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Migration of University of Maine 2002 Graduates

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MIGRATION OF UNIVERSITY OF MAINE 2002 GRADUATES

By

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In the context of today's tight labor market and increasing demand for highly skilled workers, Maine is considering how to attract and retain college graduates in the state. The educational system and economic opportunities such as the job market, wage levels, and taxes, as well as other factors impacting the migration trends of college graduates are evaluated. Understanding the patterns of educated people's relocation decisions, and the reasons influencing them, are concerns not just of government officials. Students with bachelor and advanced degrees are thought to be an asset to the community and the state since they add to the economic prosperity in the area by attracting higher paying jobs and pay more in taxes. Consequently, a greater number of them is desired.

The concern with out-migration of college-educated people is also seen in Maine. During the last 20 years, the state has lost on net about 18,000 of college-bound students (Maine State Planning Office, 2001). In addition, in 1998-2000, Maine proportion of

working-age population with at least bachelor degree was 18 percent below the national average, and Maine workers earned 14 percent less on average compared to the rest of the country (Trostel, 2002). This thesis study as a result focuses on the issue 'why' and' where' the University of Maine students resettle after graduation and what can be done to increase the retention of college graduates in Maine. Survey data of migration of University of Maine 2002 graduates are used to assess the migration trends of the University of Maine graduates. A weighted logit model is employed to estimate the effect of explanatory variables, such as personal characteristics, as well as economic, environmental, and quality of life conditions of Maine, on the relocation decisions. The results may prove to be useful to the University of Maine and the State of Maine in creating policy options that would help to attract and retain more college-educated people.

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INTRODUCTION

1.1.   Statement of the Problem

In the context of today's tight labor market and increasing demand for highly

skilled workers, many states are considering how to attract and retain college graduates.

They are reevaluating their school programs and assessing economic opportunities in

terms of the job market and wage levels as well as other factors impacting the migration

trends of college graduates (Kodrzycki, 2001). Understanding the migration patterns and

the factors influencing them are concerns primarily of state and local officials

(McCauley, 1999). The out-migration of young people and its reasons are of sufficient

importance for a number of states such as Pennsylvania. State governments address this

issue through legislation targeting an increase in the retention rate of college graduates.

For example, Governor Ridge of Pennsylvania proposed a 'Brain Gain Budget' in 1998

that connects young college graduates with employers and attracts high tech industry to

the state (De Jong and Klein, 1998).

People with college degrees are quite mobile geographically relative to the rest of

the population and 15 percent of bachelor holders move every year (Kodrzycki, 2001;

U.S Bureau of Census, 2001). It is widely known that a variety of factors drive after-

graduation location decision. Factors such as the employment growth rate (Kodrzycki,

2001), the average wage rate (Tornatzky et. al., 2001), the cost of living (Kodrzycki,

2001), as well as urbanization levels (Tornatzky et. al., 2001), and available amenities

(von Reichert and Rudzitis, 1994) are the primary reasons for relocation. Further,

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migration depends on the personal characteristics of migrants such as age, gender, and marital status (Greenwood, 1973; Mills and Hazarika, 2001). Finally, as Tornatzky et. al. (2001) reports, investment in college education influences migration trends by increasing the retention rate of college graduates in the state of college attendance.

Students with bachelor and advanced degrees are believed to be an asset to the community and the state in which they reside since they are correlated with the economic prosperity in the area. A highly skilled workforce attracts higher paying jobs and, therefore, improves economic growth in the region. With higher economic growth more expenditures can be allocated to programs such as education, public services, and workforce training. In general, every member of the community benefits from an overall increase in educational attainment levels through better public services and more employment opportunities. Without well-educated workers, communities experience lack of job prospects especially for young, college educated people who are forced to relocate to areas with favorable economic opportunities. The loss of educated people through out-migration, therefore, is a concern of state and local communities whose viability depends deeply on educated residents. Despite this concern many rural states in the U.S. lack understating of 'where' and 'why' students choose to relocate after receiving degrees from colleges (McCauley, 1999).

Concern about the out-migration of college-educated people is prevalent in Maine. During the last 10 years, the state has lost about 18,000 college-bound students (Maine State Planning Office, 2002). These students either migrated to attend college out of state or relocated to other U.S. states after graduation. Many young Mainers migrate out of state every year due to a lack of job opportunities and low wages. According to

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Trostel (2002), Maine workers on average earn 14 percent less than the average U.S. wage. As mentioned earlier, an educated workforce is correlated with the economic prosperity of the region; lack of it might create educational brain drain as well as economic distress in the area. In the last few years, Maine's government has shown great interest in finding a solution to the relocation of Maine youth, especially, those with college degrees.

The objective of this thesis is to find the motives for college graduates' emigration from Maine. For this purpose, migration data of University of Maine 2002 graduates was used to uncover the determinants of migration. Using the University of Maine graduates as a representation of the college population in Maine is appropriate. The University of Maine is the largest institution of higher education among the public and private schools in the state with approximately 11,000 students enrolled (Office of Institutional Studies, 2001). It also has the highest ratio of Maine residents (82 percent) attending its programs (Office of Institutional Studies, 2001). On the contrary, private schools such as Bates attract a high number of out of state students (80 percent) who at a large scale return to their home states after graduation (Bates College, 2000; Franklin and Hsing, 1994). Consequently, the University of Maine college graduates are the best group to participate in a study of college migration from Maine because they best represent the college-bound population in Maine.

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1.2. Background

1.2.1. Migration Trends in the U.S.

Geographical mobility has long been an important aspect of American life. About 40 to 50 million Americans move every year (Schachter, 1990-2001). In the 1950s and 1960s, the annual migration rate was around 20 percent and gradually declined to 16.6 percent in 1983. Following a short-term increase to 20.2 percent in the mid 1980s, the mobility fell to 16 percent in 1996. In 2000, the migration rate was even lower at 15.5 percent nationwide. The decline in nation-wide migration reflects the growing number of elderly population in the U.S. (Schachter, 1996 and 2001).

Between 1990 and 2000, around 480 million people in the U.S. moved (U.S. Bureau of Census, 1995-2001). On average, 63 percent relocated locally, 19 percent between counties, 15 percent across state lines, and 3 percent came from abroad (Schachter, 1995-2001). Among the U.S. regions, the West experienced the highest population growth form migration alone of 18.5 percent. People who relocated west were from the Northeast and Midwest primarily, where economic downturn forced mills and mines to close. The South experienced the second highest increase in population from migration, 17.1 percent, during the last decade and gained 2.5 million people due to a high amenity level in the region. On the other hand, the Northeast was the slowest growing region through interregional mobility in the nation with only 11.7 percent increase in population from migration, which was below the national rate of 15.9 percent. The Northeast was also the only region with a negative internal net migration of 2.3 million (Schachter, 1995-2001).

Personal characteristics such as education and age influence U.S. internal

migration trends. During the last decade, the most mobile age group was that of 20-29

year olds. About 30 percent of them moved during the last 10 years. Their high rates of

migration are associated with life course events such as a new job and/or marriage.

However, the migration rate decreases with age and consequently, fewer than 10 percent

of people older than 65 years old changed place of residency during the 1990s

(Schachter, 1995-2001). Migration rates also fluctuate with educational levels. People

with bachelor degrees were the most likely to relocate among other educational groups

during the past decade. They migrated at a rate of 15 percent compared to a rate of only

12 percent high school graduates. They were also most likely to undertake long-distance

moves and 47 percent of them relocated across state lines. Finally, nearly 50 percent of

them moved, mostly looking for higher paying jobs (Schachter, 1995-2001).

Many social scientists argue that people relocate for a combination of economic

and non-economic reasons. According to Schachter (2000), between 1999 and 2000,

more than 31 percent of migrants relocated for work-oriented reasons, with 10 percent

starting or transferring to a new job, about 30 percent for housing related reasons with 10

percent moving to a better house or apartment, and 27 percent moved for family-oriented

reasons. Better-educated people are more likely to move for work-oriented reasons. For

example, 14 percent of high school graduates moved for work-oriented reasons while 24

and 26 percent of bachelor and master holders respectively migrated to start a new job.

Additionally, 47 percent of master degree holders moved long distances for work-

oriented reasons compared to only 18 percent of high school graduates (Schachter, 2000).

1.2.2. Migration Trends in Rural America

Before the 1970s, rural areas of the U.S. were losing population to urban areas, which had better job and wage opportunities as well as better living conditions. In the 1970s, this trend reversed and population in the nonmetropolitan areas grew by 15 percent between 1970-1980. The phenomenon was a result of suburbanization, urban sprawl, and advances in transportation as well as telecommunication, strengthening the linkages between the rural and urban economies (Weeks, 1989). However, the growth in population in the nonmetropolitan areas did not affect the rural regions uniformly, creating sharp economic and demographic distinctions. For example, the costal Sunbelt areas experienced high levels of population growth attributed to both regional amenities and quickly growing regional centers with diversified economies. Additionally, rural parts of Florida and the upper Great Lakes attracted large numbers of retirees due to their high level of amenities and low cost of living. Discretionary incomes of the elderly have contributed to economic development of these nonmetropolitan areas. On the other hand, the interior states experienced an adverse impact of sprawl and technological advancements since they depended heavily on less competitive economic base (Frey, 1995).

During the period of 1988 to 1999, 10.4 million people moved into rural America from urban areas while 8.8 million moved out (Cromartie, 1995, 1998, and 2000). Annual population growth from net migration increased steadily during the early and mid-1990s but dropped to half of a percent during 1997-1999. The West had the highest nonmetropolitan population change with 1.4 percent net in-migration during 1993-1994. The North and Central regions had the lowest with only 0.3 percent increase (Cromartie,

1995). The overall net gain of 950,000 residents for rural areas reflected the economic opportunities and residential amenities, and at the same time provided nonmetropolitan regions with the human resource base required for economic growth (Cromartie, 1995, 1998, 2000). The most recent migration trends indicate a slowdown in nonmetropolitan resettlement gain from 458,000 in 1995-1996 to 170,000 in 1997-1999. This change reflected a booming metropolitan economy with increasing opportunities for labor force entrance (Cromartie, 2000).

In the mid-1990s rural areas attracted a fair share of college graduates, ending a brain drain that characterized migration patterns in the 1980s. The trend deepened in 1995 and 1996, when the net in-migration reached 1.4 percent, twice the rate for high school graduates (Cromarte, 1998). Net movement into rural areas was highest in the early career period of individuals, mainly ages 26-30, including many young families, with nonmetropolitan areas gaining 2 percent a year (Cromartie, 1998). The most popular destination among the college graduates was the Western U.S. offering high-amenity areas. In 1999, the net migration of college educated people to nonmetropolitan areas dropped to nearly zero. Although the in-migration rate of college graduates declined, the brain drain of 1980s is not a threat due to the advancements in technology, telecommunication, and transportation, which allow businesses to serve customers in the urban areas. Additionally, college graduates enjoy high-amenity areas and, consequently, are more likely to give up higher paying jobs in the city to live in rural regions (Cromartie, 2000).

1.2.3. Migration in Maine

According to the Maine State Planning Office (2002), Maine is experiencing an

out-migration of young people. This trend began in the late 1980s and accelerated in the

1990s. As mentioned earlier, young Americans between ages 20 to 29 have the highest

rates of relocation of any age groups; and approximately 30 percent of them move every

year (Schachter, 1995-2001) Their most common destinations are the urban areas in the

southern and western United States. On the other hand, rural areas of the country,

especially in the Northeast, have suffered the greatest losses due to out-migration of their

young persons. Consequently, it is not surprising that Maine as a rural northeastern state

has been experiencing a net out-migration of its youth. There are several reasons for this

in Maine. The motives for relocating out of state are attending college in another state

and the poor state of Maine's economy (Heminway, 2002).

Migration from Maine was not the dominating trend before the late 1980s.

According to Ploch (1988), Maine experienced net in-migration between 1970-1984,

although the state did not necessarily provide attractive economic opportunities. Mid-

twenties and -thirties, well educated, white-collar workers and professionals migrated to

Maine bringing with them a new outlook on the environment, community life, the arts,

and life in general. In 1984, 65 percent of the in-migrants moved into the state from either

the New England or Mid-Atlantic regions. The age composition was in favor of younger

people with ages between 20-34 years. They constituted 51 percent of the movers in 1976

and a 41 percent in 1984. Further, 43 percent of the new migrants had a college-level

education. Many of them were doctors, dentists, lawyers, and engineers, and, therefore,

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provided small Maine towns with a variety of professional services that normally were only offered in the state's urban areas (Ploch, 1988).

According to Ploch (1988), 51 percent had higher or the same level of income after their relocation that differs from the conventional notion that migrants earn lower wages after moving to Maine. However, the variation in the income levels was dependent on the occupational status. For example, in the year 1984, 45 percent of the professional and managerial workers reported an increase in earnings due to their relocation to Maine compared to only 31 percent of the blue-collar workers. This phenomenon occurred becuase Maine had a surplus of blue-collar workers and significant deficiency of white-collar workers. Additionally, most highly educated people moved to Maine for a better quality-of-life and outdoor opportunities rather than favorable economic prospects (Ploch, 1988).

According to Mageean. et. al. (2000), in-migration to Maine peaked in the 1987-1988 period during which the state gained more than 13,000 persons. Migration numbers remained positive until 1990, when the recession first struck. Since then the trend was positive, although compared to the 1970s and 1980s the in-migration was relatively small. Even during economic prosperity people left Maine. For example, between 1985 and 1990, Maine lost 98,688 individuals, who mostly migrated to Florida, Massachusetts, and New Hampshire. Most of those who migrated were in the 20-34 age group. Additionally, among out-migrants the most common educational levels were 'some college' or 'associate degree' and 'less than high school'. At the same time, Maine lost 22,818 college graduates but gained 32,731 in-migrants with college degrees. The net gain of nearly 10,000 reflected the economic prosperity in Maine at that time. Finally,

Maine experienced a net out-migration of 12,171 people between 1990 and 1998, which was due to recession in the New England region (Mageean et. al., 2000).

As mentioned earlier, Maine has experienced a sharp decline in population of young residents (15-29 years old) during the past 20 years, which was attributed to slower natural population growth as well as increasing out-migration from Maine. At the same time it experienced a rapid growth in population of residents aged 35-59. According to the U.S. Bureau of Census (2001), between the 1980-2000 period, Maine experienced a decrease in the population of young people by approximately 67,000. The most significant loss was for the 18-29 age group with the greatest population losses of 31 percent occurring for 22-24 year old Maine residents. Overall, in the last 30 years, the state lost about 25 percent of persons in their early twenties (U.S. Bureau of Census, 2001). Figure 1.1. displays the percentage change in youth population since 1980.

Figure 1.1. Percentage Change in Youth Population Since 1980
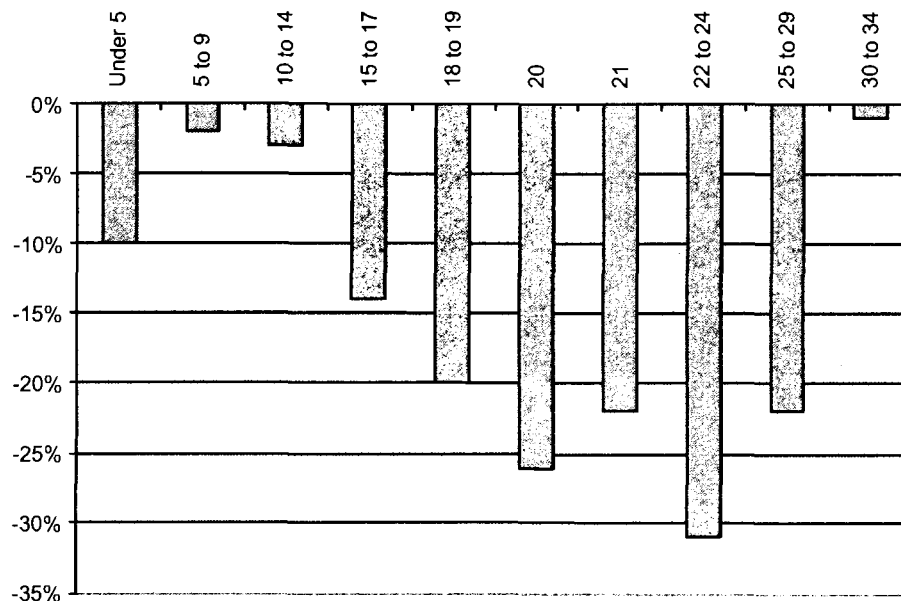
Source: U.S. Bureau of Census, 2001.

According to Heminway (2002) and Trostel (2002), a large proportion of youth

leaves Maine to attend college out of state. Even with three prestigious colleges (Bates,

Bowdoin, and Colby) attracting many out of state students, Maine exports more freshmen

than it receives. The net loss of freshman was 1,367 in 1998 (Heminway, 2002).

According to Silvernail and Gollihur (2003), many Maine students choose to study out of

state due to the relatively high tuition rates at Maine institutions. Between 1994-2001, the

average out-migration of college-bound youth was 18.6 percent. This figure is derived

based on the net migration rates of high school graduates going to four-year colleges. As

shown in figure 1.2., the highest rate 22.2 percent was during the academic year 1998-

1999 (National Center for Education Statistics,1995, 1998, 2000, and 2001).

Figure 1.2. Maine's Relative Net Migration of High School Graduates Going to Four-Year Colleges
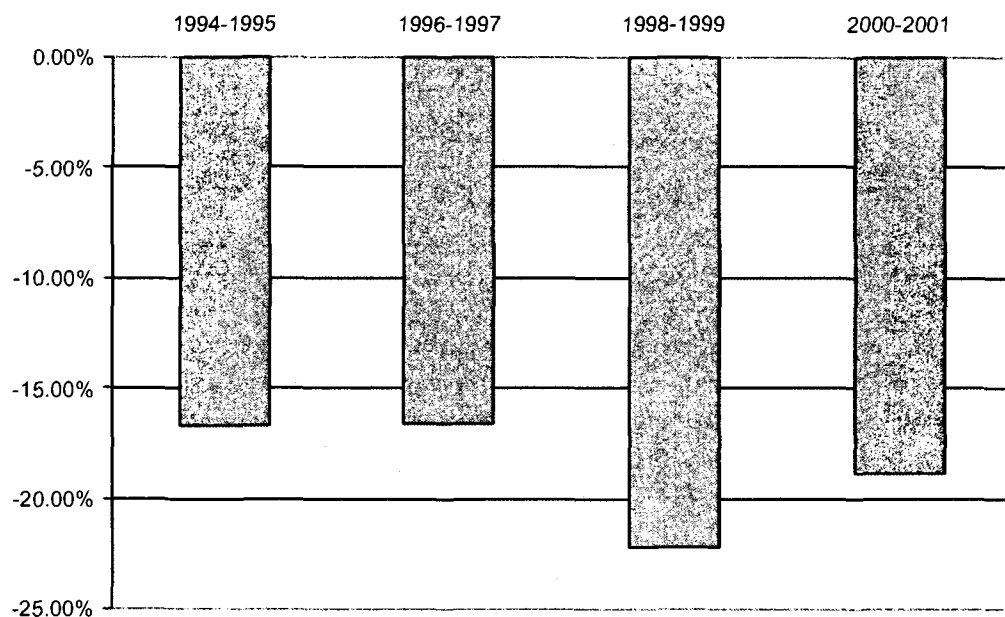
Source: National Center for Education Statistics, U.S. Department of Education, 1995, 1998, 2000, and 2001.

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Currently, there is only one data set available on the number of Maine students returning to the state after college. Silvernail and Gollihur created the data set in 2003. In 1998, 53 percent of Maine students graduating from out-of-state institutions returned to Maine to work, according to Silvernail and Gollihur (2003). This figure is slightly below Heminway's finding of a 56 percent national return rate for college graduates (Heminway, 2002). As a result, Maine is on par with the nation on the number of students returning to home state after-graduation from institutions of higher education.

According to Silvernail and Gollihur (2003), the overall percentage of Maine citizens who earned a college degree as well as lived and worked in Maine was 66 percent in 1998. On the other hand, in 1998, approximately 72 percent of Maine's 'best and brightest' left Maine for work-oriented reasons after receiving their college degrees. Additionally, 87 percent of Maine residents who graduated from Bates, Bowdoin, and Colby colleges moved away from Maine. However, only 43 percent of college graduates from Maine decided to relocate after graduation to further pursue their education, which implies an increasing attractiveness of Maine institutions of higher education.

As Silvernail and Gollihur (2003) found, the most important reason for relocating out of state are the career opportunities. As figure 1.3. shows, in 1998, 57 percent of college graduates who relocated outside Maine cited career opportunities as the most important determinant of their decision to relocate. 47.8 percent migrated out of state for better wages and benefits. 67 percent of college graduates who lived and worked in Maine after graduation stayed in the state for family-oriented reasons. Only 39.4 percent remained in the state because of favorable career opportunities (Silvernail and Gollihur, 2003).

According to Trostel (2002), Maine is well behind New England and the rest of the country in college attainment. He attributes the low educational level in Maine as the primary reason for the state's slow growth in economic prosperity. In 1998-2000, Maine proportion of working-age population with at least bachelor degree was 18 percent below

Figure 1.3. Reasons for Living and Working Outside Maine
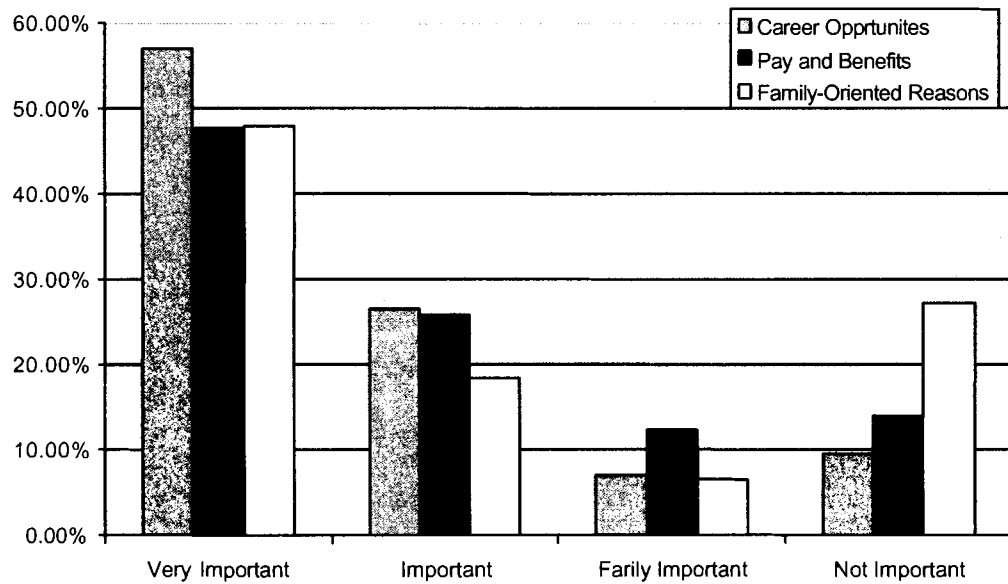
Source: Silvernail and Gollihur, 2003.

the national average and 29 percent below the New England average. In order to have economic growth in Maine, better-educated workforce is needed (Trostel, 2002). If Maine wants to attract significantly more high-wage jobs, it must produce and sustain highly skilled workers. However, as presented earlier, lack of career opportunities in the state is the primary reason for graduates moving out of state. With weakest economy in New England, Maine has fewer job opportunities and, therefore, higher rates of out-migration of young people. Maine workers also earn 14 percent less on average compared to the rest of the country, and 29 percent less compared to rest of New England. In

conclusion, Maine is in a difficult situation. It needs educated workforce to increase

economic growth, yet the college graduates' out-migration is due to lack of economic

opportunities for young people (Trostel, 2002).

1.2.4. Migration of University of Maine Graduates

For the past few years, the University of Maine has conducted an intensive

research study, tracking University of Maine graduates, their location decisions,

employment, and graduate education. According to the University of Maine Office of

Institutional Studies, more then 80 percent of UMaine graduates work full-time, about 11

percent work part-time, and about 4 percent are unemployed. About 4 percent of students

enroll fulltime in institutions of higher education to continue their schooling in graduate

programs. Nearly 60 to 68 percent of University of Maine graduates find jobs within the

State of Maine and about 32 to 40 percent leave Maine to pursue their careers. Figure

1.4. presents these statistics. According to the UMaine study, the most likely group to

leave the State of Maine is engineering and natural sciences and forestry students. In

2001, only 57 percent and 44 percent of engineering and natural sciences students

remained in Maine respectively. On the other hand, 63 percent, 67 percent, and 68

percent of students from the Colleges of Business, Public Policy and Health, Liberal Arts

and Sciences, and Education pursued careers in the State of Maine respectively (Office of

Institutional Studies, 1999, 2000, and 2001).

According to the Office of Institutional Studies, University of Maine graduates

earned $28,000 on average in 1999 and $30,000 in 2001. The median salary for those

employed in Maine full-time was $27,300 in 1999 and $28,000 in 2001 and for those

outside Maine $30,000 in 1999 and $34,000 in 2001. However, wages varied by college.

For example, in 2001, students with a degree in natural sciences had the highest average

earnings of $50,000, while graduates of College of Education and Human Development

had the lowest earnings of only $23,750 (Office of Institutional Studies, 1999, 2000, and

2001).

Figure 1.4. Post-Graduation Location Decisions of University of Maine Graduates
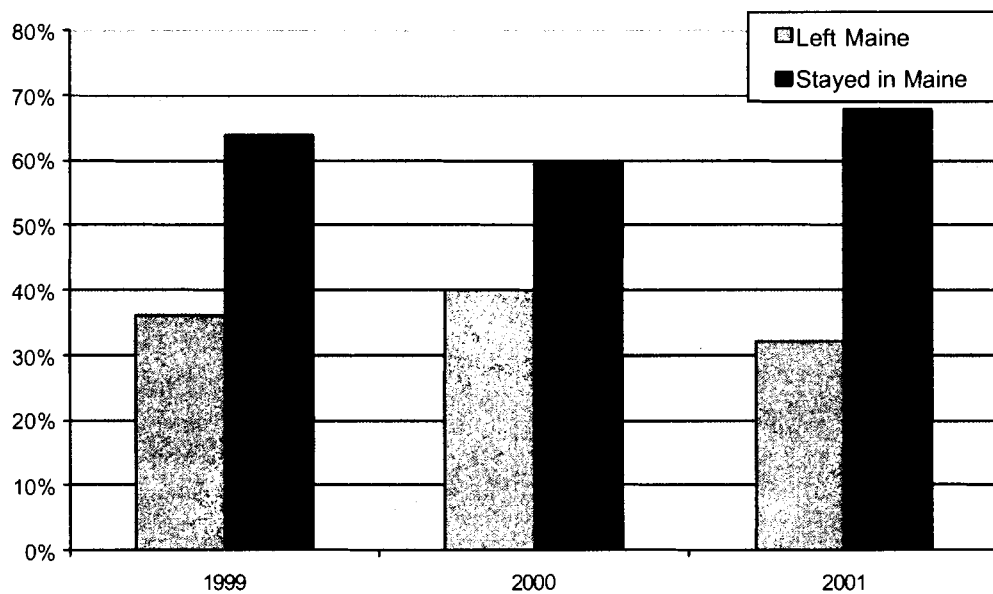
Source: Office of Institutional Studies, 1999, 2000, and 2001.

Nearly 20 percent of UMaine graduates enroll in graduate studies nationwide

every year. As shown in figure 1.5., in all three years, the natural science and forestry

(NFS) majors had the highest enrollment in graduate programs with a rate of 25-29

percent. The arts and social sciences (LAS) had the second highest rate of graduate

school attendance of 20-28 percent, although the enrollment percentage is decreasing.

The engineering (ENG) and education (EHD) graduates registered for graduate classes at

about 18-20 percent rate. Finally, the lowest proportion of graduates attending graduate

programs nationwide was for business, public policy, and health students (BPH) with

only 10 percent (Office of Institutional Studies, 1999, 2000, and 2001).

Figure 1.5. Who Is Attending Graduate School?
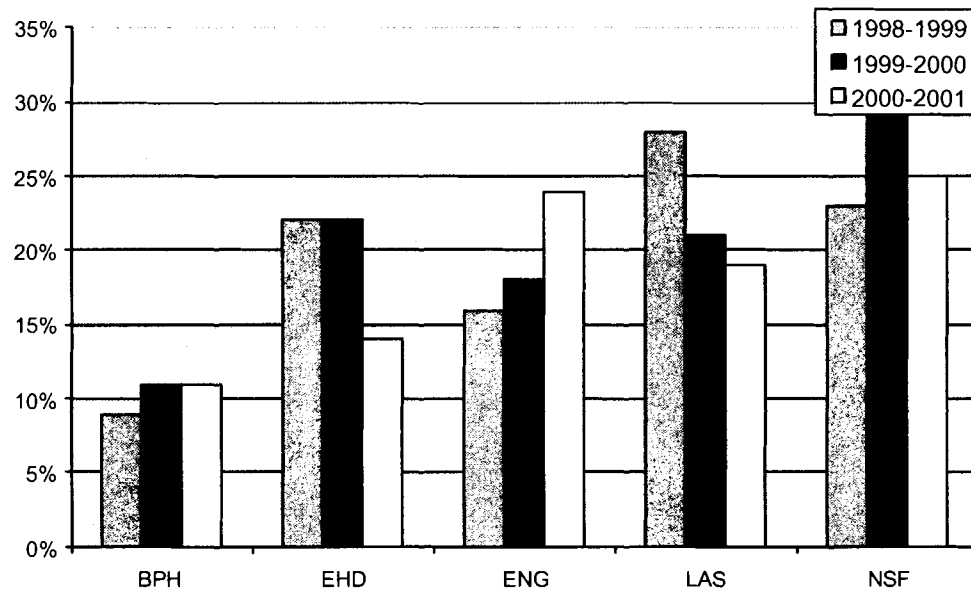
Source: Office of Institutional Studies, 1999, 2000, and 2001.

1.3.   Objectives of the Research

The emphasis of this research study is the migration trends of college graduates

from the five academic colleges of the University of Maine in the year 2002. The

objective of this research is to examine why graduating students decide to either stay or

leave Maine. To collect the necessary data, a mail and email survey of May/August 2002

graduates was conducted in August 2002. The data collected provide information on

migration by major, age, gender, and state residence, as well as the reasons for relocating

such as job availability, economic opportunities, family-oriented reasons, climate, and

cultural and social opportunities. Since these data reveals trends but not the reasons

behind the trends, this thesis examines how location decisions of graduating students are influenced by these factors. For the purpose of the analysis, the sample of University of Maine graduates is divided into two groups depending on the reason of migration. Graduates migrate either to pursue further higher education or to find or start a job. The locational decisions among these groups vary and depend on different factors. A weighted logit model is used to estimate the probability for migration of UMaine students. Public policy recommendations and final conclusions are drawn based on the outcome of the performed analysis.

1.4. Research Significance

There are several reasons why it is important to conduct this study. Since there has not been much of research done on the migration decisions of college graduates in Maine, this study is important in providing information which could inform policy decisions for ending the out-migration of young people in Maine. Consequently, the findings of this thesis are important for the University of Maine and for the State of Maine.

The study could help the University of Maine and its individual colleges better understand UMaine graduates' locational decisions. The University as a whole is interested in knowing where their graduates settle in order to provide better services to students attending the institution. Individual colleges are interested in better understanding the job market that their graduates enter in order to prepare their students better for future careers. By knowing where their graduates locate and what drives their locational decisions, colleges can design programs oriented to target specific job types

and market requirements. In close cooperation with employers, programs targeting skills important in obtaining a first job can be developed to help graduates in finding career opportunities after graduation. As an extension of this, the University of Maine could present these results to the legislature to justify the importance of investing in higher education to promote prosperity in Maine. As mentioned earlier, economic prosperity can be only achieved by having a highly educated workforce.

Secondly, since state and local officials are concerned with the out-migration of college graduates from Maine as well as economic prosperity in Maine, they might find this research helpful in creating public policy that would attract and retain a higher number of people with college degrees.

1.5. Organization

Chapter 2 of the thesis reviews previous studies on the migration of college graduates. Literature on factors influencing location decisions is presented along with extensive discussion how personal, economic, and amenity variables influence college graduates' migration patterns.

Chapter 3 presents the description of the migration survey, the methodology used in conducting the research, and the tests used to compare the survey sample to the graduating class of 2002 and to the University of Maine population. This section also provides a short descriptive analysis of the answers to survey questions.

Chapter 4 describes the data used in the study and the descriptive statistics of each variable. Chapter 5 presents the development and specification of the weighted logit model. The rationale for the utilization of the logit model is also discussed.

In Chapter 6, the estimation results are presented and a summary of the major findings of research is reported in Chapter 7. Limitations of the study as well as public policy recommendations for further efforts are also presented.

CHAPTER 2

REVIEW OF LITERATURE

There is an extensive literature on theory, methods, and applications of migration. The best-known approaches to household relocation are the human capital theory of migration (Sjaastad, 1962) and the utility theory of migration (Greenwood, 1997). The various approaches explaining relocation decisions have contributed to a well-developed research area of college graduates' migration. The research college graduates' migration trends started in the early1970s and extensively grew during the late1990s during which the college migration has become an important issue for state and local officials. During the 1980s and beginning of the 1990s, the migration research focused on human capital migration between the North and the South and used the real and nominal wages as well as general equilibrium model to explain the phenomenon (Coelho and Ghali, 1971; Roback, 1982). In this section, the theory of students' migration and past research findings is reviewed.

In 1970, Tuckman pioneered the research on college student migration. He studied migration rates for college undergraduates in 49 U.S. states. He found that the state of college attendance has a significant impact on graduates' location decisions. Moreover, the out-migration rates are negatively related to the number of public colleges in a particular state, but positively with the average tuition charged to residents. Per capita income and average student financial aid was found insignificant in his model (Tuckman, 1970).

As Tuckman (1970) found in his study, there are several reasons for the migration of college graduates such as personal characteristics of the migrant as well as economic,

social, and locational characteristics in the place of origin and destination. According to

Tornatzky et. al. (2001) and Kodrzycki (2001), differentials in wages, employment

growth rates, housing prices, and amenities are the primary causes for migration.

Relocation patterns of college-educated persons also depend on individual variables such

as age, gender, grade point average (GPA), degree, major, race, and residence, as well as

institutional issues such as average tuition rates and size of college. The theory of

migration of college graduates is a combination of human capital and economic utility

approaches. Economic and personal characteristics appear in the human capital model

and amenities are present in the utility approach. Additionally, institutional factors reflect

the special conditions which students are exposed to in college, and which, in turn, affect

college migration.

The migration of college graduates depends heavily on the location of college

attendance. Graduates are likely to stay in the state they live in while attending the

institution, and, therefore, college attendance decisions have a significant influence on the

future location decisions (Groen, 2001). As a result, it is important for colleges and

universities to attract not only in-state but also out of state students. In his study, Groen

(2001) finds that in-state schools encourage more in-state than out of state students to

attend their institutions. Unfortunately, according to the author, this approach does not

have a very positive outcome because students with low SAT scores enter the colleges,

which in turn lowers the education level of the state's future labor force. Moreover,

talented undergraduates have only a 10 percent retention rate and are very likely to leave

the state of college attendance. This means that 90 percent of talented students will

relocate upon graduation. This approach also compromises the attendance possibility for

out of state students, who in turn could add to the state's labor force after graduation

(Groen, 2001).

Small class sizes and successful athletic programs are important factors in

drawing non-resident scholars. Also, private universities attract a larger portion of non-

residents compared to public universities due to academic heritage and prestige (Franklin

and Hsing, 1994). As a result, the college graduates' retention rate is higher in the state of

college attendance. In her paper, Kodrzycki (1999) explains that tuition cost may also

influence college decisions. It may deter college participation for low-income students

and encourage students to attend out of state institutions with lower education

expenditures. For example, the Universities of Texas, Florida, and North Carolina have

the lowest tuition and fees in the U.S. compared to the national average, and as a result,

these states draw a higher number of out of state scholars (Kodrzycki, 1999).

In their report, Tornatzky et. al. (2001) mention that Carnegie classification[1],

institution affiliation, and enrollment size affect the after-graduation relocation decisions

as well. For example, the more research-oriented the institution is, the smaller is the

number of college graduates retained in the state of graduation. Attendance of public

Land Grant Colleges decreases the retention rate by 36 percent compared to other public

institutions. Finally, larger enrollment universities increase retention by 1 percent for

every 1,000-student increase (Tornatzky et. al., 2001).

According to Tornatzky et. al. (2001), recent college graduates' migration

patterns are also affected by the personal characteristics of a college population. These

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[1] The **Carnegie Classification of Institutions of Higher Education** "is the leading typology of American colleges and universities. It is the framework in which institutional diversity in U.S. higher education is commonly described. Most of the Carnegie Foundation's higher education projects rely on the Classification to ensure a representative selection of participating individuals and institutions" (the Carnegie Foundation for the Advancement of Teaching).

individual characteristic factors are: GPA, major, education level, gender, marital status, age, race, and previous moving patterns. An increase in GPA decreases the retention rate of college graduates due to the adverse selection in areas with low economic opportunities. Among majors, engineering and physical sciences students are the most likely to migrate after graduation, and education students are the least likely to relocate (Tornatzky et. al., 2001). Greenwood (1973) as well as Mills and Hazarika (2001) find that individual schooling levels have no statistically significant influence on migration decisions. On the other hand, Greenwood (1973) explains that education and income levels are positively correlated, and the income variable might pick up the effects of both education and income. On the other hand, Sanderson and Dugoni (2002) claim that doctoral graduates are the most likely to take jobs out of state.

According to Sanderson and Dugoni (2002), single students have a higher migration rate compared to married individuals. In McCauley's (1999) study, 22 percent of college graduates stayed in their home state for family-related reasons. Additionally, Kodrzycki (2001) finds that there is no significant difference between migration patterns of males and females. Sanderson and Dugoni (2002) mention, however, that more men than women with doctoral degrees work out of state. Males are less likely than females to accept initial employment in the state in which they were born, went to high school, or first matriculated in college (Sanderson and Dugoni, 2002). Age and race are also important in location decisions of college scholars. The older the student is upon college graduation, the higher is the retention rate of the state of college attendance (Tornatzky et. al., 2001). Moreover, white college graduates are more mobile compared to non-

whites. Hispanics are generally most likely to work in the state in which they were born (Sanderson and Dugoni, 2002).

Recent college graduates are more likely to move to a different state if they had moved previously, according to Kodrzycki (2001). Movement to another state to attend college is an especially strong factor. In her study, more then half of the graduates who attended college out of state lived out of state five years after graduation, compared to those who went to college in-state. Additionally, students are also influenced by their family's moving patterns. Those who moved across state lines between birth and high school were more likely to change states again than those who never left their state of residency (Kodrzycki, 2001). This phenomenon could be attributed to the psychic costs of moving, which reflect the attachment to the place of origin, family, and tradition. The attachment level decreases as the number of moves increases and awareness of other places eases the agony of relocating (Greenwood, 1975).

People with higher education are geographically quite mobile compared to the rest of the population, according to Kodrzycki (2000). They are also responsive to economic changes and regional business cycles. About 50 percent of college graduates decide on their after-graduation location based on economic opportunities (McCauley, 1999). In their study Mills and Hazarika (2001) mention that college graduates are responsive to wage differentials and that they move from a low wage region to a high one. Tornatzky et. al. (2001) finds that every $10,000 increase in the difference between the origin and destination place decreases the college graduate retention rate by 15 percent for the home state. Additionally, recent college graduates leave a state that does not offer a relatively high employment growth rate and move into localities with

expanding job opportunities (Greenwood, 1973). Kodrzycki (2001) as well as Mills and Hazarika (2001) find the employment growth variable insignificant in their analysis. They explain that personal characteristics and schooling level factors reflect the likelihood of migration better than the overall employment opportunities.

The unemployment rate in a locality also influences migration decisions, according to Greenwood (1973). Using an aggregate data set of the U.S. population, he finds that areas with high unemployment rates are undesirable destinations for college graduates because jobs are already difficult to find even for people residing in the area. As a result, the unemployment rate is higher, the expected rate of in-migration is lower and the out-migration rate is larger (Greenwood, 1973). In her paper, differently from Greenwood (1973), DaVanzo (1978) uses a micro data set and finds that people who are unemployed are especially prone to move out from a locality compared to those who are employed. Schlottmann and Herzog (1982) add that personal unemployment almost doubles the average probability for migration regardless of educational levels. Furthermore, movers are also likely to migrate over long than short distances in the search for job opportunities. Additionally, they are more responsive to other economic determinants of migration (family income, origin wage rates, and expected earnings increases) compared to people satisfied with their jobs. The outcomes listed above hold for both long-term residents and recent migrants, although the marginal effect of personal unemployment on relocation probability is systematically higher for recent migrants (DaVanzo, 1978).

Another economic factor influencing the migration of college graduates trends is taxes; however, research findings on the inference of taxes on migration are inconclusive.

Levels of taxation are strongly linked to the level of public services provided by the state and local communities. Usually, the higher the level of public services the higher the tax payments. In his article, Helms' (1985) suggests that tax rates can influence either positively or negatively the growth prospects of an area, and they are conditional on the public services mix. For example, levies financing certain public services like educational system are viewed as benefit taxes and attract higher income people into locality. On the other hand, transfer payments significantly reduce growth prospects and deter settlement of people earning higher wages. According to Hsing (1996), however, migration is negatively related to the tax burden. Recent college graduates tend to leave a state with high taxes and relocate to states with low tax burdens. On the other hand, Kodrzycki (2001) finds that taxes have no significant influence on recent college graduates and their location decisions. She claims that college graduates focus mostly on highly paid job opportunities, not the tax rates. It is important to mention, though, that the author does not control for public services mix in her study.

Greenwood and Hunt (1989) point out that amenities also may have a significant impact on the migration patterns, especially for those with a high income. Many migrants choose to relocate to locations that are characterized by low wind speed, large number of clear days, and warmer temperatures. However, it is important to mention that they as well as Kodrzycki (2001) find these variables insignificant in their studies. On the other hand, seacoast location appears to be a significant deterrent of out-migration (Kodrzycki, 2001). Additionally, in their study, von Reichert and Rudzitis (1994) argue that migrants are willing to accept lower incomes when moving to high-amenity regions. This suggests

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that movers are compensated for lower future earnings with an improved social and physical environment in the chosen area.

College graduates' migration trends are also affected by the degree of urbanization and population size of the state. The more urbanized and the higher the population density in the state in which the students attend college, the probability is higher that they will remain in the area after graduation. The higher urbanization level reflects a larger job market and greater and better employment opportunities (Tornatzky et. al., 2001).

On the other hand, Nord and Cromartie (1999) cite that in the late 1990s, the in-migration of college graduates into rural areas increased by 0.5 percentage points. This is a result of an increasing return to education in the rural areas, area-specific amenity values, lower costs of living, and family ties that offset the wage differential factor in urban areas (Mills and Hazarika, 2001). Additionally, advances in transportation and telecommunication strengthened the linkages between the rural and urban economies, allowing professionals to live in nonmetropolitan areas and have successful careers (Weeks, 1989). However, the increase in in-migration rates of the college graduates into rural areas was not uniform across the U.S. The West had the highest college educated population increase, while the Northeast had the smallest (Cromartie, 2000). Additionally, although advances in telecommunication contributed to successful careers in rural areas, the trend has not held up in the recent years as predicted and a slowdown in nonmetropolitan resettlement gain occurred from 458,000 in 1995-1996 to 170,000 in 1997-1999 (Cromartie, 2000; Frey, 1995).

The last factor influencing college graduates' migration is housing prices. Although Kodrzycki (2001) hypothesizes that recent college graduates are more likely to stay away from highly priced housing units, she finds that states with high housing costs experience in-migration. She further explains that these location decisions result in the fact that states with highly priced properties also offer other characteristics attractive to college graduates like the availability of educational, medical, security, transport, recreational, and cultural centers. Mathur and Stein (1991) agree, also implying that amenities such as warm weather and sea coastal location have an effect on population growth in high property costs areas. Utility model, in which rich-amenity regions experience on average high rents and low wages, explains this phenomenon.

According to the reviewed articles, in order to increase the recent college graduates' migration, individual states are advised to create new public policies that would aim toward increasing the post-graduation retention rate. According to Kodrzycki (1999) states should create policies (better financial aid package and more research funding) encouraging in-state as well as out of state high school students to attend in-state colleges because the place of higher education is the primary predictor of after-graduation location decisions. As Tornatzky et. al. (2001) suggest, they need to provide better financial help and more scholarships, especially to the brightest young people to convince them to attend their programs. Further, better financial help and special tuition breaks awarded to those students who decide to work at least a year in the state in which they attended college would increase the after-graduation retention rate. Additionally, it would be beneficial for each student to have the opportunity for a coop and/or internship during their college education to learn about career opportunities in the state they attend college.

Finally, programs matching college graduates with employers would secure jobs after-graduation to students and, therefore, to increase the retention rate of people with college education in the region (De Jong and Klein, 1998).

Finally, more employment opportunities and high wage levels are needed to draw more college graduates (Sjaastad, 1962). Mills and Hazarika (2001) recommend to the state and local governments to devote more resources to attract and retain more firms, especially in economically distressed areas. The financial resources could be used to provide firms with information on local opportunities and labor market characteristics, as well as incentives for them to relocate. Successful business attractions and retention efforts are expected increase labor demand and create employment in areas characterized by out-migration and poor economic conditions (Mills and Hazarika, 2001).

CHAPTER 3

SURVEY

Previous research provides some information regarding the migration of college graduates. The University of Maine Office of Institutional Studies collects data on University of Maine students, their personal characteristics, age, majors, gender, as well as residency. However, there has been limited study conducted on the migration of University of Maine graduates. There is a need to find where these graduates move and what the reasons are for their relocation decisions. It is crucial to understand where UMaine graduates locate to better serve current and future University of Maine students and to design public policy that helps increase the college retention rate. To gain insight into these important questions, I designed and administered a survey that used email and mail services as distributive instruments.

3.1. Survey and Administration

I obtained a sample of 1,364 University of Maine graduates of class of 2002 (2002 Class) from the University of Maine Student Records Office. The information provided by the office was: names of the graduating students, names of majors and colleges, as well as home addresses of graduates. During August 2002, I conducted a survey of these University of Maine students who graduated in the year 2002. The distributive instruments used in this study were email and mail.

The mail and email instruments were chosen to redistribute the survey due to a few important factors. The types of redistribution techniques chosen were used based on

articles by Schaefer (2001) and Fink (1995), which suggested these methods as the most efficient and effective ways of surveying instruments for this type of study. First, college students are skilled in computer use and most of their mailings and messages are forwarded through Internet. Internet surveys allow for fast and easy response to the surveyor as well (Schaefer, 2001). Email technique was also used since more than 90 percent of UMaine graduates had an account with the University of Maine intranet service, which allowed for an easy, fast, and inexpensive way to contact them. Finally, due to possible relocation from place of residence and unknown new addresses, mail alone was not considered as a reliable and efficient way of proceeding with the migration survey.

The survey was administered in three waves. In the first wave, most of the persons in the sample (94 percent), who had an email address at the University of Maine intranet system, received an individual email version of a migration survey with a letter of consent in which the purpose and intent of the questionnaire, including discussion of respondent confidentiality and informed consent, was explained. The University of Maine Institutional Review Board for the Protection of Human Subjects reviewed the questionnaire and the letter of consent prior to the survey mailings, and supervised the questionnaire distribution. The consent letter as well as the full survey is provided as Appendix A. Two weeks later, another set of emails was sent to those who did not respond to the first mailing. After another week, a mail version of the survey and the consent letter was sent to all of the graduates who did not reply to the email questionnaire and those who did not have an email account with the University of Maine. A return envelope with prepaid postage was included in the mailing. There were no incentives

included to improve the number of responses. The deadline for returning questionnaires was September 13, 2002. It is important to mention that the Margaret Chase Smith Center for Public Policy allowed the center's name to be printed on the letterhead of the consent letter and the survey form to provide support and to emphasize the importance of this research.

Unfortunately, there are a few faults in the chosen administration technique that could alter the questionnaire's response rate, survey representativness, and empirical results. For example, about 6 percent of the graduates did not have an account with the University of Maine intranet service at the time of the study administration and, therefore, were excluded from the email mailings. These people received only a mail version of the survey. As a result, there was a lower likelihood of receiving the survey back from them. Additionally, some of the graduates had already moved away from the addresses they provided to the University of Maine and their current places of residence in August 2002 were unknown. As a result of the above problems, the response rate could be lower than intended, and the representativness of the survey as well as empirical results could be affected significantly. The respondent group might not mirror the 2002 Class and the university student body, which would disallow to make generalizations about the whole university population based on the empirical results, which in turn would be biased.

3.2. Survey Design

The survey design was based largely on questionnaires utilized by other colleges that studied the issues of migration of their graduates. For example, a college graduates'

migration study in Oklahoma by McCauley (1999), in Wyoming by Edlin (2001), and in the Southern states by Tornatzky et. al. (2001) were used to construct the final questionnaire. Based on migration theory, important factors such as age, gender, previous moving patterns, and wages were added to the pool of questions. Additionally, several professors helped along the process as well as proposed additional questions that were included in the questionnaire form.

The email and mail survey instrument were identical and consisted of thirty-four questions in four sections that asked questions that were pertinent to the survey's objectives and that aimed to produce reliable and valid data. The complete survey instrument is attached as Appendix A. Testing of the survey instrument showed that it took approximately 15 minutes to answer the survey's questions. Section I involved questions regarding respondents' education background and further educational plans. Specifically, in this section, the place of high school attendance was asked in order to identify the residence of the students prior to University of Maine entrance. Additionally, participants were asked to reveal their major and degree obtained and to provide all reasons why they selected the University of Maine as their undergraduate or graduate institution.

Section II focused on the employment status of UMaine graduates three months from August 2002. Questions concerning wages, occupation, and place of work were asked. The place of work identified the current place of residence, which, in turn, helped reveal respondents' migration choices of either staying in or leaving the State of Maine. In Section III, participants were asked to rate a variety of factors in Maine on a scale from 1 to 4, 1 being excellent and 4 being poor. The ranked variables were economic, social,

cultural, and environmental issues. For example, students rated career opportunities in Maine as well as the degree to which the state provided a family-friendly environment. Further, respondents were asked to indicate three of these factors that were important to them in considering place of migration. In the last section, personal and socio-economic characteristics of the graduating Class of 2002 were asked. Age, gender, marital status, previous moving patterns, as well as parents' education and income were ascertained.

3.3. Survey Sampling Methods

The way the sample is created from the population or universe is an important factor in conducting a survey. A good sample is a miniature version of the population. The best sample is representative of the universe. A sample is representative of the population if important characteristics such as age and gender are distributed similarly in both groups. If the sample mirrors the targeted population then the survey findings can be generalized to the universe. (Fink, 1995).

The sample for the migration of University of Maine graduates in 2002 is taken from the population of the University of Maine. A non-probability, convenience sampling technique was utilized in the sample selection process because specific characteristics were required of the students in order to participate in the study (Fink, 1995). As a result, only scholars (undergraduate and graduate) who graduated in May and August 2002 were chosen for this research. The sample consisted of 1,364 of 2002 UMaine graduates, which was also the number of students who graduated in May/August 2002. As mentioned earlier, the University of Maine Student Records Office provided their names and additional information. Of the total number of eligible students, 515 people

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voluntarily participated in the email and mail survey. Out of all respondents, 508

answered at least some questions out of which 3 participants responded only to less then

half of the inquiries. 7 students returned an empty questionnaire or indicated that they had

not graduated at the time of survey administration.

Unfortunately, there are possible problems associated with the sampling

techniques used in the study as well as the sample and the response group. A bias that is a

systematic error affecting the accuracy and applicability of the survey's findings is one of

the existing issues (Fink, 1995). For example, people who do not complete the entire

survey may be different in important ways from those who do. Further, those who do not

participate in the survey may be different from those who do. As a result, there might be

a lack of representation of the targeted population, which, in turn, may result in bias and

an inability to make generalizations about the University of Maine (Fink, 1995).

To find out if the obtained respondent sample mirrors the University of Maine

population, first a comparison of personal characteristics of the undergraduate and

graduate student body, such as male and female, out of state and in-state, age, and

pursued majors ratios, between the University of Maine and the 2002 Class is presented,

and later a comparison of the same process is performed on the 2002 Class and the

respondent group. If the 2002 Class is representative of the University of Maine and the

respondent group is similar to the 2002 Class, then the results from the data can be

generalized to the University of Maine population as a whole. Otherwise, there is a bias

in the obtained responses and generalizations cannot be made.

A Z-test for a proportion (binomial distribution) needs to be performed on the

personal characteristics of the population, the sample and the respondent group in order

to identify if the respondent group is representative of the sample and the universe. The

Z-test for a proportion investigates the significance of the differences between an

assumed proportion p_o and an observed proportion p. The test statistic is

$$Z = \frac{(p - p_o)}{\{[p_o * (1 - p_o)]/N\}^{1/2}},$$

where N is the number of elements taken from the population. This is compared with a

standard normal distribution using a one-tailed test. The Z-test statistic at a level of

significance $\alpha = 0.05$ is ± 1.96 (Kanji, 1999).

When the Z-test was applied to the University of Maine graduates' migration

study, the overall resulting respondent group of the total 508 survey participants was

found not representative of the population of the University of Maine graduates of the

Class of 2002. On the other hand, the 2002 Class is rather similar to the University of

Maine student body. Based on the male and female ratios, out-of-state and in-state

proportions, and pursued areas of study, a comparison between the 2002 Class and the

University of Maine student body is presented first. Further, the respondent group is

compared to the 2002 Class. The data used for this comparison for the University of

Maine population comes from the University of Maine Office of Institutional Studies and

was collected in the Fall Semester of 2002. Table 3.1 displays the comparison of the

personal characteristics and more detailed results as well as Z-test results are accessible

in Appendix B.

The 2002 Class' undergraduate and graduate percentages are higher compared to the University of Maine ratios, although according to Z-test statistics, $Z_u = -1.78$ and $Z_g = 1.03$, the two proportions are similar to each other. Among undergraduates, the 2002 Class has a higher percentage of women (54.46 percent) who attended the school compared to the University of Maine undergraduate student body with 49.90%. For the 2002 Class graduate studies were pursued by 56.85 percent of women, which, in turn, is lower, and significantly different from the University of Maine, which had 66.35 percent of women in graduate programs in the fall of 2002. However, the overall, female and male proportions are similar for both groups with $Z_f = 0.77$ and $Z_m = -0.70$. The ratio of out of state to in-state students in both undergraduate and graduate studies as well as the percentages of the attended colleges is statistically the same for both groups. Only the Colleges of Education and Human Development (EDHD) and Business, Public Administration and Health (BPPH) are different for graduate students. For example, according to the University of Maine Office of Institutional Studies, 23 percent of graduate students were enrolled in education at the University of Maine compared to 31 percent that graduated in 2002. The Z-test statistics for BPPH and EDHD were $Z_{BPPHg} = 1.99$ and $Z_{EDHDg} = 2.05$ respectively which suggests that the two characteristics present significant differences between the University of Maine population and the Class of 2002. Table 3.1 displays the presented personal characteristics and more detailed results are accessible in Appendix B.

Compared to the Class of 2002, the respondent group is statistically different. The undergraduate and graduate student ratios statistically differ as well as the male and female percentages. There are 68.9 percent undergraduates and 31.1 percent graduate

students in the respondent group and 74.85 percent undergraduate and 25.25 percent graduate students in the 2002 Class. The male and female (66.46 percent-women and 33.54 percent-men) rate is the same as the University of Maine for the respondent group but different from the 2002 Class. The undergraduate percentage of women is much higher (66.86 percent) compared to either of the two other groups (49.9 percent for the University of Maine and 54.46 percent for the Class of 2002). The Z-statistics for the undergraduate female ratio between Class 2002 and the respondent group is $Z_{fu} =$ 3.81.There is also a large disparity between the out of state in-state ratios, especially for the graduate students who have an almost half and half split in Maine and out of Maine residency. The Z-statistics for graduate in-state and out of state between the Class of 2002 and the respondent group is respectively: $Z_{ig} = -6.73$ and $Z_{og} = 8.18$. These results are statically significant at a significance level of 5%.

Again, the frequency distributions of colleges attended by the survey respondents are similar to both the Class of 2002 and the University of Maine student body. Only for the Colleges of Business, Public Administration, and Health (BPPH) as well as Education and Human Development (EDHD), there is a noticeable disparity between respondents, the Class of 2002, and University of Maine students who pursued graduate studies. Only 9 and 28 percent of graduate students from these colleges respectively were enrolled at UMaine in 2002; about 17 and 31 percent were represented in the graduating the Class of 2002, and almost 22 and 36 percent responded to the migration survey. However, the Z-test statistics for BPPH and EDHD were $Z_{BPPHg} = 0.62$ and $Z_{EDHDg} = 0.80$ respectively which in turn suggested that the two characteristics did not present significant differences between the respondent group and the Class of 2002.

Frequency Distribution	University of Maine Population*	2002 Class **	Survey Respondent Group***
Education:	Percent	Percent	Percent
Undergraduate	77.19%	74.85%	68.90%
Graduate	22.81%	25.15%	31.10%
Gender:			
Undergraduate:			
Female	49.90%	54.46%	66.86%
Male	50.10%	45.54%	33.14%
Graduate:			
Female	66.35%	56.85%	66.46%
Male	33.65%	43.15%	33.54%
Residency:			
Undergraduate:			
In-State	84.04%	80.71%	74.29%
Out-of-State	15.96%	19.26%	25.71%
Graduate:			
In-State	80.33%	81.05%	51.90%
Out-of-State	19.67%	18.95%	48.10%
College:			
Undergraduate:			
BPPH	16.15%	19.88%	21.43%
EDHD	12.37%	14.30%	15.14%
EGR	13.36%	15.67%	14.57%
LAS	29.76%	32.81%	32.29%
NSFA	15.92%	16.35%	16.57%
Graduate:			
BPPH	9.79%	17.49%	21.52%
EDHD	22.86%	31.20%	36.08%
EGR	6.77%	10.50%	10.13%
LAS	12.08%	18.66%	16.46%
NSFA	12.33%	19.24%	15.82%

Due to the dissimilarities in characteristics among the respondent group and the Class of 2002 and the University of Maine student body, there is a possibility for data bias. It means that the respondent group is not representative of the sample and the universe from which the sample was drawn. As a result, generalizations cannot be made about the whole population due to those differences. The conclusions can be only presented for the existing respondent group and its characteristics.

In order to make generalizations about the sample and the universe based on the survey respondent group, the collected data need to be weighted accordingly to offset the existing disparities in the gender, place of residency, and undergraduate and graduate ratios. Sampling weight compensates for deviations from an unequal probability design and is defined as the reciprocal of respondent's probability of selection (Wiship and Radbill, 1994). Based on Z-tests comparing the personal characteristics between the 2002 Class and the respondent group, three personal characteristics of the University of Maine 2002 graduates: level of education: undergraduate and graduate; gender: female and male; and residency prior to the University of Maine entrance: in-state and out of state were chosen to create sample weight. The weights were obtained by constructing a three-way cross-tabulation table of the frequency distributions of the Class of 2002 and the respondent group and by taking the ratio of the proportion of the sample population to the proportion of the respondent group (Wiship and Radbill, 1994). Table 3.2 below presents the three-way cross tabulation and sampling weights. The weights were then allocated to the respondents according to their three-way cross tabulation of personal characteristics. The revised data was utilized in the economic analysis of this University of Maine migration study.

Table 3.2. Three-Way Cross-Tabulation Table and Sampling Weights

	Undergraduate		Graduate	
	Female	**Male**	**Female**	**Male**
In-State	35.26%	28.15%	11.73%	8.21%*
	39.76%	19.29%	12.80%	6.89%**
Weight	*88.68%*	*145.93%*	*91.64%*	*119.16%*
Out-of-State	5.57%	5.87%	2.49%	2.71%*
	6.30%	3.54%	8.07%	3.35%**
Weight	*88.41%*	*165.82%*	*30.86%*	*80.90%*

* Class of 2002's three-way cross-tabulation frequency distribution.
** Respondent Group's three-way cross-tabulation frequency distribution.
*** Source: University of Maine Office of Institutional Studies, Office of Student Records, and 2002 Migration of University of Maine Graduates' Survey.
Percentages may not sum to 100 percent due to rounding.

3.4. Reliability and Validity

It is important that a survey instrument is reliable and valid. The instrument should measure what it is intended to measure and the obtained responses should be reproducible (Fink, 1995). To ensure the reliability and validity of the survey, many protective procedures were adopted during the survey design process. The study was reviewed for clarity and completeness by a panel of persons who were not trained in the survey design and migration issues as well as by those who were survey and migration experts. Additionally, the survey was compared to other questionnaires intended to measure the migration of college graduates to see if sampling procedures, major rules, structure, and questions were common among all analyses. These reviewed questionnaires were: McCauley's (1999), Edlin's (2001), Silvernail and Gollihur's (2003), and Tornatzky et. al.'s (2001). The main question and structure design as well as chosen sampling techniques were similar among all evaluated surveys. In conclusion, the administered study should produce reliable and valid responses.

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3.5. Results

In total, 515 people responded to the survey and 26 mailings were returned as undeliverable. The response rate for this questionnaire was 38.5 percent (515/ (1364-26)). The response rate is comparable to other surveys. The percentage range of mail questionnaire responses is between 20 to 40 percent for a mail survey and is considered an acceptable response rate (Fink, 1995). For example, the Silvernail and Gollihur's (2003) survey had 25 percent response rate. Additionally, 7 respondents out of the 515 returned empty surveys or notified that they had not graduated from the University of Maine at the time of questionnaire's administration. The rest of the 508-survey participants filled at least some of the questions. 3 respondents filled the form in only 40 percent and their responses where dropped due to their incompleteness. Overall, 505 questionnaires, which constituted 38 percent of the eligible sample (505/(1364-26-7-3)), were used in the final analysis of the migration of University of Maine graduates.

3.5.1. Data Coding

Ideally, double entry of data should be conducted. In this study, the survey responses were recorded only once due to constraints in time as well as in personnel. As a result, there is a possibility for a measurement error that could occur due to mis-typing of provided answers. To limit this problem and to identify possible mistakes, a data file was checked for logical consistency and for out-of-range codes. All revealed errors were corrected immediately. Another problem with the data is that some variables had missing observations. 3 surveys were dropped from the analysis since they were 60 percent incomplete. They were, however, used in calculations of frequency distributions for each

survey question. The rest of the 505 questionnaires were mostly completed with only few missing values. In order to analyze the data, most of the missing answers were coded as absent and were not used in the final analysis. However, in the case of questions in Section III, which rated the State of Maine characteristics, an extra category, "Do not know", was created to account for lack of opinion on the rating of Maine economic, social, cultural, and environmental features. All missing responses in the rating parts of Section III were converted into a new type of answers. In the questionnaire, there were also variables with inapplicable answers. These responses related to questions for which only some of the students had to reply to. These values were also coded as absent and were not used in the final analysis of the migration study.

The following part of the data results section presents a summary of responses from 508 respondents to the migration survey. The summary covers chosen questions in four sections of the questionnaire. Frequencies for all survey questions are presented in Appendix C.

3.5.2. Demographics

In this sample, the respondents ranged in age from 21 to 66 years old with an average age of 29 years. Just over 66 percent of those responding were females and 33 percent were males. 66 percent of respondents described themselves as single, 30 percent as married, and about 4 percent as in a committed relationship but not married. About 40 percent of respondents grew up in a family where at least one of the parents had a bachelor and/or higher degree, 25 percent with some college, 25 percent with a high school diploma, and 10 percent with less than a high school education. 36 percent of

respondents revealed the combined income of their parents as greater than $65,000, about 17 percent as below $30,000 and 47 percent as from $30,000 to $65,000. Almost two-thirds of respondents indicated that they had moved at least once in their lives. About a half of respondents changed their place of residency within the state of Maine and a half relocated within the U.S. boundaries prior to graduation.

3.5.3. Education

The questionnaire asked a series of questions about the respondents' education obtained at the University of Maine as well as future educational plans. To identify place of residence of the survey participants before enrolling at the University of Maine, the place of high school attendance was asked. As displayed below, almost 70 percent of those responding attended high school in Maine. 12 percent resided in New England states other than Maine before enrolling at the University of Maine, 7 percent in the Mid-Atlantic region, and about 4 percent in the Midwest. About 6 percent lived in other parts of the U.S. and 4 percent came to the University of Maine from other countries such as Spain, Bosnia and Herzegovina, Germany, China, and Japan.

The analysis revealed that most University of Maine 2002 graduates who responded to the survey attended the institution because it offered the program they wanted, was cheaper than other colleges, close to family and friends, and because it was nicely located. Nearly 40 percent of those who responded received 75 percent and more in financial aid in terms of scholarships, loans, and outside funding.17 percent did not receive any financial help and the rest of the students obtained at least some college

Figure 3.1. Place of High School Attendance of the 2002 University of Maine
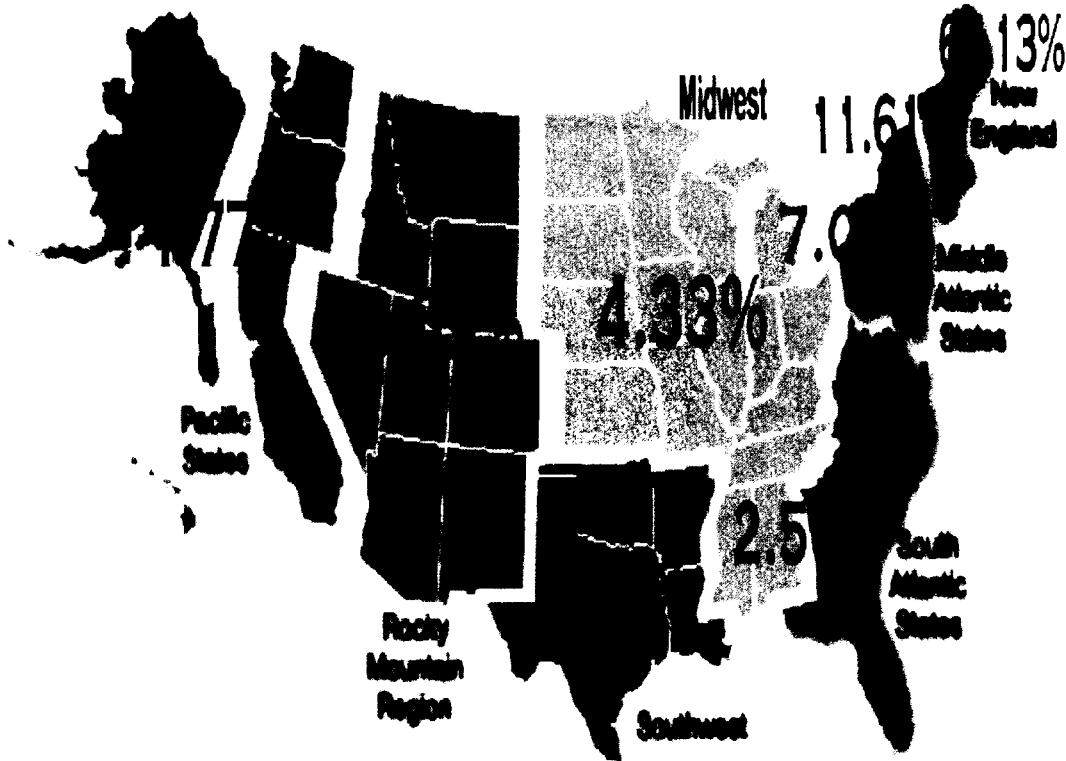
Graduates

Source: Migration of UMaine 2002 Graduates

Percentages may not sum to 100 percent due to rounding.

financing. Two thirds of respondents reported receiving a Bachelor of Arts and Science

degree. About a quarter of the graduates received a Master's degree with 13 percent

obtaining a Master of Science, 4 percent a Master of Arts, 7 percent a Master of

Education, and nearly 1.5 percent a Master in Business Administration. 3 percent of

respondents obtained a doctoral degree and 2 percent acquired a certificate degree. Figure

3.2 presents the education levels discussed above.

Figure 3.2. Degrees Received from the University of Maine in 2002
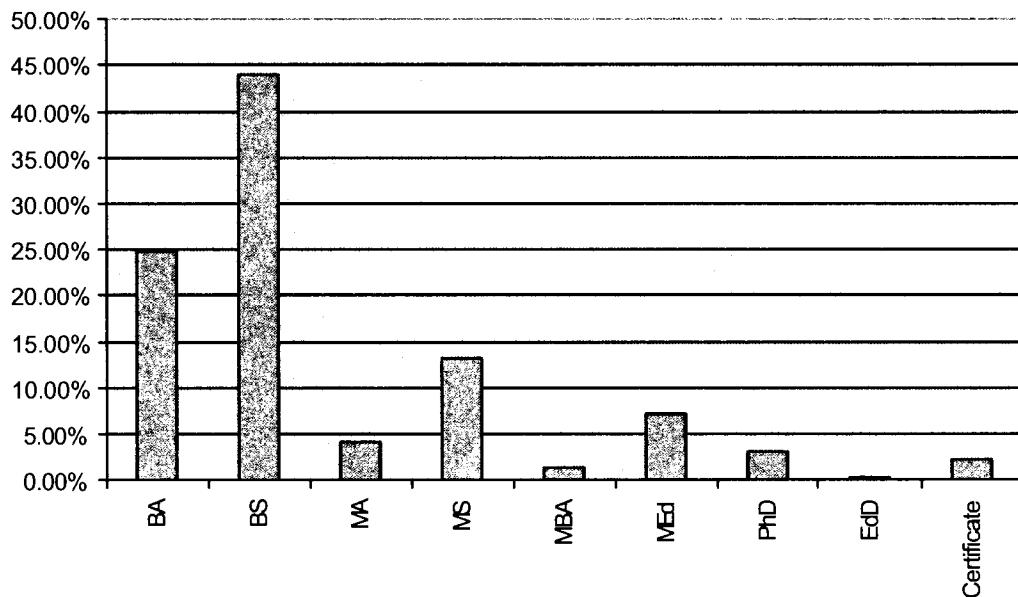
Source: 2002 Migration of University of Maine Graduates' Survey.
Percentages may not sum to 100 percent due to rounding.

Among University of Maine graduates, who responded to the survey, the most

popular majors were education and social sciences. Two fifths of them studied these two

subjects. The second most popular area was physical sciences with a nearly 17 percent

response rate. Engineering was pursued by 13 percent of the graduating class. Business,

economics, and public administration as well as social work and nursing respectively

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constituted about 11 percent and 13 percent. Finally, forestry, arts and music, and individualized major represented 5 percent of the 2002 graduates. The overall grade point average (GPA) for the sample was 3.38 on a 4.0 scale. Almost half of the respondents had a 3.5 and higher GPA. 29 percent obtained between 3.0 and 3.5, and the rest of the graduates (30 percent) had a grade point average below 3.0.

Among all respondents, nearly two-thirds reported a willingness to continue their education. More than a quarter had started their programs in the fall of 2002 and the rest of the graduates were expecting to pursue their studies in the near future. One-third will enroll full-time and 35 percent will enroll their studies part-time. More than 30 percent reported that they would like to continue their education in Maine and 15 percent reported that they would like to enroll out of state for reasons such as attending a highly prestigious school, a lack of wanted programs at the University of Maine, and family-oriented causes.

Of those who indicated that they would pursue further education more than two-fifths will study education, arts, and social sciences. Nearly 13 percent reported business as the preferred area of education and 13 percent would like to study physical and engineering sciences. Almost 10 percent noted medicine, nursing, and social work as the future area of learning. Only 1 present declared the possibility of studying for a law degree in the future. Among pursued degrees, more than half of the graduates indicated that they would like to acquire a master's degree and 14 percent a doctoral degree.

3.5.4. Work Experience

Respondents were asked to provide information about their place of residence and their employment status after graduating from the University of Maine in 2002. Overall, the similar percent of graduates lived and worked in Maine after graduation compared to their residency prior to attending the University of Maine. New England and Mid-Atlantic states lost 0.08 percent and 0.69 percent of population respectively due to migration. Other parts of the United States, such as the South Atlantic and Southwest, gained about 3.5 percent through relocation. Fewer graduates (only 2.89 percent) migrated abroad after graduation. The figure 3.3 below presents the frequency distributions for the place of residency after graduation from the University of Maine in 2002 with Maine residency accounting for more than 65 percent. Additionally, among 2002 University of Maine graduates, doctorate recipients migrated out of Maine at the highest rate of 54 percent, while holders of master and bachelor degrees had a migration rate of 24 percent and 22 percent respectively.

About two-thirds of the respondents reported being employed full-time after graduation and about 17 percent being employed part-time. Nearly 17 percent were not working at the time of the survey administration. More than seventy percent of those who reported working were employed in occupations related to their areas of study at the University of Maine. 19 percent of them earned from $25,000 to $30,000 a year. 17 percent revealed earning less than $20,000 and about 20 percent more than $45,000. 1 percent of those working in the occupation related to their areas of study received more than $100,000 in income. A vast majority of them were physical sciences and engineering majors. On average, University of Maine 2002 graduates who left the state

earned 6 percent more in wages compared to those who stayed in Maine after graduation. More than one-third of respondents worked for private business. 36 percent took a job in non-profit organizations, and the remaining quarter was either employed in government agencies or self-employed.

From those students whose jobs were not related to college majors, about 31 percent expected to find occupations in their field of study in the near future. Almost a quarter of them anticipated earning somewhere from $25,000 to $30,000 per year and 20 percent from $35,000 to $40,000. Less than 18 percent indicated that they would like to be paid more than $55,000 and 16 percent expected not to earn more than $25,000. Almost half of them anticipated working for private business and about 30 percent for government agencies. The remaining quarter expected to either be self-employed or take a job in non-profit organizations.

3.5.5. Maine Economic, Social, Cultural, and Environmental Characteristics

Respondents were asked to rate the State of Maine as a place to live based on economic, social, cultural, and environmental characteristics on a scale from 1 to 4. 1 rated the factors as excellent and 4 as poor. A value of 10 was assigned to those respondents who had no opinion on the subject. Based on the responses provided in table 3.3, economic conditions in the State of Maine were viewed as fair. Nearly half of the people surveyed rated career opportunities in Maine as fair, and more than a quarter as poor. Also more than 80 percent viewed salaries and benefits as average and below.

Figure 3.3. Place of Residency After Graduation from the University of Maine in 2002
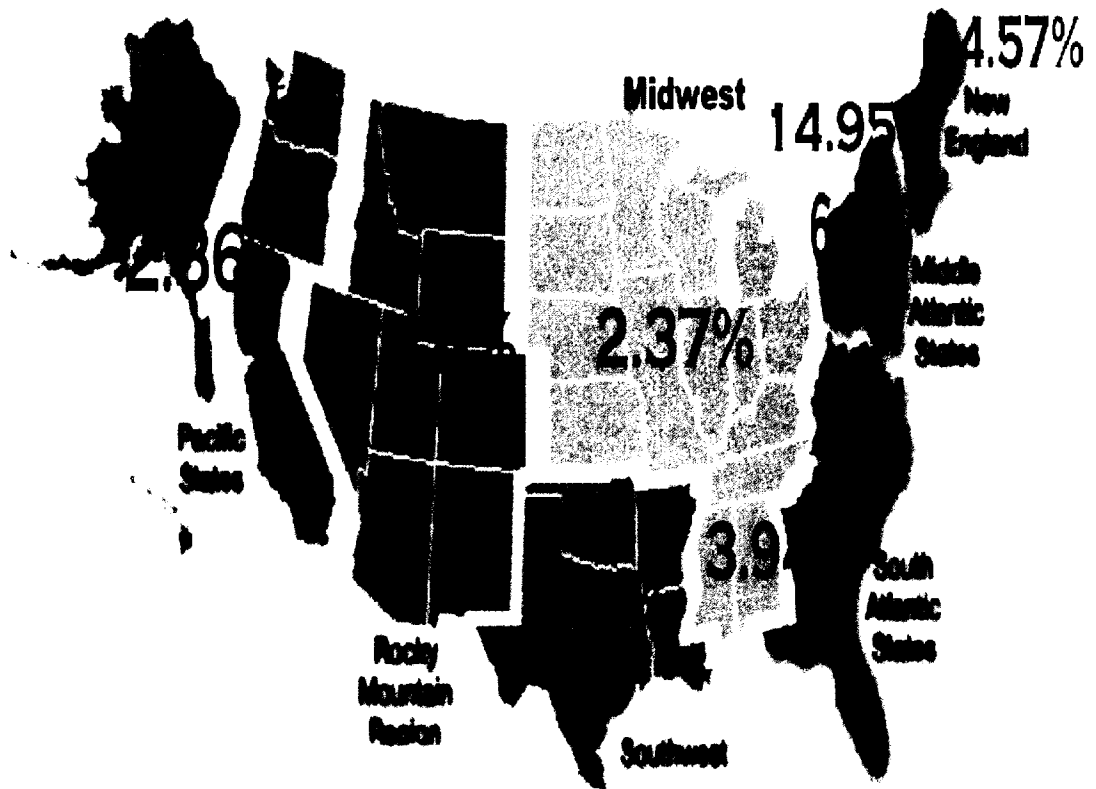
Source: Survey of 2002 UMaine Graduates

Percentages may not sum to 100 percent due to rounding.

Taxes that reflect the amount of public services provided by the state and local governments were seen as poor by 34 percent, as fair by 37 percent, and only by 25 percent as good and excellent. Almost 70 percent of respondents rated the cost of living as good and excellent in Maine.

The educational system and family-friendly environment are viewed as good and excellent in the State of Maine. Almost 72 percent gave the educational system in Maine high marks and 92 percent reported Maine as a family-friendly environment. However, more then 60 percent viewed the state as lacking cultural and social opportunities. 95 percent of those who responded to the survey rated Maine as an excellent and good place for outdoor and recreational activities with 70 percent of the people enjoying the weather conditions. 92 percent viewed Maine as a rural state and 60 percent of the respondents rated the urban setting of the state as good or fair. In most cases, between 2 and 5 percent of the graduates did not have an opinion on the subject.

The questionnaire asked the survey participants to check three of the most important economic, social, cultural, and environmental characteristics that they took into consideration when deciding where to live. The provided characteristics were: career opportunities, salary and benefits, taxes, cost of living, educational system, cultural and social opportunities, family-friendly environment, outdoor and recreational setting, urban setting, rural setting, weather conditions. According to the respondents' responses, the three important economic, social, cultural, and environmental characteristics when deciding on migration destination are: career opportunities with a 56 percent response rate, family-friendly environment with 46 percent, and outdoor and recreational setting

Table 3.3. Rating of the State of Maine's Economic, Social, Cultural, and

Environmental Characteristics

The State of Maine Characteristics	Excellent	Good	Fair	Poor	Do not know
Career Opportunities	1.77%	18.31%	49.02%	28.35%	2.56%
Salary and Benefits	0.20%	17.91%	54.92%	24.61%	2.36%
Taxes	1.57%	23.23%	36.61%	34.06%	4.53%
Cost of Living	17.52%	50.59%	22.24%	6.50%	3.15%
Education System	11.42%	60.24%	23.23%	1.97%	3.15%
Cultural and Social Opportunities	6.69%	30.51%	43.31%	17.13%	2.36%
Family-Friendly Environment	58.66%	34.06%	3.94%	0.79%	2.56%
Outdoor/Recreational Setting	76.57%	18.31%	1.57%	0.59%	2.95%
Urban Setting	6.69%	30.91%	34.25%	23.82%	4.33%
Rural Setting	52.36%	39.37%	3.74%	1.38%	3.15%
Weather	16.93%	54.33%	22.24%	4.33%	2.17%

Source: 2002 Migration of University of Maine Graduates' Survey.
Percentages may not sum to 100 percent due to rounding.

with 37 percent. Of the other factors: the cost of living as well as salaries and benefits,

ranked fourth and fifth respectively with 33 and 31 percent responses. Surprisingly,

participants cared the least about the urbanization level of the area while deciding to

relocate. Rural setting was more important to them (20 percent). Taxes also were checked

as an unimportant factor with only a 5 percent rate. Additionally, cultural and social

opportunities educational system as well as weather conditions have a less significant

impact on graduates' migration decisions. Figure 3.4 displays the rankings above.

Figure 3.4. Ranking of Economic, Social, Cultural, and Environmental

Characteristics of Migration
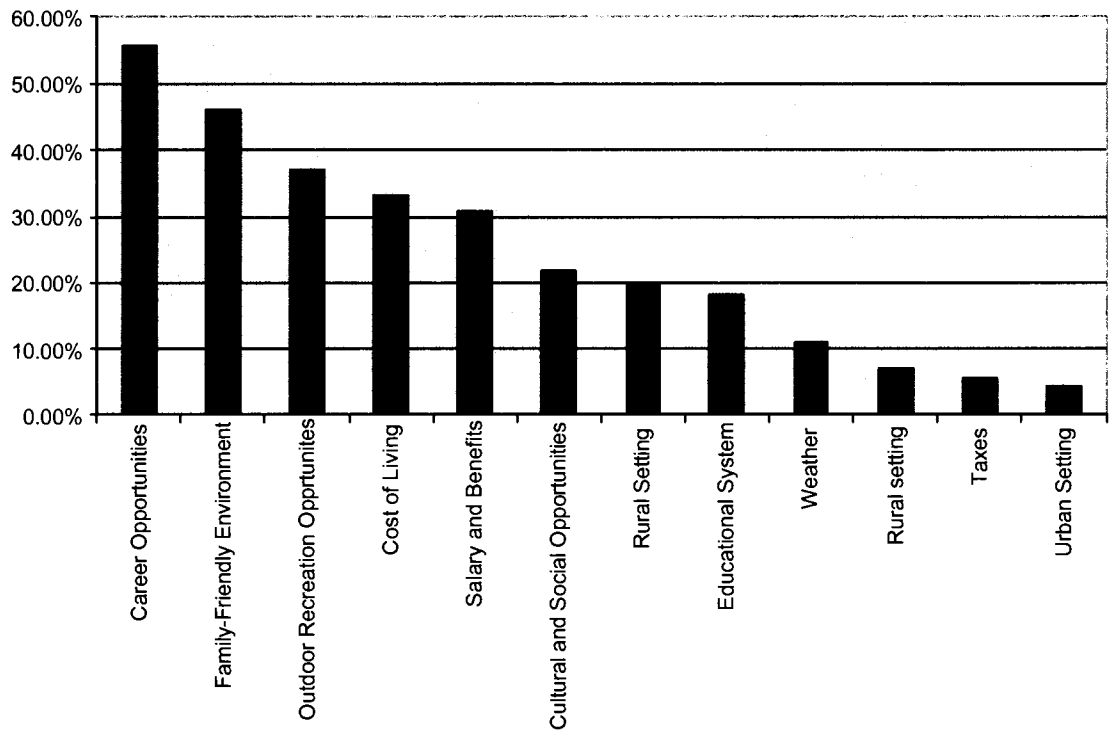
Source: 2002 Migration of University of Maine Graduates' Survey.
Percentages do not sum to 100 percent due to the use of a different measurement technique.
The percentages were drawn based on the number of checks provided for each category and the total
number of respondents responding to the question, which was 495.

CHAPTER 4

DATA

In this section the data used in the analysis are introduced. There are two types of data utilized in this study: primary and secondary. The primary data come from the survey of University of Maine 2002 graduates, which was conducted in August 2002 with a response rate of 38%. Additionally, secondary data, which is the average wage by occupation in Maine and the U.S., were gathered from the Bureau of Labor Statistics for 2001. In accordance with the economics theory and reviewed articles, the variables used here are migration of University of Maine graduates, grade point average, gender, age, marital status, residency, previous moving patterns, financial aid, field of study, level of education, employment status, wage, and variables describing the economic and quality-of-life characteristics in Maine: career opportunities, salary and benefits, taxes, cost of living, family-friendly environment, cultural and social opportunities, educational system, urbanization level, as well as amenities (outdoor and recreational opportunities and weather conditions). The study consists of 505 observations. Table 4.1 displays the definitions of the variables used in the research.

As presented in the chapter on survey, there are missing observations present in the survey data. In order to estimate the model correctly, each missing observations was coded as a value of 99 and was omitted in the final analysis of the data. These missing observations were also excluded from mean and standard deviation calculations.

4.1. Personal Characteristics Variables

There are seven personal characteristics variables used in the study: grade point average, gender, age, marital status, residency, previous moving patterns, and financial aid. 'Grade point average' (GPA) is the grade point average of a student at graduation on a 4.0 scale. In the questionnaire, the responses for GPA were not recorded as the actual values but rather were treated as categorical values and grouped depending on the GPA's value. For each category, the median value was obtained and recorded as an answer. For example, a GPA: 3.5-4.0 was recorded as 3.75 and GPA: 2.5-2.99 was coded as 2.75.

'Gender' is a dummy variable that takes on a value of 1 for females and 0 for males. 'Age' is a continuous variable that represents the age of graduates at the graduation date. The 'marital status' variable, which is also a dummy variable, equals 1 for unmarried students and 0 for married and same sex couples. 'Residency' refers to a Maine resident. It is a dummy variable and takes the value of 1 when a student went to high school in Maine and 0 when high school was outside Maine. 'Previous moving patterns' are a continuous factor reflecting the number of moves before enrolling in the University of Maine.

Finally, 'financial aid' offered to each student at the University of Maine is a proxy for the cost of education of the attended school. The financial aid figure is used to find the influence of education expenses on graduate's post-graduation migration decision. Using the actual cost of education at the University of Maine is not an appropriate measure for this study because the cost of education at the University of Maine is approximately the same among students. The financial aid variable is, however, different among students due to different financial packages and scholarships received as

well as different financial help obtained from students' family members. In the survey questionnaire, the factor was presented as a categorical variable by grouping the aid variable depending on the percent of education expenses received in financial help. The actual amount of financial aid was not recorded. For each of the categories, the median value was obtained and recorded as an answer. For example, financial help of 75%-100% was recorded as 87.5% and financial help of 1%-24% coded as 12.5%.

4.2. Job Variables

The job variables include factors influencing decisions about a job placement either in Maine or outside Maine. Further, some of the job factors like major and educational level are part of the personal characteristics of University of Maine 2002 graduates, and at the same time are also influenced by outside environment like requirements of the national and local job markets. For example, being an engineer affects the decision for finding a job since the job market is larger in scale and the obtained skills although more specific are universal across the country and the world. On the other hand, being an education or social work major limits the job opportunities to the locality since students acquire skills specifically relevant to the requirements of the local job market. Additionally, having a master or doctoral degree opens up a greater area for job search as well as at the same time increases the opportunities for finding highly paying jobs. The job variables employed in this study are field of study, education level, employment status of a graduate, and wage.

A 'field of study' defines the area of study that a graduate pursued at the University of Maine. The actual major of each student was recorded and majors were

grouped together depended on the field the major was a part of. For example, political science, art studio, and sociology were assigned to the arts, humanities and social sciences field. On the other hand, mechanical engineering and civil engineering were assigned to the engineering group. There are six fields of study: arts, humanities and social sciences; education; business, economics and public administration; nursing and social work; physical sciences and forestry; and engineering. Each of the sub fields is a dummy variable that takes a value of 1 for each of the areas of study. 'Degrees' earned reflect the educational level of a graduate. There are three educational levels: bachelor, master and certificate, and doctorate, and they are presented as dummy variables.

The 'employment status' of a college graduate is a variable that presents if a student was employed or unemployed at the time of survey administration. It is a dummy variable that equals 1 for a student being unemployed and zero otherwise. This variable is only used for students who were not attending a higher education program full-time.

The last variable is the 'wage' factor. The data describing wages were obtained from the Bureau of Labor Statistics for 2001. Earnings were determined for students employed in Maine, outside Maine, and for those who were unemployed but were not enrolled full-time in a higher education program like a graduate school. Average wages by occupation were collected for Maine and the U.S. as a whole. The Maine and U.S. wages were used in the study to account for the influence of Maine wages relative to the rest of the country on the migration decisions of University of Maine graduates. Maine wages reflect the earnings opportunities in the state and the U.S. wages represent the salary potentials in states other than Maine. Since the number of observations is relatively small in the sample, limiting the amount of information and variation in graduates'

destinations, the U.S. average wages by occupation are employed as a proxy for all U.S. states that are considered during relocation decisions, revealing the wage opportunities outside Maine.

In order to create the wage variable, majors reported by respondents in the migration of the University of Maine 2002 survey were matched with occupations listed by the Bureau of Labor Statistics. There were approximately 80 different majors reported in the migration study, consequently, there is a high variation of occupations within the wage variable. Multiple occupations were listed for majors: Studio Art, Business, Mathematics and Statistics, Computer Science, Computer Engineering, Communication, English, and Journalism. To obtain the average wage for these majors, a weighted wage average was taken of the annual salaries for Maine and the U.S. Weights used to calculate the average wage were the employment data for each occupation in each major divided by the total employment of all occupations for that major.

To obtain the average wage differential between the U.S. and Maine, the Maine average wages by occupation were subtracted from the U.S. average wages by occupation. The wage differential is positive when the U.S. average wage is greater than the Maine average wage, and it is negative when the Maine average wage is greater than the U.S. wage. A second wage variable was created to represent the ratio of the U.S. average wage to the Maine average wage. Consequently, the U.S. average wage was divided by the Maine average wage. When the U.S. average earnings are greater than the Maine average earnings, the wage ratio is greater than one; when both earnings are equal then the ratio is one; and when the U.S. earnings are smaller than Maine's, the ratio is less than one. As a result, two regressions will be estimated in which each of the wage

factors is employed to find the influence of Maine wages relative to the rest of the country on migration decisions.

4.3. Maine Characteristics Variables

4.3.1. Economic Variables

Historically economists have assumed that the primary determinant of persons' location decision is economic opportunities. There are four variables in the migration of University of Maine 2002 graduates that represent the economic conditions of the State of Maine. The economic variables used in this study are ordinal variables[2] that rate Maine's career opportunities, salary and benefits, taxes, and cost of living.

The ordinal variables mentioned above rate Maine's economic characteristics on a scale from 1 to 4 (1 being the highest and 4 being the lowest). As mentioned in the chapter on survey, there were survey respondents who did not have an opinion on Maine's features and, therefore, a value of 99 was assigned as their answers. Consequently, these observations were treated as missing values in the final analysis and were not included in mean and standard deviation calculations. Generally, the higher the rating of a characteristic, the less likely the student is to relocate. The 'career opportunities' factor is the availability for meaningful career development in the area of study for college graduates. 'Salary and benefits' are the rankings of Maine's incomes, wages, as well as, benefits. 'Taxes' are the evaluation of Maine's taxation base and are a proxy for the cost of local public services in the area. Finally, 'cost of living' reflects the living expenses including housing prices in the state.

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[2] **Ordinal Variables (Scales)** – "used for characteristics that have underlying order among them, although the order may be arbitrary. Examples of ordinal scales are these: frequently, often, sometimes, rarely; strongly agree, agree, disagree, and strongly disagree" (Fink, 1995).

4.3.2. Quality of Life Variables

The quality of life variables also represent University of Maine 2002 graduates' opinions on social and family-oriented characteristics in Maine. They include ordinal scales such as family-friendly environment, cultural and social opportunities, and the quality of the educational system in Maine, outdoor and recreational opportunities, and weather conditions. The factors are rated on a 1 through 4 scale with 1 being the highest and 4 being the lowest. The quality of life variables are included because of the evidence from numerous studies of migration that they are important factors in migration decisions (Greenwood and Hunt, 1989; Kodrzycki, 2001). Typically these factors include public services, climate and natural resource amenities.

'Family-friendly environment' is used to represent the level of safety and friendliness in Maine as a place to raise a family. 'Cultural and social opportunities' refers to the ranking of cultural and social life in the State of Maine, including diversified cultural background as well as music and arts displays. Ranking of the 'educational system' signifies the amount of public services as defined by the school quality level offered by local communities. 'Outdoor and recreational setting' reflects the availability for outdoor and recreational activities such as tourism and sport activities. Finally, 'weather', symbolizes the climate conditions in Maine. These two variables are also called amenities of an area.

Table 4.1. Variable Names, Definitions, Responses, Means and Standard Deviations

Name	Definition	Response Nr. of Responses	Mean Std. Dev.
UM Migration	The number of University of Maine 2002 graduates who migrated from Maine after graduation. It takes a value of 1 for migration out of Maine and 0 otherwise. This is the variable in question.	161	0.211 (0.410)
Grade Point Average	The grade point average at graduation.	<2.00-9 2.25-19 2.75-85 3.25-145 3.75-250	3.386 (0.428)
Gender	A dummy variable that equals 1 for women and 0 for men	338	0.665 (0.472)
Age	A graduate's age upon graduation.	(21-30)-374 (31-40)-54 (41-50)-52 (51-60)-27 (61-70)-1	29.309 (9.144)
Marital Status	A dummy variable that equals 1 for single people and 0 for married couples and for people in committed relationships but not married.	336	0.661 (0.474)
Residency	A dummy variable that equals 1 if a graduate is from Maine and 0 otherwise.	400	0.787 (0.409)
Previous Moving Patterns	Number of moves before enrolling to the University of Maine.	0-154 (1-2)-157 (3-5)-131 (6-10)-37 (10<)-26	2.405 (9.506)
Financial Aid	Percentage of cost obtained in financial aid in the form of scholarships, loans, etc.	0%-84 12.5%-57 37.5%-61 62.5%-101 87.5%-201	0.529 (0.344)

Table 4.1. Continued

Name	Definition	Response– Nr. of Responses	Mean Std. Dev.
Field of Study	An area of study while at the University of Maine.		
	Liberal arts, humanities and social science	128	0.251 (0.434)
	Education	102	0.200 (0.400)
	Business, economics, and public administration	66	0.103 (0.304)
	Nursing and social work	52	0.129 (0.335)
	Physical sciences and forestry	92	0.181 (0.385)
	Engineering	68	0.134 (0.341)
Degree	A degree earned at graduation. Bachelor: BA + BS	349	0.670 (0.467)
	Master: MA + MS + MBA + MEd + Certificate	142	0.297 (0.529)
	Doctorate: Ph.D. + Ed.D.	15	0.030 (0.169)
Employment Status	A dummy variable that equals 1 for being unemployed and 0 otherwise.	89	0.175 (0.380)
Wage	An average college wage ratio/differential by occupation earned in the U.S. and Maine.	N/A	1.165 6573 (0.142)(5868)
Career Opportunities	An ordinal variable rating on a 1 through 4 scale of Maine's employment opportunities.	1-9 2-93 3-249 4-144	3.053 (0.736)

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Table 4.1. Continued

Name	Definition	Response- Nr. of Responses	Mean Std. Dev.
Salary and Benefits	An ordinal variable rating on a 1 through 4 scale of Maine's salary and benefits.	1-1 2-91 3-279 4-125	3.051 (0.661)
Taxes	An ordinal variable rating on a 1 through 4 scale of Maine's taxes.	1-8 2-118 3-186 4-173	3.054 (0.803)
Cost of Living	An ordinal variable rating on a 1 through 4 scale of Maine's living expenses.	1-89 2-257 3-113 4-173	2.193 (0.879)
Family-friendly Environment	An ordinal variable rating on a 1 through 4 scale of Maine's family-friendly environment.	1-298 2-173 3-20 4-4	1.481 (0.629)
Cultural and Social Opportunities	An ordinal variable rating on a 1 through 4 scale of Maine's cultural and social opportunities.	1-34 2-155 3-220 4-87	2.720 (0.820)
Educational System	An ordinal variable rating on a 1 through 4 scale of Maine's educational system.	1-58 2-306 3-118 4-10	2.173 (0.635)
Urban Setting	An ordinal variable rating on a 1 through 4 scale of Maine's urbanization level.	1-34 2-157 3-174 4-121	2.778 (0.886)
Outdoor and Recreational Opportunities	An ordinal variable rating on a 1 through 4 scale of Maine's outdoor and recreational opportunities.	1-389 2-93 3-8 4-3	1.277 (0.538)

Table 4.1. Variable Names, Definitions, Responses, Means, and Standard

Deviations, Continued

Name	Definition	Response- Nr. of Responses	Mean Std. Dev.
Weather	An ordinal variable rating on a 1 through 4 scale of Maine's climatic conditions.	1-86 2-276 3-113 4-22	2.151 (0.740)

Source: 2002 Migration of University of Maine Graduates' Survey and the Bureau of Labor Statistics for 2001.

4.3.3. Population Density Variables

An ordinal variable, 'urban setting', is used to identify the urbanization level in Maine. This factor rates the urbanization level in Maine on a scale from 1 to 4 with 1 being the highest and 4 being the lowest. As mentioned above, there were again survey respondents who did not have an opinion on Maine's features and, therefore, their answers were omitted in the final analysis.

CHAPTER 5

METHODOLOGY

In this section, the theoretical model of migration that establishes the framework for the empirical analysis of this thesis is presented as well as the empirical model and methods of estimation. As in many migration papers, statistical techniques are utilized to analyze the college graduates' migration data. To estimate the college graduates' migration model, a discrete choice logit regression is used. Statistical tests are performed to find the significance of the model and individual parameters.

The goal of this research is to determine why a University of Maine graduate decided to either stay in Maine or to move out from Maine after graduation in May/August 2002 and how explanatory variables such as personal characteristics and Maine characteristics affected University of Maine 2002 graduates' decisions to relocate outside Maine. Migration out of Maine, which is the variable in question, is regressed on the above factors. The hypothesis of this research is that variables such as grade point average; marital status; previous moving patterns; liberal arts, humanities, and social sciences; business, economics, and public administration; nursing and social work; physical sciences and forestry; engineering; master degree; doctoral degree; employment status; wage, career opportunities; salary and benefits; tax; cost of living; family-friendly environment; cultural and social sciences; educational system; outdoor and recreational opportunities; urban setting; and weather positively influence the decisions to migrate out of Maine. On the other hand, variables: age, gender, residency, and financial aid negatively affect the migration decisions of University of Maine 2002 graduates.

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According to several articles reviewed, there are several ways of regressing

migration trends using statistical techniques. For example, Kodrzycki (2001) applies a

probit model to estimate the impact of explanatory variables such as age, income, and

amenities on migration of college graduates. Tornatzky et. al. (2001) uses logit

estimation to find the importance of personal, economic, and institutional factors on

college graduates' relocation decisions. Groen (2001) employs a conditional logit model

to estimate the effects of college location on after graduation settlement choices. In their

study, although not on the subject of college migration, Kanaroglou and Ferguson (1998)

use two types of models, a multinomial logit and aggregated spatial choice model, on

migration microdata for Canada. They conclude that both models precisely estimate

migration data. However, the aggregated spatial choice model outperforms the more

commonly used multinomial logit regression (Kanaroglou and Ferguson, 1998).

Based on a review of statistical methods used to estimate college migration, it was

decided to employ a logit model, which is used for discrete or binary choice studies. The

use of the logit estimation can be justified by derivation of the model from models of

individual behavior. It offers not only the major advantage of a ready interpretation of the

parameters, but additionally, in economic applications, it even permits an interpretation in

utility terms (Cramer, 1991).

5.1. Theoretical Model

Location decisions entail the selection of a single, discrete alternative from a set

of numerous options. The random utility modeling framework is appropriate to represent

the economic behavior of location choices. In his 1978 article, McFadden presents a

rigorous discussion of the application of the random utility modeling framework to residential location choices.

Consider a University of Maine graduate who must decide whether to stay in the State of Maine or to move away from Maine after the May/August 2002 graduation. The college graduate will either select to stay in Maine (Me) or to relocate to other states in the U.S. or outside the U.S. The relocation outside Maine is denoted as j. Assuming that the student maximizes utility at any given time, the decision to either stay in or to leave Maine corresponds to the highest level of utility obtained by the University of Maine 2002 graduate from the execution of either of the two choices. The set of alternatives is denoted as R (j and $Me \in R$). To properly investigate this association, it is crucial to describe the factors that influence the utility derived by the individual's location decisions (Cramer, 1991; Griffiths, Hill, and Judge, 1993).

Let a University of Maine 2002 graduate, i, receive utility, U_{ij}, from either moving away or staying in Maine after graduation. The utility derived by an individual from choosing to resettle is a function of personal characteristics of the 2002 college graduate, job factors, and Maine characteristics. As a result, the decision to relocate depends on the highest utility achieved from the two alternatives, migrating out of Maine (j) or staying in Maine (Me). The utility equation is expressed as a function of deterministic portion, V, and a stochastic portion, ε. The utility gained by a college student, i, from choosing to move out of Maine, j, is denoted:

$$U_{ij} = V_{ij} + \varepsilon_{ij},$$

where V_{ij} is the observed indirect utility associated with the location decision and ε_{ij} is the random disturbance that reports on the error associated with researcher's lack of knowledge. In turn, the selection either to relocate out of Maine (j) or to stay in Maine (*Me*) by a University of Maine graduate, i, is expected if and only if:

$$V_{ij} + \varepsilon_{ij} \geq V_{iMe} + \varepsilon_{iMe}, \; \forall \, Me \neq j; j, Me \in R$$

Using the above expression, the probability, P_i, of a graduate, i, choosing to relocate out of the State of Maine is written as follows:

$$P_i = P(\varepsilon_{ij} - \varepsilon_{iMe} \geq V_{iMe} - V_{ij}), \; \forall \, Me \neq j; \; j, Me \in R$$

The probability expression above serves as the basis for the random utility modeling framework utilized in this thesis. In order to apply this model, it is crucial to state assumptions regarding the functional form of V and the distribution of ε. The first assumption is that the indirect utility function is linear in parameters. As a result, the utility of a University of Maine graduate, i, is presented as a function of the graduate's personal attributes, X, the job factors, Y, and the opinions of graduates on the characteristics of the State of Maine, Z. Since, for this project, a bivariate model of either leaving or staying in Maine is utilized, the probability, P_i, always remains in the [0,1] interval. The second assumption is that the stochastic part of the utility function consists of errors independently and identically distributed of a type 1 extreme value. The independence assumption implies that the utility derived by one college graduate is not

related to the utility derived by any other graduates, and the utility that a college graduate

derives from the choice of one alternative is not related to the utility provided by the

other alternative (Cramer, 1991; Griffiths, Hill, and Judge, 1993; McFadden, 1978).

The observed part of the indirect utility of the ith graduate can be represented as

follows:

$$V_{ij} = \alpha X_i + \beta Y_i + \gamma Z_i,$$

where X_i is the vector of a University of Maine 2002 graduate, i, personal characteristics,

Y_i denotes a vector of the job factors, and Z_i is the valuation of characteristics of the State

of Maine. α, β, and γ are vectors of parameters to be estimated. The vector X_i describing

the personal characteristics of a graduate may contain such factors as grade point average,

age, gender, previous moving patterns, and financial aid. The vector Y_i includes field of

study, education level, employment status, and wage. Finally, the Z_i vector symbolizes

the graduates' opinions of the Maine characteristics and includes variables such as cost of

living, taxes, quality of life attributes, and amenities like climate (Griffiths, Hill, and

Judge, 1993; Cramer, 1991).

As the values of vectors X_i, Y_i, and Z_i change, the value of the indirect utility

varies over the real number line. The larger the value of V_{ij}, the greater the probability, P_i,

that a college graduate, i, chooses to relocate out of state. The cumulative distribution

function is a probability transformation of V_{ij}, keeping P_i between zero and one (Griffiths,

Hill, and Judge, 1993; Cramer, 1991). This yields a monotonic relationship between the

indirect utility and probability. The relationship is presented as follows:

$$P_i = F(V_{ij}) = F(\alpha X_i + \beta Y_i + \gamma Z_i),$$

where $F(\bullet)$ is the cumulative distribution of a logistic random variable and is given by

$$P_i = F(V_{ij}) = \{1/[1 + exp(-(\alpha X_i + \beta Y_i + \gamma Z_i))]\}$$

The logit estimation provides only the signs of each coefficient without the

magnitudes of the variables' effects. To find the marginal effect of each variable on the

migration of college graduates, a partial differentiation is used. A partial is taken of the

cumulative distribution function with respect to each explanatory factor at its mean value

(m) as presented below:

$$\partial P_m/\partial X_m, \; \partial P_m/\partial Y_m \; and \; \partial P_m/\partial Z_m$$

This procedure translates into an incremental increase in each independent variable,

which increases the probability for migration of University of Maine graduates (Griffiths,

Hill, and Judge, 1993; Green, 1993).

5.2. Empirical Model

The goal of this research is to determine why a University of Maine graduate, i, decided to either stay in Maine or to move out from Maine after graduation in May/August 2002. The bivariate logit model is utilized to find the impact of personal, job, economic, social, cultural, environmental, and climatic variables on the decision to migrate after college commencement. Because college graduates can either migrate or stay due to an offered job placement or continuation of higher education, two equations are employed to estimate the migration of University of Maine 2002 graduates. These regressions are called: "work-oriented", which includes students who worked either part- or full-time, or did not work at all at the time of the survey, but who did not plan to attend an institution of higher education; and "college-oriented" that includes students who planned to further pursue their education and were enrolled full-time in higher education institutions in fall 2002. The college-oriented equation has 89 observations and the work-oriented 416 observations. The difference between the two migration regressions is the lack of variables identifying wage differentials and employment status for the college-oriented equation. These factors are excluded from the analysis of the college-oriented equation due to their irrelevance. UMaine 2002 graduates who enrolled full-time into a higher education program are not a part of a workforce and, therefore, are not listed as unemployed or employed. Consequently, they do not receive payment other than scholarships, financial aid, and assistantships.

5.2.1. Specification of the Logit Model

5.2.1.1. College – Oriented Migration Equation

Given the data and the assumptions, the college-oriented model specifies the

probability of either migrating from or staying in the State of Maine as follows:

$$P_i = \alpha X_i + \beta Y_i + \gamma Z_i$$

where P_i denotes the probability of a University of Maine 2002 graduate migrating out of

the State of Maine to pursue further higher education, α, β, γ and are the coefficient

parameters, and X, Y and Z are the explanatory variables, such as personal characteristics:

grade point average, gender; age, marital status, Maine residency, previous moving

patterns, financial aid; job variables: liberal arts, humanities, and social sciences,

business, economics, and public administration, nursing and social work, physical

sciences and forestry, and engineering, master degree; and Maine characteristics: career

opportunities, salary and benefits, taxes, cost of living, family-friendly environment,

cultural and social opportunities, educational system, outdoor and recreational

opportunities, and weather conditions.

Explanatory variables such as grade point average, gender, age, marital status,

Maine residency, previous moving patterns, and financial aid account for the personal

characteristics of University of Maine 2002 graduates who continued their education in

fall 2002. Further variables, fields of study: liberal arts, humanities, and social sciences,

business, economics, and public administration, nursing and social work, physical

sciences and forestry, and engineering, as well as master degree account for variables

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affecting job opportunities after graduation. In accordance with the theory and the literature, a field of study: education and educational attainment: bachelor degree was omitted in the model to avoid the dummy variable trap[3].

Fields of study: liberal arts and social sciences, business, economics, and public administration, nursing and social work; physical sciences and forestry, and engineering, were found insignificant in the college-oriented equation as reported in appendix D. The lack of significance is a result of a low number of education students represented in this group, which, in turn, might cause a dummy variable trap, because education is the omitted dummy variable in the model. In order to find if any of these fields of study are statistically different from each other, the dummy variables were individually tested. By including only one field of study and excluding others from the tested equation, the testing was performed. Unfortunately, none of the fields of study appeared to have a significantly significant influence on migration decisions of 2002 UMaine graduates, and therefore, were not found different from each other. Liberal arts, humanities, and social sciences were found insignificant at 71 percent, education at 99 percent, business, economics, and public administration at 90 percent, nursing and social work at 14 percent, physical sciences and forestry at 67 percent, and engineering at 90 percent. Consequently, the final analysis of college-oriented equation does not include any fields of study.

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[3] **Dummy Variable Trap** –" …the number of dummy variables is always less by one than the number of categories that exists for each characteristic. Otherwise the dummy variables would sum up to one and be linearly dependent with the intercept" (Griffiths, Hill, and Judge, 1993).

The variables: marital status and financial aid were also found insignificant.

Further, although overall marital status does not have serious multicollinearity[4] problems,

it is considered that it approximates the same characteristics as a family –friendly

environment variable. It is suspected that the variables act both as proxies for marital

status and family- oriented features. To find multi variable correlation, a multicollinearity

test was performed using Pearson correlation coefficients between pairs of explanatory

variables as well as auxiliary regressions.[5] The collinearity results are presented in

appendix D.

The variables career opportunities, salary and benefits, taxes, and cost of living

symbolize the economic conditions in the State of Maine that college graduates face. The

career opportunity variable is a proxy for meaningful career development in the area of

study. Salary and benefits describe possible incomes, wages, and benefits earned in

Maine. Taxes are a proxy for the cost of local public services, and cost of living

represents the cost of living in Maine including housing prices. Unfortunately, the

variables career opportunities, salary and benefits, and cost of living display high values

of R^2 in their auxiliary regressions, and, therefore, experience multicollinearity. However,

all three variables are kept to approximate economic factors in the State of Maine. On the

other hand, the taxation variable is excluded from the analysis due to its high

insignificance as reported in appendix D.

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[4] **Collinearity (Multicollinearity)** – "[a condition that] arises in nonexperimental data when society's experimental design for the explanatory variables is such that their individual effects cannot be isolated and the corresponding parameter magnitudes cannot be determined with the desired degree of precisions" (Griffiths, Hill, and Judge, 1993).

[5] **Auxiliary Regression** –"one right-hand-side variable is written as a linear function of the other right-hand-side variables plus the difference (the error). This equation has the form of a regression model but it is only descriptive of the collinearity relationship that exists. Auxiliary regressions can be estimated for each of the independent variables. If the R^2 is high then a collinear relationship is indicated." If R^2 is higher then 0.8 that means that 80 percent or more of the variable's variation is explained by other right-hand-side factors (Griffiths, Hill, and Judge, 1993).

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Factors such as family-friendly environment, cultural and social opportunities, educational system, outdoor and recreational opportunities, and weather represent quality of life and amenity variables. They are expected to positively influence the location decisions of University of Maine graduates. The urban setting variable, which symbolizes population density factor, is included in the model and captures the urbanization level of Maine. Unfortunately, the variables cultural and social opportunities, educational system and weather experience high multicollinearity and is highly correlated with other right-hand-side variables. For example, climate correlates with some of the fields of study and financial aid. Although cultural and social opportunities, educational system and weather factors experience collinearity, they are kept in the final equation to symbolize the social and cultural background, quality of educational system, and climatic characteristics of the State of Maine.

5.2.1.2. Work-Oriented Migration Equation

The specification of the work-oriented logit model, which describes the migration behavior of University of Maine graduates who either were employed at the time of the survey or unemployed but not enrolled full-time in any educational programs, entails including job variables such as employment status, wage, and doctoral degree in the model. This inclusion will reveal the impact of wages and employment status on college graduates' location decisions.

Given the data and assumptions, the work-oriented model specifies the probability of either migrating out of or staying in the State of Maine as follows:

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$$P_i = \alpha X_i + \beta Y_i + \gamma Z_i$$

where P_i denotes the probability of a University of Maine 2002 graduate migrating out of the State of Maine to start his/her professional career, α, β, and γ are the coefficient parameters, and X, Y, and Z are the explanatory variables, personal characteristics: grade point average, gender, age, marital status, Maine residency, previous moving patterns, financial aid; job factors: liberal arts, humanities, and social sciences, business, economics, and public administration, nursing and social work, physical sciences and forestry, and engineering, master degree, doctoral degree, employment status, wage; and Maine characteristics: career opportunities, salary and benefits, taxes, cost of living, family-friendly environment; cultural and social opportunities, educational system, outdoor and recreational opportunities, and weather conditions.

The variables included in the work-oriented migration equation are the same as the variables incorporated in the college-oriented migration equation. Only three job factors, employment status and wage, as well as an educational level variable, a doctoral degree, are added to the equation. Employment status indicates whether a University of Maine graduate is employed or unemployed. An unemployed UMaine graduate is expected to be more prone for leaving Maine and, therefore, there is in a positive relationship between employment status and out-migration.

As mentioned in the chapter on data, there are two types of wage variable, the U.S./Maine wage ratio and the U.S.-Maine wage differential, defined in this study. Consequently, two regressions will be run for the work-oriented model to find the sensitivity of the model to the wage variable definition. The two types of the wage factor

are utilized due to suspected dissimilarities in migrants' decision to leave Maine based on the wage differences either in percentages or in actual dollar signs. Some people base their decisions on the actual money differences in wage figures and others prefer to know the wage ratio between two wage groups in order to decide on relocation. Additionally, there is a limited number of observations in the analysis (416) and a low out-migration rate of UMaine graduates uncovered in the survey results section, which in turn may influence the final results in both equations.

The U.S. and Maine average wage by occupation define the wage ratio and differential variable. When the U.S./Maine wage ratio is greater than one, then UMaine migrants should relocate out of state. When the ratio is smaller than one, then the migrants should stay in Maine. Consequently, a positive relationship between wage and the dependent variable is expected. When the U.S.-Maine wage differential is positive, UMaine migrants are expected to relocate out of state as well. On the other hand, if the wage differential is negative and Maine average wage by occupation is greater than the U.S. average wage, college graduates should live and work in Maine. As a result, there is a positive relationship between the average wage differential and the dependent variable.

Finally, an additional education level, which is a doctoral degree obtained from the University of Maine, was included in the equation. Since, there are now three educational levels, the bachelor degree is omitted in the analysis in order to avoid the dummy variable trap. Only master and doctoral degrees are utilized to signify the educational differences in migration probability. It is expected that master and doctoral degree holders are more likely to leave the State of Maine compared to the bachelor degree holders.

Unfortunately, as in the college-oriented migration equation, there are variables that are excluded from the final analysis due to either muticollinearity and/or lack of significance as presented in appendix D. The Pearson correlation coefficients between pairs of variables as well as the auxiliary regression results are very similar for both equations because they only differ by the expression of the wage variable, which is, in turn, constructed of the same components. Consequently, only one set of the results is used.

The variables with high correlation and multicollinearity are career opportunities, salary and benefits, cost of living, and outdoor and recreational opportunities. The career opportunities variable is highly correlated with factors like grade point average, financial aid, employment status, and wage. It is assumed that career opportunities increase with higher GPA. It is also suspected that both career opportunities and employment status are proxies for job availability in Maine. The variable salary and benefits is highly insignificant and also correlated with numerous variables such as grade point average financial aid, wage, and marital status in the work-oriented migration equations. This variable has especially high correlation with grade point average and wage. According to the theory, wages are higher with better grade point averages. Additionally, salary and benefits and wage are thought to be proxies for the same factor, which are the potential earnings in Maine. Further, the wage variable is also highly insignificant, but since it is an important factor of migration, it is kept in the model to reflect the wage opportunities in Maine relative to the rest of the country.

The salary and benefits, cost of living, cultural and social opportunities, educational system, outdoor and recreational opportunities, and weather conditions have

very high R^2 in their auxiliary regressions, which indicate high multicollineairty. Additionally, outdoor and recreational opportunities are highly insignificant. As a result, variables: career opportunities, salary and benefits, cost of living, and outdoor and recreational opportunities are excluded from the final analysis, but cultural and social opportunities, educational system, and climate factors are kept to reflect the cultural and educational opportunities as well as weather conditions in Maine. Appendix D presents the multicollinearity and preliminary results of these two equations.

5.2.2. Expected Coefficients' Signs

In accord with economic theory and literature, the variables grade point average; marital status; previous moving patterns; liberal art, humanities, and social sciences; business, economics, and public administration; nursing and social work; physical sciences and forestry; engineering; master degree; doctoral degree; employment status; wage, career opportunities; salary and benefits; tax; cost of living; family-friendly environment; cultural and social sciences; educational system; outdoor and recreational opportunities; urban setting; and weather are expected to have positive signs on their coefficients and negative signs are alleged on parameters of variables: age, gender, residency, and financial aid.

5.2.3. Statistical Tests

To determine the impact of the independent variables on the migration of University of Maine 2002 graduates, a hypothesis-testing technique is used. The likelihood ratio test is conducted to find the significance of the model as a whole and the

chi-square test is used to examine the significance of individual parameters on the

dependent factor. Additionally, the McFadden's pseudo R^2 test is employed to measure

regression's goodness of fit.

The likelihood ratio test compares the value of the log-likelihood function, *lnl*,

evaluated at the maximum likelihood estimator *(β^)* to the restricted maximum likelihood

estimator *(β^*)* that results when the log-likelihood function is maximized subject to the

restrictions *Rβ = r* being true. If the hypotheses being tested can be substituted easily into

the model to obtain a restricted model, then the restricted value of the log-likelihood

function is obtained by re-estimating the restricted version of the model. The likelihood

ratio test statistic is as follows:

$$\lambda LR = 2[lnl(\beta') - lnl(\beta'^*)]$$

and has a $\chi^2_{(J)}$ distribution if the joint null hypothesis is true. If the data do not support

the null hypotheses then the value of the test statistic becomes larger. The null hypotheses

are rejected if $\lambda LR \geq \chi^2_{(J)}$. In this case, *J* is 16 for the college-oriented migration equation

and 23 for the work-oriented migration equation. The test is performed at a significance

level of $\alpha = 5\%$. (Griffiths, Hill, and Judge, 1993).

The McFadden's pseudo R^2 test is employed to measure regressions' goodness of

fit. It is analogous to the R^2 in a conventional regression model[6] and it is called the

likelihood ratio index (*LRI*). *LRI* is defined as follows:

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[6] **R²** – "…the proportion of variation in the dependent variable that is explained by variation in the explanatory variables" (Griffiths, Hill, and Judge, 1993).

$$LRI = 1 - lnl(\beta^{\wedge}) / lnl(\beta^{\wedge}*),$$

where $lnl(\beta^{\wedge})$ is the maximized value of the log-likelihood function and $lnl(\beta^{\wedge}*)$ is the

log-likelihood computed with only a constant term. The measure is bounded by values

zero and one. If all of the slope coefficients are zero, LRI equals zero. It is, however,

impossible to obtain $LRI = 1$, which indicates 'a perfect fit'. LRI values might be only

very close to one. As a result, the greater the likelihood ratio index, the better the fit of

the regression model (Greene, 1993).

Finally, the chi-square test examines nonlinear probit and logit models for

individual and joint null hypotheses. The test statistic is $\lambda w/J$. The critical value comes

from a $\chi^2{}_{(J)}$ distribution. In this case, $J = 1$ for both migration regressions, since only one

coefficient at a time is tested. The test is performed at a significance level of $\alpha = 1\%$, 5%,

and 10% (Griffiths, Hill, and Judge, 1993).

CHAPTER 6

RESULTS

In this chapter, the results of the migration model are reported. For this research, two migration models were estimated, college-oriented and work-oriented. A logit model was employed to approximate both regressions and to find the impact of University of Maine graduates' personal characteristics as well as economic, social, cultural, quality-of-life, and climatologic conditions on decisions to leave or to stay in the State of Maine after college graduation. For the work-oriented migration model, two regressions were estimated that included two definition types of the wage variable. As mentioned earlier, the wage factor was defined using the Maine and U.S. average wages by occupation. As will be seen in this chapter the results are very similar across equations. In the following sections, the magnitudes and the overall effects of each variable, as well as their level of statistical significance, are presented. The overall statistical significance of each equation is also presented.

As mentioned in the chapter on methodology, the logit estimation provides only the signs of each coefficient without the total magnitudes of the variables' effects, and the overall effect of each variable on the migration of college graduates is found by using a partial differentiation technique. This translates into an incremental increase in each independent variable, which increases the probability for migration of University of Maine 2002 graduates. The college graduates' migration probability is found at the mean values of each explanatory variable for both work- and college-oriented equations. The means used in the calculations are presented in appendix D. (Griffiths, Hill, and Judge, 1993). Additionally, as mentioned earlier, some variables were dropped from the final

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analysis of migration of University of Maine 2002 graduates due to their insignificance, multicollinearity with other explanatory variables, and/or an approximation of the same characteristic. The preliminary results are presented in appendix D.

6.1. College-Oriented Migration Equation

In the college-oriented migration of University of Maine 2002 graduates study, the total number of observations is 89. Overall, 34.35 percent of University of Maine 2002 graduates migrated from the State of Maine to further pursue their college education. As presented in figure 6.1, nearly 28 percent of liberal arts, humanities, and social sciences students left the state after graduation. Physical sciences and forestry as well as engineering graduates migrated to other states at a 19.35 percent and 18.18 percent rate respectively. 14 percent of the nursing and social work as well as business, economics, and public administration students chose to enroll in out of state institutions of higher education. There were no education students who left the state for educational reasons. All of them continued education in Maine. Among University of Maine 2002 graduates, master degree recipients migrated at a rate of 27.27 percent and holders of bachelor degrees migrated at a rate of 18.89 percent.

After running the logit estimation on the college-oriented migration of University of Maine graduates, only seven estimate parameters appear significant. These results are presented in table 6.1. Overall, the model is statistically significant, and there is a considerable impact of the independent variables on the probability of an individual migrating from Maine to further pursue his/her education. The likelihood ratio test statistic for the regression is $\lambda r = 42.904$ with the test critical value of $\chi2(16) = 26.296$ at

Figure 6.1. College-Oriented Migration by Field of Study
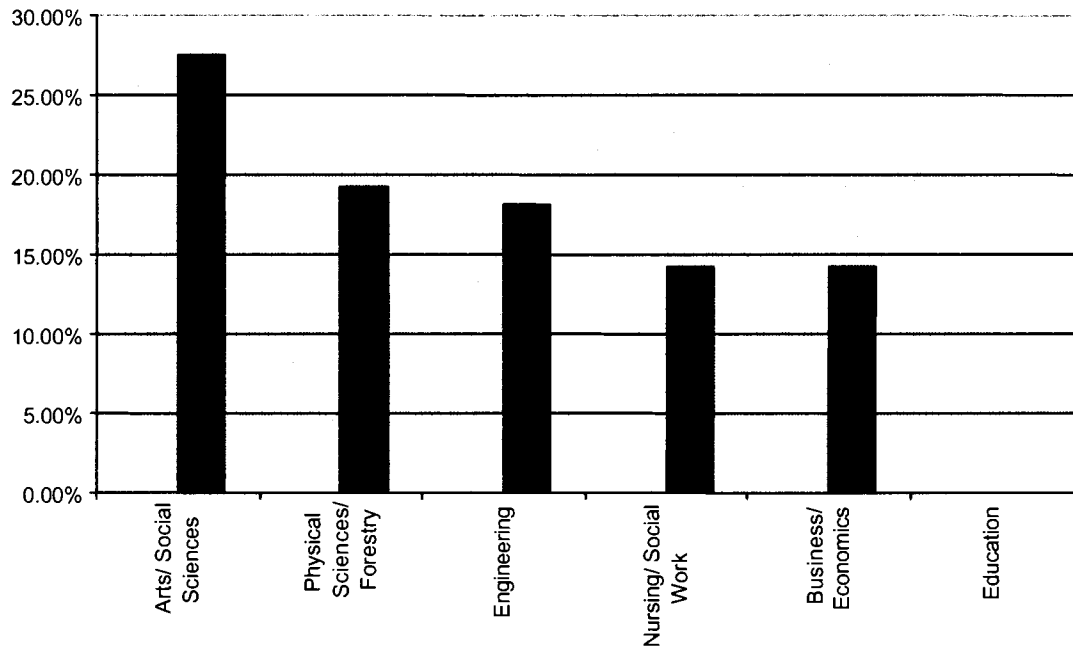
Source: 2002 Migration of University of Maine Graduates' Survey.

the α= 5% level of significance[7]. McFadden's pseudo R^2 is LRI = 0.401. It means that

40.1 percent of variation in the migration variable is explained by variation in the

explanatory variables. In the college-oriented migration model, based on results of Chi-

Square tests, variables age, educational system, and outdoor and recreational

opportunities, are significant at the α= 1% and grade point average and residency at the

α = 5% and finally, urban setting and weather at α = 10%. The variables: master degree,

gender, previous moving patterns, career opportunities, salary and benefits, cost of living,

and family-friendly-environment are not statistically significant and, therefore, they are

explained as factors that do not impact the college-oriented migration of University of

Maine 2002 graduates.

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[7] Restricted model's log likelihood at β = 0 is –53.461 and the unrestricted model's log likelihood at $\beta \neq 0$ is –32.009.

According to the results, grade point average has a positive sign and is positively related to the migration of University of Maine graduates. A 0.5 increase in grade average, increases the probability of migrating out of Maine by about 0.06 percent. As anticipated, age of the college graduate is negatively related to migration, and a 10-year increase in age at graduation decreases the likelihood of moving away by approximately 0.05 percent. Being from Maine also decreases the probability of resettling by about 14.14 percent compared to being from out of state. A higher ranking of Maine educational system (an increase by one category) diminishes the likelihood for leaving the state by 33.19 percent. A higher positive valuation of the variable describing the urban setting in Maine decreases one's probability for relocating out of state by 12.78 percent. Additionally, a higher ranking of outdoor and recreational opportunities offered by the State of Maine increases the retention rate of 2002 graduates by 28.11 percent. Finally, contrary from one might expect, the weather conditions are negatively related to the migration of college graduates and act as an environmental disamenity. Those who rank the Maine climate favorably have an increased probability of migrating by 5.77 percent.

Finally, as mentioned earlier, the personal characteristics variables: gender and educational level; as well as the economic factors: career opportunities, salary and benefits, taxes, and living expenses; quality-of-life variables: family-friendly environment and cultural and social opportunities do not affect the migration decisions of University of Maine graduates.

Table 6.1. Results of College-Oriented Migration Equation

Variable	Estimate	Probability Estimates	Chi-Square Statistics
Intercept	-0.776		0.023
Grade Point Average	2.681	0.0006**	3.421
Gender	-0.853	-0.142	1.286
Age	-0.310	-0.00005*	7.193
Residency	-2.294	-0.141**	4.963
Previous Moving Patterns	-0.008	-0.002	0.113
Master Degree	1.897	0.451	2.258
Career Opportunities	-0.557	-0.042	1.211
Salary and Benefits	0.403	0.096	0.665
Cost of Living	0.703	0.122	1.426
Family-Friendly-Environment	-0.026	-0.006	0.111
Cultural and Social Opportunities	-0.653	-0.045	1.294
Educational System	1.704	0.332*	8.770
Outdoor and Recreational Opportunities	1.723	0.281*	10.331
Urban Setting	0.845	0.123***	2.663
Weather	-0.886	-0.058***	3.521

Log-Likelihood = -32.009
Likelihood Ratio = 42.904
Pseudo R^2 = 0.401
Number of Observations = 89

* Denotes significance at $\alpha = 1\%$
**Denotes significance at $\alpha = 5\%$
***Denotes significance at $\alpha = 10\%$
Source: 2002 Migration of University of Maine Graduates' Survey.

6.2. Work-Oriented Migration Equation

In the work-oriented migration of University of Maine 2002 graduates study, the total number of observations is 416. Overall, 24.25 percent of University of Maine 2002 graduates migrated from the state in order to search for job opportunities. As presented in figure 6.2, nearly 25 percent of physical sciences and forestry students left the state after graduation. Nursing and social work as well as business and economics graduates out migrated at a rate of about 24 percent. Approximately 78 percent of the liberal arts, humanities and social sciences as well as engineering students remained and worked in Maine. The least mobile were the education students with only a 10 percent migration rate. Among the University of Maine 2002 graduates, doctoral recipients were the most mobile and migrated out of Maine at a rate of 46.75 percent. Holders of bachelor degrees had a migration rate of 21.22 percent, and only 14.07 percent of master degree students left Maine. The smaller migration rate on master students than expected includes professional degrees like education majors who are trained for the local job market. Finally, the migration rate was also calculated by employment status. 70 percent of unemployed graduates migrated out of Maine to find job opportunities.

After running the logit estimation on the work-oriented migration of University of Maine graduates, many of the estimate parameters appear significant. These results are presented in tables 6.2. and 6.3. Overall, the model is statistically significant, and there is a considerable impact of the independent variables on the probability of an individual migrating from Maine for job-oriented reasons. The likelihood ratio test statistic for regression with the U.S./Maine wage ratio is $\lambda/r = 86.758$ and regression with the U.S.

Figure 6.2. Work-Oriented Migration by Field of Study
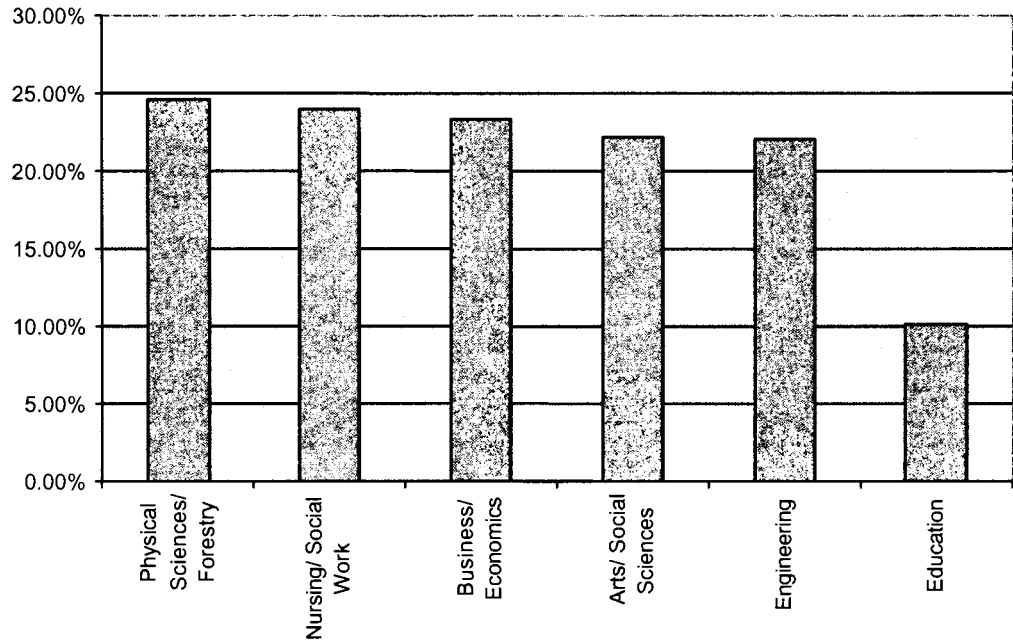
Source: 2002 Migration of University of Maine Graduates' Survey.

and Maine wage differential is λr = 86.556 with the test critical value of $\chi 2(23)$ = 35.172

at the α = 5% level of significance[8]. McFadden's pseudo R^2 is LRI = 0.211 for regression

with the U.S./Maine wage ratio and LRI = 0.211 for regression with the U.S. and Maine

wage differential. This means that 21.1 percent of variation in the migration variable is

explained by variation in the explanatory variables.

For the work-oriented migration model, based on the Chi-Square tests, in both

equations, variables: business, economics and public administration; age; residency; and

employment status are significant at the α = 1%. A doctoral degree previous moving

patterns, and weather conditions are significant at the α = 5%, and finally, liberal arts,

humanities and social sciences; nursing and social work and urban setting at α = 10%.

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[8] Restricted model's log likelihood at β = 0 is –204.956 and the unrestricted model's log likelihood at β ≠ 0 is –161.667 (U.S./Maine wage) and –161.673 (U.S. - Maine wage).

Variables: grade point average; field of study: physical sciences and forestry; gender; marital status; financial aid; master degree; wage; tax, family-friendly-environment; cultural and social opportunities; and educational system are not statistically significant and, therefore, they do not have any significant impact on the work-oriented migration of University of Maine 2002 graduates. Overall, the results for both equations are very similar in probability estimates and the two different ways of construction of the wage variable (the wage ratio and the wage differential) did not differently affect decisions to relocate for the University of Maine graduates. However, because of small differences in the probability estimates and significance levels of some coefficient parameters, the two equations are discussed separately.

6.2.1. Work-Oriented Migration Equation with the U.S./Maine Average Wage

According to the results obtained from the equation using the U.S./Maine average wage, students with fields of study such as liberal arts, humanities, and social sciences; business, economics, and public administration; nursing and social work; and engineering have a greater probability of migrating out of the State of Maine after graduation compared to education students. The probability of leaving the state for liberal arts, humanities, and social sciences graduates is 20.4 percent higher compared to graduates with education degree. Those who studied business, economics, and public administration have a 33.7 percent greater chance of moving out of Maine. The migration rate of nursing and social work as well as engineering graduates is 23.1 percent and 22.6 percent respectively higher compared to education students. Additionally, those who

obtained a doctoral degree are nearly 44 percent more likely to resettle than those with bachelor degrees.

As projected, the variable describing the employment status of each student is significant at $\alpha = 1\%$ and positively associated with the dependent variable. Being unemployed raises the chances for relocating by nearly 0.06 percent. Further, as anticipated, the age of the college graduate is negatively related to migration, and a 10-year increase in age at graduation decreases the likelihood of moving away by approximately 3 percent. Being from Maine also decreases the probability for resettling by 37.7 percent compared to being from out of state. Previous moving patterns have a positive impact on relocation decisions and an increase in the number of moves that occurred before enrolling at the University of Maine increases the likelihood for relocating by 0.7 percent.

Among the quality of life and urbanization factors, only urbanization level and climate conditions are statistically significant. In accordance with the economics theory, weather conditions are positively associated with relocation decisions and those who rank the Maine climate favorably have a lower probability for migrating by 5.6 percent. Weather is seen as an environmental amenity. Finally, contrary to expectations, a variable describing urbanization level in the State of Maine appears to be negatively related to the migration of college graduates. A higher positive valuation of the variable describing the urban setting in Maine increases one's probability of relocating out of state by 8.9 percent. Consequently, students might prefer less urbanized areas.

Table 6.2. Results of Work-Oriented Migration Equation with the U.S./Maine Average Wage

Variable	Estimate	Probability Estimate	Chi-Square Statistics
Intercept	0.676		0.155
Grade Point Average	0.016	0.003	0.747
Gender	0.047	0.010	0.366
Age	-0.101	-0.003*	8.277
Marital Status	0.625	0.118	2.416
Residency	-1.656	-0.400*	21.867
Previous Moving Patterns	0.033	0.007**	4.938
Financial Aid	-0.037	-0.008	0.225
Liberal Arts, Humanities and Social Sciences	0.998	0.204***	3.520
Business, Economics, and Public Administration	1.611	0.337*	6.894
Nursing and Social Work	1.096	0.231***	3.301
Physical Sciences and Forestry	0.596	0.129	1.046
Engineering	1.057	0.226***	3.440
Master Degree	0.151	0.033	0.147
Doctoral Degree	2.014	0.439**	4.848
Employment Status	0.029	0.006*	6.618
Wage	0.120	0.025	0.014
Taxes	0.015	-0.003	1.847
Family-Friendly-Environment	-0.069	-0.016	0.276
Cultural and Social Opportunities	0.043	0.009	0.090
Educational System	-0.029	-0.006	0.048

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Table 6.2. Continued

Variable	Estimate	Probability Estimate	Chi-Square Statistics
Urban Setting	-0.366	-0.089***	3.265
Weather	0.358	0.056**	3.899

Log-Likelihood = -161.667
Likelihood Ratio = 86.578
McFadden Pseudo R^2 = 0.211
Number of Observations = 416

* Denotes significance at α = 1%
**Denotes significance at α = 5%
***Denotes significance at α = 10%
Source: 2002 Migration of University of Maine Graduates' Survey and the Bureau of Labor Statistics for 2001.

Finally, as mentioned earlier, the personal characteristics variables: grade point average, gender, marital status, and financial aid; the job factor: master degree; as well as the economic factors: wages, taxes; quality-of-life variables: family-friendly-environment, cultural and social opportunities, and educational system do not affect the migration decisions of University of Maine 2002 graduates.

6.2.2. Work-Oriented Migration Equation with the U.S. - Maine Average Wage Differential

According to the results obtained from the equation using the U.S.-Maine wage differential, students with fields of study such as liberal arts, humanities, and social sciences; business, economics, and public administration; nursing and social work; and engineering have a greater probability of migrating out of the State of Maine after graduation compared to education students. The probability of leaving the state for liberal arts, humanities, and social sciences graduates is 19.3 percent higher compared to graduates with education degree. Those who studied business, economics, and public administration have a 31.8 percent greater chance of moving out of Maine. The migration rate of nursing and social work as well as engineering graduates is 22.0 percent and 21.3 percent respectively higher compared to education students. Additionally, those who obtained a doctoral degree are nearly 42 percent more likely to resettle than those with bachelor degrees.

As projected, the employment status is significant and positively associated with the dependent variable. Being unemployed raises the chances for relocating by nearly 0.6 percent. Further, as anticipated, the age of a college graduate is negatively related to the

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migration, and a 10-year increase in age at graduation decreases the likelihood of moving away by approximately 8 percent. Being from Maine also decreases the probability of resettling by about 40 percent compared to being from out of state. Previous moving patterns have a positive impact on relocation decisions and an increase in the number of moves that occurred before enrolling at the University of Maine increases the likelihood of relocating by 0.7 percent.

Among the quality of life and urbanization factors, only urbanization level and climate conditions are significant. In accordance with the economics theory, weather conditions are positively associated with relocation decisions and those who rank favorably weather conditions in Maine have a lower probability of migrating by 5.2 percent. Weather is seen as an environmental amenity. Finally, contrary to what one might expect, urban setting, that describes the urbanization level in Maine, appears to be negatively related to the migration of college graduates. A higher positive valuation of the variable describing the urban setting in Maine increases one's probability of relocating out of state by 9 percent. Consequently, students might prefer less urbanized areas.

Finally, as mentioned earlier, the personal characteristics variables: grade point average, physical sciences and forestry, gender, marital status, and financial aid; educational level: master degree; as well as economic factors: wages, taxes; quality-of-life variables: family-friendly-environment, cultural and social opportunities, and educational system do not affect the migration decisions of University of Maine graduates.

Table 6.3. Results of Work-Oriented Migration Equation with the U.S. -Maine Average Wage Differential

Variable	Estimate	Probability Estimate	Chi-Square Statistics
Intercept	1.809		0.4226
Grade Point Average	0.016	0.003	0.747
Gender	0.044	0.010	0.484
Age	-0.110	-0.008*	8.281
Marital Status	0.624	0.111	2.408
Residency	-1.676	-0.394*	23.359
Previous Moving Patterns	0.033	0.007**	4.920
Financial Aid	-0.037	-0.008	0.224
Liberal Arts, Humanities and Social Science	1.002	0.193***	3.566
Business, Economics, and Public Administration	1.604	0.318*	6.878
Nursing and Social Work	1.104	0.220***	3.367
Physical Sciences and Forestry	0.596	0.122	1.046
Engineering	1.052	0.213***	3.432
Master Degree	0.151	0.032	0.148
Doctoral Degree	2.011	0.417**	4.834
Employment Status	0.029	0.006*	6.583
Wage	0.001	0.0002	0.003
Taxes	0.015	-0.003	1.857
Family-Friendly Environment	-0.068	-0.015	0.267
Cultural and Social Opportunities	0.042	0.009	0.058

Table 6.3. Continued

Variable	Estimate	Probability Estimate	Chi-Square Statistics
Educational System	-0.028	-0.006	0.044
Urban Setting	-0.365	-0.090***	3.252
Weather	0.376	0.052**	3.906

Log-Likelihood = -161.672
Likelihood Ratio = 86.567
McFadden Pseudo R^2 = 0.211
Number of Observations = 416

* Denotes significance at α = 1%
**Denotes significance at α = 5%
***Denotes significance at α = 10%

Source: 2002 Migration of University of Maine Graduates' Survey and the Bureau of Labor Statistics for 2001.

CHAPTER 7

CONCLUSIONS

7.1. Discussion of the Results

The results summarized in Chapter 6 provide several insights regarding the location decisions of University of Maine graduates and the key determinants of college migration out of Maine. As shown earlier, college graduates are quite mobile, and 34.5 percent and 24.5 percent respectively of the graduates surveyed leave the State of Maine to pursue further education or to work. This out-migration rate is similar to the finding of Silvernail and Gollihur (2003) who found that 34 percent of Maine college graduates stayed in Maine. According to the results, University of Maine 2002 graduates who relocate to continue their education have a higher grade point average, are younger, and did not attend Maine high schools. Additionally, they value the quality of the educational system, level of urbanization, and recreational opportunities as important factors in their location decisions. However, they do not enjoy weather conditions in Maine, although they rank Maine's climate highly.

According to the analysis of work-oriented migration, University of Maine 2002 graduates who relocate out of Maine for work-oriented reasons are more likely to the liberal arts, humanities, and social sciences; business, economics, and public administration; nursing and social work; and engineering students. They are unemployed, young, not Maine residents, have a doctoral degree and a history of geographical relocation. They look for meaningful career opportunities, and prefer to live in less

urbanized areas with milder weather conditions. Finally, they do not respond to higher

wage differentials offered in other parts in the U.S. relative to Maine.

According to the results, only the weather variable in the college-oriented

migration equation and urbanization level in the work-oriented migration equation have

different signs than predicted by the migration theory. There is no clear-cut explanation

why a higher valuation of Maine weather conditions could increase the probability of out-

migration of University of Maine 2002 graduates and, therefore, act as a disamenity.

There are three possible explanations. First, although Maine climate conditions are highly

ranked among University of Maine 2002 graduates, weather conditions are not the

deciding factor in college-oriented migration. Second, as mentioned in the earlier

chapters, the weather variable has high R^2 of 0.973, which implies high multicollinearity

of the explanatory variable with other independent variables in the regression. A high R^2

may cause the parameter's coefficient to have an inappropriate sign, which in this case is

a negative sign. Finally, the construction of the variable might not be as precise as

intended and, therefore, might not measure the Maine characteristics appropriately. For

an appropriate measurement of the desired factor, the creation of dummy variables for

each of the four valuation categories (excellent, good, fair, and poor) is suggested. This

correction would not only result in a more precise measurement of the Maine

characteristic but also in well-defined results.

On the other hand, there is also an easy explanation for receiving a negative sign

on the urbanization level factor. University of Maine 2002 graduates simply just value

rural areas more than an urbanized setting. This statement is in accord with the findings

of Ploch (1988) who finds that many Maine residents reside in the State due to their

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disillusion with city life and their fear for the safety of their children. Additionally, they

cite pollution, noise, and traffic as the precipitating forces for rural relocation (Ploch,

1988). On the other hand, the construction of the ordinal scale variable might not be

appropriate, precise and, consequently, might measure the Maine characteristic

inappropriately. It is doubtful that the factor measured what it was intended, considering

that the variable recorded people's valuation of the Maine urbanization level and did not

record the actual population density in Maine. For example, some people might have

liked the Maine urban setting although Maine is considered a rural state. Others, on the

other hand, might have viewed Maine as a rural state and recorded a poor valuation of

Maine urbanization level. As a result, the obtained results of the variable 'urban setting'

should be lightly considered when evaluating the final results of this migration study.

However, in order to more precisely measure the desired factor, creating dummy

variables for each of the four valuation categories, excellent, good, fair, and poor, is

suggested. This correction would not only result in a more precise measurement of the

Maine characteristic but also well-defined results.

As presented in the section on methodology and results, two regressions were

estimated for the work-oriented migration model to find the response of the coefficients

to differences in the wage variable definition. In both equations, wage variables were

highly insignificant and, consequently, were not viewed as influential factors in the

migration of University of Maine 2002 graduates. On the other hand, the results for both

equations are very similar with only small differences in magnitudes and levels of

significance of each coefficient. Consequently, the two ways of constructing the wage

variable (the wage ratio and the wage difference) do not differently influence overall

decisions to relocate for the University of Maine 2002 graduates as well as the individual impacts of migration variables. The outcomes are very similar across the equations due to the utilization of the Maine and U.S. average wages in the definition of the two types of earnings.

The wage variable, although it has a positive sign as predicted by the economic theory, is highly insignificant in both equations. The lack of significance is attributed to the limited number of observations in the study, the small number of University of Maine 2002 graduates who migrated out of Maine, and to the utilization of the U.S. average wages by occupation as the proxy for earnings in other parts of the country. The unsatisfactory results could also be credited to the inclusion of fields of study in the model and their partial explanation of the variation in the migration variable that otherwise could be associated to the wage variable. When the fields of study are excluded from the regression, any variation in the independent variable related to the variety of occupations pursued by University of Maine graduates should be at least partially explained by the variation in the wage variable due to the expression of wages by occupation. Consequently, this factor should be significant at an appropriate level of significance or at least have a lower insignificance level. However, in this migration study, even in an analysis that excludes fields of study, the significance level of the wage factor does not change and the variable is still highly insignificant.

As mentioned in the chapter on results, there are several migration variables that are statistically insignificant and, therefore, are not used in the final conclusions, although it does not mean that they are not relevant in other migration studies. The reason for the irrelevance, as well as the unimportance of these estimates, is the omitted variable bias.

Consequently, there are factors like destination characteristics that are included in the theoretical college migration model, but not included in the two migration models. As a result, the real effect of other factors on migration is not captured precisely due to the missing information and the omitted variable bias. Additionally, some of the variables such as the rankings of Maine economic and quality-of-life characteristics might not be the best representation of the targeted factors and, therefore, cause alterations in the results. In the case of the insignificance of the master's educational level in both work- and college-oriented equations, the explanation is observed in the data set. Most of the education students, who constitute a large number of bachelor and master students, choose to stay in Maine after graduation, and, therefore, the educational level differences are not that apparent.

In order to obtain more comprehensive results representing the relocation decisions of college graduates in the State of Maine, the migration study should include other institutions of higher education. A larger sample, which would better represent Maine's graduating population, would improve the significance level of independent variables and produce more reliable results that would better identify the key factors of migration out of Maine. Additionally, institutional factors should be included to control for the school size, its reputation, and number of majors and degrees offered by each school. The study should also be conducted over a wider range of years not just one year, to allow for external disruptions like changes in population size and market variations that are not present in the model. With a better model specification, the study would be a more precise measure of college migration trends in the State of Maine.

7.2. Public Policy Implications

This college migration study revealed valuable information about the University

of Maine 2002 graduates and their location decisions. As mentioned earlier, variables

including age, area of study, employment status, Maine residency, educational system,

and climate conditions are important determinants of the University of Maine college

migration. Consequently, a development of a long-term comprehensive plan addressing

all relevant migration issues is necessary to decrease the migration from Maine and to

build a highly educated workforce in the state. The objective of the policy

recommendation drawn for this migration study is to suggest policies based on the

uncovered outcomes from the econometric analysis. The policies proposed here might not

necessarily apply to the whole population of college educated people in Maine and

should not be treated as the only relevant implication in decreasing the out-migration of

recent college graduates. The policy recommendation is strictly based on the statistically

significant variables in both migration equations, which, in turn, excludes other factors in

the study that otherwise would be important in the out-migration phenomenon in Maine.

Since the place of college attendance is an important factor in after-graduation

location decisions and, therefore, is a vital piece in building a highly skilled workforce in

Maine, higher education in Maine should be improved and made more affordable in order

to attract a greater number of students from within Maine. As Trostel (2002) mentions,

devoting more public resources to higher education is the primary step in creating a

highly educated workforce. More funding would allow for lower cost of education, which

in turn would attract more students to stay in Maine for college and decrease the number

of Maine students going away to continue schooling due to high tuition levels (Trostel,

2002). Besides lowering the cost of education, the institutions of higher education should more proactively promote the quality and diversity of their programs (Silvernail and Gollihur, 2003). Further, the number of programs offered at the undergraduate and graduate levels should be extended to attract a higher number of students. Many Maine students leave the state since it does not provide the quality and type of programs that they are interested in (Tornatzky et. al., 2001). These improvements in the quality of college education in Maine would not only increase the enrollment in Maine institutions but also would educate a highly skilled workforce (Silvernail and Gollihur, 2003; Tornatzky et. al., 2001; Trostel, 2002).

However, having a highly educated workforce is not the only important factor in building the Maine labor force. For many years, Maine has been an exporter of college graduates, especially to other New England states. As the evidence from this college migration study presents, there is a need for more dynamic and sustained economic growth in Maine in order to retain a highly skilled workforce (Silvernail and Gollihur, 2003). According to the results, for many of the 2002 University of Maine graduates, the potential for career development is the key factor in their decisions to relocate. As a result, the comprehensive workforce development plan should not only focus on improvements of the higher educational system, but also on creating competitive work conditions for college-educated people (Silvernail and Gollihur, 2003). Without opportunities for a successful and fulfilling career, not many students will choose to stay in Maine; most graduates will relocate outside Maine to have better possibilities for career advancement. As a result, the State of Maine, institutions of higher education, and

local industries should work together to enhance the opportunities in Maine by improving its economy (Silvernail and Gollihur, 2003; Tornatzky et. al., 2001).

According to Trostel, businesses would locate in Maine only if the state had a highly educated workforce base (Kennebeck Journal, 2003). One way of keeping an educated labor force in Maine is by providing students with opportunities to engage with local industries during their educational experience at the University of Maine and other institutions. An internship or co-op requirement would allow students to discover career opportunities in Maine and would allow employers to find and train a highly qualified workforce (Tornatzky et. al., 2001). Private companies and the State of Maine could fund this program since they would be the primary beneficiaries. Similar program to the one proposed here was established by in Pennsylvania by Governor Ridge in 1998 to decrease the number of college graduates leaving the state (De Jong and Klein, 1998). Additionally, since older graduates are more likely to stay in Maine, the State of Maine, in cooperation with institutions of higher education and local businesses, should establish a program helping older students in finding jobs after graduation (Tornatzky et. al., 2001). By targeting career and educational development at the same time, students attending Maine institutions would have better access to Maine jobs and opportunities and, therefore, a larger number of graduates could remain in the state after graduation (Kennebec Journal, 2003; Tornatzky et. al., 2001).

In conclusion, the comprehensive workforce development plan should address the need for improvement in the higher education system, economic development, and extensive cooperation between the legislative body, institutions of higher education, and the local industries. Only a plan addressing all three parts could produce successful

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results and increase the retention rate of college-educated people in the State of Maine.

However, it is important to remember that greater investment in education and economic

development will not produce immediate results. The process will take many years to to

lead to the intended results (Silvernail and Gollihur, 2003; Tornatzky et. al., 2001;

Trostel, 2002).

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APPENDIX A

SURVEY QUESTIONNAIRE

INFORMED CONSENT FOR US MAIL VERSION

Dear Respondent,

I am conducting a graduate thesis project on the migration patterns of University of Maine graduates to assess college graduates' relocation decisions. This project is being funded by the Margaret Chase Smith Center for Public Policy. I am interested in exploring why University of Maine graduates decide either to stay in or to leave the State of Maine. As a part of my research, I am conducting a survey of 2002 UMaine graduates.

I am writing to you because you are included in a list of those who graduated from the University of Maine in May 2002. Participation in the survey is voluntary and you do not have to answer any questions you do not want to. Your feedback, however, is important to help the state improve economic and career opportunities in Maine for people with a college education. In addition, your feedback is important to the University of Maine to better serve their students as an institution of higher education.

I estimate that completing this survey will take about 15 minutes. Except for your time and inconvenience, there are no risks to you from participating in this research. Please complete and return the survey in the postage paid envelope provided by August 31st, 2002. Return of the survey implies consent to participate. Your response will be anonymous. Please do not write your name on the survey. Survey results will be reported in aggregate form only.

Thank you in advance for your participation. Please contact me if you have any questions about this survey or the research project at (207)-581-3179 or at ewa_kleczyk@umit.maine.edu. If you have any questions about your rights as a research participant, please contact Gayle Anderson, Assistant to the Protection of Human Subjects Review Board, at (207)-581-1498 or gayle@maine.edu.

Thank you for your time and help.

Sincerely,

Ewa Kleczyk
Research Assistant
Margaret Chase Smith Center for Public Policy
University of Maine
28E Coburn Hall
Orono, ME. 04469

INFORMED CONSENT FOR E-MAIL VERSION

Dear Respondent,

I am conducting a graduate thesis project on the migration patterns of University of Maine graduates to assess college graduates' relocation decisions. This project is being funded by the Margaret Chase Smith Center for Public Policy. I am interested in exploring why University of Maine graduates decide either to stay in or to leave the State of Maine. As a part of my research, I am conducting a survey of 2002 UMaine graduates.

I am writing to you because you are included in a list of those who graduated from the University of Maine in May 2002. Participation in the survey is voluntary and you do not have to answer any questions you do not want to. Your feedback, however, is important to help the state improve economic and career opportunities in Maine for people with a college education. In addition, your feedback is important to the University of Maine to better serve their students as an institution of higher education.

I estimate that completing this survey will take about 15 minutes. Except for your time and inconvenience, there are no risks to you from participating in this research. Please complete and email the survey back by August 31st, 2002. Return of the survey implies consent to participate. I will enter the data into a computer without any names or other identifiers. After the data have been entered, I will delete the emails and will not be able to link your responses to your name. Survey results will be reported in aggregate form only.

Thank you in advance for your participation. Please contact me if you have any questions about this survey or the research project at (207)-581-3179 or at ewa_kleczyk@umit.maine.edu. If you have any questions about your rights as a research participant, please contact Gayle Anderson, Assistant to the Protection of Human Subjects Review Board, at (207)-581-1498 or gayle@maine.edu.

Thank you for your time and help.

Sincerely,

Ewa Kleczyk
Research Assistant
Margaret Chase Smith Center for Public Policy
University of Maine
28E Coburn Hall
Orono, ME. 04469

Migration Patterns of the University of Maine Graduates in 2002

Please complete this survey by highlighting/ underlining your answers and return it by August 12th. Please email the survey to ewa_kleczyk@umit.maine.edu. Thank you in advance for your assistance, and please know that all responses are kept confidential.

Section I.

In this section, I would like to find out about your high school and University of Maine education as well as further educational plans.

1.   Where did you go to high school?

☐ Androscoggin County   ☐ Aroostook County
☐ Cumberland County   ☐ Franklin County
☐ Hancock County   ☐ Kennebec County
☐ Knox County   ☐ Lincoln County
☐ Oxford County   ☐ Penobscot County
☐ Piscataguis County   ☐ Sagadahoc County
☐ Somerset County   ☐ Waldo County
☐ Washington County   ☐ York County
☐ New England, outside Maine (State:_____)
☐ Outside New England (State: _____)
☐ Outside the US (Country: _____)

2.   What type of high school did you attend?

☐ Public   ☐ Private

3.   What did you do after graduating from high school?

☐ Straight from high school to college full-time
☐ Straight from high school to college part-time
☐ Took a year off between high school and college
☐ Took two years off between high school and college
☐ Took more then two years off between high school and college

4.   What degree did you receive from the University of Maine in May 2002?

☐ BA   ☐ BS
☐ MA   ☐ MS
☐ MBA   ■ MEd
☐ PhD   ☐ EdD
☐ Other (Explain:_____)

5.   What was your major?

_____

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6. What was your cumulative GPA (on a 4.0 scale) when you graduated in May 2002?

☐ 3.5-4.0   ☐ 3.0-3.49
☐ 2.5-2.99   ☐ 2.0-2.49
☐ Lower than 2.0

7. How many years did it take you to finish your degree?

■ Less than 2 years   ■ 2 years
☐ 3 years   ☐ 4 years
■ 5 years   ☐ More then 5 years

8. Why did you choose the University of Maine? Please check all that apply.

■ Good school   ■ Offered the programs I wanted
☐ Lower costs of education   ☐ State school
■ Near home/work/family   ☐ Liked the location
☐ Had no other option (Explain: _____)
☐ Other (Explain: _____)

9. About how much of the total cost (tuition, books, fees, including living expenses) of attending to the University of Maine did you receive in financial aid (scholarships, loans, etc.)?

☐ 75%-100% in financial aid   ☐ 50%-74% in financial aid
☐ 25%-49% in financial aid   ☐ 1%-24% in financial aid
■ No financial aid

10. Do you plan to continue your education in the future?

☐Yes (If yes, please proceed to #9)
☐ No (If no, please proceed to question #15)
■ Do not know (If do not know, please proceed to question #9)

11. When do you plan to continue education?

☐ In 2002   ☐ In 2003
■ Later than in 2003   ☐ Do not know

12. What will be your educational status?

■ Enrolled full-time   ■ Enrolled part-time   ☐ Do not know

13.   Where is the school/institution located?

☑ In Maine (If in Maine, please proceed to question #13)
☑ Do not know(If do not know, please proceed to question #13)
☑ Out of Maine (State:_____) (If out of Maine, please answer question #12)

14.   What are your reasons for pursuing further education out of Maine? Please check all that apply.

☑ Good school   ☐ Offered the programs I wanted
☑ Maine did not offer the program I wanted   ☑ Lower costs of education
☑ Near home/work/family
☐ Other (Explain: _____)

15.   What will be the field of study?

☑ Liberal Arts and Sciences   ☑ Business
☑ Forestry and Natural Sciences   ☑ Education
☑ Engineering   ☐ Law
☑ Medical   ☑ Nursing
☐ Other (Specify: _____)   ☑ Do not know

16.   What degree will you be seeking?

☑ Additional Bachelors   ☑ Masters
☑ Doctorate   ☑ Law
☑ Medical   ☑ Do not know
☐ Other (Specify: _____)

Section II.
In this section, I would like to find out about your employment status.

17.   Where do you expect to live 3 months from now?
☑ Androscoggin County   ☑ Aroostook County
☐ Cumberland County   ☑ Franklin County
☑ Hancock County   ☑ Kennebec County
☑ Knox County   ☑ Lincoln County
☐ Oxford County   ☐ Penobscot County
■ Piscataguis County   ☐ Sagadahoc County
☑ Somerset County   ☐ Waldo County
☑ Washington County   ■ York County
☑ New England, outside Maine (State:_____) ☑ Do not know
☐ Outside New England (State: _____)
☐ Outside the US (Country: _____)

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18.   What is your current employment status?

☑ Employed full-time   ☐ Employed part-time
☐ Currently not working (If not working, please proceed to question # 20)

19.   Is your occupation related to your field of study at the University of Maine?

☑ Yes (If, yes, please answer questions #18-19)
☐ No (If no, please answer questions #20-23)

If your occupation is related to your field of study, please proceed with the following questions:

20.   Approximate annual salary:

☑ Less than $20,000   ☐ $20,000-$25,000
☑ $25,001-$30,000   ☐ $30,001-$35,000
☑ $35,001-$40,000   ☐ $40,001-$45,000
☐ $45,001-$50,000   ☐ $50,001-$55,000
☐ $55,001-$60,000   ☐ $60,001-$65,000
☑ $65,001-$70,000   ☐ $70,001-$100,000
☑ More than $100,000

21.   Type of organization you currently work for:

☑ Government   ☑ Non-profit
☑ For profit   ☐ Self-employed

If your occupation is not in the field of study please answer the following questions:

22.   Are you expecting to work in a job related to your field of study?

☐ Yes
☑ No (If no, please proceed to question # 24)

23.   Approximate annual salary you expect to earn:

☑ Less than $20,000   ☐ $20,000-$25,000
☑ $25,001-$30,000   ☐ $30,001-$35,000
☑ $35,001-$40,000   ☐ $40,001-$45,000
☑ $45,001-$50,000   ☐ $50,001-$55,000
☑ $55,001-$60,000   ☐ $60,001-$65,000
☐ $65,001-$70,000   ☐ $70,001-$100,000
☑ More than $100,000

24.	Type of organization you expect to be employed in:

☐ Government	☐ Non-profit

☐ For profit	☐ Self-employed

25.	Location of your job. Please specify the state.

_____

Section III.

Deciding on where to live is based on a variety of factors. Based on your knowledge and experience, please rate the State of Maine as a place to live on each of the following characteristics. Next in the last column, please check the boxes of the three most important characteristics that you take into consideration when deciding where to live.

26.

Characteristics	Rate the State of Maine as a place to live				Check the three most important characteristics
	Excellent 1	Good 2	Fair 3	Poor 4	
Career Opportunities	☐	☐	☐	☐	☐
Salary and benefits	☐	☐	☐	☐	☐
Taxes	☐	☐	☐	☐	☐
Cost of living	☐	☐	☐	☐	☐
Education system	☐	☐	☐	☐	☐
Family friendly environment	☐	☐	☐	☐	☐
Cultural and social opportunities	☐	☐	☐	☐	☐
Outdoor/recreational setting	☐	☐	☐	☐	☐
Urban setting	☐	☐	☐	☐	☐
Rural setting	☐	☐	☐	☐	☐
Weather	☐	☐	☐	☐	☐

Section IV.

In this section, I would like some information about you.

27. What is your sex?

☐ Female	☐ Male

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28. In what year were you born? 19____

29. How many times had you moved (changed towns) before enrolling at the University of Maine?

_____

30. Of these how many were in Maine and how many were across state lines?

_____ in Maine   _____ across state lines

31. What is your current marital status?

☐ Single   ☐ Married   ☐ Other

32. What is the highest education level of your mother?

☐ Less than high school   ☐ High school degree
☐ Some college   ☐ Associate degree
☐ Bachelor's degree   ☐ Master degree's and higher

33. What is the highest education level of your father?

☐ Less than high school   ☐ High school degree
☐ Some college   ☐ Associate degree
☐ Bachelor's degree   ☐ Master degree's and higher

34. Approximately, what is your parents' current combined income?

☐ Less than $20,000   ☐ $20,000-$25,000
☐ $25,001-$30,000   ☐ $30,001-$35,000
☐ $35,001-$40,000   ☐ $40,001-$45,000
☐ $45,001-$50,000   ☐ $50,001-$55,000
☐ $55,001-$60,000   ☐ $60,001-$65,000
☐ $65,001-$70,000   ☐ $70,001-$100,000
☐ More than $100,000

****

Thank you for participating in the survey
Please return the survey by emailing to
ewa_kleczyk@umit.maine.edu

****

APPENDIX B

SAMPLE CHARACTERISTICS COMPARISON

Table B.1. Characteristics of the University of Maine Population, Class of 2002, and Survey Respondent Group

Frequency Distribution	University of Maine Population*	2002 Class **	Survey Respondent Group***
Education:	Percent	Percent	Percent
Undergraduate	77.19%	74.85%	68.90%
Graduate	22.81%	25.15%	31.10%
Gender:			
Undergraduate:			
Female	49.90%	54.46%	66.86%
Male	50.10%	45.54%	33.14%
Graduate:			
Female	66.35%	56.85%	66.46%
Male	33.65%	43.15%	33.54%
Total:			
Female	53.65%	55.06%	66.73%
Male	46.35%	44.94%	33.27%
Residency:			
Undergraduate:			
In-State	84.04%	80.71%	74.29%
Out-of-State	15.96%	19.26%	25.71%
Graduate:			
In-State	80.33%	81.05%	51.90%
Out-of-State	19.67%	18.95%	48.10%
Total:			
In-State	83.19%	80.79%	67.32%
Out-of-State	16.81%	19.21%	32.68%

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Table B.1. Continued

Frequency Distribution	University of Maine Population*	2002 Class **	Survey Respondent Group***
College:			
Undergraduate:			
BPPH	16.15%	19.88%	21.43%
EDHD	12.37%	14.30%	15.14%
EGR	13.36%	15.67%	14.57%
LAS	29.76%	32.81%	32.29%
NSFA	15.92%	16.35%	16.57%
Graduate:			
BPPH	9.79%	17.49%	21.52%
EDHD	22.86%	31.20%	36.08%
EGR	6.77%	10.50%	10.13%
LAS	12.08%	18.66%	16.46%
NSFA	12.33%	19.24%	15.82%
Total:			
BPPH	14.07%	19.28%	21.46%
EDHD	14.76%	18.55%	21.65%
EGR	11.86%	17.37%	13.19%
LAS	25.73%	29.28%	27.36%
NSFA	15.10%	17.09%	16.34%

* Source: Office of Institutional Studies at the University of Maine.
** Source: Student Record Office at the University of Maine.
*** Source: University of Maine Office of Institutional Studies, Office of Student Records, and 2002 Migration of University of Maine Graduates' Survey.
Percentages may not sum to zero due to rounding.

	University of Maine vs. Class of 2002	Class of 2002 vs. Respondent Group
Educational Level:		
Undergraduate	-1.78	-2.57
Graduate	1.03	1.69
Gender:		
Undergraduate:		
Female	2.15	3.81
Male	-1.96	-2.68
Graduate:		
Female	-2.81	1.99
Male	2.45	-1.41
Total:		
Female	0.77	4.32
Male	-0.70	-3.41
Residency:		
Undergraduate:		
In-State	-2.61	-2.62
Out-of-State	1.28	1.54
Graduate:		
In-State	0.30	-6.74
Out-of-State	-0.15	8.18
Total:		
In-State	-2.13	-6.32
Out-of-State	1.04	4.41
Undergraduate:		
BPPH	1.44	0.34
EDHD	0.71	0.17
EGR	0.86	-0.20
LAS	1.22	-0.12
NSFA	0.15	0.04
Graduate:		
BPPH	1.99	0.62
EDHD	2.05	0.80
EGR	0.89	-0.05
LAS	1.62	-0.29
NSFA	1.71	-0.43

APPENDIX C

DESCRIPTIVE STATISTICS OF MIGRATION SURVEY

Section I.

In this section, I would like to find out about your high school and University of Maine education as well as further educational plans.

Question 1   **Where did you go to high school?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Androscoggin County	1	24	4.72%	4.72%	4.72%
Aroostook County	2	37	7.28%	7.28%	12.01%
Cumberland County	3	36	7.09%	7.09%	19.09%
Franklin County	4	6	1.18%	1.18%	20.28%
Hancock County	5	16	3.15%	3.15%	23.43%
Kennebec County	6	29	5.71%	5.71%	29.13%
Knox County	7	10	1.97%	1.97%	31.10%
Lincoln County	8	10	1.97%	1.97%	33.07%
Oxford County	9	7	1.38%	1.38%	34.45%
Penobscot County	10	96	18.90%	18.90%	53.35%
Piscataquis County	11	10	1.97%	1.97%	55.31%
Sagadahoc County	12	5	0.98%	0.98%	56.30%
Somerset County	13	17	3.35%	3.35%	59.65%
Waldo County	14	5	0.98%	0.98%	60.63%
Washington County	15	10	1.97%	1.97%	62.60%
York County	16	24	4.72%	4.72%	67.32%
New England, outside Maine	17	59	11.61%	11.61%	78.94%
Outside New England	18	87	17.13%	17.13%	96.06%
Outside the U.S.	19	20	3.94%	3.94%	100.00%
Missing	99	0	0.00%	Missing	Missing
Total		508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

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Question 1b. Region you went to high school

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Maine, Massachusetts, New Hampshire, Rohde Island, Connecticut, Vermont	1	400	78.74%	79.05%	79.05%
New Jersey, New York, Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia	2	36	7.09%	7.11%	86.17%
Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee	3	13	2.56%	2.57%	88.74%
Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin	4	19	3.74%	3.75%	92.49%
Arkansas, Louisiana, New Mexico, Oklahoma, and Texas	5	4	0.79%	0.79%	93.28%
Iowa, Kansas, Missouri, and Nebraska	6	3	0.59%	0.59%	93.87%
Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming	7	3	0.59%	0.59%	94.47%
Arizona, California, Hawaii, Nevada, Alaska, Idaho, Oregon, and Washington	8	9	1.77%	1.78%	96.25%
Europe	9	11	2.17%	2.17%	98.42%
Africa	10	1	0.20%	0.20%	98.62%
Asia	11	4	0.79%	0.79%	99.41%
Canada	12	3	0.59%	0.59%	100.00%
South America	13	0	0.00%	0.00%	100.00%
Australia	14	0	0.00%	0.00%	100.00%
Missing	99	2	0.39%	Missing	Missing
Total		508	100.00%	100.00%	

Valid Cases 506   Missing Cases 2

Question 2   **What type of high school did you attend?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Public	1	437	86.02%	86.02%	86.02%
Private	2	58	11.42%	11.42%	97.44%
Semiprivate	3	13	2.56%	2.56%	100.00%
Missing	99	0	0.00%	Missing	Missing
Total		508	100.00%	100.00%	

Valid Cases 508   Missing Cases 0

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Question 3   **What did you do after graduating form high school?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Straight from high school to college full-time	1	445	87.60%	87.60%	87.60%
Straight from high school to college part-time	2	9	1.77%	1.77%	89.37%
Took a year off between high school and college	3	9	1.77%	1.77%	91.14%
Took two years of between high school and college	4	4	0.79%	0.79%	91.93%
Took more then two years off between high school and college	5	41	8.07%	8.07%	100.00%
Missing	99	0	0.00%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 4   **What degree did you receive from the University of Maine on May 2002?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
BA	1	126	24.80%	24.80%	24.80%
BS	2	224	44.09%	44.09%	68.90%
MA	3	21	4.13%	4.13%	73.03%
MS	4	67	13.19%	13.19%	86.22%
MBA	5	7	1.38%	1.38%	87.60%
MEd	6	36	7.09%	7.09%	94.69%
PhD	7	15	2.95%	2.95%	97.64%
EdD	8	1	0.20%	0.20%	97.83%
Certificate	9	11	2.17%	2.17%	100.00%
Missing	99	0	0.00%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 5   **What is your major?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percen
Social Science	1	111	21.85%	21.85%	21.85%
Arts and Music	2	9	1.77%	1.77%	23.62%
Business	3	48	9.45%	9.45%	33.07%
Public Administration	4	4	0.79%	0.79%	33.86%
Social Work	5	32	6.30%	6.30%	40.16%
Nursing	6	34	6.69%	6.69%	46.85%
Engineering	7	67	13.19%	13.19%	60.04%
Education	8	102	20.08%	20.08%	80.12%
Forestry	9	7	1.38%	1.38%	81.50%
Physical Sciences	10	86	16.93%	16.93%	98.43%
Individualized	11	8	1.57%	1.57%	100.00%
Missing	99	0	0.00%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   Missing Cases   0

Question 6   What was your cumulative GPA (on a 4.0 scale) when you graduated in May 2002?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Lower then 2	1	9	1.77%	1.78%	1.78%
2.0-2.49	2	16	3.15%	3.16%	4.94%
2.5-2.99	3	85	16.73%	16.80%	21.74%
3.0-3.49	4	145	28.54%	28.66%	50.40%
3.5-4.0	5	251	49.41%	49.60%	100.00%
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   506   Missing Cases   2

Question 7   How many years did it take you to finish your degree?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Lower then 2 years	1	24	4.72%	4.76%	4.76%
2 years	2	58	11.42%	11.51%	16.27%
3 years	3	38	7.48%	7.54%	23.81%
4 years	4	234	46.06%	46.43%	70.24%
5 years	5	103	20.28%	20.44%	90.67%
More then 5 years	6	47	9.25%	9.33%	100.00%
Missing	99	4	0.79%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   504   Missing Cases   4

Question 8   Why did you choose the University of Maine?
Please check all that apply.

Dichotomy label	Name	Count
Good school	Q8A	189
Offered the programs I wanted	Q8B	270
Lower costs of education	Q8C	241
Near home/work/family	Q8D	228
State school	Q8E	62
Liked the location	Q8F	119
Had no other option	Q8G	16
Other	Q8H	102
Total Responses		1227

00 Missing Cases   508 Valid Cases

Question 9

About how much of the total cost of attending to the University of Maine did you receive in financial aid?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
75%-100% in financial aid	1	201	39.57%	39.72%	39.72%
50%-74% in financial aid	2	101	19.88%	19.96%	59.68%
25%-49% in financial aid	3	61	12.01%	12.06%	71.74%
1%-24% in financial aid	4	57	11.22%	11.26%	83.00%
No financial aid	5	86	16.93%	17.00%	100.00%
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases 506   Missing Cases   2

Question 10   Do you plan to continue your education in the future?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Yes	1	327	64.37%	64.75%	64.75%
No	2	78	15.35%	15.45%	80.20%
Do not know	10	100	19.69%	19.80%	100.00%
Missing	99	3	0.59%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   507   Missing Cases   3

Question 11   When do you plan to continue education?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
In 2002	1	113	22.24%	26.46%	26.46%
In 2003	2	71	13.98%	16.63%	43.09%
Later then in 2003	3	89	17.52%	20.89%	63.93%
Do not know	10	154	30.31%	36.07%	100.00%
N/A	88	78	15.35%	N/A	N/A
Missing	99	3	0.59%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   427   Missing Cases   81

Question 12   What will be your educational status?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Enrolled full-time	1	142	27.95%	33.26%	33.26%
Enrolled part-time	2	145	28.54%	34.96%	67.21%
Do not know	10	140	27.56%	32.29%	100.00%
N/A	88	78	15.35%	N/A	N/A
Missing	99	3	0.59%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   427   Missing Cases   81

130

Question 13   Where is the school/institution located?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
In Maine	1	162	31.89%	40.20%	40.20%
Out of Maine	2	81	15.94%	20.10%	60.30%
Do not know	10	160	31.50%	39.70%	100.00%
N/A	88	78	15.35%	N/A	N/A
Missing	99	27	5.31%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   403   Missing Cases   105

Question 14 — **What are your reasons for pursuing further education out of Maine? Please check all that apply.**

Dichotomy label	Name	Count
Good school	Q14A	56
Maine did not offered the programs I wanted	Q14B	43
Offered program I wanted	Q14C	50
Lower costs of education	Q14D	13
Near home/work/family	Q14E	31
Liked the location	Q14F	56
Other	Q14H	33
Total Responses		282

427 Missing Cases   81 Valid Cases

Question 15   What will be the field of study?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Liberal Arts and Sciences	1	88	17.32%	20.85%	20.85%
Business	2	65	12.80%	15.40%	36.26%
Forestry and Natural Sciences	3	37	7.28%	8.77%	45.02%
Education	4	92	18.11%	21.80%	66.82%
Engineering	5	31	6.10%	7.35%	74.17%
Law	6	6	1.18%	1.42%	75.59%
Medical	7	23	4.53%	5.45%	81.04%
Nursing	8	17	3.35%	4.03%	85.07%
Social work	9	14	2.76%	3.32%	88.39%
Do not know	10	49	9.65%	11.61%	100.00%
N/A	88	78	15.35%	N/A	N/A
Missing	99	8	1.57%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   422   Missing Cases   86

131

Question 16 | **What degree will you be seeking?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Additional bachelors	1	10	1.97%	2.37%	2.37%
Masters	2	257	50.59%	60.90%	63.27%
Doctorate	3	73	14.37%	17.30%	80.57%
Law	4	4	0.79%	0.95%	81.52%
Medical	5	9	1.77%	2.13%	83.65%
Other	6	1	0.20%	0.24%	83.89%
Certificate	7	21	4.13%	4.98%	88.86%
Non-degree	8	2	0.39%	0.47%	89.34%
Post-doctoral	9	2	0.39%	0.47%	89.81%
Do not know	10	43	8.46%	10.19%	100.00%
N/A	88	78	15.35%	N/A	N/A
Missing	99	8	1.57%	Missing	Missing
	Total	508	100.00%	100.00%	

		Missing			
Valid Cases	422	Cases	86		

Section II.
In this section, I would like to find out about your employment status.

Question 17a   **Where do you expect to live in 3 months from now?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Androscoggin County	1	13	2.56%	2.57%	2.57%
Aroostook County	2	5	0.98%	0.99%	3.56%
Cumberland County	3	52	10.24%	10.28%	13.38%
Franklin County	4	4	0.79%	0.79%	14.62%
Hancock County	5	16	3.15%	3.16%	17.79%
Kennebec County	6	16	3.15%	3.16%	20.95%
Knox County	7	8	1.57%	1.58%	22.53%
Lincoln County	8	16	3.15%	3.16%	25.69%
Oxford County	9	1	0.20%	0.20%	25.89%
Penobscot County	10	155	30.51%	30.63%	56.52%
Piscataquis County	11	3	0.59%	0.59%	57.11%
Sagadahoc County	12	4	0.79%	0.79%	57.91%
Somerset County	13	7	1.38%	1.38%	59.29%
Waldo County	14	9	1.77%	1.78%	61.07%
Washington County	15	5	0.98%	0.99%	62.06%
York County	16	12	2.36%	2.37%	64.43%
Do not know	17	21	4.13%	4.15%	68.58%
New England, outside Maine	18	53	10.43%	10.47%	79.05%
Outside New England	19	91	17.91%	17.98%	97.04%
Outside the U.S.	20	15	2.95%	2.96%	100%
Missing	99	2	0.39%	Missing	Missing
Total		508	100%	100%	

Valid Cases 506   Missing Cases 2

133

Question 17b   **Region where you expect to live**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont	1	381	75.00%	78.56%	78.56%
New Jersey, Pennsylvania, New York, Delaware, Maryland, Virginia, West Virginia, and the District of Columbia.	2	32	6.30%	6.60%	85.15%
Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.	3	20	3.94%	4.12%	89.28%
Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin	4	11	2.17%	2.27%	91.55%
Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.	5	8	1.57%	1.65%	93.20%
Iowa, Kansas, Missouri, and Nebraska	6	1	0.20%	0.21%	93.40%
Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming	7	6	1.18%	1.24%	94.64%
Arizona, California, Hawaii, Nevada, Alaska, Idaho, Oregon, and Washington	8	12	2.36%	2.47%	97.11%
Europe	9	7	1.38%	1.44%	98.56%
Africa	10	1	0.20%	0.21%	98.76%
Asia	11	1	0.20%	0.21%	98.97%
North America	12	3	0.59%	0.62%	99.59%
South America	13	2	0.39%	0.41%	100.00%
Australia	14	0	0.00%	0.00%	100.00%
N/A	88	21	4.13%	N/A	N/A
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   485   Missing Cases   23

Question 18   **What id your current employment?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Employed full-time	1	334	65.75%	66.40%	66.40%
Employed part-time	2	84	16.54%	16.70%	83.10%
Currently not working	3	85	16.73%	16.90%	100.00%
Missing	99	5	0.98%	Missing	Missing
	Total	508	100.00%	100.00%	

134

Question 19   **Is your occupation related to your field of study at the University of Maine?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Yes	1	296	58.27%	70.98%	70.98%
No	2	121	23.82%	29.02%	100.00%
N/A	88	88	17.32%	N/A	N/A
Missing	99	3	0.59%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   417   Missing Cases   91

If your occupation is related to your field of study, please proceed with the following questions:

Question 20   **Approximate annual salary:**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Less than $20,000	1	51	10.04%	17.00%	17.00%
$20,000-$25,000	2	31	6.10%	10.33%	27.33%
$25,001-$30,000	3	57	11.22%	19.00%	46.33%
$30,001-$35,000	4	40	7.87%	13.33%	59.67%
$35,001-$40,000	5	43	8.46%	14.33%	74.00%
$40,001-$$45,000	6	17	3.35%	5.67%	79.67%
$45,001-$50,000	7	29	5.71%	9.67%	89.33%
$50,001-$55,000	8	10	1.97%	3.33%	92.67%
$55,001-$60,000	9	9	1.77%	3.00%	95.67%
$60,001-$65,000	10	2	0.39%	0.67%	96.33%
$65,001-$70,000	11	6	1.18%	2.00%	98.33%
$70,000-$100,000	12	2	0.39%	0.67%	99.00%
More than $100,000	13	3	0.59%	1.00%	100.00%
N/A	88	206	40.55%	N/A	N/A
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   300   Missing Cases   208

Question 21 Type of organization your currently work for:

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Government	1	77	15.16%	26.10%	26.10%
Non-profit	2	108	21.26%	36.61%	62.71%
For profit	3	105	20.67%	35.59%	98.31%
Self-employed	4	5	0.98%	1.69%	100.00%
N/A	88	208	40.94%	N/A	N/A
Missing	99	5	0.98%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   295   Missing Cases   213

135

If your occupation is not in the field of study please answer the following questions:

Question 22 **Are you expecting to work in a job related to your field of study?**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Yes	1	158	31.10%	76.33%	76.33%
No	2	49	9.65%	23.67%	100.00%
N/A	88	295	58.07%	N/A	N/A
Missing	99	6	1.18%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   207   Missing Cases   301

Question 23 **Approximate annual salary:**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Less than $20,000	1	9	1.77%	5.81%	5.81%
$20,000-$25,000	2	15	2.95%	9.68%	15.48%
$25,001-$30,000	3	37	7.28%	23.87%	39.35%
$30,001-$35,000	4	17	3.35%	10.97%	50.32%
$35,001-$40,000	5	31	6.10%	20.00%	70.32%
$40,001-$$45,000	6	5	0.98%	3.23%	73.55%
$45,001-$50,000	7	15	2.95%	9.68%	83.23%
$50,001-$55,000	8	0	0.00%	0.00%	83.23%
$55,001-$60,000	9	13	2.56%	8.39%	91.61%
$60,001-$65,000	10	4	0.79%	2.58%	94.19%
$65,001-$70,000	11	0	0.00%	0.00%	94.19%
$70,000-$100,000	12	7	1.38%	4.52%	98.71%
More than $100,000	13	2	0.39%	1.29%	100.00%
N/A	88	344	67.72%	N/A	N/A
Missing	99	9	1.77%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   155   Missing Cases   353

Question 24 **Type of organization your expect work for:**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Government	1	46	9.06%	29.68%	29.68%
Non-profit	2	34	6.69%	21.94%	51.61%
For profit	3	69	13.58%	44.52%	96.13%
Self-employed	4	6	1.18%	3.87%	100.00%
N/A	88	344	67.72%	N/A	N/A
Missing	99	9	1.77%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   155   Missing Cases   353

Question 25   **Location of your job.**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Connecticut, Maine, Massachusetts New Hampshire, Rhode Island, and Vermont	1	164	32.28%	74.21%	74.21%
New Jersey, New York, Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia.	2	16	3.15%	7.24%	81.45%
Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.	3	16	3.15%	7.24%	88.69%
Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.	4	4	0.79%	1.81%	90.50%
Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.	5	4	0.79%	1.81%	92.31%
Iowa, Kansas, Missouri, and Nebraska	6	1	0.20%	0.45%	92.76%
Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming	7	3	0.59%	1.36%	94.12%
Arizona, California, Hawaii, Nevada, Alaska, Idaho, Oregon, and Washington	8	7	1.38%	3.17%	97.29%
Europe	9	4	0.79%	1.81%	99.10%
Africa	10	0	0.00%	0.00%	99.10%
Asia	11	0	0.00%	0.00%	99.10%
North America	12	2	0.39%	0.90%	100.00%
South America	13	0	0.00%	0.00%	100.00%
Australia	14	0	0.00%	0.00%	100.00%
N/A	88	266	52.36%	N/A	N/A
Missing	99	21	4.13%	Missing	Missing
Total		508	100.00%	100.00%	

Valid Cases   221   Missing Cases   287

Section III.
Deciding on where to live is based on a variety of factors. Based on your knowledge and experience, please rate the State of Maine as a place to live on each of the following characteristics. Next in the last column, please check the boxes of the three most important characteristics that you take into consideration when deciding where to live.

Rate the State of Maine as a place to live:

Question 26a   Career Opportunities

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	9	1.77%	1.77%	1.77%
Good	2	93	18.31%	18.31%	20.08%
Fair	3	249	49.02%	49.02%	69.09%
Poor	4	144	28.35%	28.35%	97.44%
Do not know	10	13	2.56%	2.56%	100.00%
	Total	508	256.50%	100.00%	

Valid Cases	508	Missing Cases		0	

Question 26b   Salary and benefits

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	1	0.20%	0.20%	0.20%
Good	2	91	17.91%	17.91%	18.11%
Fair	3	279	54.92%	54.92%	73.03%
Poor	4	125	24.61%	24.61%	97.64%
Do not know	10	12	2.36%	2.36%	100.00%
	Total	508	456.50%	100.00%	

Valid Cases	508	Missing Cases		0	

Question 26c   Taxes

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	8	1.57%	1.57%	1.57%
Good	2	118	23.23%	23.23%	24.80%
Fair	3	186	36.61%	36.61%	61.42%
Poor	4	173	34.06%	34.06%	95.47%
Do not know	10	23	4.53%	4.53%	100.00%
	Total	508	656.30%	100.00%	

Valid Cases	508	Missing Cases	0	

138

Question 26d Cost of living

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	89	17.52%	17.52%	17.52%
Good	2	257	50.59%	50.59%	68.11%
Fair	3	113	22.24%	22.24%	90.35%
Poor	4	33	6.50%	6.50%	96.85%
Do not know	10	16	3.15%	3.15%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases 508   Missing Cases   0

Question 26e   Education system

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	58	11.42%	11.24%	11.24%
Good	2	306	60.24%	60.24%	71.65%
Fair	3	118	23.23%	23.23%	94.88%
Poor	4	10	1.97%	1.97%	96.85%
Do not know	10	16	3.15%	3.15%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases 508   Missing Cases   0

Question 26f   **Cultural and social opportunities**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	34	6.69%	6.69%	6.69%
Good	2	155	30.51%	30.51%	37.00%
Fair	3	220	43.31%	43.31%	80.51%
Poor	4	87	17.13%	17.13%	97.64%
Do not know	10	12	2.36%	2.36%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases 508   Missing Cases   0

Question 26g Family friendly environment

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	298	58.66%	58.66%	58.66%
Good	2	173	34.06%	34.06%	92.72%
Fair	3	20	3.94%	3.94%	96.65%
Poor	4	4	0.79%	0.79%	97.44%
Do not know	10	13	2.56%	2.56%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases 508   Missing Cases   0

139

Question 26h   Outdoor/recreational setting

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	389	76.57%	76.57%	76.57%
Good	2	93	18.31%	18.31%	94.88%
Fair	3	8	1.57%	1.57%	96.46%
Poor	4	3	0.59%	0.59%	97.05%
Do not know	10	15	2.95%	2.95%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 26i   Urban setting

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	34	6.69%	6.69%	6.69%
Good	2	157	30.91%	30.91%	37.60%
Fair	3	174	34.25%	34.25%	71.85%
Poor	4	121	23.82%	23.82%	95.67%
Do not know	10	22	4.33%	4.33%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 26j   Rural setting

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	266	52.36%	53.36%	52.36%
Good	2	200	39.37%	39.37%	91.73%
Fair	3	19	3.74%	3.74%	95.47%
Poor	4	7	1.38%	1.38%	96.85%
Do not know	10	16	3.15%	3.15%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 26k   Weather

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Excellent	1	86	16.93%	16.93%	16.93%
Good	2	276	54.33%	54.33%	71.26%
Fair	3	113	22.24%	22.24%	93.50%
Poor	4	22	4.33%	4.33%	97.83%
Do not know	10	11	2.17%	2.17%	100.00%
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

140

Question 26l   Check the three most important characteristics:

Dichotomy label	Count
Career Opportunities	275
Salary and benefits	152
Taxes	27
Cost of living	164
Education system	90
Family friendly environment	227
Cultural and social opportunities	108
Outdoor/recreational setting	183
Urban setting	21
Rural setting	98
Weather	54
Total Responses	1399

13   Missing Cases   495   Valid Cases

Section IV.
In this section, I would like some information about you.

Question 27   What is your sex?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Female	1	339	66.73%	66.73%	66.73%
Male	2	169	33.27%	33.27%	100.00%
Missing	99	0	0.00%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 28   What is your age?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
21-30	21-30	374	73.62%	73.62%	73.62%
31-40	31-40	54	10.63%	10.63%	84.25%
41-50	41-50	52	10.24%	10.24%	94.49%
51-60	51-60	27	5.31%	5.31%	99.80%
61-70	61-70	1	0.20%	0.20%	100.00%
Missing	99	0	0.00%	Missing	Missing
	Total	508	100.00%	100.00%	

Question 29 How many times had you moved (changed towns) before enrolling at the University of Maine?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
0	0	154	30.31%	30.43%	30.43%
1-2	1	157	30.91%	31.03%	61.46%
3-5	2	131	25.79%	25.89%	87.35%
6-10	3	37	7.28%	7.31%	94.66%
More then 10	4	19	3.74%	3.75%	98.42%
Many	77	8	1.57%	1.58%	100.00%
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   506   Missing Cases   2

Mean	2.7953
Standard Deviation	11.2689
Minimum	0
Maximum	77
Median	0

Question 30 Of these how many were in Maine?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
0	0	259	50.98%	51.19%	51.19%
1-2	1	162	31.89%	32.02%	83.20%
3-5	2	67	13.19%	13.24%	96.44%
6-10	3	11	2.17%	2.17%	98.62%
More then 10	4	2	0.39%	0.40%	99.01%
Many	77	5	0.98%	0.99%	100.00%
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   506   Missing Cases   2

Mean	1.8110
Median	0
Standard Deviation	9.7445
Minimum	0
Maximum	77

Question 31 Of these how many were in the US?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
0	0	278	54.72%	54.94%	54.94%
1-2	1	135	26.57%	26.68%	81.62%
3-5	2	68	13.39%	13.44%	95.06%
6-10	3	11	2.17%	2.17%	97.23%
More than 10	4	10	1.97%	1.98%	99.21%
Many	77	4	0.79%	0.79%	100.00%
Missing	99	2	0.39%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   506   Missing Cases   2

Mean	1.6949
Median	0
Standard Deviation	9.1713
Minimum	0
Maximum	77

Question 32   What is your current marital status?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Single	1	336	66.14%	66.14%	66.14%
Married	2	153	30.12%	30.12%	96.26%
Other	3	19	3.74%	3.74%	100.00%
Missing	99	0	0.00%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   508   Missing Cases   0

Question 33   What is the highest education level of your mother?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Less then high school	1	24	4.72%	4.78%	4.78%
High school	2	148	29.13%	29.48%	34.26%
Some college	3	86	16.93%	17.13%	51.39%
Associates	4	53	10.43%	10.56%	61.95%
Bachelor's	5	120	23.62%	23.90%	85.86%
Master's and higher	6	71	13.98%	14.14%	100.00%
Missing	99	6	1.18%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   502   Missing Cases   6

Question 34   What is the highest education level of your father?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Less than high school	1	29	5.71%	5.74%	5.74%
High school	2	128	25.20%	25.35%	31.09%
Some college	3	85	16.73%	16.83%	47.92%
Associates	4	41	8.07%	8.12%	56.04%
Bachelor's	5	127	25.00%	25.15%	81.19%
Master's and higher	6	95	18.70%	18.81%	100.00%
Missing	99	3	0.59%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   505   Missing Cases   3

Question 35   What is your parents' current income?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Less than $20,000	1	50	9.84%	10.96%	10.96%
$20,000-$25,000	2	14	2.76%	3.07%	14.04%
$25,001-$30,000	3	23	4.53%	5.04%	19.08%
$30,001-$35,000	4	20	3.94%	4.39%	23.46%
$35,001-$40,000	5	26	5.12%	5.70%	29.17%
$40,001-$$45,000	6	16	3.15%	3.51%	32.68%
$45,001-$50,000	7	33	6.50%	7.24%	39.91%
$50,001-$55,000	8	17	3.35%	3.73%	43.64%
$55,001-$60,000	9	34	6.69%	7.46%	51.10%
$60,001-$65,000	10	13	2.56%	2.85%	53.95%
$65,001-$70,000	11	37	7.28%	8.11%	62.06%
$70,000-$100,000	12	101	19.88%	22.15%	84.21%
More than $100,000	13	72	14.17%	15.79%	100.00%
Missing	99	52	10.24%	Missing	Missing
	Total	508	100.00%	100.00%	

Valid Cases   456   Missing Cases   52

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APPENDIX D

MULTICOLLINEARITY AND SIGNIFICANCE TEST RESULTS

Table D.1. Pearson Correlation Coefficients

Pearson Correlation Coefficients, N = 505
Prob > |r| under H0: Rho=0

	GPA	lahss	edu	bepa	nsw	psf	eng
GPA	1.00000	-0.04443	-0.02380	-0.02237	0.07877	-0.03301	0.07449
		0.3643	0.6271	0.6479	0.1074	0.5004	0.1279
lahss	-0.04443	1.00000	-0.30938	-0.22739	-0.19533	-0.23834	-0.20475
	0.3643		<.0001	<.0001	<.0001	<.0001	<.0001
edu	-0.02380	-0.30938	1.00000	-0.22739	-0.19533	-0.23834	-0.20475
	0.6271	<.0001		<.0001	<.0001	<.0001	<.0001
bepa	-0.02237	-0.22739	-0.22739	1.00000	-0.14357	-0.17518	-0.15049
	0.6479	<.0001	<.0001		0.0032	0.0003	0.0020
nsw	0.07877	-0.19533	-0.19533	-0.14357	1.00000	-0.15048	-0.12927
	0.1074	<.0001	<.0001	0.0032		0.0020	0.0081
psf	-0.03301	-0.23834	-0.23834	-0.17518	-0.15048	1.00000	-0.15773
	0.5004	<.0001	<.0001	0.0003	0.0020		0.0012
eng	0.07449	-0.20475	-0.20475	-0.15049	-0.12927	-0.15773	1.00000
	0.1279	<.0001	<.0001	0.0020	0.0081	0.0012	
bachelor	-0.05351	0.07430	-0.23160	0.00272	0.07162	0.01206	0.12065
	0.2745	0.1289	<.0001	0.9557	0.1434	0.8056	0.0135
master	0.04147	-0.08002	0.25275	-0.01453	-0.04670	-0.06271	-0.09558
	0.3972	0.1019	<.0001	0.7669	0.3403	0.2001	0.0506
doc	-0.00325	0.01378	-0.07694	-0.00543	-0.06767	0.16581	-0.03130
	0.9471	0.7784	0.1158	0.9118	0.1668	0.0007	0.5228
sex	-0.00956	0.09438	-0.01285	-0.00079	-0.02507	-0.02749	-0.05111

	0.8453	0.0536	0.7932	0.9871	0.6089	0.5746	0.2966
age	0.00548	-0.08574	0.24600	0.14015	-0.11578	-0.12279	-0.11264
	0.9110	0.0796	<.0001	0.0040	0.0177	0.0119	0.0211
single	-0.03361	0.14178	-0.14994	-0.17110	0.06021	0.05114	0.08040
	0.4926	0.0036	0.0021	0.0004	0.2188	0.2963	0.1003
me	0.03137	0.01001	0.01001	-0.01359	0.05718	-0.04344	-0.01817
	0.5220	0.8381	0.8381	0.7815	0.2429	0.3751	0.7108
move	-0.00538	0.00118	0.03849	0.00020	-0.05369	0.04657	-0.05244
	0.9126	0.9808	0.4320	0.9967	0.2729	0.3416	0.2842

Pearson Correlation Coefficients, N = 505
Prob > |r| under H0: Rho=0

	bachelor	master	doc	sex	age	single	me
GPA	-0.05351 0.2745	0.04147 0.3972	-0.00325 0.9471	-0.00956 0.8453	0.00548 0.9110	-0.03361 0.4926	0.03137 0.5220
lahss	0.07430 0.1289	-0.08002 0.1019	0.01378 0.7784	0.09438 0.0536	-0.08574 0.0796	0.14178 0.0036	0.01001 0.8381
edu	-0.23160 <.0001	0.25275 <.0001	-0.07694 0.1158	-0.01285 0.7932	0.24600 <.0001	-0.14994 0.0021	0.01001 0.8381
bepa	0.00272 0.9557	-0.01453 0.7669	-0.00543 0.9118	-0.00079 0.9871	0.14015 0.0040	-0.17110 0.0004	-0.01359 0.7815
nsw	0.07162 0.1434	-0.04670 0.3403	-0.06767 0.1668	-0.02507 0.6089	-0.11578 0.0177	0.06021 0.2188	0.05718 0.2429
psf	0.01206 0.8056	-0.06271 0.2001	0.16581 0.0007	-0.02749 0.5746	-0.12279 0.0119	0.05114 0.2963	-0.04344 0.3751
eng	0.12065 0.0135	-0.09558 0.0506	-0.03130 0.5228	-0.05111 0.2966	-0.11264 0.0211	0.08040 0.1003	-0.01817 0.7108
bachelor	1.00000	-0.71661 <.0001	-0.26772 <.0001	0.03340 0.4954	-0.53821 <.0001	0.34787 <.0001	0.24195 <.0001
master	-0.71661 <.0001	1.00000	-0.09938 0.0420	-0.02755 0.5739	0.40608 <.0001	-0.29919 <.0001	-0.10483 0.0319
doc	-0.26772 <.0001	-0.09938 0.0420	1.00000	-0.01503 0.7591	0.14623 0.0027	-0.04063 0.4069	-0.20811 <.0001
sex	0.03340 0.4954	-0.02755 0.5739	-0.01503 0.7591	1.00000	-0.02109 0.6669	0.03817 0.4358	0.01992 0.6843

age	-0.53821 <.0001	0.40608 <.0001	0.14623 0.0027	-0.02109 0.6669	1.00000	-0.52823 <.0001	-0.11539 0.0181
single	0.34787 <.0001	-0.29919 <.0001	-0.04063 0.4069	0.03817 0.4358	-0.52823 <.0001	1.00000	0.04078 0.4050
me	0.24195 <.0001	-0.10483 0.0319	-0.20811 <.0001	0.01992 0.6843	-0.11539 0.0181	0.04078 0.4050	1.00000
move	-0.10509 0.0315	0.04738 0.3333	0.10050 0.0398	-0.01378 0.7786	0.14914 0.0022	-0.06312 0.1972	-0.03004 0.5398

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Pearson Correlation Coefficients, N = 505
Prob > |r| ander HO: Rho=0

	move	aid	unempl	wage	co	sb	tax
GPA	-0.00538	-0.00272	-0.00409	0.03412	-0.01361	-0.01315	0.15184
	0.9126	0.9557	0.9335	0.4861	0.7813	0.7885	0.0018
lahss	0.00118	-0.02693	-0.05275	0.11078	0.07755	0.07593	0.04674
	0.9808	0.5825	0.2813	0.0233	0.1129	0.1207	0.3399
edu	0.03849	-0.02839	0.00331	-0.08438	-0.01725	-0.00598	0.04558
	0.4320	0.5622	0.9461	0.0845	0.7248	0.9029	0.3520
bepa	0.00020	-0.01942	0.03015	-0.27492	-0.02237	-0.02210	-0.01826
	0.9967	0.6918	0.5383	<.0001	0.6479	0.6520	0.7093
nsw	-0.05369	-0.02513	0.04491	0.27695	-0.04381	-0.04961	-0.07112
	0.2729	0.6079	0.3591	<.0001	0.3710	0.3110	0.1461
psf	0.04657	-0.01588	-0.04373	0.04447	0.03438	0.03325	0.00773
	0.3416	0.7459	0.3719	0.3639	0.4828	0.4972	0.8747
eng	-0.05244	0.13545	0.03773	-0.05428	-0.05098	-0.05708	-0.04128
	0.2842	0.0055	0.4411	0.2676	0.2978	0.2437	0.3993
bachelor	-0.10509	-0.06747	-0.03199	0.06417	0.10808	0.10474	0.07307
	0.0315	0.1680	0.5138	0.1899	0.0270	0.0321	0.1354
master	0.04738	0.04890	0.02701	-0.03411	-0.08076	-0.07987	-0.05013
	0.3333	0.3180	0.5814	0.4862	0.0988	0.1025	0.3060
doc	0.10050	-0.00665	-0.02151	-0.07206	-0.02300	-0.02564	-0.04359
	0.0398	0.8920	0.6606	0.1409	0.6388	0.6008	0.3735
sex	-0.01378	-0.00069	-0.01905	-0.00349	0.32257	0.32325	0.23034
	0.7786	0.9887	0.6974	0.9432	<.0001	<.0001	<.0001

age	0.14914	-0.03515	-0.06277	-0.12592	-0.08704	-0.07842	-0.05371
	0.0022	0.4730	0.1997	0.0099	0.0751	0.1090	0.2727
single	-0.06312	0.04008	-0.02663	0.08883	0.01698	0.01326	0.03286
	0.1972	0.4132	0.5867	0.0693	0.7289	0.7866	0.5023
me	-0.03004	-0.08963	-0.00971	0.04432	0.07901	0.07866	-0.02320
	0.5398	0.0668	0.8430	0.3655	0.1063	0.1079	0.6358
move	1.00000	-0.01008	0.15115	-0.05932	-0.01911	-0.01701	-0.02724
		0.8371	0.0019	0.2256	0.6965	0.7284	0.5781

Pearson Correlation Coefficients, N = 505
Prob > |r| under H0: Rho=0

	cl	ffe	cso	es	urban	outdoor	weather
GPA	-0.01755 0.7202	-0.01809 0.7119	-0.01518 0.7567	-0.01415 0.7728	-0.01284 0.7932	-0.01552 0.7514	-0.01197 0.8071
lahss	0.05951 0.2241	0.04246 0.3860	0.07259 0.1380	0.07676 0.1167	0.03794 0.4386	0.01024 0.8345	0.09133 0.0618
edu	-0.00268 0.9563	0.00074 0.9879	-0.00401 0.9347	-0.00923 0.8506	0.04138 0.3981	0.08936 0.0676	0.00075 0.9878
bepa	0.01268 0.7959	0.01506 0.7586	-0.01145 0.8152	0.03594 0.4632	-0.02870 0.5580	-0.01089 0.8242	-0.00572 0.9071
nsw	-0.01671 0.7331	-0.06100 0.2128	-0.05563 0.2559	-0.04981 0.3091	-0.01325 0.7868	-0.06744 0.1682	-0.04780 0.3290
psf	-0.00346 0.9438	0.04610 0.3465	0.02770 0.5718	-0.01942 0.6918	-0.03470 0.4788	-0.01492 0.7607	-0.01398 0.7753
eng	-0.06819 0.1635	-0.06554 0.1806	-0.05478 0.2632	-0.05759 0.2395	-0.02141 0.6622	-0.03705 0.4494	-0.05276 0.2813
bachelor	0.09398 0.0546	0.12252 0.0121	0.10030 0.0402	0.11082 0.0233	0.09130 0.0619	0.00991 0.8397	0.10254 0.0359
master	-0.06792 0.1652	-0.09020 0.0651	-0.07552 0.1227	-0.08507 0.0820	-0.06461 0.1869	0.13517 0.0056	-0.07637 0.1186
doc	-0.03531 0.4710	-0.03264 0.5052	-0.02468 0.6144	-0.02831 0.5634	-0.03262 0.5054	0.03210 0.5123	-0.02423 0.6209
sex	0.27155 <.0001	0.28210 <.0001	0.32370 <.0001	0.32742 <.0001	0.28215 <.0001	0.24374 <.0001	0.34630 <.0001

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age	-0.04217 0.3893	-0.09549 0.0508	-0.07720 0.1146	-0.08999 0.0657	-0.07758 0.1128	-0.01330 0.7860	-0.08065 0.0992
single	0.01254 0.7980	0.04217 0.3892	0.00722 0.8828	0.05123 0.2955	0.07061 0.1491	0.00191 0.9689	0.03748 0.4442
me	0.03381 0.4900	0.08892 0.0690	0.07058 0.1492	0.07647 0.1181	0.05394 0.2706	0.04252 0.3853	0.06916 0.1576
move	-0.02593 0.5966	-0.02347 0.6319	-0.02117 0.6656	-0.02079 0.6713	0.07553 0.1227	-0.02469 0.6143	-0.01696 0.7292

Pearson Correlation Coefficients, N = 505
Prob > |r| under HO: Rho=0

	GPA	lahss	edu	bepa	nsw	psf	eng
aid	-0.00272	-0.02693	-0.02839	-0.01942	-0.02513	-0.01588	0.13545
	0.9557	0.5825	0.5622	0.6918	0.6079	0.7459	0.0055
unempl	-0.00409	-0.05275	0.00331	0.03015	0.04491	-0.04373	0.03773
	0.9335	0.2813	0.9461	0.5383	0.3591	0.3719	0.4411
wage	0.03412	0.11078	-0.08438	-0.27492	0.27695	0.04447	-0.05428
	0.4861	0.0233	0.0845	<.0001	<.0001	0.3639	0.2676
co	-0.01361	0.07755	-0.01725	-0.02237	-0.04381	0.03438	-0.05098
	0.7813	0.1129	0.7248	0.6479	0.3710	0.4828	0.2978
sb	-0.01315	0.07593	-0.00598	-0.02210	-0.04961	0.03325	-0.05708
	0.7885	0.1207	0.9029	0.6520	0.3110	0.4972	0.2437
tax	0.15184	0.04674	0.04558	-0.01826	-0.07112	0.00773	-0.04128
	0.0018	0.3399	0.3520	0.7093	0.1461	0.8747	0.3993
cl	-0.01755	0.05951	-0.00268	0.01268	-0.01671	-0.00346	-0.06819
	0.7202	0.2241	0.9563	0.7959	0.7331	0.9438	0.1635
ffe	-0.01809	0.04246	0.00074	0.01506	-0.06100	0.04610	-0.06554
	0.7119	0.3860	0.9879	0.7586	0.2128	0.3465	0.1806
cso	-0.01518	0.07259	-0.00401	-0.01145	-0.05563	0.02770	-0.05478
	0.7567	0.1380	0.9347	0.8152	0.2559	0.5718	0.2632
es	-0.01415	0.07676	-0.00923	0.03594	-0.04981	-0.01942	-0.05759
	0.7728	0.1167	0.8506	0.4632	0.3091	0.6918	0.2395
urban	-0.01284	0.03794	0.04138	-0.02870	-0.01325	-0.03470	-0.02141
	0.7932	0.4386	0.3981	0.5580	0.7868	0.4788	0.6622

outdoor	-0.01552	0.01024	0.08936	-0.01089	-0.06744	-0.01492	-0.03705
	0.7514	0.8345	0.0676	0.8242	0.1682	0.7607	0.4494
weather	-0.01197	0.09133	0.00075	-0.00572	-0.04780	-0.01398	-0.05276
	0.8071	0.0618	0.9878	0.9071	0.3290	0.7753	0.2813

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Pearson Correlation Coefficients, N = 505
Prob > |r| under H0: Rho=0

	bachelor	master	doc	sex	age	single	me
aid	-0.06747 0.1680	0.04890 0.3180	-0.000665 0.8920	-0.00069 0.9887	-0.03515 0.4730	0.04008 0.4132	-0.08963 0.0668
unempl	-0.03199 0.5138	0.02701 0.5814	-0.02151 0.6606	-0.01905 0.6974	-0.06277 0.1997	-0.02663 0.5867	-0.00971 0.8430
wage	0.06417 0.1899	-0.03411 0.4862	-0.07206 0.1409	-0.00349 0.9432	-0.12592 0.0099	0.08883 0.0693	0.04432 0.3655
co	0.10808 0.0270	-0.08076 0.0988	-0.02300 0.6388	0.32257 <.0001	-0.08704 0.0751	0.01698 0.7289	0.07901 0.1063
sb	0.10474 0.0321	-0.07987 0.1025	-0.02564 0.6008	0.32325 <.0001	-0.07842 0.1090	0.01326 0.7866	0.07866 0.1079
tax	0.07307 0.1354	-0.05013 0.3060	-0.04359 0.3735	0.23034 <.0001	-0.05371 0.2727	0.03286 0.5023	-0.02320 0.6358
cl	0.09398 0.0546	-0.06792 0.1652	-0.03531 0.4710	0.27155 <.0001	-0.04217 0.3893	0.01254 0.7980	0.03381 0.4900
ffe	0.12252 0.0121	-0.09020 0.0651	-0.03264 0.5052	0.28210 <.0001	-0.09549 0.0508	0.04217 0.3892	0.08892 0.0690
cso	0.10030 0.0402	-0.07552 0.1227	-0.02468 0.6144	0.32370 <.0001	-0.07720 0.1146	0.00722 0.8828	0.07058 0.1492
es	0.11082 0.0233	-0.08507 0.0820	-0.02831 0.5634	0.32742 <.0001	-0.08999 0.0657	0.05123 0.2955	0.07647 0.1181
urban	0.09130 0.0619	-0.06461 0.1869	-0.03262 0.5054	0.28215 <.0001	-0.07758 0.1128	0.07061 0.1491	0.05394 0.2706

outdoor	0.00991	0.13517	0.03210	0.24374	-0.01330	0.00191	0.04252
	0.8397	0.0056	0.5123	<.0001	0.7860	0.9689	0.3853
weather	0.10254	-0.07637	-0.02423	0.34630	-0.08065	0.03748	0.06916
	0.0359	0.1186	0.6209	<.0001	0.0992	0.4442	0.1576

Pearson Correlation Coefficients, N = 505
Prob > |r| under H0: Rho=0

	move	aid	unempl	wage	co	sb	tax
aid	-0.01008 0.8371	1.00000	-0.00507 0.9176	0.01854 0.7051	0.00117 0.9810	-0.00217 0.9647	-0.00838 0.8643
unempl	0.15115 0.0019	-0.00507 0.9176	1.00000	-0.05465 0.2643	-0.01332 0.7857	-0.01525 0.7557	-0.01535 0.7541
wage	-0.05932 0.2256	0.01854 0.7051	-0.05465 0.2643	1.00000	0.00616 0.8999	0.00163 0.9735	0.02330 0.6343
co	-0.01911 0.6965	0.00117 0.9810	-0.01332 0.7857	0.00616 0.8999	1.00000	0.99874 <.0001	0.69670 <.0001
sb	-0.01701 0.7284	-0.00217 0.9647	-0.01525 0.7557	0.00163 0.9735	0.99874 <.0001	1.00000	0.69709 <.0001
tax	-0.02724 0.5781	-0.00838 0.8643	-0.01535 0.7541	0.02330 0.6343	0.69670 <.0001	0.69709 <.0001	1.00000
cl	-0.02593 0.5966	-0.00422 0.9314	-0.01544 0.7527	0.00088 0.9857	0.82573 <.0001	0.82521 <.0001	0.77641 <.0001
ffe	-0.02347 0.6319	-0.00621 0.8991	-0.01550 0.7517	-0.01432 0.7700	0.85806 <.0001	0.86022 <.0001	0.66652 <.0001
cso	-0.02117 0.6656	0.00312 0.9492	-0.01618 0.7413	-0.00514 0.9165	0.99794 <.0001	0.99825 <.0001	0.69817 <.0001
es	-0.02079 0.6713	0.00250 0.9594	-0.01287 0.7928	-0.01250 0.7987	0.88111 <.0001	0.88122 <.0001	0.69877 <.0001
urban	0.07553 0.1227	-0.00364 0.9408	-0.01747 0.7214	0.02032 0.6783	0.76318 <.0001	0.76448 <.0001	0.52847 <.0001

out door	-0.02469 0.6143	-0.00469 0.9237	-0.01958 0.6894	-0.01494 0.7604	0.65271 <.0001	0.65182 <.0001	0.57155 <.0001
weather	-0.01696 0.7292	0.00107 0.9825	-0.01467 0.7646	0.00271 0.9558	0.94056 <.0001	0.94057 <.0001	0.66103 <.0001

Pearson Correlation Coefficients, N = 505
Prob > |r| under H0: Rho=0

	cl	ffe	cso	es	urban	outdoor	weather
aid	-0.00422 0.9314	-0.00621 0.8991	0.00312 0.9492	0.00250 0.9594	-0.00364 0.9408	-0.00469 0.9237	0.00107 0.9825
unempl	-0.01544 0.7527	-0.01550 0.7517	-0.01618 0.7413	-0.01287 0.7928	-0.01747 0.7214	-0.01958 0.6894	-0.01467 0.7646
wage	0.00088 0.9857	-0.01432 0.7700	-0.00514 0.9165	-0.01250 0.7987	0.02032 0.6783	-0.01494 0.7604	0.00271 0.9558
co	0.82573 <.0001	0.85806 <.0001	0.99794 <.0001	0.88111 <.0001	0.76318 <.0001	0.65271 <.0001	0.94056 <.0001
sb	0.82521 <.0001	0.86022 <.0001	0.99825 <.0001	0.88122 <.0001	0.76448 <.0001	0.65182 <.0001	0.94057 <.0001
tax	0.77641 <.0001	0.66652 <.0001	0.69817 <.0001	0.69877 <.0001	0.52847 <.0001	0.57155 <.0001	0.66103 <.0001
cl	1.00000	0.79347 <.0001	0.82495 <.0001	0.82389 <.0001	0.63030 <.0001	0.61159 <.0001	0.77997 <.0001
ffe	0.79347 <.0001	1.00000	0.86356 <.0001	0.85795 <.0001	0.74524 <.0001	0.63476 <.0001	0.81023 <.0001
cso	0.82495 <.0001	0.86356 <.0001	1.00000	0.88219 <.0001	0.76654 <.0001	0.65690 <.0001	0.94085 <.0001
es	0.82389 <.0001	0.85795 <.0001	0.88219 <.0001	1.00000	0.76044 <.0001	0.65372 <.0001	0.93929 <.0001
urban	0.63030 <.0001	0.74524 <.0001	0.76654 <.0001	0.76044 <.0001	1.00000	0.63602 <.0001	0.80829 <.0001

outdoor	0.61159	0.63476	0.65690	0.65372	0.63602	1.00000	0.69607
	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001
weather	0.77997	0.81023	0.94085	0.93929	0.80829	0.69607	1.00000
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	

* Where GPA is grade point average; majors: lahss is liberal arts, humanities and social sciences, edu is education, bepa is business, economics, and public administration, nsw is nursing and social work, psf is physical and social sciences, and eng is engineering; educational degree: bachelor, master, doc is doctorate; sex is gender; age; single is marital status; me is Maine residency; move is previous moving patterns; aid is financial aid; unempl is the employment status; wage; co is career opportunities; sb is salary and benefits; tax; cl is cost of living; ffe is family-friendly-environment; cso is cultural and social opportunities; es is educational system; urban is urban setting; outdoor is outdoor and recreational opportunities; and weather.

**Source: 2002 Migration of University of Maine Graduates' Survey.

Table D.2. Results of Auxiliary Regression Performed on Independent Variables

Independent Variables	R2
Grade Point Average	0.137
Liberal Arts, Humanities, and Social Science	0.505
Business, Economics and Public Administration	0.362
Nursing and Social Work	0.373
Physical Sciences and Forestry	0.475
Engineering	0.458
Master Degree	0.271
Doctoral Degree	0.122
Gender	0.259
Age	0.348
Marital Status	0.319
Residency	0.060
Previous Moving Patterns	0.101
Financial Aid	0.015
Employment Status	0.026
Wages	0.159
Career Opportunities	**0.998**
Salary and Benefits	**0.998**
Taxes	0.695
Cost of Living	**0.890**
Family-Friendly Environment	0.713
Cultural and Social Opportunities	**0.933**

Table D.2. Continued

Independent Variables	R2
Educational System	**0.957**
Urban Setting	0.774
Outdoor and Recreational Opportunities	0.619
Weather	**0.973**

*Source: 2002 Migration of University of Maine Graduates' Survey.
**Bolded R^2 values are greater then 0.8 and imply serious multicollinearity between variables in question and other right-hand-side variables.

Table D.3. Preliminary Results of College-Oriented Migration Equation

Variable	Estimate	Chi-Square Probability
Intercept	-19.083	0.999
Grade Point Average	2.473	0.108
Gender	-0.907	0.328
Age	-0.345	0.009
Marital Status	**-0.236**	**0.973**
Residency	-2.600	0.025
Previous Moving Patterns	-0.008	0.774
Financial Aid	**-0.171**	**0.894**
Liberal Arts, Humanities, and Social Sciences	**20.376**	**0.999**
Business, Economics, and Public Administration	**20.510**	**0.999**
Nursing and Social Work	**16.540**	**0.999**
Physical Sciences and Forestry	**20.490**	**0.999**
Engineering	**20.310**	**0.999**
Master Degree	2.576	0.077
Career Opportunities	-0.516	0.380
Salary and Benefits	0.785	0.386
Taxes	**-0.053**	**0.848**
Cost of Living	0.591	0.406
Family-Friendly Environment	-0.020	0.779
Cultural and Social Opportunities	-0.741	0.246

Table D.3. Continued

Variable	Estimate	Chi-Square Probability
Educational System	1.968	0.006
Urban Setting	1.151	0.090
Outdoor and Recreational Opportunities	-2.013	0.003
Weather	-1.130	0.056

*Source: 2002 Migration of University of Maine Graduates' Survey.
**Bolded are variables that have a high level of insignificance (higher than 0.8) and are excluded from final analysis.

Table D.4. Preliminary Results of Work-Oriented Migration Equation

Variable	U.S./Maine		U.S. - Maine	
	Estimate	Chi-Square Probability	Estimate	Chi-Square Probability
Intercept	0.545	0.748	0.645	0.613
Grade Point Average	0.015	0.397	0.015	0.397
Gender	0.045	0.493	0.045	0.493
Age	-0.111	0.004	-0.111	0.004
Marital Status	0.582	0.151	0.581	0.152
Residency	-1.720	<0.0001	-1.720	<0.0001
Previous Moving Pattern	0.033	0.030	0.032	0.030
Financial Aid	-0.030	0.645	-0.036	0.646
Liberal Arts, Humanities and Social Sciences	0.944	0.080	0.947	0.079
Business, Economics, and Public Administration	1.648	0.008	1.642	0.082
Nursing and Social Work	0.997	0.108	1.004	0.105
Physical Sciences and Forestry	0.553	0.371	0.527	0.371
Engineering	1.012	0.081	1.008	0.081
Master Degree	0.163	0.689	0.164	0.688
Doctoral Degree	2.022	0.029	2.020	0.029
Employment Status	0.029	0.010	0.028	0.010
Wage	**0.090**	**0.992**	**0.0007**	**0.974**
Career Opportunities	0.126	0.601	0.126	0.823
Salary and Benefits	**0.054**	**0.823**	**0.054**	**0.823**

Table D.4. Continued

	U.S./Maine		U.S./Maine	
Variable	Estimate	Chi-Square Probability	Estimate	Chi-Square Probability
Taxes	0.016	0.198	0.016	0.197
Cost of Living	**-0.0006**	**0.974**	**-0.0005**	**0.974**
Family-Friendly Environment	-0.094	0.450	-0.093	0.504
Cultural and Social Opportunities	-0.106	0.635	-0.108	0.630
Educational System	0.049	0.718	0.048	0.724
Urban Setting	-0.362	0.080	-0.361	0.078
Outdoor and Recreational Opportunities	**-0.004**	**0.833**	**-0.004**	**0.832**
Weather	0.333	0.071	0.333	0.070

*Source: 2002 Migration of University of Maine Graduates' Survey.
**Bolded are variables that have a high level of insignificance (higher than 0.8) and are excluded from final analysis.

Table D.5. Means and Standard Deviations for College- and Work- Oriented Migration Equations

Variable	College-Oriented Equation Mean (Standard Deviation)	Work-Oriented Equation Mean (Standard Deviation)
Grade Point Average	3.454 (0.355)	3.373 (0.441)
Gender	0.634 (0.484)	0.673 (0.469)
Age	25.613 (4.641)	30.074 (9.653)
Marital Status	0.790 (0.405)	0.635 (0.482)
Residency	0.817 (0.388)	0.780 (0.414)
Previous Moving Pattern	2.914 (12.830)	2.744 (10.843)
Financial Aid	0.597 (0.336)	0.513 (0.345)
Liberal Arts, Humanities and Social Sciences	0.333 (0.474)	0.236 (0.425)
Education	0.043 (0.204)	0.236 (0.425)
Business, Economics, and Public Administration	0.064 (0.247)	0.110 (0.313)
Nursing and Social Work	0.064 (0.247)	0.143 (0.350)

Table D.5. Continued

Variable	College-Oriented Equation	Work-Oriented Equation
	Mean (Standard Deviation)	Mean (Standard Deviation)
Physical Sciences and Forestry	0.301 (0.461)	0.155 (0.362)
Engineering	0.193 (0.397)	0.119 (0.324)
Bachelor Degree	0.827 (0.379)	0.663 (0.477)
Master Degree	0.172 (0.379)	0.322 (0.624)
Doctoral Degree	N/A	0.036 (0.186)
Employment Status	N/A	0.128 (0.335)
Wage	N/A	1.165 6573 (0.142)(5861)
Career Opportunities	2.956 (0.931)	3.002 (0.853)
Salary and Benefits	3.010 (0.840)	2.993 (0.795)
Taxes	2.882 (1.062)	2.950 (1.008)
Cost of Living	1.967 (0.827)	2.141 (0.886)
Family-Friendly Environment	1.419 (0.727)	1.420 (0.633)
Cultural and Social Opportunities	2.666 (0.948)	2.661 (0.911)

Table D.5. Continued

Variable	College-Oriented Equation Mean (Standard Deviation)	Work-Oriented Equation Mean (Standard Deviation)
Educational System	2.054 (0.771)	2.102 (0.726)
Urban Setting	2.677 (1.085)	2.678 (1.036)
Outdoor and Recreational Opportunities	1.236 (0.682)	1.193 (0.496)
Weather	2.043 (0.883)	2.112 (0.781)

*Source: 2002 Migration of University of Maine Graduates' Survey.

BIOGRAPHY OF THE AUTHOR

Ewa Jadwiga Kleczyk was born on October 27th, 1978 in Wroclaw, Poland to Zofia and Miroslaw Kleczyk. She was raised in Wroclaw and moved to Belfast, Maine to attend the Belfast High School in 1996. Ewa was awarded an international tuition waiver to the University of Maine and graduated with a Bachelor of Arts degree in Economics and minor in Mathematics in 2001. She stayed at UMaine to pursue a Master of Science degree in Resource Economics and Policy. She worked under Dr. Deirdre Mageean.

After receiving her degree, Ewa will be joining Virginia Polytechnic Institute and State University to begin her doctoral degree in the field of International Development Economics. Ewa is a candidate for the Master of Science degree in Resource Economics and Policy in August, 2003.