	---	---	---	---	---	---	---	---
Education							1.266 (0.870)	3.547
Engineering, Math and Physical Science							0.080 (0.602)	1.083
Biological Sciences and Health Professions							-0.026 (0.558)	0.974

Humanities							1.015 (0.633)	2.759
Social Sciences							-0.418 (0.652)	0.658
Other							4.732 (1.749)	113.522
INCOME * Aspirations								
*No Loans * Below Master's*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Below Master's*	---	---	---	---	---	---	---	---
*Loans above $15,000 * Below Master's*	---	---	---	---	---	---	---	---
*No Loans * Master's or higher*	---	---	---	---	---	---	---	---
*Loans $15,000 or less * Master's or higher*								
Business and Management	---	---	---	---	---	---	---	---
Education							0.200 (0.350)	1.221
Engineering, Math and Physical Science							0.005 (0.288)	1.005
Biological Sciences and Health Professions							0.447 (0.277)	1.564
Humanities							0.010 (0.300)	1.010
Social Sciences							0.168 (0.322)	1.183
Other							1.086 (1.365)	2.962
*Loans above $15,000 * Master's or higher*								
Business and Management	---	---	---	---	---	---	---	---

Education				-0.156 (0.386) 0.856
Engineering, Math and Physical Science				0.565 (0.334) 1.759
Biological Sciences and Health Professions				0.261 (0.306) 1.298
Humanities				0.897 (0.350) 2.452
Social Sciences				0.124 (0.346) 1.132
Other				-0.551 (1.372) 0.576
n	9835	9835	9835	9835
Log likelihood	-16634.167	-16534.782	-16360.065	-16246.956
LR chi2	1042.936	1241.706	1591.141	1817.358
Prob > chi2	0.000	0.000	0.000	0.000
Pseudo R2	0.030	0.036	0.046	0.053
D	33268.334	33069.565	32720.130	32493.913

* p<.05; ** p<.01; *** p<.001; Business and management is the base outcome for the response. Multiple-df tests are reported for sets of dummy regressors. Robust standard errors are in parentheses. 'Missing' categories (not shown) were created for categorical variables. Additional models included interactions between income and gender, race, father's education, and mother's education, but none of these additional terms significantly improved the overall model fit.

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