Center for Demography and Ecology

University of Wisconsin-Madison

Ties and Opportunities: The Effects of Legislative, Personal, and Economic Conditions on the Development of Migrant Networks Among Professionals

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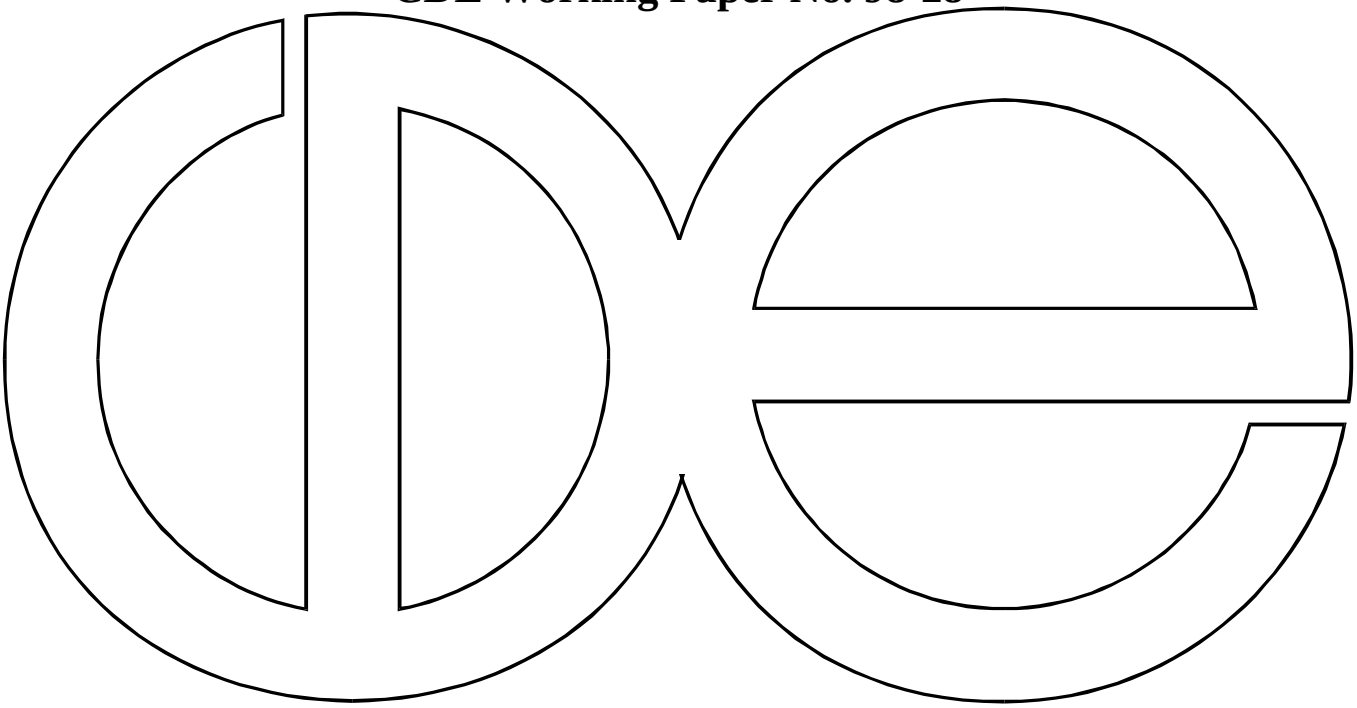

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INTRODUCTION

Migrant networks have become an important concept in understanding the immigration process. Networks serve many functions and increase predictive power for determining who enters the United States and how they do so. However, the literature on migrant networks is devoid of an adequately representative cross-section of the immigrant population. One class of immigrants largely overlooked in the field of immigration studies in general and in the study of migrant networks in particular is professional workers.

Interest in the reasons for and means of migrating among professionals peaked in the 1970s after passage of the 1965 Amendments to the Immigration and Nationality Act resulted in large numbers of Asian professionals immigrating to the United States. Fear of a "Brain Drain" undermining productivity in "Third World" nations led to a wide body of literature aimed at understanding its underlying causes and consequences. Although interest in professionals waned in the 1980s, it has been rekindled in recent years as United States policy-makers contemplate changes in immigration legislation which would place more selective emphasis on immigrant skills.

The present study lays the groundwork for a more extensive research project aimed at identifying and understanding the types of networks utilized by professional workers. In addition to quantitative analyses using published data sources, future work planned for this topic includes a sample survey of professionals employed in the New York Standard Metropolitan Area with the eventual goal of incorporating findings from past studies and the current project to develop a

framework for understanding and modeling the immigration process as it applies to professionals in the United States. The immediate purpose, however, is to identify the major modes of entry among professionals and examine how they operate across occupational classes.

My general intentions are as follows: 1) to develop and utilize a conceptual framework of migrant networks to study a heretofore neglected segment of the immigrant population; 2) to show that, depending on the degree of specificity required, one general set of findings may not necessarily hold even for very similar groups of people and that, therefore, a more flexible model of migrant networks is required and 3) to encourage use of a broader view of migrant networks in order to capture the true complexity of immigration as it occurs in practice.

BACKGROUND

A Conceptualization of Migrant Networks

Social networks are composed, most basically, of actors and the relationships that exist between them. To develop a feasible network framework, however, requires consideration of four additional properties as outlined by Davern (1997). The structure of a network describes its physical content including not only which ties exist but the strength of those ties.[1] The structure may include individual actors or corporations and describes the relationships between members of the system. The second property, resources, affects the relative power of network members and influences network operation. Resources help determine social and economic outcomes of the network and may include ability, ethnicity or class. Norms dictate the reciprocal obligations between network members and play an important role in sustaining the network. Finally, every

[1] Granovetter (1973) introduced the concept of the "strength of ties" to contrast linkages between close associates and distant acquaintances and the effect of both on business networks.

network operates through a dynamic component which defines the ways in which networks expand or contract over time as members are gained and/or lost.

Utilizing this basic framework to study the immigration process and examining how these factors interact it is possible to describe a wide variety of migrant networks from those that facilitate undocumented entry to those based on family relationships. Past models of migrant networks emphasized strong ties to family and friends (see, for example Massey, 1990) but these conceptualizations do not necessarily apply to the circumstances faced by higher socioeconomic status migrants. Given their superior resources, higher socioeconomic status immigrants are better equipped to obtain information regarding potential visas in the destination country, to conduct extensive job searches and visit the destination area before actually emigrating.

This paper examines two particular forms of migrant networks, spousal migrant networks and employment migrant networks and analyzes the effects of legislative decisions and economic conditions on their availability. Using longitudinal data from the Immigration and Naturalization Service it will be possible to describe the nature of migrant networks for a sub-set of immigrant professionals and to show that even within this sub-set the use of networks differs considerably depending on individual characteristics. The primary purpose of the paper is to elaborate on some of the network components described above (e.g., to show how the content of networks changes over time) and to demonstrate the importance of a more flexible model of networks for understanding immigration as a process.

Legislation's Role in the Immigration Process

Immigration usually takes place through the aid of networks composed primarily of either strong or weak ties as described by Granovetter (1973). Based on his definition of the "strength

of ties," strong ties are characterized by substantial time investment, high emotional intensity, intimacy and the reciprocal exchange of services. A marital relationship or that existing between a parent and child most clearly satisfy these requirements. Alternatively, low levels of time investment, weak emotional bonds, a lack of intimacy and an unreciprocated exchange of goods or services would characterize a weak tie. One might imagine the relationship between a potential immigrant sponsor and an agent of the Immigration and Naturalization Service as typical of a weak tie. Given these examples, the strength of ties should be understood as a continuum with some relationships falling more clearly towards one end than the other depending on the characteristics of the relationship.

American immigration policy developed in reflection of these general conditions. As the United States moved from an open borders policy to one of restriction certain immigrant characteristics took precedence over others in awarding immigrant visas. In particular, immigrant skill level and relationship to an American citizen became the most important determinants of who was granted entry. Clearly, kin-based admissions reflect some form of a strong tie as discussed previously. Immigration through skill-based visas most often occur through weak ties since, at least initially, the only aspect of strong ties between an employer and a potential immigrant employee is the reciprocal exchange of goods (i.e., sponsorship for labor). In addition to the three major immigrant acts passed since the 1920s, several smaller acts profoundly affected the distribution of visas to professional workers based on these two types of ties.

The 1952 Immigration and Nationality Act (widely known as the McCarran-Walter Act) made several important changes to immigration law as it had held since the 1920s. One feature of the Quota Laws of the 1920s which legislators retained in the 1952 law was the system of country quotas. Although the quota policy was modified slightly in 1952 to allow a token number of

entries from Asian countries it continued to prevent widespread Asian immigration. Given that the pioneering immigrants from very distant countries typically represent higher socioeconomic classes the quotas most likely prevented many highly skilled individuals from entering the United States.

On the other hand, the 1952 law introduced the first system of visa preferences. The new law set aside an unlimited number of visas for the spouses and unmarried minor children of citizens and distributed a restricted number of additional visas based on immigrant characteristics. Among the numerically limited visas fifty per cent of a country's quota were reserved for those highly skilled workers whose services were in short supply among the native labor force while another twenty per cent were set aside for the spouses and unmarried adult children of permanent resident aliens. Specific provisions were also introduced for other relatives of United States citizens (e.g., including parents and unmarried adult children) but assignment to these categories depended on under-subscription of the primary visas.

The McCarran-Walter Act therefore had significant implications for the availability of ties to immigrant sponsors. The preference system assured that two particular modes of entry gained prominence, each representing one of the two types of ties Granovetter described. Potential immigrants could either utilize their family connections (i.e., strong ties) to obtain a visa or find an employer willing to sponsor them under an occupational category (i.e., through a weak tie). The only readily available means to immigrate under the new law, therefore, were through the use of either family-based or occupation-based migrant networks.

The 1965 amendments to the Immigration and Nationality Act entailed a complete overhaul of immigration law. The country-based quota system was replaced with hemispheric ceilings: the law awarded 170,000 visas to individuals originating from eastern hemisphere

countries (with a 20,000 visa limit per country) on the basis of a newly revised preference system and 120,000 to persons from the western hemisphere on a first-come-first-served basis.[2]

The preference system as applied to the eastern hemisphere was also revised from its 1952 version and created some hindrances to employment-based immigration. The new system broke down the occupational provision into two separate categories; assigning only twenty per cent of all numerically restricted visas (i.e., 34,000 visas) on the basis of skill level and reduced the priority level for these visas from first to third and sixth. In addition, the law stipulated that the Department of Labor must ensure no immigrant worker would either replace an American worker or adversely affect the wages or working conditions of similarly employed individuals in the United States.[3]

The act continued to favor immediate relatives of U.S. citizens and permanent residents as immigrants but two basic changes to the preference system magnified this effect. First, the parents of U.S. citizens could now enter outside the numerical restrictions. Whereas by the 1952 law parental visas, along with visas awarded to unmarried adult children of citizens, were limited to thirty per cent of each country's quota, an unlimited number of visas were set aside for the parents of American citizens under the 1965 amendments. The new law also brought several new family relationships into the visa preference system including brothers and sisters and married children of U.S. citizens.

[2] In 1976, the Immigration and Nationality Act was further amended to bring the Western Hemisphere under the same system of preferences and applied the 20,000 per-country limit as had been in effect for the Eastern Hemisphere since 1965. In 1978 the separate ceilings for the Eastern and Western Hemispheres were combined into one worldwide limit of 290,000.

[3] The Eilberg Act was an amendment to the Immigration and Nationality Act which altered the Department of Labor requirements for occupational visas. The act introduced the requirement that third preference beneficiaries must obtain a job offer prior to immigrating and that potential employers, rather than the Department of Labor, would be required to provide proof of a labor shortage in their field before hiring an immigrant worker. Both of these provisions further increased the difficulty of obtaining sponsorship through an American employer.

The 1965 amendments also introduced provisions for refugees and certain special immigrants such as ministers of religion, which essentially added several new types of migrant networks into the immigration system, but the number of entries in these classes formed such a small percentage of total immigrants (e.g., only six percent of the numerically restricted visas went to refugees) that familial and occupational migrant networks retained their predominant position.[4]

A third general piece of legislation, passed in 1986, diminished the attractiveness of marriage as a form of family-based network. The Immigration Marriage Fraud Amendments sought to discourage the misuse of spousal visas through dubiously contracted marriages - those entered into solely for the purpose of immigrant sponsorship. The amendments require a two year waiting period before issuance of a spousal visa. During those years, the potential immigrant qualifies as a conditional permanent resident and at the end of the period, if the immigrant can provide evidence of an intact marriage or a sincere effort to maintain the marriage, they may petition to have the conditional status removed. Passage of the Marriage Fraud Amendments led to reduced reliance on one form of family tie as a means to immigrate and bolstered usage of other types of networks.

One final law, the Immigration Act of 1990, made the greatest impact on the availability and use of migrant networks by professional workers. More than any other act before it, the 1990 law clearly delineated the preference classes by the strength of social ties. Apart from the approximately 65,000 visas set aside for diversity immigrants[5] and asylees, the preference classes

[4] The increased issuance of non-immigrant visas, as well as the expansion of non-immigrant visa categories, introduces some complication into the basic network framework. Since many non-immigrants do not require sponsorship it is unclear which types of networks they utilize to gain information about the United States and about potential visas.

[5] The diversity program was initiated as a way to award visas to individuals from those countries "adversely affected by the 1965 Immigration and Nationality Act Amendments" (U.S. Immigration and Naturalization Service, 1997). A transition period from 1992 to 1994 reserved 40,000 visas for diversity immigrants - 40% of which were allocated to natives of Ireland. Once the program was permanently put in place in fiscal year 1995 the number of visas was increased to 55,000.

were formally divided into “Family-Sponsored” and “Employment-Based” preferences. The 1990 law increased the worldwide ceilings on immigration to 700,000 between fiscal year 1992 and 1994 and 675,000 beginning in fiscal year 1995. Although the family-sponsored preference categories remained the same as those in the 1965 amendments, the overall increase in the immigrant ceiling dramatically increased the absolute number of individuals entering through family ties.

The most significant change in the 1990 law as it applies to professionals, however, was the addition of three new occupational preference categories. The new employment-based visas provide immigrant opportunities to persons of exceptional ability, individuals willing to invest in businesses to provide employment opportunities and other “special immigrants.” Whereas under the 1965 law no more than 34,000 of all immigrant visas were awarded on the basis of skill, under the new law over 146,000 preference visas were set aside for employment-based entries. These changes led to a dramatic increase in the number and percentage of all immigrants entering through the sponsorship of potential employers.

Differential Usage of Migrant Networks by Occupation

The goals of the previous sections were to offer a more general definition of migrant networks and to outline how various legislative decisions altered the availability of various types of networks to a particular sub-population of immigrants - professional workers. In the discussion of the basic network model I pointed out that past studies of migrant networks suffered from a lack of generalizability due to the restrictive definition of migrant networks employed and the subsequent reliance on one particular class of immigrants as examples of the immigration process. This paper also considers only a subset of all immigrants (i.e., those entering the United

States with advanced degrees and/or very specialized skills) and, therefore, the findings are no more representative than previous case studies. However, similar types of analyses could be conducted for refugees or undocumented immigrants utilizing the same conceptualization of migrant networks.

There are reasons to suspect that the general impact of the legislative measures outlined above do not hold for every category of professional worker. Differences in the demographic characteristics of individuals typically employed in a particular profession may lead to differences in the use of networks. For example, the nursing profession has long been a field dominated by women. If differences exist between men and women in their use of network connections then legislative measures which alter the set of available visas will affect the nursing profession differently than a male dominated profession such as engineering.

Another obvious source of difference in network usage across professions has been the passage of legislation that specifically targets particular subgroups. For example, the Health Professions Educational Assistance Act of 1976 greatly curtailed immigration by foreign medical graduates (FMGs). The law restricted the entrance of FMGs in two ways. First, health professions were removed from the Department of Labor's Schedule A list of certified occupations which made the labor certification process more difficult.

Second, FMGs were thereafter required to pass two parts of a National Board of Medical Examiners' Test and prove their competency in written and oral English. The latter provision particularly affected those individuals entering the United States from "Third World" countries in which English is not an official language. With such specific barriers in place against the entry of foreign born physicians through occupational channels one would suspect that in the years following passage of the Health Professions Act use of family networks increased more

dramatically for physicians than for other professionals. In addition, after passage of the 1986 Marriage Fraud Act the number of entries by physicians would most likely have dropped substantially as the second viable means of entry was cut back.

Unlike physicians, foreign born nurses benefited from a labor shortage over the 1980s and 1990s. Several measures made it easier for nurses to qualify for employment visas or at least to gain entry through non-immigrant visa categories and later adjust to permanent resident status. Professional nurses have been listed on the Department of Labor's Schedule A since its inception making the labor certification process relatively hassle-free. In addition, the Immigration Nursing Relief Act, which passed in 1989, allowed certain qualified nurses to adjust from non-immigrant to permanent resident status without regard to numerical limit and established a new non-immigrant category to encourage further migration of registered nurses.

Finally, two acts passed in the fall of 1992 provided immigration benefits to two more groups of workers. The Chinese Student Protection Act allowed those nationals from the People's Republic of China who had been in the United States between June 4, 1989 and April 11, 1990, to adjust to permanent resident status under a special class of employment-based preferences. A second act, passed the following day, provided some of the same benefits to scientists from the independent states of the former Soviet Union and the Baltic States. The overall numerical impact of these acts was not substantial but highlights the special treatment which occasionally befalls particular occupational classes.

As these examples demonstrate, legislative measures may interact with demographic, political or economic conditions to alter the pattern of migration across sub-groups within a larger occupational class. Physicians have been clearly discouraged from immigrating to the United States through either of the two primary forms of migrant networks emphasized here while

legislation has encouraged nurses to utilize the employment networks available to them. In the analytic section of this paper these differences will be formally modeled and the following hypotheses tested:

H_1: Professionals utilize networks composed of both strong and weak ties.
H_2: The structure of professional networks changes over time.
H_3: Legislative changes which affect visa availability inadequately account for the changes across years.
H_4: Network structure differs depending on a variety of individual characteristics including immigrant status, occupation and sex.
H_5: The trends in network usage vary depending on a variety of individual, legislative and economic conditions.

DATA AND METHODS

Data Set Strengths and Weaknesses

This study utilizes the Public Use Files, *Immigrants Admitted to the United States*, of the Immigration and Naturalization Service (INS) for fiscal years 1972-1992[6] to examine use of networks among professionals. Most studies of networks utilize qualitative data collected through personal surveys. One reason for the predominance of this method is the fact that migration occurs as a process. By relying on quantitative data of immigrant admission it is possible to capture only one end of that process.

The ideal study design is the ethnosurvey (Massey 1987) which incorporates a variety of methods into a longitudinal design and studies the immigration process from both the sending and receiving areas. As Massey points out, the ethnosurvey provides "specialized information on the social processes that underlie the aggregate patterns revealed in national statistics" but "the financial and time costs of such a design rule it out for most applications" (1987: 1515). A follow-up to this analysis is planned which employs a personal survey to collect data from

[6] The analysis was limited to these years due to the fact that the INS did not produce the files until 1972 and because values for additional variables (e.g., the adjusted Gross Domestic Product measure) included in the analysis do not extend beyond the year 1992.

immigrant professionals. Combining data from the two analyses more closely approximates an ethnosurvey design but, without the opportunity to gather data in the country of origin,[7] the design still falls short of the ideal.

The Public Use files suffer from more specific weaknesses as well. First, they contain information only for individuals who have been admitted as immigrants to the United States. Non-immigrants, therefore, are represented only if they adjust from a non-immigrant to an immigrant visa. This weakness of the data set reflects the limitations of immigration-related data collection in the United States. Despite the fact, or possibly due to the fact, that non-immigrant admissions have increased from six million in 1975 to approximately 23 million in 1995 (U.S. Immigration and Naturalization Service, 1997) data on non-immigrant admissions are not recorded with the same degree of detail as they are for other classes of admission. For these reasons the INS data files omit several important variables pertaining to non-immigrants, including the number of previous entries and the classes of admission on prior stays, from their public use files.

A second set of shortcomings in the data particularly affects the present analysis and concerns the reporting of occupation. The number of immigrants reporting an occupation is extremely low in some years and the meaning of this designation depends on the class of entry. For those entering on an employment visa occupation refers to the job they will perform in the United States. On the other hand, for every other type of entry, occupation refers to the last job held in the immigrant's prior country of permanent residence. Another serious problem with the occupational designation concerns the coding of this variable across years. For the first ten years,

[7] To better understand the immigration process, a variety of data should ideally be collected in the sending country. Examples of such information include the following: 1) Why do networks break down or fail to develop for many individuals who wish to emigrate but do not?; 2) Where do potential immigrants find information regarding job opportunities in the destination country?; and 3) Which resources do potential immigrants call upon in their

the INS coded occupation according to the detailed occupation codes utilized by the United States' Census Bureau. In the following years, these categories were consolidated into twenty-five descriptive codes. Without information from the INS as to the procedure used to map the detailed codes into the 25 categories[8] it is impossible to be sure the data for physicians refers to the same population for the entire study period.

Finally, the INS data include missing cases on a number of variables for several years. For example, the FY 1979 file contains missing information for 10 variables on 22,680 records. Among the set of missing variables is sex of the respondent - a possibly important predictor of network usage across occupations. Unfortunately, little can be done to rectify this problem except to utilize as many cases as possible for which all factors of interest are available.

The Public Use files may suffer some serious drawbacks but for the purposes of this analysis are superior to other data sources. Most importantly, the data set covers the population of interest; immigrants admitted to the United States. The usual alternative sources, the United States Census of the Population and the Current Population Survey (CPS), do not distinguish among the various classes of immigrants. In these sources undocumented immigrants, legal immigrants and non-immigrants are all enumerated as "foreign born." In addition, the Census and CPS do not record the class of entry which would render it impossible to examine the use of networks among recent immigrants. Finally, the INS files are compiled annually over the fiscal year calendar[9] which enables more detailed analyses of longitudinal trends.

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attempt to emigrate? These are only some of the questions which, if answered, would provide a clearer image of network development and operation.

[8] I am aware of some attempts by other researchers to obtain this information from the INS but thus far the data has not yet been made available.

[9] In 1977 the time frame of the fiscal year was changed by the INS from July 1 through June 30 to October 10 through September 30. As a result, although each INS Public Use file contains twelve months worth of data, they do not cover the same months before 1976 and after 1977. In addition, July 1, 1976 through September 30, 1976 did not fall into either FY 1976 or FY 1977 so the period was designated a Transitional Quarter. For the purposes of this analysis the 1976 Transitional Quarter data were assigned to either FY 1976 or FY 1977 using a random number generator available in the STATA computational software.

Dependent and Independent Variables

The following analysis attempts to discern the impact of several major legislative decisions on the use of family versus occupational migrant networks among a subset of professional workers. In addition, this research examines the hypothesis that network usage differs according to a variety of individual characteristics including occupation, sex and visa status. Four professions were chosen for the study based on the large percentages of immigrants entering in each of the occupational categories over the period in question. According to data compiled from the 1990 United States Census, the following professions are among those with the highest percentage of foreign-born workers: engineering, the natural sciences and mathematics, nursing and medical sciences (Bouvier and Simcox, 1994).

Based on the discussion of migrant networks presented earlier the analysis is limited to those immigrants who chose to enter the United States through one of the two primary network ties (i.e., familial or occupational). The type of network utilized can be operationalized through the class of admission variable recorded in the INS files and then re-classified into a categorical variable in order to model the odds of choosing one type of visa over another. Entries made by the primary beneficiaries[10] of occupational visas were grouped together into a single category of "Employment-Based Admissions" and, in the interests of model simplicity, only those immigrants entering as spouses of U.S. citizens were included in the category of "Family-Based Admission."[11]

[10] For most visa classes entries fall into one of two categories: primary beneficiaries are those aliens "on whose behalf the visa or petition is directly filed" while derivative beneficiaries include the "spouse(s) or child(ren) of the principal beneficiary" (Papademetriou and Yale-Loehr, 1996: 39). All derivative beneficiaries were excluded from this analysis.

[11] Including other types of familial relationships into the category of family based admissions would require calculation of the probability that a particular immigrant already has relatives living as permanent residents or citizens of the United States. The intention of this analysis was to model network usage as a choice between comparable alternatives. A different set of assumptions and models would be necessary to compare those immigrants with relatives already resident in the United States with those lacking such contacts. For these reasons, only spousal visas were considered and spousal and employment visas were treated as comparable and

The dependent variable is therefore a dichotomous variable taking on the value one if the immigrant arrived on an employment visa and zero if they entered through a spousal visa.

As noted earlier, non-immigrants frequently take very complex routes to enter the United States. In some cases, the same individual may enter on a different non-immigrant visa several times in the same year before eventually obtaining an immigrant visa. In other cases, the alien may receive a long term non-immigrant visa (e.g., F1 student visa or J1 exchange worker visa), remain in the U.S. for the duration of their visa and then adjust their status to permanent resident. Although it is impossible to distinguish between these various routes it is possible to examine the transition of non-immigrants to immigrant status based on their last non-immigrant visa. Given the greater predominance of employment-based criteria among non-immigrant visas the variable, Status, representing this dichotomy should show a positive relationship to the dependent variable.

The independent variables included in the analysis fall under three general headings: legislation, individual characteristics and economic conditions. The legislative measures include most of those discussed in the previous section of the paper. Since the data set begins in the year 1972 the 1952 Immigration and Nationality Act and 1965 Amendments are excluded. For the remaining laws a dichotomous indicator is used to identify those years before and after the law went into effect.[12]

The Marriage Fraud Act, the Nursing Relief Act and the Immigration Act of 1990 are all expected to exhibit a positive relationship with the odds of entering under an employment visa. As marital visas became more difficult to obtain potential migrants would most likely turn to other visa categories which would lead to an increase in the number seeking entry through occupational skills. Both the Nursing Relief Act and the Immigration Act introduced new categories of

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competing alternatives (i.e., in theory, an individual wishing to emigrate could choose among either all potential spouses in the destination country or among all potential employers).

admission and eased entry through employment-based categories, therefore, after their passage there should be some increase in entrance through these visas.

Passage of the Health Professions Act and the INA amendments would most likely lead to reductions in employment certification since they both limit the number of entries for previously unrestricted classes of entry (i.e., physicians and immigrants from the Western hemisphere). In addition, although combining the hemispheric ceiling led to an increase in the percentage of all visas awarded on the basis of occupational skills,[13] it was not enough to offset the increase in number of entries among spousal visas. Therefore, both laws should exhibit a negative relationship to the odds of entry under employment categories.

As alluded to earlier only those individuals reporting their occupation as a physician, nurse, engineer (including all sub-fields but excluding engineering technicians) and scientist (broadly defined to include all natural scientists, computer scientists and mathematicians) are included in the analysis. Occupation is also coded as a set of dummy variables contrasting each occupational category with the remaining three. Physicians are expected to exhibit the lowest odds of entry through occupational preferences with nurses occupying the opposite extreme. The odds of employment-based entry among engineers and scientists should fall somewhere between these two extremes with engineers slightly more likely to obtain occupational visas.

Immigrant's sex is also included as a dichotomous variable with the value one representing males and zero females. In general men utilize formal network ties to a greater extent than women and until recently, males dominated the flow of immigrants across the United States' borders. For these reasons more men than women are expected to gain entry through

[12]The effective date of the law was used rather than the year of the law's passage since in some cases the effective date falls several years after the passage date.

[13] Under the old system a total of 290,000 visas were awarded worldwide. Employment visas were limited to 20% of the visas for the Eastern Hemisphere (i.e., 20% of 170,000 or 34,000 visas). But 34,000 is only 8.53% of

employment preferences which would suggest a positive relationship between the odds of entering through employment categories and immigrant sex.

The analysis considered only those immigrants between the ages of 21 and 65. Although individuals reporting the relevant occupations may obtain visas at younger or later ages the intention was to develop a model which would identify class of entry as a choice on the part of a potential migrant. Very few immigrants entered under one of these occupational titles outside this age span and since these years are considered to be the prime working ages, 21 and 65 appeared to be reasonable cutoffs. With respect to the relationship to the dependent variable one would expect the odds of employment-based entry to increase relative to spousal entries as age increases. Past a certain age, a majority of immigrants are married. In addition, many of the employment-based visas require specialized skills and a great deal of effort on the part of sponsors - both of which would favor older, more mature employees. For these reasons, the odds of employment entry are expected to increase with age. To test for possible non-linear effects of age (i.e., greater odds of employment entry at the middle age range), age was squared and also included in the equations.

In addition to limiting the analysis by age and occupation, only selected countries were retained in the data set. Forty-seven countries were chosen based upon the number of immigrants admitted over a ten-year period in all of the occupational categories combined. Truncation of the data set was necessary for two reasons. First, economic variables pertaining to the country of origin were unavailable for several countries. Second, a vast number of countries sent very few immigrants to the United States under any of the four occupational categories. For these underrepresented countries estimates of economic influences would be unreliable.

290,000. After combining the hemispheric ceilings and placing the Western Hemisphere under the same set of visa restrictions, 58,000 visas could be awarded on the basis of employment (20% of the full 290,000 visas).

Three measures representing economic conditions were included in the analysis. Two measures gauge the impact of the state of the sending country's economy while the other provides some indication of the economic conditions facing immigrants to the United States. The first measure is the price adjusted Gross Domestic Product (P) obtained from the Penn World Table (Mark 5.6) compiled by Summers and Heston (see Summers and Heston, 1991, for a fuller description of this data set). The measure, P, provides a value of the "purchase power parity of each country's currency relative to the United States dollar ... as a percentage of the country's U.S. dollar exchange rate" (Summers and Heston, 1991: 347). A high value for P would suggest a lower probability of immigration through employment visas since the purchasing power of an individual's income would be comparable or superior to someone employed in the same occupation in the United States.

The second variable is the population in the respondent's country of birth. Population pressure is often cited as one motivation for immigration. Competition for jobs, overcrowding in cities and other socioeconomic pressures lead some people to search for opportunities abroad. However, it is unclear without further information whether these choices reflect primarily a hope for improved job prospects or social betterment. In the former case, the immigrant would most likely choose to immigrate through employment networks while in the latter stronger ties would most likely predominate. As such, population is included as a regressor in the equations but with an uncertain relationship to the dependent variable.

Finally, the third measure, the average annual United States' unemployment rate for professional workers as determined by the Bureau of Labor Statistics (Statistical Abstract of the United States, various years), should display a negative relationship to the odds of entering through occupational preferences. If employment prospects are low in the destination country

then it will be difficult for immigrants to qualify for occupational visas. If unemployment rates are high immigrants will be forced to compete with native workers for jobs - violating the stipulations of the Department of Labor's certification requirements. A list of descriptive statistics for relevant variables appears in Table 1 while the full set of independent variables, their coding scheme and expected relationship to the dependent variable are summarized in Table 2.

Model Estimation

The analysis examines two of the four components of networks as identified in previous sections of the paper: structure and change over time. Structure is studied through comparison of two types of networks, spousal and occupational, based on strong and weak ties, respectively. Differences in usage of employment and spousal visas provides some evidence of how network structures develop across a variety of circumstances. Using data for Fiscal Year (FY) 1972 through FY 1992 provides some indication of how these structures change over time. Without more detailed personal information on recent immigrants (unavailable in the INS files) little can be said regarding the role of resources or norms in network formation for the purposes of this analysis.

A series of logistic models, based on the following general equation, were run to examine longitudinal trends in the odds of entering the United States through an employment visa versus a spousal visa and to assess the impact of legislation, personal characteristics and economic conditions on those odds:

$$\log(\text{Employment Entry/Spousal Entry}) = Y_i = a_i + B_i X_i + e_i$$

(where X_i is a matrix containing the set of independent variables included in the analysis). The first two models provide evidence of the yearly trends in visa usage for all newly admitted

immigrants. One model presents the findings on a yearly basis while the second adds controls for the legislative measures. The second pair of models first tests for the significance of immigrant status as a predictor of visa usage and then compares yearly tends for immigrants and non-immigrants. A third set of equations examines the role of occupation and sex (and explores likely interactions) on the odds of employment visa utilization. Finally, the full set of independent variables is included with year dummies to assess the significance of various predictors on the structure of immigrant networks over time.

Results and Test of Hypotheses

H_1: Professionals utilize networks composed of both strong and weak ties: Table 1 provides descriptive statistics for relevant independent variables. Comparing the percentage of newly admitted immigrations utilizing spousal versus employment visas provides some evidence in favor of the first hypothesis. Although not a formal test, the results suggest that a much larger percentage of recent immigrants from among the chosen professional occupations enter through employment sponsorship than through spousal visas. This suggests that previous conceptualizations of migrant networks which emphasized strong ties do not necessarily apply to the case of immigrant professionals. The networks these professionals utilize appear much more complex than previous scholars implicitly suggest. Examining the results from additional models may offer further evidence in favor of this hypothesis.

H_2: The structure of professional networks changes over time: Table 3 reports the results of the model describing annual trends in the odds of visa usage across the study period. The bold faced, italicized dates reflect years in which one of the major pieces of legislation went into effect. Declines in the odds of employment-based entry were expected for 1978 and 1979,

the years that the Health Professions Act and the 20,000 visa country limit of the Immigration and Nationality Act and the INA amendments to combine the hemispheric ceilings went into effect, respectively. Although some decline is in evidence it appears to be a continuation of a trend begun in 1977. It is possible that preparation for the new laws preceded their passage such that a trend toward decreasing reliance on employment sponsorship started before the law took effect although it is impossible to verify this effect with the available data. A follow-up on this idea will be considered during the sample survey phase of the research.

A much clearer outcome is the dramatic increase in the odds of spousal entry relative to employment entry in 1988 after passage of the Marriage Fraud Act of 1986. The results for 1987 suggest that the legislative change had started to influence visa usage but the full effect was delayed for another year. Clearly, the odds ratios suggest that by limiting the availability of spousal sponsorship immigrants were forced to rely more upon potential employers or other types of visas. The change in trend was bolstered through passage of Nursing Relief Act in 1989 but did not begin to falter again until passage of the 1990 Immigration Act. These findings lend fairly convincing support to the second hypothesis of shifting trends in network usage over time.

H_3: Legislative changes which affect visa availability inadequately account for the changes across years: Table 4 presents the yearly trends once legislative measures have been taken into consideration. Several points deem special emphasis. First, the relationship between each legislative decision and the odds of entry through employment visas fit the expected patterns as outlined in Table 2. The passage of the Health Professions Act and the INA Amendments exhibit a negative relationship to the odds of employment sponsorship while the remaining three laws show a positive relationship.

The impact of the laws can be seen in the individual effects of each piece of legislation as well as in the annual trend. Comparing tables 3 and 4 elucidates this point. The odds ratios for FY 1973 through 1975 do not change between the two tables. This is to be expected since none of the laws took effect until FY 1977 at the earliest. However, the odds ratios for FY 1977 through 1985 show a marked increase once legislative controls are added. Similarly, the odds for FY 1987 through 1992 exhibit a general downturn. Given that the laws in effect until 1985 were expected to be negatively related to the odds of employment entry while the laws introduced after 1986 were assumed to have the opposite effect, adding controls for these measures would tend to increase the odds of employment entry prior to 1986 and decrease the odds following that year. These are exactly the trends indicated in tables 3 and 4.

A test of significance comparing the two models indicates that adding legislative controls significantly improves model fit. The test compares log likelihood values (when multiplied by -2) for nested models and amounts to a chi-squared test with degrees of freedom equal to the difference in number of regressors in the models. The difference in -2 log likelihood values in the models depicted in Tables 3 and 4 equals 7.278 which, for a chi-square with one degree of freedom[14] is significant at $p < 0.01$. Rejecting the null hypothesis in this case suggests that addition of legislative measures significantly improves the fit of the model.

With respect to the third hypothesis that the annual trends in the odds of employment entry are due in part, but not wholly, to the passage of several legislative measures which at times hindered employment sponsorship but at other times encouraged it, the evidence appears favorable. Although the odds ratios in nearly every year moved towards the value one, a majority of the years remained significantly different from one indicating that some additional factors

[14] The model of annual trends which incorporates legislative measures should have 25 degrees of freedom. However, due to problems with collinearity, four dummy variables were dropped from the equation. Hence, the legislative model contained only 21 regressors and, therefore, 21 degrees of freedom.

influenced the yearly trend in visa usage. This point will be addressed again at a later stage of the analysis.

H_4: Network structure differs depending on a variety of individual characteristics including immigrant status, occupation and sex: Examining first the effect of immigrant status we find that significant differences exist in the odds of employment entry between immigrants and non-immigrants. Table 5 provides the odds ratio estimated with respect to the variable Status. The results indicate that non-immigrants are far more likely to be admitted as immigrants under occupation-based criteria than are new arrivals. Given that many of the non-immigrant visas available are offered on the basis of job skills, especially among highly skilled workers, the most common route to permanent resident status appears to be through sponsorship of an employer whereby the non-immigrant is retained as an employee through adjustment to an immigrant visa.

Table 6 compares the annual trends in the odds of employment entry broken down by immigrant status. Two interesting points arise. First, in every year after 1975, non-immigrants show greater odds of admission through employment categories than do their immigrant counterparts. Second, the trend observed in Table 3 for the years 1988 through 1992 appears largely due to the impact of non-immigrant admissions. As Table 3 showed, from 1988 until the end of the period under consideration, the odds of entering through employment sponsorship increased dramatically and for the first time exceeded the odds of entry through spousal sponsorship. Although the odds of employment admission increase for both immigrants and non-immigrants starting in 1988, the trend is overwhelmingly more apparent among non-immigrants. The results reported in both tables therefore appear to confirm the hypothesis that immigrant status is an important predictor of network utilization among the professional occupations considered.

Unlike previous analyses of migrant networks, this study examines the structure of networks not only within a broad occupational class (i.e., professional workers) but between members of various professions. The assumption is that various factors influencing occupational distribution also lead to differences in the use of networks. As indicated in Table 7a, there is reason to believe that the networks among various professional workers do vary. The odds ratios suggest that, when compared to the patterns observed for scientists, physicians and nurses experience greater odds of reliance on spousal sponsorship while engineers appear to rely on employers to the same extent as scientists.

Comparing the odds across sexes suggests that men are far more likely to utilize employer sponsorship than are women. As indicated in Table 7b, men are one and one-half times more likely to enter through occupational visas than women. These results conform to expectations but leave the findings somewhat in doubt. In all four of the occupations considered large differences exist with respect to the sex distribution. Among physicians and scientists approximately 22% of immigrants admitted are women whereas 95% of the nurses in the data set are women. At the other extreme, women comprise only 6% of the population of engineers. The differences by occupation and sex observed in Tables 7a and 7b may, therefore, be a product of the interaction between these two characteristics.

Table 7c reports the results of a model which examines possible interactions between sex and occupation on the odds of entering the United States through an occupational visa as opposed to a spousal visa. The data indicate that even after controlling for sex distribution, doctors are less likely to utilize weak ties to employers than are members of the other professions. The singling out of immigrant physicians through various pieces of legislation and licensing requirements, as discussed in a previous section, apparently has taken a toll on the ability of

doctors to enter the United States based on their job skills. In addition, taking into account the interaction of sex and occupation actually led to an increase in the odds of employment sponsorship of men compared to women.

A test of the significance of these models indicates that adding interactions between sex and occupation to the individual equations improves the fit of these models considerably. The difference in -2 log likelihood values between the occupation model and the model including sex and the relevant interactions terms equals 969.206 while the difference between the model for sex and that including interactions amounts to 921.866. With degrees of freedom of four and six respectively, the more complex model significantly improves the fit over the more basic equations. Based on the findings in Tables 5 though 7c, it appears that a variety of individual factors influence the structure of professionals' networks besides the nature of the legal environment which potential immigrants face.

H_5: The trends in network usage vary depending on a variety of individual, legislative and economic conditions: The final model under consideration depicts the trend in visa usage over the study period after controlling for the full set of independent variables, including economic conditions in the sending and receiving societies. Although the set of economic measures is quite limited they are suggestive of the role which economic circumstances play. In further research into this topic some data collection in the sending countries could provide additional insight into the role of economics on the structure of immigrant networks.

Comparison of Tables 3, 4 and 8 suggests that a variety of factors other than simply the passage of significant legislation affect the odds of entering through employment sponsorship between 1972 and 1992. Between 1979, when the INA amendments first took effect, and 1986, when the Marriage Fraud Act passed, the odds originally favored entry through spousal visas.

After introducing controls for the various sets of factors under consideration, this trend reverses such that employment entry appears more likely. For a majority of the remaining years, the individual, economic and legislative measures introduced appear to account for any differences in the odds of network utilization.

The individual and economic factors included in this model confirm expectations of their relationship to the odds of entering through an employment versus a spousal visa. Advancing age does increase the odds of securing an employment visa while high unemployment rates in the destination country and a high price adjusted gross domestic product suppress those odds. The odds ratios for the age-squared term and population suggest a lack of non-linearity with respect to age and that a large population base in the sending country favors neither employment-based nor spousal-based entries.

Finally, reconsidering the third hypothesis, the improvement in model fit between the models described in Tables 3, 4 and 8 suggests that many factors besides legislative conditions affect the availability and use of networks by professionals. The same chi-squared test of nested models indicates an improvement in the test statistic between the legislative and full effects models of 24, 333.466 which with 12 degrees of freedom is highly significant. These results serve to confirm the significance of a large number of factors on the odds of immigrant entry through strong and weak network ties.

DISCUSSION AND CONCLUSIONS

Theoretically, this paper sought to clarify the concept of migrant networks. As noted in the introductory sections past studies of migrant ties have been constrained to particular countries of origin, socioeconomic classes and specific modes of entry. Use of the case study offers

important insights into the process of immigration but cannot capture the complexity of the phenomenon. Researchers either must expand the number and variety of case studies performed or utilize other research methods in order to develop a more representative concept of immigration and its underlying structure. To these ends, the present research will be extended to incorporate additional quantitative analysis and sample survey methods. The ultimate aim is for a simplified version of the ethnosurvey approach; one that examines the problem using a variety of techniques from several fields including sociology, survey research and demography.

The current analysis was designed to address two primary questions: 1) Are there differences in the structure of networks among immigrant professionals? and 2) Does the structure of these networks change over time? The results from logistic regression models suggest that the answer to both question is "yes." Operationalizing employment migrant networks and family migrant networks using entries through occupational preferences and visas for citizens' spouses, the analysis offers evidence that different types of networks exist across professions and that a variety of conditions affect the structure of these networks over time.

According to the regression results the most realistic way to conceptualize immigrant networking is as a process highly dependent on the circumstances of particular groups and circumstantial conditions. In an attempt to draw generalized conclusions researchers often oversimplify the process they hope to explain. An overly high degree of specificity may not be attractive to the sociologist but this does not mean that researchers should ignore very obvious distinctions in the way a process operates. The evidence most clearly supports a need for further study into differences in network usage across occupations, between the sexes and by mode of entry to immigrant status. As this study develops it will incorporate techniques to search for

possible changes in immigration patterns over time and methods for identifying cohesive groups which experience the immigration process in similar ways.

In addition to the preceding, this research suggests several additional questions worth consideration and study. First, do all employment (i.e., weak tie) entries eventually become strong tie migrant networks? Visas granted through employment principals are awarded to two different types of immigrants: the principal beneficiary and derivative beneficiaries. Among principal beneficiaries, those persons immigrating through employment sponsorship may sponsor relatives in large numbers within or outside the preference system thereby creating a family-based migration stream from what was once a weak tie network.

It is not impossible to imagine situations in which weak ties continue to predominate in a migration stream. If a company hires an Indian engineer and particularly like the skills and training of their employee they may decide to hire another individual trained in the same institution. A strong tie may develop through the employer and the particular institution from which they recruit but the ties between employers and employees remain essentially weak in nature. One can envision ways in which this process continues but then the network may take on other identifying characteristics which may or may not alter its basic structure.

A second, more fundamental question is how do networks differ between those initiated by an employment visa and those by a family visa? Even if the process of migration changes in the ways suggested above it becomes important to identify both the short run and long term differences in network operation. Weak tie migrant networks may be more selective of higher socioeconomic status persons than strong tie migrant networks or vice versa. Assortative mating, for example, may ensure similarity in socioeconomic status between spouses but this correlation may dissipate as a migration chain develops. One of the most discussed aspects of immigration in

policy rhetoric is whether or not the skills of immigrants have declined over the years. Understanding the operation of both weak and strong tie networks may aid in predicting and understanding these outcomes.

The conceptual model of network development set forth in the introductory section provides much scope for further study of these and many other issues. The analysis developed its evidence from a very specific set of immigrants but offers intriguing clues as to the various ways that migrant networks develop and operate over time. In addition to limiting the analysis to particular occupational groups, the study also focused on a small sub-set of modes of entry. With time, the study can be expanded to cover a much broader range of topics, immigrant groups, visa types and individual circumstances. The analytic results clearly confirm the need for a flexible model of network development, one that adequately accounts for the broad patterns which result from so complex a process.

Table 1: Descriptive Statistics for Relevant Independent Variables

Variable	Number	Percentage
Visa		
Spousal	47,591	28.09%
Occupational	121,829	71.91%
Status		
Immigrants	76,469	45.14%
Non-Immigrants	92,951	54.86%
Sex		
Males	106,354	62.79%
Females	63,035	37.21%
Occupation		
Doctors	24,034	14.19%
Nurses	49,977	29.50%
Engineers	68,981	40.72%
Scientists	26,428	15.60%
Mean Age	34 Years	NA
Total	**169,420**	**100%**

Table 2: Description of Variables and their Relationship to the Odds of Entering Through an Employment Visa

VARIABLE	DESCRIPTION AND CODING SCHEME	EXPECTED RELATIONSHIP TO DEPENDENT VARIABLE
Dependent Variable	Log odds of entering through an employment visa versus a spousal visa; 0 = spousal visa, 1 = employment visa	NA
Independent Variables		
Legislative		
FMGINA	Passage of Health Professions Act (FMG) and 20,000 Country Limit (INA) 0 if year <= 1977, 1 if year >= 1978	Negative
INAWorld	Passage of INA Amendments to Combine Hemispheric Ceilings; 0 if year <= 1978, 1 if year >= 1979	Negative
Marriage	Passage of Marriage Fraud Act 0 if year <= 1985, 1 if year >= 1986	Positive
RNRelief	Passage of Nursing Relief Act 0 if year <= 1988, 1 if year >= 1989	Positive
IMMMISC	Passage of Immigration Act and other Miscellaneous Acts; 0 if year <= 1991, 1 if year >= 1992	Positive
Individual Characteristics		
Age	Continuous Variable with Possible Values 21 - 65	Positive
Sex	Dichotomous Variable; 0 = Female, 1 = Male	Positive
Status	Immigrant Status; 0 = Immigrants, 1 = Non-Immigrants	Positive
Economic		
Unemp[a]	Continuous Variable Defining the Average Annual Unemployment Rate in the United States for Civilian Professionals Aged 16 and Older	Negative
POP	Continuous Variable Designating the Population in Country of Birth	Unclear
PGDP[b]	Country-Specific Gross Domestic Product Adjusted by the Country's Currency Exchange Rate with the United States	Negative

Source: *Statistical Yearbook of the Immigration and Naturalization Service, 1972-1992*;
a - *Statistical Abstract of the United States, Various Years*;
b - Summers and Heston's Penn World Data (Mark 6.5) (1991)

Table 3: Annual Trends in the Odds of Employment Entry, FY 1972 - 1992

Year	Odds Ratio
1972	Comparison Year
1973	0.6991**
1974	0.7939**
1975	1.0407
1976	0.8645**
1977	0.5710**
1978	0.4312**
1979	0.4009**
1980	0.4305**
1981	0.4395**
1982	0.5019**
1983	0.3882**
1984	0.3856**
1985	0.3505**
1986	0.3470**
1987	0.9489
1988	1.3051**
1989	1.4168**
1990	1.2281**
1991	1.3803**
1992	1.0298
-2 Log Likelihood	**193,540.39**

Highlighted dates indicate years of legislative changes.

* - Significant at the 0.05 level ** - Significant at the 0.01 level

Table 4: Annual Trend in Odds of Employment Entry Controlling for Legislative Factors, FY 1972 - 1992

Variable	Odds Ratio
1972	Comparison Year
1973	0.6991**
1974	0.7939**
1975	1.0407
1976	0.8747**
1977	0.6835**
1978	0.5225**
1979	0.9314
1980	NA
1981	1.0210
1982	1.1660**
1983	0.9019**
1984	0.8958**
1985	0.8142**
1986	0.8060**
1987	NA
1988	1.3754**
1989	1.1536**
1990	NA
1991	1.1240*
1992	0.8386**
FMGINA	0.8252**
INAWorld	0.5216**
RNRelief	1.2942**
Marriage	2.2044**
IMMMISC	NA
-2 Log Likelihood	**193,533.11**

* - Significant at the 0.05 level ** - Significant at the 0.01 level

NA - Variable dropped out due to collinearity.

Table 5: Odds of Employment Entry by Immigrant Status

Variable	Odds Ratio
Status	1.4965**
-2 Log Likelihood	**199,823.42**

* - Significant at the 0.05 level ** - Significant at the 0.01 level

Table 6: Annual Trend in Odds of Employment Entry by Status, FY 1972 - 1992

Year	Odds Ratio	
	New Arrivals	**Status Adjusters**
1972	Comparison Year	Comparison Year
1973	0.8000**	0.5685**
1974	0.8578**	0.6803**
1975	1.0687	0.9732
1976	0.8193**	0.9198
1977	0.4859**	0.6906**
1978	0.3213**	0.5283**
1979	0.3155**	0.4967**
1980	0.3562**	0.4903**
1981	0.3228**	0.6036**
1982	0.3184**	0.6725**
1983	0.2625**	0.5113**
1984	0.2875**	0.4730**
1985	0.2393**	0.4607**
1986	0.2566**	0.4431**
1987	0.6804**	1.3606**
1988	0.8718*	1.9499**
1989	0.8446**	2.4215**
1990	0.7656**	2.2689**
1991	0.8507**	2.6365**
1992	0.4170**	1.7765**
-2 Log Likelihood	**92,141.56**	**97,952.50**

Highlighted dates indicate years of legislative changes.

* - Significant at the 0.05 level ** - Significant at the 0.01 level

Table 7a: Odds of Employment Entry by Sex

Variable	Odds Ratio
Sex	1.5575**
-2 Log Likelihood	**199,576.94**

* - Significant at the 0.05 level ** - Significant at the 0.01 level

Table 7b: Odds of Employment Entry by Occupation

Variable	Odds Ratio
DOC	0.6356**
NUR	0.6683**
ENG	1.0155
-2 Log Likelihood	**199,624.28**

* - Significant at the 0.05 level ** - Significant at the 0.01 level

Table 7c: Odds of Employment Entry by Sex and Occupation

Variable	Odds Ratio
Sex	1.6145**
DOC	0.5180**
NUR	0.9650
ENG	0.9458
Male DOC	1.3121**
Male NUR	0.5844**
Male ENG	0.9890
-2 Log Likelihood	**198,655.07**

* - Significant at the 0.05 level ** - Significant at the 0.01 level

Table 8: Annual Trend in Odds of Employment Entry Controlling for Individual Characteristics, Economic Conditions and Legislative Factors

Year	Odds Ratio
1972	Comparison Year
1973	0.7722**
1974	0.9505
1975	1.1252
1976	0.8756*
1977	0.6390**
1978	0.4194**
1979	1.2249**
1980	NA
1981	1.1610**
1982	1.5383**
1983	1.2938**
1984	1.1016*
1985	0.8900**
1986	0.9556
1987	0.7694**
1988	NA
1989	NA
1990	0.9748
1991	NA
1992	0.6788**
FMGINA	0.8125**
INAWorld	0.3246**
RNRelief	1.0125
Marriage	2.9004**
IMMMISC	NA
Sex	1.3903**
Age	1.3652**
AgeSq	0.9967**
Status	1.5054**
Unemp	0.8037**
POP	1.0000**
PGDP	0.9945**
DOC	0.4470**
NUR	1.1069**
ENG	0.9668
Male DOC	1.4132**
Male NUR	0.6514**
Male ENG	1.0441
-2 Log Likelihood	**169,199.64**

* - Significant at 0.05 ** - Significant at 0.01 NA – Variable dropped out due to collinearity

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