

Towards less segregation?

A study of women's occupational mobility in the U.S.
labor market.

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*A mis padres, que siempre me harán falta,
con todo mi amor y mi admiración.*

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Abstract

This dissertation seeks to expand and refine our understanding of sex-segregation in the labor market. The rapid changes in women's roles that have taken place in recent decades have made traditional explanations incapable of accounting for current patterns of mobility in the labor market, and the persistence of sex-segregation in modern times. Throughout this dissertation I draw on a wide variety of sources and research methods to examine the striking movement of women out of male-dominated occupations in the U.S. There is an important conundrum to unravel, as less attrition of women from male-dominated occupations would mean more progress was being made toward the integration of men and women in the workplace. Results indicate the emergence of new line of demarcation between women; whereas a minority of women tend to plan their job careers more efficiently in a similar way to men, low-status women continue to have unstructured career patterns.

Resumen

Esta tesis busca ampliar y refinar nuestra comprensión sobre la segregación de género en el mercado laboral. Dados los recientes cambios en los roles de las mujeres, las explicaciones tradicionales son insuficientes para explicar los actuales patrones de movilidad y la persistencia de segregación en el mercado de trabajo. A lo largo de esta tesis, se emplea una variedad de fuentes y métodos de investigación para examinar la cuantiosa salida de mujeres de ocupaciones mayoritariamente masculinas en los EE.UU. Este es un dilema importante que desentrañar, ya que reducir el número de mujeres que salen de ocupaciones típicamente masculinas significaría progresar hacia la integración de hombres y mujeres en el lugar de trabajo. Los resultados indican la aparición de una nueva línea de demarcación entre las mujeres; mientras una minoría tiende a planificar sus carreras de trabajo de manera eficiente, similar a los hombres, las mujeres en ocupaciones de bajo estatus continúan desarrollando carreras desestructuradas.

Preface

This dissertation seeks to expand and refine our understanding of sex-segregation in the labor market. By sex-segregation I mean the tendency of men and women to be employed in different occupations. Or to be more specific, men's propensity to do "men's work" and women's propensity to do "women's work".

Sex-segregation has been extensively studied. When Gross (1968) and Oppenheimer (1968) almost simultaneously argued that "sexual segregation" was one of the most striking sources of inequality in the labor market, a fruitful line of study was born. Several academic disciplines have sought to understand men's and women's distribution in the job market, with interest being spurred on by new legislation. These legislative changes aimed at: achieving equal opportunities, inclusive education, and greater equality between the sexes; and was matched by rising participation rates of women in the labor force. However, none of these changes or interventions has delivered equality between men and women in the labor force. The index of dissimilarity¹ in the USA still has a value over 0.5 in 2007, meaning that over 50% of women currently working would have to change their jobs in order to have a distribution equal to men.

¹ Duncan and Duncan 1955

This rather negative scenario does not in any way mean that improvements have not been made. Among the most noteworthy examples of positive change in the last few decades might be the significant increase of women in management positions. Women have progressively been able to enter male dominated occupations to a greater extent than ever before. However, it is still true to say that female workers continue to face barriers in ‘typical male occupations’ and women continue to be concentrated in a limited number of ‘typical female occupations’, working part-time and seeing their careers truncated. To sum up, gender equality at work is still much more a theoretical ideal, rather an actual fact.

Rapid societal changes in recent decades have shown traditional explanations to be incapable of accounting for current patterns of mobility and the persistence of the segregation of women’s roles, both at home and at work. The vast majority of the literature in this field has been concerned with what has been called a ‘self-selection process’ to explain the gender typicality of occupations². On the one hand, human capital scholars have emphasized women’s rational self-selection into female-dominated occupations to explain segregation (see for example Mincer and Polacheck 1974). The argument is that returns on job specialization are linked to tenure, and that employees must remain in their firm in order to recoup their investments in training. Thus, rational employees anticipating a discontinuous career will avoid incurring such specialized

² A full review of the main literature on sex-segregation is presented in Chapter One.

investments. The same rationale holds for employers, who will be unwilling to invest in employees who are likely to quit their jobs (Breen 1997; Sorensen 2000; Polavieja 2008). As women are expected to have a less regular pattern of labor force participation (given the distribution of childcare and domestic tasks), they will be less willing to incur additional investment costs and will of their own volition self-select themselves into occupations with relatively high starting pay, relatively low returns to work experience and relatively low penalties for temporary withdrawal from the labor force (Mincer and Polacheck 1974). In parallel, time-demanding jobs, requiring a high level investment in specific skills, experience and on-the-job training, will be more likely to be offered to men. On the other hand, socio-cultural theories are mainly concerned with non-labor market variables which economists take as given. Conversely to neo-classical thought, sociologists stress the effect of early socialization in channeling men and women into sex-typical occupations. The basic premise behind the gender socialization approach is that sex-role differences acquired through the socialization processes (especially primary), result in differences that sexes develop before reaching adulthood (Reskin 1993; Marini and Brinton 1984). Gender stereotypes learned during childhood are later carried over into the labor market, pushing men and women to self-select themselves into sex-typical jobs (England et al. 1994). A segregated labor market, it is argued, is a result of these processes.

An alternative approach to these traditional theories posits that sex segregation is maintained by a lifelong system of social control.

Social control theory argues that rather than a central institutional structure that maintains sex segregation in the long term, there is a social control system that operates at each stage of life. Thus, sex-segregation derives from differences acquired during primary and secondary socialization, but also from gender tracking in the educational systems and sex-linked social control at the workplace, both at the hiring stage and beyond (Jacobs 1989). In 1989, Jacobs's outstanding work "Revolving Doors" showed that, using U.S. data from the 1970s and early 1980s, these decades represented a period of significant net movement by women into male-dominated fields. However, they also saw substantial movement out of, or attrition from, male-dominated occupations, which reproduced the overall level of sex segregation despite the fact that the mobility pattern was bringing more women into male-dominated occupations.

Jacob's findings posed a major challenge to the theories predominant at the time. They challenged the logic offered by the socialization approach, as occupational changes were evident across all age groups, and were not only characteristic of the youngest female cohorts. The author argued that while sex-role socialization is important in beginning the dynamics of sex segregation, it is not sufficient to maintain this system in itself. In Jacob's own words, socialization is not a 'straight jacket', since individuals move extensively after their initial choices have been formed. Neither are the individual or aggregate changes observed consistent with an economic explanation of sex-segregation. First, high levels of career mobility between male and female-dominated occupations are

inconsistent with the emphasis on the maximization of lifetime earnings that is defended by economic theorists. Moreover, the quick reaction of women to the opportunities provided by the weakening of discriminatory barriers -women moved into male-dominated occupations as opportunities expanded- is hard to reconcile with the rationale that women's pursuit of female-dominated occupations represent the rational pursuit of individual self-interest over their lifetimes. The social control theory of sex segregation, on the other hand, can account for extensive sex-type mobility because it recognizes a variety of stages in the career development process. Women will face different obstacles at different points, it is argued, and while they are like to overcome some of those barriers, they are bound to fail at others.

Thus, women's movement out of male-dominated occupations represents one of the main mechanisms that drive segregation in the job market. By reducing the high rate at which women leave male-dominated jobs, we would significantly reduce the sex-segregation of occupations (Jacobs 1989). However, the reason why women leave typical male jobs, once they have overcome the entry barriers, continues to be a puzzle that has yet to be unravelled.

Throughout this dissertation, I carefully examine women's occupational mobility in the US labor market by paying special attention to the striking movement of women out of male-dominant occupations. Understanding women's departures from typical male jobs requires moving beyond the study of women's access to

traditional male occupations and focusing on what occurs after women manage to enter. In the socio-economic literature, women's exits from male-dominated jobs has been attributed to: the lack of performance-relevant skills necessary to develop typically male tasks (Reskin 1993; Waite and Berryman 1986); the aggravation of the conflict between work and family responsibilities in time-demanding occupations (Jacobs and Gerson 2004; Perchesky 2008; Blackwell 2001); women's preferences for "*female*" kind of work (Filer 1985 1990); and to the social constraints and pressures derived from the sex-composition of the occupations (Maume 1999; Glass 1990; Jacobs and Steinberg 1990; Reskin 1993). Additionally, *homophile behavior* (Walby 1986; Tomaskovic-Devey 1993) and *homosocial reproduction* explanations (Kanter 1977; Cassirer and Reskin 2000; Smith 1999) have stressed the significant problems of acceptance and integration that women encounter when they enter into male-dominated occupations, and its role in precipitating their exit from such occupations (Reskin 1993; Taylor 1981; Kanter 1977).

Most of these theories, however, are tangential findings from major studies, rather than the result of a systematic analysis of the process of women's attrition from typical male jobs. The main goal of this thesis, therefore, is to contribute to the literature by carrying out a comprehensive analysis that combine a variety of theoretical hypothesis and empirical strategies that allow us to evaluate the scope, determinants and impact of women's exits from traditional male occupations on women's careers. The relative novelty of the

study is a double-edged sword. Naturally, the modest attention that sex-type mobility has received in recent years opens the door for a variety of possible contributions, both theoretical and empirical. However, the lack of a solid theoretical framework represents a clear disadvantage, as it hinders the development of hypotheses properly linked to previous research.

Throughout this dissertation, I consider segregation to be the result of a dynamic process rather than a static phenomenon. Although aggregate levels of segregation remain relatively constant over time (Hegewish et al. 2010; Charles and Grusky 2004), there are continuous inputs and outputs in the occupational structure. In other words, women migrate from “typically female” jobs to “typically male” jobs and *vice versa*, making it necessary to carry out individual analysis that measure stability and change in the professional trajectories of both men and women.

The central thesis of this dissertation is that we are witnessing increasing differentiation among women in the labor market without which the persistence of sex-segregation cannot be understood. This idea is not completely new. Indeed, Hakim (2000, 2003) already suggested that we can distinguish different “types” of women as far as their lifestyle preferences (with respect to the trade off between family and work) are concerned. However, this perspective is not exempt from criticisms. Firstly, it is argued that the causality nexus acts in the opposite direction, i.e. that person-specific circumstances and background factors are decisive for a person’s orientation in life

and thus determine decisions, while preferences do not causally explain behavior but simply shape and influence choices (Fagan, 2001). Furthermore, a second criticism is the indetermination of the sources that lead to preference heterogeneity among women. Indeed, Hakim not only has not provided an explanation as to why women differ in their preferences, but explicitly argues that preference theory is not about the causes of core value differentiation. This is why in practice it is often hard to identify which empirical prediction could distinguish Hakim's model from the predictions that stem from both the socio-cultural and economic perspective (Polavieja 2008). Recently, on other hand, Charles and Grusky (2004) found a weakening trend of segregation among nonmanual occupations in advanced industrial countries. The authors attributed these results to a breakdown of the cultural premise of *male primacy*³ in high-status occupations. Here again, a fair explanation of why cultural change should take place exclusively among a selected group of women. The approach adopted in this dissertation differs substantively from that of the two previously mentioned studies. Instead of focusing on revealed preferences or cultural assumptions as determinants of market outcomes, I argue that achievements in the labor market trigger attitudinal and behavioral changes (Wright 2010). In order to account for this potential heterogeneity among female workers, I investigate the way women's position in the job market intersects with the way that they make their career decisions.

³ By "male primacy" the authors refer to a belief that men are more competent or better- suited to positions of authority, leading to a "vertical" segregation of occupations (Charles and Grusky 2004:21)

Specifically, I distinguish between two groups of women according to their outcomes in the job market: professionals and managers, on the one hand; and workers from other sectors, on the other. I argue that the relative improvement of professionals and managers over other female workers forms the basis for two different observable patterns of mobility among these two groups; one devoted to high-status careers and the other more marginally connected to the labor force. The rationale behind this assumption is straightforward. First, women in high-ranking positions are required to develop specific skills that are frequently less transferable than general skills (more common among low-status occupations) (Tam 1997, 2000; Polavieja 2008), and which hinder their possibilities of changing their field of work.

Second, high-status workers in the US have more resources to balance work and family life. Although the passage of the Family and Medical Leave Act (FMLA) apparently signaled a new era in the US context for work and family, the truth is that its use by workers is highly variable. Not all workers are covered, and not all employees can afford to take unpaid time off from work (Pettit and Hook 2009; Gerstel and McGonagle 1999). Moreover, to give a different example, highly skilled professional workers commonly already have more generous employer-sponsored parental leave (Pettit and Hook 2009). The differences in the availability of material resources and the degree of transferability of skills therefore would lead to different outcomes and mechanisms underlying women's decisions both at work and at home.

Arguably, this division of female workers into two big categories is far too ample. Clearly, it offers some advantages, (e.g. it can be easily operationalized into two large samples) and it facilitates the interpretation of women's mobility in the job market. Admittedly, some *intra-group* heterogeneity may be expected, especially in the group of low status workers which includes women from a wide variety of occupations -sales, service, clerical and blue-collar workers-, but also among medium- and top-level female workers. These potential variations among major occupational groups need to be controlled for and taken into account when conclusions are drawn.

Taking these theoretical assumptions as a connecting thread, the empirical part of this dissertation is articulated in three independent -but interrelated- pieces of work in which different research questions are addressed. First, Chapter Three⁴ reexamines career mobility between male-dominated, gender-neutral, and female-dominated occupations in recent decades. Earlier research, drawing on data from the 1970s and early 1980s, showed that along with a significant net movement by women into male dominated fields there was also substantial attrition from male-dominated occupations. Women in the middle of their careers during the 1970s faced a much broader set of opportunities than they had anticipated when they were young. Specifically, many more found themselves employed, and employed more intensively, than they had

⁴ Chapter Three is coauthored with Prof. Jerry Jacobs (University of Pennsylvania)

anticipated during their formative years (Shaw 1983; Jacobs 1989). Thus, it may be that during this period, the connection between aspirations and subsequent outcomes was weaker than is generally the case. However, is this pattern of mobility still evident in the US? Or on the contrary, have the increased opportunities for women since the 1970s lead to changes in the pattern evident during the 1970s? In this article, we examine whether this pattern of mobility is still evident in the U.S. by developing this possibility along with several other hypotheses regarding trends since the 1970s in sex-type mobility.

In analyzing job histories, I have also had the opportunity to explore the determinants of women's exits from male-dominated occupations. Previous research has mainly focused on individual attributes (Jacobs 1979; Sheridan 1997). Here, I take one step further and analyze the role of career dynamics on segregation. While doing so, I pose and respond to a number of important empirical questions. Are all individuals on equal terms once they overcome initial filters and get hired, as economic theory suggests? Or on the contrary, can prior trajectories have a perverse effect on women's survival in male-dominated jobs in a way that women cannot fully anticipate before entering? Is there any difference in the probability of moving out of the male sector for women who started careers in the male sector and those who previously worked in the female sector? Over three thousand female job histories (between 1979 and 2006) are analyzed in order to test different scenarios in which alternative plausible relationships between job

experiences and female survival in male-dominated jobs are presented. In this way, this paper contributes to previous research by bringing together both individual attributes and work trajectories. In addition, the longitudinal perspective of this analysis allows us to evaluate the long-term effects of attrition from male- to female-dominated occupations on women's careers.

Finally, in Chapter Five I expand on previous research by incorporating a new explanatory factor of job segregation, namely, job attributes. This new dimension of analysis allows us to address whether women's concentration in female-dominated occupations is due to the attributes of jobs. By means of an exhaustive analysis of working conditions and job attributes for over 400 occupations, this paper seeks to contribute to the debate of sex differences on preferences. Specifically, I directly test whether women's concentration in typical female jobs is due to their preference for certain kinds of market work (Filler 1985, 1990; Tam 1997, 2000) or, on the contrary, whether the labor market constrains opportunities for females (Reskin 1993; England et al. 1988, Glass 1990; Jacobs and Steinberg 1990). In doing so, I respond to key questions such as: Do women have trouble getting into male-dominated sectors because of discrimination? Or do they avoid these jobs because they have attributes that pose a problem for women – long hours, inflexibility, heavy work, etc.? Is women's attrition from male-dominated jobs due to these job's attributes? In other words, are women 'running away' from male-dominated jobs

per se or only from those jobs with attributes that are most problematic for women?

Overall, this dissertation uses a variety of econometric techniques and methodological approaches to answer the questions raised in each chapter, which have involved intensive work on data management. Specifically, I examine data from four main sources - the Current Population Survey (CPS), the National Longitudinal Survey of Youth 1979 (NLSY79), the O*Net dataset and Census data- to collate information on individual attributes, job histories and work-related characteristics. The essential element for the individual analysis is that the data contain information on the same individuals over time, allowing us to study stability and change in women's careers. A full discussion of the technical issues involved is provided in Chapter Two.

The results obtained here confirm that women's attrition from typical male jobs continues to be a key mechanism in explaining the persistence of sex-segregation levels. Furthermore it is found that the results deepen the paradox observed three decades ago. Not only do high levels of segregation coexist with high levels of mobility, but declines in the level of gender segregation coincide with declines in the level of sex-type mobility. Declining gender segregation in part reflects the increasingly developed careers plans of a minority of women who seek to pursue their careers in male-dominated fields. However, the large majority of women continue to have unstructured careers.

With some noticeable exceptions, I find that women's attrition from male-dominated occupations can neither be explained by women's attributes, nor by women's preference for work. In fact the results show that women's attrition depends, to a great extent, on the sex-composition of their previous occupations. The probability of leaving after one year of work in male dominated jobs is significantly lower for a woman that has previously worked in a male dominated field, than it is for newcomers from a non male-dominated occupation, indicating the emergence of new line of demarcation between women. By and large, patterns of attrition are highly dependent on women's position in the job market, which supports the hypothesis of a deepening division between women in the labor market. On the other hand, whereas a minority of women now tends to plan their job careers more efficiently, in a similar way to men, this approach still represents a challenge for the large majority of women.

As pointed out above, this study is based on U.S. data. The country choice of this study is mainly dictated by both context and the empirical strategy⁵. It could be argued that the cost of eliminating institutional variations between countries is too high, as the results obtained cannot automatically be extrapolated to other contexts. However, it is only by holding constant all the institutional macro-level effects that we can focus on the micro-level mechanisms of gender type mobility.

⁵ See Chapter Two

The structure of this dissertation is as follows. Chapter One examines the social implications of sex-segregation in the labor market and its academic relevance. This is followed by a detailed review of previous research on sex segregation. Chapter Two discusses the theoretical and methodological contributions of this dissertation, explains the construction of the dependent variable and the reasons for the country choice. Chapters Three to Five represent the empirical part of this dissertation, in which research questions are discussed and tested. Finally, Chapter Six summarizes the findings, discusses the main results and makes suggestions for further research.

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Table of contents

<i>Acknowledgements/Agradecimientos</i>	v
<i>Abstract/Resumen</i>	ix
<i>Preface</i>	xi
<i>Table of contents</i>	xxxiii
<i>List of tables</i>	xxxvii
<i>List of figures</i>	xxxix

CHAPTER ONE 1

OCCUPATIONAL SEX-SEGREGATION IN THE LITERATURE: WHAT WE KNOW AND WHAT WE DO NOT KNOW. 1

1.1 INTRODUCTION	1
1.2. MEASURES OF SEX-SEGREGATION	3
1.3.WHY DOES SEGREGATION MATTER? SEGREGATION AND INEQUALITY IN THE LABOR MARKET	7
1.4.MAIN THEORIES AND EXPLANATIONS ABOUT SEGREGATION IN THE LABOR MARKET	15
<i>Economic Theory</i>	17
<i>Socio-cultural theories</i>	21
<i>Labor market segmentation theories</i>	25
<i>Hakim's preference hypothesis</i>	27
<i>The social control theory</i>	29
1.5. NEW CHALLENGES: TOWARDS LESS SEGREGATION?	32
1.6. BIBLIOGRAPHY	35

CHAPTER TWO..... 47

NEW CHALLENGES: SEX SEGREGATION, OCCUPATIONAL MOBILITY AND WOMEN'S HETEROGENEITY IN THE LABOR MARKET. 47

2.1 THEORETICAL CONTRIBUTIONS.....	47
2.2. METHODOLOGICAL CONTRIBUTIONS	60
2.3.COUNTRY CHOICE: AN ANALYSIS OF THE UNITED STATES	62
2.4. DATA	65
2.5 THE DEPENDENT VARIABLE	67
2.5. BIBLIOGRAPHY	70

CHAPTER THREE.....	76
THE GENDER MOBILITY PARADOX: GENDER SEGREGATION AND WOMEN'S CAREER MOBILITY, 1970-2006.....	77
3.1. INTRODUCTION.....	78
3.2. PREDICTIONS FOR TRENDS IN GENDER-TYPE MOBILITY.....	81
3.3. NEW PATTERNS OF OCCUPATIONAL MOBILITY: INCREASING DIFFERENTIATION AMONG WOMEN.....	84
3.4. DATA.....	87
3.5. METHODOLOGY.....	88
<i>Occupational mobility</i>	89
<i>The probability of changing occupation</i>	89
3.6. RESULTS.....	95
3.7. CONCLUSIONS AND FURTHER RESEARCH.....	104
3.8. REFERENCES.....	106
CHAPTER FOUR.....	121
THE CAUSES AND LONG-TERM CONSEQUENCES OF WOMEN'S ATTRITION FROM MALE-DOMINATED OCCUPATIONS.....	121
4.1. INTRODUCTION.....	122
4.2. SEX-SEGREGATION AND WOMEN'S CAREERS.....	124
4.3. THE ROLE OF OCCUPATIONAL TRAJECTORIES: HYPOTHESES.....	130
4.4. DATA.....	136
4.5. METHODS AND COVARIATES.....	137
4.6. MOBILITY IN THE SAMPLE.....	143
4.7. FINDINGS.....	146
4.8. DISCUSSION.....	154
4.9. REFERENCES.....	156
CHAPTER FIVE.....	171
CONSTRAINED CHOICES. OCCUPATIONAL ATTRIBUTES AND SEX-TYPE MOBILITY IN THE LABOR MARKET.....	171
5.1. INTRODUCTION.....	172
5.2. THEORETICAL FRAMEWORK.....	174
5.3. HYPOTHESES.....	181
5.4. DATA.....	183
5.5. OCCUPATION-RELATED AND SOCIO-ECONOMIC DESCRIPTORS.....	185
5.6. METHODS.....	188

5.7. DISTRIBUTION OF OCCUPATION-RELATED ATTRIBUTES IN THE SAMPLE	191
5.8. FINDINGS	194
5.9. DISCUSSION	200
5.10. REFERENCES	205
CHAPTER SIX.....	221
MAIN FINDINGS, CONCLUSIONS AND FURTHER RESEARCH.....	221
6.1. SUMMARY AND FINDINGS	221
6.2. FINAL REMARKS	233
6.3. BIBLIOGRAPHY	236
FINAL APPENDIX.....	241
LIST OF OCCUPATIONS BY YEAR AND SEX-COMPOSITION OF THE OCCUPATION	241

List of figures

FIGURE 1.1. LITERATURE SCHEME ON SEX-SEGREGATION IN THE LABOR MARKET.....	45
FIGURE 3.1. THEORETICAL PREDICTIONS FOR TRENDS IN SEGREGATION AND MOBILITY	118
FIGURE 3.2. TRENDS OF SEX-SEGREGATION AND SEX-TYPE ASSOCIATION IN THE LABOR MARKET, 1970-2007	119
FIGURE 4.1. EVENT HISTORY MODEL. FLUX DIAGRAM FOR FEMALES 1979-2006.....	168
FIGURE 4.2. PROBABILITY OF ATTRITION FROM MALE-TO FEMALE-DOMINATED OCCUPATIONS. HIGH- AND LOW-STATUS WORKERS.	169

List of tables

TABLE 2.1. NUMBER OF OCCUPATIONS BY MAIN OCCUPATIONAL GROUPS AND SEX-TYPE OCCUPATIONS, 1980-2000.	76
TABLE 3.1. STATISTICAL DESCRIPTIVES 1992, 2006	109
TABLE 3.2. OCCUPATIONAL MOBILITY TABLE. 1981, 1992, 2006.....	110
TABLE 3.3. SEX-TYPE ASSOCIATION BY SOCIO-DEMOGRAPHIC CHARACTERISTICS: 1991-1992, 2005-2006	112
TABLE 3.4. SEX-TYPE ASSOCIATION BY WORK-RELATED CHARACTERISTICS. MEN AND WOMEN OCCUPATION CHANGERS. YEARS 1992, 2006	113
TABLE 3.5. PROBABILITY OF CHANGE OCCUPATIONS. 1992, 2006	114
TABLE 3.6. PROBABILITY OF CHANGE OCCUPATIONS ACROSS SEX-TYPE BOUNDARIES. 1992, 2006	116
TABLE 4.1. NUMBER OR WOMEN IN THE LABOR MARKET BETWEEN 1979 AND 2006.....	162
TABLE 4.2. DESCRIPTIVE STATISTICS ON PREDICTORS OF WOMEN’S ATTRITION FROM MALE-DOMINATED JOBS.	163
TABLE 4.3. ODDS RATIOS FOR WOMEN’S ATTRITION FROM MALE-DOMINATED JOBS. PROFESSIONALS AND MANAGERIAL WORKERS IN YEAR _T . 1979-2006.	164
TABLE 4.4. ODDS RATIOS FOR WOMEN’S ATTRITION FROM MALE-DOMINATED JOBS. SERVICE, CLERICAL, SALES AND BLUE-COLLAR WORKERS IN YEART. 1979-2006	166
TABLE 5.1. FACTORS CREATED FROM O*NET 2006 DATABASE. ...	209
TABLE 5.2. DESCRIPTIVE FOR WOMEN AND MEN IN THE LABOR MARKET.	210
TABLE 5.3. OCCUPATIONAL CHARACTERISTICS BY SEX-TYPE OF OCCUPATION. MEAN VALUES.....	211
TABLE 5.4. OCCUPATIONAL CHARACTERISTICS BY GENDER AND SEX-TYPE OF OCCUPATION. MEAN VALUES AND STANDARD DEVIATIONS.	212
TABLE 5.5. PROBABILITY OF FINDING A MAN/WOMAN EMPLOYED IN A MALE-DOMINATED OCCUPATION. NEWCOMERS FROM NON-MALE DOMINATED JOBS.	213

**TABLE 5.6. PROBABILITY OF WOMEN'S ATTRITION FROM
MALE-DOMINATED OCCUPATIONS..... 214**

CHAPTER ONE

Occupational sex-segregation in the literature: What we know and what we do not know.

1.1 Introduction

The study of sex-segregation concerns the tendency of men and women to be employed in different occupations, and measures the extent to which this occurs. To be more specific “occupational segregation by gender exists when men and women do different kinds of work, so that one can speak of two separate labor forces, one male and one female, which are not in competition with each other for the same jobs” (Hakim 1979:1). Furthermore, segregation is defined as *complete* when a specific group is excluded from certain outcomes; while *perfect integration* envisages a situation in which men and women are proportionally distributed across occupational categories. Although these extremes exist only at the theoretical level, they serve as standards against which segregation is measured in the empirical world.

Frequently, segregation is used as a bi-dimensional concept that refers, on the one hand, to the unequal distribution of men and women in different occupational sectors (horizontal segregation)

and, on the other, to the unequal distribution of men and women across the occupational (vertical segregation) (Hakim 1979:19). This distinction between horizontal and vertical segregation has become highly popular among scholars in recent years, since it is readily operationalized and useful in understanding both the dynamics of segregation and its variability across countries.

The vast amount of existing literature leaves no room for doubt about the level of interest that the study of gender segregation in the labor market has attracted. Figure 1.1. illustrates the overall picture on sex-segregation research from a socio-economic perspective. On the left, we can observe the leading theories that attempt to explain the causal mechanisms driving gender segregation. On the right, we can see a list of some of the principal consequences derived from sex-segregation in the job market, such as the sex gap in wages or roles of authority. Finally, there is a third branch of literature that focuses on measurement of the concept, which is represented at the bottom of the chart.

(Figure 1.1. about here)

I then establish the current state of the literature by reviewing in detail the main work developed in these three areas of research. Next, I highlight the limits of this literature to account for the persistence of occupational sex-segregation, and argue for the need to address its study from a different perspective.

1.2. Measures of sex-segregation

Unquestionably, the most popular index to measure existing segregation has been the D index of dissimilarity (Duncan and Duncan 1955)⁶. In fact this index has become so popular that the concept of segregation has sometimes come to be equated with ‘D’ itself (Charles and Grusky 2004). One of the principal reasons for its popularity might be attributed to the relative ease with which it can be calculated. Moreover, the D index has a simple interpretable meaning, as it reflects the proportion of either group (men or women in our case) that would have to change occupation to bring about a perfect correspondence between the sex-composition of each occupation.

After twenty-two years of unreserved agreement on the use of the D index of dissimilarity, Cortese et al. (1976) produced a fierce critique that listed a series of objections to the index. The authors argued that levels measured by D are affected by three factors, namely: the level of sophistication of occupational distinctions; the number of people in particular occupations; and the sex composition of the labor force (Cortese et al. 1976; Reskin 1993; Charles and Grusky 1995, 2004). It was further contended that these factors produced biased results when comparing different market distributions. Beyond this weakness in measuring segregation,

$$^6 D = \sum_{i=1}^n \left| \left(\frac{W_i}{W} \right) - \left(\frac{M_i}{M} \right) \right| \times 100 \times \frac{1}{2}$$

W_i = number of women in occupation i ; W =total number of women; M_i =number of men in occupation i ; M =total number of men; n =number of occupations.

Cortese and his colleagues also mock the misleading interpretation of the term, suggesting that it could be better taken as the percentage of men or women that would have to be removed from the labor force to bring about a perfect correspondence between the sex composition of each occupation, and that of the entire labor force (Cortese et al.1976; Charles and Grusky 2004). Although it is true to say that Cortese et al.'s work did not have a serious direct impact on the measurement of segregation, and that practitioners did not take its criticism too seriously (Massey 1978; Taeuber & Taeuber 1966; Massey and Denton 1988); it certainly had a profound effect on segregation studies. Since its publication, a torrent of papers have put forward a number of different definitions of segregation, proposed a host of new measures, and rediscovered several old indices (Massey and Denton 1988).

Among the various attempts to replace and improve the D index of dissimilarity, the best-known and most frequently used alternative is the so-called size-standardized index of dissimilarity (D_s)⁷. Nevertheless, this standardization merely trades off one form of margin dependence for another; eliminating a dependence on the occupational distribution at the cost of introducing a new dependence on gender distribution (Grusky and Charles 1998; Charles and Grusky 2004).

$$D_s = \sum_{j=1}^J \left[\left(\frac{W_j}{M_j + W_j} \right) / \sum_{j=1}^J \left(\frac{W_j}{M_j + W_j} \right) \right] - \left[\left(\frac{M_j}{M_j + W_j} \right) / \sum_{j=1}^J \left(\frac{M_j}{M_j + W_j} \right) \right]$$

Terms defined as in note ¹

In an attempt to bring some order to the field, Massey and Denton (1988) undertook a systematic methodological evaluation of 20 potential measurements of segregation. The authors argued that *concentration* and *isolation* can be considered as two key dimensions of segregation that complement the dimension of *unevenness* represented by the D index of dissimilarity. The concentration index (C)⁸ indicates the proportion of a particular group of individuals who would have to change occupations to be evenly distributed across all occupations (Jacobs 1989), and it has been used to document the fact that women are frequently clustered in a small number of occupations. On the other hand, the isolating effect of segregation depends on the relative size of groups in which men and women find themselves working, as well as the level of segregation. In this way, the index of the probability of inter-group contact (P)⁹ supplements the standard index of dissimilarity by indicating the manner in which each group experiences segregation (Jacobs 1989).

More recently, Charles and Grusky (2004) claimed that no matter what index is used, all conventional segregation indices are *margin-dependent*, in that they are derived from the D index of dissimilarity. When margin-dependent measures are used, it has to be borne in mind that any variability observed (whether across

$$^8 C = \sum_{i=1}^n \left(\frac{W_i}{W} \right) - \left(\frac{1}{n} \right) \times \frac{1}{2}$$

Terms defined as in note ¹

$$^9 P * WM = \sum_{i=1}^n \left(\frac{W_i}{W} \right) - \left(\frac{M_i}{T_i} \right)$$

Ti is the total Number of individuals in unit i. Other terms defined as in note ¹

countries or time) could be due not only to variability in the joint distribution of gender and occupation, but also to variability in any particular distribution taken alone. In an attempt to solve these problems, the authors recommend a new index named A^{10} , which better captures prevailing concepts of segregation. The value of A indicates the extent to which occupation-specific sex ratios deviate from the mean of such ratios calculated across all occupations (Charles and Grusky 2004). If the exponent of A is taken, the result may be interpreted as the multiplicative factor by which males or females are, on average, overrepresented in an occupational category. When A is zero and $\exp(A)$ equals one, then the labor market is perfectly integrated.

It could be that the big advantage of the A index is that it can be used to compare countries and time periods with different occupational structures, or different rates of female participation in the labor force. However, there is a clear trade off between its efficiency and its “readable interpretable meaning” (Jacobs 2001). Additionally, since scholars studying sex segregation generally prefer more detail rather than more aggregation, the use of odds ratio measures does not appear to be an appropriate tool (Jacobs 1993).

Currently, the debate remains open in the absence of a measure able to capture all the theoretically relevant aspects of segregation. For

¹⁰
$$A = \exp \left(\frac{1}{n} \times \sum_{i=1}^n \left\{ \ln \left(\frac{W_i}{M_i} \right) - \left[\frac{1}{n} \times \sum_{i=1}^n \ln \left(\frac{W_i}{M_i} \right) \right] \right\}^2 \right)^{1/2}$$

this reason, and before a suitable single measure is available, the best option for researchers is to select one or various indices that allow them to match the concepts they seek to investigate (Jacobs 1993).

1.3. Why does segregation matter? Segregation and inequality in the labor market

Whichever definition has been employed, occupational segregation by sex has been documented in all regions, at all economic development levels, under all political systems and in diverse religious, social and cultural environments (Anker 1997). Segregation is widespread at every level, across: organizations; economic sectors; enterprises; kind of employees; occupations; work hierarchies; private, public or voluntary sectors, etc.; and there is unanimous agreement that it represents one of the most significant and enduring aspects of labor markets around the world. From a socio-economic perspective, sex segregation is not a problem in itself, but there are several reasons to be concerned about occupational segregation. At the aggregate level, it is a major source of labor market rigidity and economic inefficiency (Anker 1997). At the individual level, occupational segregation by sex is detrimental to women, affecting their status, their income and consequently, many other social variables, from mortality to poverty and income inequality. In other words, it widely contributes

to the generation of inequality in a variety of both direct and indirect ways.

The impact of sex-segregation on the gender wage gap has undoubtedly been the most studied in the literature, both within sociology and economics. Petersen and Morgan (1995) showed that around 64% of the observed gender wage gap is attributable to the allocation of men and women in different occupations. Other empirical analyses go further and suggest that there is up to a 90% earnings differential between men and women that can be explained by occupational segregation (Tomasovich-Devey 1993; Meyersson-Millgron et al. 2001). Furthermore, Reskin et al. found that this occurs both *within occupations* and/or *across firms* (Reskin et al. 1999). In the former case, it occurs because women in the same occupation may do different jobs. In the latter, segregation occurs because women and men who perform the same occupation may be segregated by firm enterprise.

Traditionally, scholars of economics have claimed that differences in worker's attributes do form a legitimate basis for wage differentials (Becker 1993[1964]). From this perspective, men and women are differentially rewarded because of the particular skills that they bring from the educational system into the labor market. Nevertheless, the lower pay in women's work remains a puzzle because, on average, predominantly female jobs require as much education as men's (England 1992)., Researchers employing a human capital perspective took this one step further by moving

beyond differences in educational level, and focusing instead on the effect of skills acquired after joining the labor market. In this way, they established a widely accepted relationship between experience and earnings that takes years of work experience as a proxy for unobservable investment in on-the-job training (Mincer and Polacheck 1974). Wage differentials between individuals throughout the life-cycle are still seen therefore as the result of differential patterns of investment in human capital. In fact, the main difference appears in the form of on-the-job training investment (obtained in the job market), that increases productivity in only one firm; as opposed to general training investment, that increases worker productivity in *more* than one firm (obtained principally through the educational system) Returns on job specialization are linked to tenure, and employees must remain in their firm in order to recoup their investments in training. Thus, rational employees anticipating a discontinuous career will avoid incurring such specialized investments. The same rationale holds for employers, who will be unwilling to invest in employees who are likely to quit their jobs (Breen 1997; Sorensen 2000; Tam 1997; Polavieja 2008). As women are expected to have a less regular pattern of labor force participation (given the distribution of childcare and domestic tasks), they are also expected to have less economic incentives to invest in on-the-job training (Mincer and Polacheck 1974). As a result, women will, in general, have accumulated less human capital than men with the same number of years of experience and, consequently, their returns on experience would be expected to be lower. Furthermore, human capital

scholars appeal to the notion of “compensating differential” when addressing the issue of comparable skills offering differential pay (Smith 1937[1776]; Filer 1985, 1989). The hypothesis of compensating differentials holds that more unpleasant working conditions must pay premiums in order to be attractive. Thus, it is argued that the lower monetary rewards in typical “female” posts are partly explained by some “pay” being taken in non-wage forms (Filler 1985 1990). In this way, human capital scholars explained the gap in wages as being due to an *allocative process*, that is, a process in which men and women are unequally distributed across occupations (Petersen and Morgan 1995).

There is widespread evidence for both direct and indirect sex differences in job specialization. In 1979, Duncan and Hoffman employed data from the Panel Study of Income Dynamics (SPID) to analyze both the determinants of training, (namely, who gets training and how much), and its effects on earnings. The authors found strong evidence that time spent in on-the-job training increases earnings, and that while this payoff was quite uniform for men and women, women were found to have less labor force experience than men and, moreover, were much less successful in translating that experience into training opportunities. Another direct test can be found in Tam (1997) who, using cross-sectional data from the 1988 U.S. Current Population Survey, showed that the observable impact of occupational sex composition on wages disappears totally once both information on the average length of specific training required in respondents’ occupations and a set of

industry dummies were introduced into the wage models. Tam's results generated an important debate in the field of sociology (see, for example, England et al. 2000; Tam 2000; Tomaskovic-Devey and Skaggs 2002). In fact, in a response to Tam's empirical tests (1997), England et al. (2000) showed - using the same data used by Tam - that the addition of just one crucial control variable (a measure for the demand for general education in particular occupations) completely changes the results and re-confirms the conclusion that there is a wage penalty for working in occupations with a higher percentage of females. Socio-cultural scholars argue that women's jobs are culturally devalued and that this explains why predominantly female occupations tend to offer lower pay than occupations in which men prevail. This procedure, known as the *valuative* process, claims that gender biases infect the decision that managers or consultants make about the remuneration for particular jobs, making them tend to underestimate the relative contribution of work done in "female" jobs (Petersen and Morgan 1995; England 1992; England et al. 1994; England et al. 2000). First, the bias results from generalizing to women's work the relatively low value assigned to women by culture. Later, bureaucratic inertia takes over and the wage consequences of these biases are 'set in stone' (England et al. 2000). In England's own words, "although the specific capital thesis may have some explanatory power, Tam was in error to reject the devaluation thesis

In contrast to cultural-socialization and rational-action theorists, scholars of labor market segmentation offer a different explanation

of the effect of segregation on wage outcomes. (Doeringer and Piore 1971). According to this latter perspective, earnings are thought to be largely determined by the labor market in which an individual works, rather than the skills (or human capital) he or she possesses. A certain amount of training is intrinsic to any job, so it is argued that individuals acquire training by first gaining access to a job that provides training. In other words, jobs and job markets intercede between an individual and investment in on-the-job training. The utility of an economic segmentation approach for explaining structural sources of income inequality was highlighted by Kalleberg and his colleagues (1981), although, the relative power of labor-market structures in explaining income attainment and the income gap is higher in dualist countries than it is in corporatist countries (Rosenfeld and Kalleberg 1990). Segmented market theorists usually argue that because hiring decisions involve a considerable amount of subjective input there is ample opportunity to practice discrimination (Duncan and Hoffman 1979).

The “fringe benefits” or financial supplements that workers are able to obtain from their job form an additional source of income inequality derived from sex-segregation. Following Hefferan (1985), the sum of these benefits (that include life, health and accident insurance, paid vacations and sick leave, pensions plans and so forth) constituted as much as 21.8 percent of the total compensation paid to employees in 1983, and illustrated women’s lack of fringe benefit coverage (Pearce 1987). Drawing on data from the Current Population Survey (CPS) for 1979, Perman and

Stevens (1989) found little support for direct discrimination in occupational segregation models, but strong support for the industrial segregation model, and argued that this was a significant reason for women's inferior earnings and benefits in the American labor market. Further analyses, using CPS data from 1995, found that men are less likely to have *bad* jobs than women (interpreting bad jobs as those which offer low wages, no health-insurance or pension benefits; Kalleberg et al. 2000)

Among the diversity of approaches and opinions, there also exists remarkable widespread agreement: namely that the more "feminized" an occupation is, the worse it is remunerated. And according to Treiman and Hartmans' predictions (1981), it seems that both intentional and unintentional discrimination in the determination of wages are likely to persist, given the current operation of the labor market and the existence of a variety of factors that permit the persistence of earning differentials between men and women (e.g., labor market segmentation, job segregation, employment practices and socio-cultural values)

Regardless of its overwhelming weight in the literature, the analysis of the gap in wages represents only one face of the inequalities between working men and women. Research has also revealed other important consequences of segregation on women's work. For example, typical female occupations offer limited opportunities for promotion (Rosenbaum, 1984) and reduce possibilities to attain positions of authority (Reskin and Roos, 1992). Research has also

shown that most employees who attained management positions were originally hired into entry-level jobs and then progressed to upper-level positions through promotions on a well-defined career ladder (Baron et al. 1986; Rosenbaum 1984). Since female occupations offer less promotion chances (Rosenbaum 1985; Steinberg et al. 1990), gender typed jobs represent an obstacle for promotion for women who start working in highly feminized jobs.

More recently, some scholars have found that employees are increasingly attaining management positions at all levels in the hierarchy by being hired directly into their positions from outside the organizations (Baker et al. 1994; Schwan & Soeter 1994). This change in hiring practices could represent an open door for women who have been initially working in the more feminized sectors, but only in the event that female managers are equally likely to be promoted as their male counterparts. Scholars studying women's access to managerial jobs developed the well known metaphor "*glass ceiling*" to refer to invisible barriers that impede the career advancement of women in the American workforce (Hymowitz and Schellhardt 1986; Steinberg et al. 1990). However, the debate about the existence of a glass ceiling has been revitalized in recent years following the dramatic entry of women into managerial positions (Jacobs 1992; Huffman and Cohen 2004). In a comparative analyses across countries, Wright et al. (1995) found little support for the "glass-ceiling" hypothesis, instead arguing that barriers to upward promotions for women in authority are greater than the barriers they face getting into hierarchies in the first place. The authors added

that the barriers faced by women were relatively weaker in the United States than in other countries.

Recent research has provided evidence that the presence of high-status female managers has also had a greater impact on gender wage inequality (Cohen and Huffman 2007). Using data from the 2000 American Census, the authors carried out hierarchical models to analyze how the gender composition and relative status of female managers could affect inequality for the non-managerial workers below them in the occupational structure. The authors conclude that the promotion of women into management positions may benefit all women, but only if female managers reach relatively high-status positions.

Finally, it is worth mentioning that the occupational structure is not merely the backbone of the economic reward system (Parkins 1971 as in Charles and Grusky 2004:18) but it also serves as the main conduit through which working conditions, consumption practices, and lifestyles are determined (Grusky and Sorensen 1998).

1.4. Main theories and explanations about segregation in the labor market.

The research literature that deals with sex segregation is not concerned with occupational segregation *per se*, but because of the

multiple consequences it has for female and male outcomes. Specifically, there is considerable debate about the reasons why occupations become and remain segregated.

Far from being the result of a natural order, derived from biological necessities or capacities, we argue that the sexual division of labor is a social construct. As demonstrated by cross-national comparisons, work carried out by men in one place is often performed by women in others. Furthermore, the allocation of task between men and women not only changes between societies, but also over time in any particular context (Jacobs 1989).

Efforts to explain the causes and origins of the gender division of work in the socio-economic literature can be classified into two broad fields, (namely, the human capital and the socio-cultural theories), although other theses have been proposed, such as labor market segmentation and social control theory. Despite the differences in their approaches, these theories either focus on the supply-side or demand-side. Factors related to labor supply focuses on workers' occupational choices, that is, on female and male preferences for certain types of occupations. According to this approach, workers' occupational outcomes reflect their preferences. Demand-side explanations on the contrary, stress employer's actions, and specifically employer's preference to hire women or men for particular occupations or promotions, and in this way determine their careers.

Economic Theory

Neo-classical economics is built on three fundamental pillars: workers' rationality, employers' rationality and the efficiency of labor markets. Based on the rationality assumption, workers will seek to get the best-paying jobs by evaluating their personal background, preferences and constraints. In the same way, employers will seek to increase productivity and reduce cost, in order to maximize their final profits.

On the supply side, human capital theorists (such as Becker 1993) have undoubtedly been very influential. The human capital model argues that individuals in the labor market are rewarded for the value of the additional productivity that investments in skills bring. Based on their scope of applicability, skills are commonly defined as general (if they are acquired in the formal educational system, e.g., educational level, field of study, etc) or specific (those obtained after joining the labor market, through experience and continued participation, etc). According to this rationale, women rightfully receive lower pay than men because of their lower productivity, derived from their lower level of human capital when they arrive to the labor market and their lower commitment to develop skills on the job.

There is considerable evidence to support the idea of a skill- (or ability-) wage link¹¹. Since returns on specific skills and abilities are linked to tenure, only employees who remain in their occupations or firms for longer periods are able to recoup their job-specific investments. Rationally, workers anticipating discontinuous careers will seek, of their own volition, to avoid such specialization. This is mostly true in the case of women, who despite the trend toward parity in the occupational realm, continue to perform the majority of housework (Coltrane 2000; Bianchi et al. 2000; Sayer 2002). Given that women anticipate temporary or permanent withdrawals from the labor force (frequently to care for young children and undertake domestic duties), it seems reasonable that women are unwilling to incur costly investments. On the contrary, they will self-select themselves into occupations with relatively high starting pay, relatively low returns on work experience and relatively low penalties for temporary withdrawal from the labor force.

The same underlying principles apply when we focus on employer's preferences and choices, both when hiring and offering promotions. From a rational point of view, employers will be averse to invest in workers who are less committed to the labor market; that is, more likely to quit their jobs. Given the existing distribution of childcare and domestic tasks, women are considered to be less stable actors in the labor markets, constantly susceptible to labor force withdrawals as a result of their household demands. Consequently, time-

¹¹ For more detail about the relationship between skills and wages see previous section

demanding jobs, requiring a high level investment in specific skills, experience and on-the-job training, are more likely to be offered to men.

Sex can also be used by companies as an ‘inexpensive filter’ to help fill jobs when employers are not certain about worker’s abilities. Give this lack of information; employers may base employment decisions on the workers' visible features, such as the gender of the candidate, and on existing stereotypes about the group’s average behavior (Arrow 1973; Phelps 1972). In other words, employers will assign men and women to different jobs based on their own beliefs about men and women’s productivity and behavior. This phenomenon, known as ‘statistical discrimination’, contributes both to sex-typed job allocation, (with women filling jobs that demand social skills and men occupying those positions where physical effort is required (Bielby and Baron 1994)) and to the persistence of inequalities between demographic groups even when economic agents are rational. However, research in the literature has often showed how statistical discrimination is based on invalid stereotypes more than on actual sex differences (Bielby and Baron 1986; England and McCreary 1987).

Anti-discrimination regulation in the U.S. in the 1960s and 1970s made it illegal for employers to exclude workers from any jobs because of their sex. Employer’s response to these external pressures can be seen in a decline in segregation (Baron et al. 1991), but the integrative effects of enforcement and the threat of litigation

appear to have been short-lived (Deaux 1984; Rosenbaum 1985; Reskin 1993). In fact, statistical discrimination procedures and many other factors obstruct integration in pay and into occupations from the demand-side. Male workers can inhibit integration by, for example, insisting on a wage premium to work with women (Bielby and Baron 1986); sabotaging women's productivity (Cohn 1985); or disrupting production by threatening strikes or striking (Milkman 1987). On the other hand, some employers have cited customer discrimination to justify barring women from certain jobs, saying that 'women drive away customers' (Reskin 1993). Economic pressures also play a significant role in hiring processes. The cost of hiring, training and paying prospective workers influences employer's personnel decisions, which tend to favor the cheapest qualified workers available. Women's lower market wage should make them attractive candidates for both male and female occupations, but in reality, men's higher average pay has not induced very many employers to employ women in typically male jobs (Reskin 1993).

There are various factors that impact on the economic advantage of hiring women. First, they are often said to have higher rates of absenteeism, to be late for work more frequently and in general, to require more flexible working conditions due to their 'mother-and-worker' condition (Paringer 1983). Second, women are often considered to be higher-cost workers because of a number of supposedly higher indirect labor costs associated with female employment (Anker 1997). For example, labor laws and regulations, such as maternity leave, may have a negative impact on

women's employment because they increase the cost of women workers relative to men, (and is an indirect form of sex discrimination if employers have to bear this cost). As a consequence, some authors have recommended that the cost of maternity leave be borne by the state and not by employers (Melkas and Anker 1997), as any factor altering the comparative cost of employing female workers versus male workers may affect employer's propensity to hire women (Reskin 1993).

Socio-cultural theories

Socio-cultural theories are predominantly concerned with non-labor market variables, which economists take as given. Conversely to neo-classical thought, sociologists stress the effect of early socialization in channeling men and women into sex-typical occupations. The basic premise behind the gender socialization approach is that sex-role differences acquired through socialization processes (especially primary), result in sex differences that are developed before adulthood (Reskin 1993; Marini and Brinton 1984). For example, the argument is that because women are frequently socialized into domestic and caretaking roles, they develop values and occupational aspirations that reflect these roles. Conversely, the motivation to attain high paid-work and progress in a career is significantly greater for men. The early division of responsibilities is instrumental in determining why women develop more "female orientated" occupational skills that make them better

suiting to work in jobs with “traditionally female” working characteristics, while exactly the opposite occurs among men. In other words, gender stereotypes learned during childhood are later carried over into the labor market, pushing men and women to self-select themselves into sex-typical jobs (England et al. 1994).

The same logic applies from a demand-side perspective. According to socio-cultural theories, employers’ gender bias drives them to follow exclusionary or discriminatory practices, which are result of their socialization in patriarchal values (Reskin and Padavic 1988; Goldin 1990). In this way, the *allocative process* is cyclical (Pettersen and Morgan 1995), through both a process of self-selection from the supply-side and a process of discrimination by sex from the demand-side.

Past segregation between men and women also have persistent effects in the tendency of women to choose female-dominated occupations. Breen and García-Peñalosa (2002) demonstrate the extent to which customs lead members of each gender to hold different beliefs about probabilities of success in, for example, traditionally “male” occupations, and how these divergences in beliefs result in different career choices, even if both men and women were identical in their preferences. They argue that more information about the probability of success of female workers in these occupations would result in a reduction in the extent of gender segregation.

Finally, socio-cultural scholars have argued that a process of devaluation of typical female occupations exists, in parallel with the allocation of women into less prestigious, less rewarding jobs. The *cultural devaluation theory* highlights the fact that people tend to assign a lower value to typical female work (England et al. 1994), as do employers. As a consequence, work carried out by women is devalued, resulting in the underevaluation of female-dominated occupations (England et. al 1994; Reskin 1999). The effect of this (de)valuation process can be interpreted as a bi-directional one. On the one hand, women's jobs are under-valued because of their female gender composition. As a result, female jobs become even less attractive to men over time, due to their lower levels of rewards and prestige. This reinforcement phenomenon results in the creation of a highly feminized and under-valued sector, where women remain trapped.

In a similar way to socio-cultural scholars, gender theorists and feminists claim that women's disadvantaged position in the labor market is a reflection of patriarchy and women's subordinate position in society and the family. In their attempt to explain occupational segregation, gender scholars showed how closely the characteristics of typical female occupations mirror the common stereotypes of women and their supposed abilities (Anker 2001). With this aim, they compiled a list of characteristics commonly attributed to women and which may have an impact on occupational segregation by sex. Female stereotypes and features can be classified into three main categories relating to their effects on

occupational segregation (Anker and Hein 1985, 1986). The first group comprises of a sequence of characteristics defined as “positive”. Among these are listed features such as having a caring nature, skill and experience in household-related work, greater manual dexterity, greater honesty and an attractive physical appearance. In contrast, the second group lists the so-called “negative” features of stereotypes about women. This group includes a disinclination to supervise others, less physical strength, less ability in science and mathematics, less willingness and availability to travel and finally, less willingness to face physical danger and to use physical force. Finally, the last category of female attributes includes a willingness to take orders, to do monotonous work and lesser inclination to complain about work or working conditions and join trade unions; greater acceptance of lower wages, a lesser need for income and greater interest in working at home. According to the feminist argument, the “positive” stereotypes listed above improve the chances of women being incorporated into occupations such as nursing, social work, teaching, cleaning, and in general, highly feminized and low-paid occupations. On the other hand, “negative” stereotypes would help to ensure the persistence of male dominated occupations, by disqualifying women for occupations such as manager and supervisor, executive, construction worker, etc. The third and last group of stereotypes would not have a big impact on segregation, since they do not serve to qualify or disqualify women for certain occupations. However, they have a great influence on the general characteristics that typify female occupations (such as low pay, high flexibility, low status,

less decision-making authority) (Anker 2001). Sex-stereotypes play a role both on the supply side and from the demand side. From the supply side, stereotypes contribute to create differences in aspirations and expectations of men and women, resulting in a 'post-sort' into occupations matching their sex-stereotypes. On the other hand, employers recur to stereotypes on work productivity when hiring and promoting, contributing to the segregation of the job market from the demand side. Empirical evidence extracted from ILO (International Labour Organization) enterprise surveys illustrates that such stereotyping on occupational segregation is widely supported by employers when asked directly whether they would prefer to employ men or women for certain jobs (Anker 2001).

Labor market segmentation theories

Economic segmentation theorists examine the way that the structure of the economy mediates the attainment of individuals (Beck et al. 1978; Berg 1981). In this literature, it is assumed that institutions (unions, enterprises) play a determining role in deciding who is hired, fired and promoted, and how much they are paid. However, in contrast to the views of neo-classical economic theory -which posits the existence of a unified market for labor- it considers that the economy is typically divided into a core and a periphery: the core has large and relatively stable firms (and offers good pay, security, opportunities for advancement and working conditions), as

opposed to the peripheral, which consist in small firms in competitive markets (where pay, chances for promotions, job security and working conditions are relatively poor). In a core labor market, workers are assumed to be able to progress in their careers at least partly protected from competition from those outside this market segment (Rosenfeld 1992). To reflect the existence of these different market strata, scholars have referred to “static” versus “progressive” jobs (Standing, 1989), “open/flexible” versus “closed/inflexible” (Sorensen and Tuma 1981), “formal” and “informal” sectors (ILO, 1972); “internal” versus “external” (Althausen 1989), “primary” versus “secondary” sectors (Doeringer and Piore 1971; Kalleberg and Sorensen 1979), etc.; however the basic logic behind all these models is very similar.

The concept of dual labor markets has been employed to highlight differences in the careers of men and women in different sectors of the economy (Kemp and Beck 1981), and argues that one segment comprises mostly “female” occupations while another comprises predominantly “male” occupations. There are relatively low wage rates in female occupations because female workers are crowded into a small number of female occupations, while male occupations benefit from reduced competition within a wider set of occupations (Bergman 1974).

Hakim's preference hypothesis

The already classic *preference theory* developed by Hakim (1996, 2000, 2002, 2003) offers a new explanation for labor market participation and outcomes, especially for women. Although sometimes classified as a sociological perspective, the preference theory distinguishes itself both from the socio-cultural and the economic view. On the one hand, it breaks with the tradition of assuming that preferences are homogeneous, stable, and revealed through behavior. On the other, it rejects the sociological tradition of giving primacy to social, structural and institutional factors to explain women's labor enrollment. As an alternative to the "old" theories, it gives a central role to lifestyle and values as primordial determinants of individual's employment choices. In the words of the author, this theory is "historically informed, empirically based, multidisciplinary, prospective (rather than retrospective in orientation) and applicable in all rich modern societies" (Hakim 2002).

According to Hakim, recent changes in the labor market, starting in the late 20th century, generated a new scenario of options and opportunities for women in the 21st century. The contraception revolution, the equal opportunities revolution, market expansion in white-collar sectors and the creation of "secondary earner's" jobs, together with the increasing relevance of personal preference in choice, have configured a new state in which women have the possibility to choose different lifestyles. According to their work

orientation and preferences (measured through a series of indicators in which women directly reveal their preferences), women are classified into three differentiated groups. In the largest group (about two thirds of the female population), *adaptive women* have no prevailing preference orientations, but “they want to enjoy the best of both worlds” (Hakim 2002) and live in the trade-off between family and career. This is the category researchers usually refer to when they treat women as a homogenous group. A second group of women are defined as *family-oriented*, and represent about 20 percent of the female population in modern society. For women in this category, children and family life constitute the main priority in their life, and higher educational attainments among these women are a way to obtain higher levels of social capital, but are not a tool to work. Finally, at the other extreme, *work-oriented* women represent about a fifth of all women. These women make work a priority in their life and they are predominantly childless women. In this case, educational achievements are directed toward a professional career, and they are prone to invest in specific skills and on-the-job training.

However, this heterogeneity among women is not observable in any modern country. While the United States and Great Britain represent the best example of countries in which women can choose a specific lifestyle, many European countries are still far from achieving this new scenario for women. Additionally, Britain and the United States both have large and diverse populations, ensuring that cultural diversity and differences in values are accepted, and

even welcomed. Many European countries have not yet come to terms with the ethnic, religious, and cultural diversity that generally ensues from decades of immigration (Hakim 2002).

To sum up, differences in preferences are responsible for a large share of the observed sex-differences among women in the labor-market. Based on this assumption, Hakim confers on women the status of “self determined” actors, and in so doing sets her approach apart from both socio-cultural and economic perspectives.

The social control theory

An alternative approach to most traditional theories posits that sex segregation is maintained by a lifelong system of social control. By social controls, sociologists refer to the mechanisms that a society has to develop in order to maintain any social division of labor.

Social control theory argues that rather than a central institutional structure existing that maintains sex segregation in the long run, there is a social control system that is operative at each stage of life. Sex-segregation derives from differences acquired in primary and secondary socialization, but also from gender tracking in the educational systems and sex-linked social control at the workplace, both at the hiring stage and beyond (Jacobs 1989). In other words, pressure for women to pursue jobs in female-dominated occupations does not end in early childhood, but continues into adult life.

Naturally, sex-role socialization is the first step towards occupational segregation by sex, but the values and beliefs of individuals at young ages are constantly being reinforced (Jacobs 1989). To sum up, without constraints on opportunity, socialization by itself would be insufficient to channel women into female-dominated occupations (Jacobs 1989:48)

Built on the ‘lifelong control’ thesis, the social control perspective defines its own place among the economic and socio-cultural theories. On the one hand, it claims the much of what economists would consider as being free choices are in fact the result of socialization and other forms of the internalization of values. On the other, social control theory also distinguishes itself from socio-cultural explanations by arguing that socialization should not be seen as a straight-jacket on individual initiative (Jacobs 1989). Even though people make their own choices in the context of prevailing norms and institutional constraints, they are, nonetheless, able to do it, even at the cost of being treated as social *deviants*. Indeed, evidence shows that while some people conform to their internalized values, others successfully challenge the constraints imposed upon them and do something very different.

Jacobs (1989), using U.S. data from the 1970s and early 1980s, showed that these decades represented a period of significant net movement by women into male-dominated fields. However, they also displayed substantial movement out of, or attrition from, male-dominated occupations, reproducing in that way the overall level of

sex segregation, despite the fact that the mobility pattern was bringing more women into male-dominated occupations. This bidirectional pattern was summarized by the metaphor “Revolving Doors” (Jacobs 1989), as opposed to the well-known “cumulative disadvantage” proposed by the previous version of the lifelong social control perspective. Under *cumulative disadvantage*, theorists meant that occupational segregation by sex is the result of the accumulation of obstacles women face in their professional trajectories (Jacobs, 1989). The *revolving doors* model of sex segregation, on the contrary, can account for extensive sex-type mobility because it recognizes a variety of stages in the career development process. Women will face different obstacles at various points, and while they are like to overcome some of those barriers, they will fail to pass others.

Jacob’s findings posed a major challenge to the theories predominant at the time. Specifically, they contrasted the two principal alternatives: the socialization approach, highlighting the acquisition of values early in life, and the human capital framework, emphasizing women’s rational self-selection for female-dominated occupations. First, Jacob’s empirical findings showed that, contrary to the logic offered by the socialization approach, occupational changes were evident among all age groups and not only a characteristic of the youngest female cohorts. Indeed, with the exception of educational level, a high mobility of women from male to female dominated jobs (and *vice versa*) was not determined by type. On the other hand, both the aggregate and individual changes

observed are inconsistent with an economic explanation of sex-segregation. The rapid reaction of women to the opportunities provided by the weakening of discriminatory barriers -women moved into male-dominated occupations as opportunities expanded- is hard to reconcile with the rationale that women's pursuit of female-dominated occupations represent the rational pursuit of individual self-interest over their lifetimes. Finally, according to the author, the core-peripheral distinction is not particularly powerful in informing our understanding of gender inequality at work. On the one hand, despite women being slightly more concentrated in the peripheral sector of the economy, there is nearly as much occupation segregation by sex within each sector as there is in the labor force as a whole. On the other hand, segmentation theories are not well suited to explain patterns of change (Jacobs 1989).

1.5. New challenges: Towards less segregation?

If economics is about how people make choices, sociology explains why people have no choice to make due to the constraints they face (Hakim 2002; England and Farkas 1986). The social control theory builds on the insight of these different perspectives; social control begins during early socialization, proceeds during the school years and is continued through various discriminatory processes on the job. Thus, social control theory reveals the importance of examining women's career in a dynamic framework, considering the

intersection of the careers of individual men and women within different dimensions of the occupational structure (Jacobs 1989).

Sex-segregation cannot be understood as the mere result of men's and women's self-selection processes into typical jobs. Indeed, there are continuous inputs and outputs in the occupational structure. In other words, women migrate from "typically female" jobs to "typically male" jobs and *vice versa*, making it necessary to carry out individual analyses that measure the stability and change in professional trajectories of both men and women. Undoubtedly, among the most noteworthy examples of positive change in the last few decades might be the significant increase of women in management positions (Jacobs 1992). However, the reasons for the dramatic movement of women out of male-dominated occupations still remain unknown. As pointed out by Jacobs (1989) reducing the high rate at which women leave male-dominated occupations may be an important route towards less sex-segregation of occupations. The unravelling of this apparent paradox represents the core of this dissertation.

From previous research we can deduce that women's exits from typical male jobs are related to the lack of performance-relevant skills necessary to do typical male tasks (Reskin 1993; Waite and Berryman 1986). Additionally, the aggravation of the conflict between work and family responsibilities in time-demanding occupations (Jacobs and Gerson 2004; Perchesky 2008; Blackwell 2001) have been shown to increase the probability of women's

departures towards female-dominated occupations. Some authors argue that women's mobility is due to women's preferences for "female" kind of work (Filer 1985 1990), while others contend that it is due to social constraints and pressures derived from the sex-composition of the occupations (Maume 1999; Glass 1990; Jacobs and Steinberg 1990; Reskin 1993). Additionally, *homophile behavior* (Walby 1986; Tomaskovic-Devey 1993) and *homosocial reproduction* explanations (Kanter 1977; Cassirer and Reskin 2000; Smith 1999) have stressed the significant problems of acceptance and integration that women encounter when they enter into male-dominated occupations, and its role in precipitating their exit from such occupations (Reskin 1993; Taylor 1981; Kanter 1977).

However, most of these explanations are tangential findings from more general studies or studies seeking other goals, and not the result of a systematic analysis of the process of women's attrition from typical male jobs. Therefore, this dissertation seeks to contribute to the literature reviewed above by offering a comprehensive analysis of a variety of theoretical statements and empirical strategies which allow us to evaluate the scope, determinants and impact of women's exits from traditional male occupations on women's careers.

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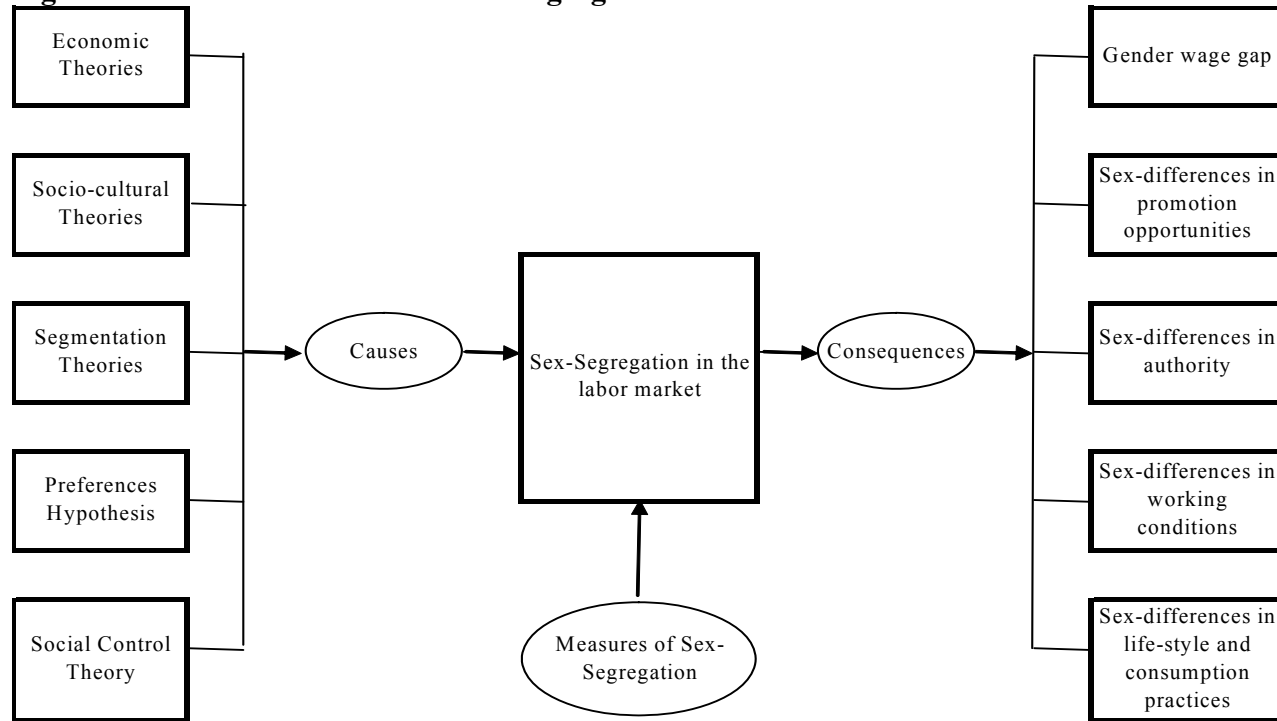
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Figure 1.1. Literature scheme on sex-segregation in the labor market.



Source: Own elaboration by the author

CHAPTER TWO

New challenges: Sex Segregation, occupational mobility and women's heterogeneity in the labor market.

2.1 Theoretical contributions

This dissertation seeks to expand and refine our understanding of sex-segregation in the labor market. The rapid changes that have taken place in recent decades regarding women's role both at home and work, have made traditional explanations incapable of accounting for current patterns of mobility and the persistence of segregation in modern times. As was seen in Chapter 1, a large amount of literature in this field has been concerned with self-selection processes to explain the channeling of men and women into sex-typical occupations. However, the high levels of career mobility between male- neutral and female-dominated jobs reported during the 1970s and 80s (Jacobs 1989) reveal the need to address the issue from a new perspective; and to consider segregation as the result of a dynamic process rather than a static phenomenon. Even though aggregate levels of segregation remain relatively constant

over time (Hegewish et al. 2010; Charles and Grusky 2004), there is actually continuous movement in the occupational structure. In other words, women migrate from “typically female” jobs to “typically male” jobs and *vice versa*, making it necessary to carry out individual analysis that measures both stability and change in the professional trajectories of men and women.

Throughout this dissertation I exhaustively examine women’s occupational mobility in the U.S. labor market, paying special attention to the striking movement of women out of male-dominated occupations. Why women leave typical male jobs continues to be a challenging conundrum to unravel, as less attrition of women from male-dominated occupations, would mean more progress was being made toward the integration of men and women in the workplace (Jacobs 1989). Thus, with the aim of shedding new light on this field, this dissertation carries out a comprehensive analysis that combines a variety of theoretical statements and empirical strategies that allow us to evaluate the scope, determinants and impact of women’s exits from traditional male occupations on women’s careers.

The empirical part of this dissertation is articulated in three independent -but interrelated- pieces of work in which different research questions are addressed. In the first part, I specifically account for occupational mobility trends in recent decades. In the second and third part, I deal in depth with processes of women’s attrition from male-dominated jobs.

First, Chapter 3¹² reexamines career mobility between male-dominated, gender-neutral, and female-dominated occupations in recent decades. Earlier research, using data from the 1970s and early 1980s, showed that along with significant net movement by women into male dominated fields there was also substantial attrition from male-dominated occupations. Women in the middle of their careers during the 1970s faced a much broader set of opportunities than they had anticipated when they were young. Indeed, many more found themselves employed, and employed more intensively, than they had anticipated during their formative years (Shaw 1983; Jacobs 1989). Thus, it may be that during this period, the connection between aspirations and subsequent outcomes was weaker than is generally the case. In this article, we examine whether this pattern of mobility is still evident in the U.S. by developing this possibility along with several other hypotheses regarding trends in sex-type mobility since the 1970s.

Specifically, we test three possible competing predictions for trends in gender-type mobility. The first prediction –what we termed “declining significance of gender”- contends that if over recent decades gender has become less salient as a defining feature of occupations, then it stands to reason that gender would become a less salient factor in explaining where people start and end up in the job market. Thus, barriers to gender-type mobility could well be expected to ease as the level of gender segregation in the labor market declines.

¹² Chapter 3 is coauthored with Prof. Jerry Jacobs (University of Pennsylvania)

The second hypothesis suggests that career mobility peaks during periods of rapid social change. We argue that during “period turbulence” there is a disconnection for many women between the traditional gender roles that young women grew up with and the expanded opportunities they confronted as they entered the labor market. In other words, the remarkably high levels of gender-type mobility documented by Jacobs (1989) between the late 1960s and early 1980s may have reflected the turbulence of those times, while the gradual transition to a ‘new normal’ level of gender segregation since that time might have led to a stronger association between origin and destination jobs, and lower mobility between male-neutral and female-dominated occupations.

A final possible explanation –that of “increasing differentiation among women”- is that increasing career opportunities resulted in the emergence of new lines of demarcation among women. Whereas the unplanned careers of the 1970s resulted in substantial mobility, increasing differentiation between women would lead one group to pursue jobs in male-dominated fields and another group to plan to take jobs in more traditional female-dominated fields. Consequently, career mobility among those pursuing jobs in male-dominated fields could involve moves to other male-dominated fields rather than switches to female-dominated fields. Thus, declining gender segregation in part reflects the increasingly developed careers plans of a minority of women who seek to pursue their careers in male-dominated fields. An inverse relationship is

predicted, namely that declining gender segregation in the labor market is linked with an increased association between the gender-type of jobs.

In Chapter 4, I move one step further and examine the specific reasons why women move out of male-dominated occupations. Over three thousand female job histories between 1979 and 2006 are analyzed in order to account for women's movement out of the male-dominated sector. In this way, this paper contributes to previous research by bringing together both individual attributes and work trajectories. In addition, the longitudinal perspective of this analysis allows us to evaluate the long-term effects of female attrition from male- to female-dominated occupations on women's careers. Due to the lack of a consolidated theoretical framework regarding the determinants of women's attrition from typical male jobs, the analytical strategy followed in this chapter is similar to the previous one. Here, I contrast different scenarios which represent alternative plausible relationships between women's occupational trajectories and their probability of attrition from male-dominated jobs.

Job mobility has been defined as a process of occupational attainment that is "generated by the individual to maximize status and income" (Sorensen 1974). Indeed, the term career implies some sort of progress, or at least coherence, to the posts people hold during their working life that produces a defined pattern of job histories (Spilerman 1977; Rosenfeld 1992). Consistently, only

those who expect some kind of gains are willing to change occupations, and gains are linked both to access and *success* in the new occupation. Taking this assumption as a departure point, I propose to test the following scenarios.

The first scenario follows the classical rational logic of both employees and employers. As regards the former, women entering the male-dominated sector are expected to stay there the necessary time to recoup their initial investments (Becker 1993; Mincer and Polacheck 1974). Likewise, employers will only invest in employees who are unlikely to quit their jobs (Breen 1997; Sorensen 2000; Tam 1997; Polavieja 2008). Moreover, all individuals would be on equal terms once they overcome the initial filters and are contracted. Therefore, under these conditions, it seems reasonable to anticipate greater levels of stability after women enter the male dominated sector and no effect of the previous occupational path.

The second scenario builds on the same ground as the previous, but introduces an important variation; prior trajectories can arguably have an unexpected effect on women's survival in male-dominated jobs, in a way that women cannot fully anticipate before entering. Arguably, women may not have complete information at the moment they move to the male-dominated sector, which can result in an increase in women's dissatisfaction, and accelerate their exits from male occupations (Kanter 1977; Waite and Berryman 1986). Thus, all other things being equal, attrition can be related in the

short term to newcomers' relative disadvantages when compared to current insiders, both men and women, who are already employed in typical-male occupations. Still, certain kinds of occupational paths can be interpreted in the labor market as a sign of a lack of commitment, loyalty or devotion to the job market and, specifically, to men's jobs. To the extent that this holds true, previous episodes of attrition from male occupations, as well as unemployment episodes and withdrawals from the job market would add to women's problems of integrations when they return to the male sector. If this holds true, we would observe that the probability of attrition is related to previous occupational trajectories and especially, to the sex-composition of the previous occupations.

The third and final scenario represents a situation in which observed mobility in the labor market is simply the byproduct of the *random mobility* of a group of women with low attachment to the labor market and high levels of job volatility and therefore not related to personal, occupational or career attributes. Thus, we would observe that women's departures from male-dominated jobs are neither related to women's attributes, nor to their previous trajectories in the job market.

Finally, in Chapter 5 I expand previous research by incorporating a new explanatory factor of job segregation, namely, job attributes. On the supply side, human capital scholars mainly explain sex differences in the job market as a consequence of sex differences in human capital investment and preferences for work. These

academics argue that women's interest in combining both work and family responsibilities pushes them both to invest less in education (Becker 1993[1964]; Mincer and Polachek 1974) and to choose jobs that offer a lower depreciation of human capital while unemployed. They also contend that women prefer jobs with flexibility and more pleasant working conditions, even though they may have lower wages, probabilities of promotion, prestige and authority than those of men (Polachek 1981; Marini and Britton 1984; Tam 1997; Filer 1985, 1990, 1989). Socio-cultural researchers, on the other hand, seek explanations in the socialization process, discrimination, institutional practices and feedback effects among them to explain the perpetuation of occupational segregation (Fernandez and Sosa 2005; Glass 1990; Reskin 1993; England et al. 1988; Jacobs and Steinberg 1990). By means of an exhaustive analysis of working conditions and job attributes for over 400 occupations, this paper seeks to contribute to the debate by directly testing the human capital assumptions about sex-differences in preferences for work.

The human capital perspective hypothesizes that the demands and skill requisites of an occupation determine mobility, rather than the gender composition of occupations. Here, I contend that for this to be true, two conditions must hold at the same time. First, that when men and women enter male-dominated occupations, they systematically choose occupations with a specific subset of attributes. In other words, work-related attributes should explain women's entry into the labor market. Second, that there is a pattern of occupation-related attributes that differentiate women who

remain or depart from a male-dominated sector. In other words, women's attrition from male-dominated occupations varies with occupational attributes.

A theoretical commonality throughout the empirical chapters is the assumption of a potential polarization between women in the binomial labor force/domestic work. The central thesis of this dissertation is that we are witnessing increasing differentiation between women in the labor market without which sex-segregation persistence cannot be fully understood. Although female workers have been commonly treated as a homogeneous group in the literature, recent changes in institutional and legal systems (Tomaskovic-Devey et al. 2006), in attitudes and values (Davis and Greenstein 2009; Cunningham et al. 2005; Rokeach 1974;), and especially gains in education (Buchmann et al. 2008) have resulted in a significant change in the distribution of men and women in the labor market. These changes lead us to think that women form an increasingly differentiated group, who exhibit varying outcomes and behavior in the job market.

Indeed, Hakim (2000, 2003) has already suggested that we can distinguish different "types" of women as far as their lifestyle preferences and their trade off between family and work are concerned. Specifically, Hakim classifies women into three differentiated groups¹³: *adaptive women* (with no prevailing preference orientations); *family-oriented women* (who make

¹³ For an extensive review on Hakim's hypothesis see Chapter One.

children and family life the main priority in their life); and *work-oriented women* (who makes work a priority in their life and are therefore predominantly childless women).

However this classification is not exempt from criticisms. On the one hand, Hakim's detractors argue that the causality nexus acts in the opposite direction, i.e. that person-specific circumstances and background factors are decisive to a person's orientation in life and thus determine decisions, while preferences do not causally explain behavior but simply shape and influence choices (Fagan 2001). In other words, her theory does not sufficiently take into account the fact that situational, structural and normative constraints might bias women's choices. On the other hand, a second relevant criticism concerns the indetermination of the sources that lead to preference heterogeneity among women. Indeed, Hakim not only has not provided an explanation as to why women differ in their preferences, but explicitly argues that preference theory is not the cause of core value differentiation. This is why in practice it is often hard to identify which empirical prediction could distinguish Hakim's model from the predictions that stem from both the socio-cultural and economic perspective (Polavieja 2008)

Additionally, Charles and Grusky (2004) have sought to account for the deepening division between women in the job market. By means of a comparative analyses, they show a significant reduction in the overrepresentation of men in upper nonmanual occupations (professionals) and of women in lower nonmanual occupations

(clerks), indicating a weakening trend of segregation among nonmanual occupations in advanced industrial countries. However, no changes in the segregation forms of manual workers are observed. Charles and Grusky claim that egalitarian forces have reduced vertical segregation in “non-manual” occupations (predominantly managerial, professional, sales and service jobs) by facilitating women’s entrance into high-status professional and managerial occupations. Nevertheless, because ideals of gender equality are combined with notions of gender essentialism -the belief that men and women are essentially different and have different skills and abilities- horizontal segregation persists. Thus, according to the authors, changes in segregation trends might be attributed to a breakdown of the cultural premise of *male primacy*¹⁴ in high-status occupations, but not in the others. Here again, a fair justification is missing of why the cultural change has exclusively taken place among a selected group of women.

The approach adopted here differs substantively from the two previous. Instead of focusing on revealed preferences or cultural assumptions as determinants of market outcomes, I consider achievements in the labor market as being a trigger for attitudinal and behavioral changes (Wright 2010). Departing from this assumption, I distinguish between two groups of women according to their outcomes in the job market: professional and managers, on the one hand, and workers from other sectors, on the other. The

¹⁴ By “male primacy” the authors refer to a belief that men are more competent or better- suited to positions of authority, leading to a “vertical” segregation of occupations (Charles and Grusky 2004:21)

relative improvement of professionals and managers over other female workers would shape the basis for two different observable patterns of mobility among these two groups; one devoted to high-status careers and the other who are less connected to the labor force. The rationale behind this differentiation is twofold. On the one hand, high-status workers not only register lower fertility rates, but they also have more available resources than low-status workers to afford private child-care and attend to other domestic responsibilities without having to abandon their positions. For example, highly skilled professional workers are either covered by the FMLA or may already have more generous employer-sponsored parental leave (Petit and Hook 2010). On the other hand, low-status workers not only are not always covered by the FMLA, but frequently they cannot afford to take unpaid time off from work or pay for private child care (Petit and Hook 2010; Gerstel and McGonagle 1999). Therefore, high-status workers in the US are better equipped to balance work and family life. Furthermore, women in high-ranking positions are required to develop specific skills that frequently are less transferable than general skills (that are more common among low-status occupations) (Tam 1997, 2000; Polavieja 2008), which limit their possibilities of changing their field of work. Throughout this dissertation, I contend that these differences in the availability of material resources and the degree of transferability of skills lead to both different mechanisms underlying women's decisions in the labor market and different outcomes.

This classification into two broad categories offers some important advantages. For example, it is easily operationalized into sizeable samples, and noticeably facilitates the interpretation of women's mobility in the job market. However, this classification can miss some important intra-group variations. Logically, it may be expected that some internal heterogeneity would exist, particularly among low-status workers (which incorporates women from a large variety of occupations -sales, service, clerical and blue-collar workers), but also among low-, medium- and top-level female workers. Thus, analyses must account for these potential variations among major occupational groups and conclusions must be carefully drawn.

Finally, this work predominantly focuses on the *supply-side*; that is, on the explanations centered on female and male attributes and choices. This does not mean in any way that I discard demand-side explanations. However, the evidence in support of the demand-side argument is mainly based on a residual approach and cannot be directly tested, but only inferred. Since accuracy of the residual approach depends crucially on there being an adequate vector of explanatory variables in the underlying function (Polavieja 2005, 2008), this dissertation attempts to be as exhaustive as possible in capturing factors influencing individual sex-type mobility.

2.2. Methodological contributions

Overall, this dissertation uses a variety of econometric techniques and methodological approaches to answer the questions raised in each chapter. Chapter Three for example brings together intra-generational mobility tables to examine mobility, and then multivariate analyses is employed to test whether the patterns of mobility found apply to a broad range of labor market settings and to individuals with a variety of demographic characteristics. Chapter Four adopts a life-course approach, using individual job histories to model women's attrition from male-dominated occupations. As a result, it makes an important contribution to the existing analysis by applying event history modeling that takes into account previous work trajectories, which I believe has been a key missing element in most studies of women's movement out from typical male occupations. Finally, Chapter Five contributes to the literature by carrying out an exhaustive analysis of working conditions and job attributes for over 400 occupations, which allows us to test the *supply side* argument about sex differences in preferences for certain kinds of work. The empirical approach is twofold; the first is descriptive while the second is analytical. The descriptive part of the analysis aims to demonstrate that there are sex differences both across and within sex-type occupations. In other words, it shows to what extent occupation-related attributes are currently (un-)equally distributed across male-, neutral and female-dominated occupations and to what extent men and women working in the same field equally are (un-)equally distributed. This

is followed by a set of multivariate probit regressions designed to test whether women's entries into, and exits from, typical male jobs can be explained by women's preferences for certain kinds of jobs.

One of the standard methodological problems in the previous research has been sample selection. Analyses of women's socio-economic achievements have been frequently identified in the literature as potentially affected by nonrandom selection of women in the labor market (see Winship and Mare 2002; Heckman 1979; Esping-Andersen and Przeworsky 2000). In parallel, it is also argued that the pattern of women working in the typical male sector cannot be random. One major contribution of this dissertation is to address this problem, especially in chapters three and five. In order to do so, I make use of one of the most common econometric approaches for causal inference to resolve sample selection problems; the two-stage Heckman's selection correction model. Additionally, I generate corrected standard errors generated by bootstrapping (Fox 2002). This is aimed at dealing with the potential inconsistency of covariance matrix generated by OLS estimators of the Heckman procedure that several critics have pointed out. The bootstrap is a method to derive properties of the sampling distribution of estimators by using the sample data as a population from which repeated samples are drawn and it is especially suited for multi-stage estimators, such as the two-stage estimator of the Heckman sample selection model (Cameron and Trivedi 2009; Schmidheiny 2010). However, correcting for selection bias is not uncontroversial. As pointed out by Esping-

Andersen and Przeworsky (2000) if selection occurs exclusively on observables, traditional techniques are well suited to correct this bias. Nonetheless, it is on unobservables that such controls only worsen the bias. Thus, results must be treated with care if evidence of sample selection bias is found.

2.3. Country choice: An analysis of the United States

The country choice of this study is mainly dictated both by context and the empirical strategy. Accordingly, the dissertation is based in the United States because of a variety of characteristics that make the American labor market especially interesting for the purposes of this analysis.

The female share of employment in the United States was 65.5% in 2008¹⁵ (OECD 2010), with over 80% of employed women working full-time. The USA therefore has a very different labor force profile than that of European countries such as Germany, Netherlands and UK –which all have fairly high rates of female participation (64.4% 70.2% and 66.9% respectively) mainly part-time (60% in the Netherlands and almost 40% in the Germany and UK)- and south European countries –with low levels of female participation (55.7% in Spain and 47.2% in Italy) and lower rates of part-time work (below 30%).

¹⁵ Data in this section are extracted from OCDE 2010 if no other source is specified

Certainly, labor force statistics in the US are rather similar to the Nordic countries, where the levels of female participation are very high (between 70% and 75%) and women are primarily working in full-time employment (the incidence of part-time is under 20%), but also have quite high sex segregation levels (Petit and Hook 2010). Interestingly enough, Denmark has about the same job mobility as the US when measured by the average number of years spent working for the same employer, as there are very few tenure-related benefits and there is very little job protection compared to most other European countries (Datta Gupta and Smith 2010). Additionally, since the late 1970s, the USA has registered a persistent increase in replacement level fertility. In 2008, the total fertility rate in the US records 2.12 children born per woman, a data only comparable with the Nordic Countries (1.89 in Denmark, 1.91 in Sweden and 1.96 in Norway).

High levels of fertility and of women's participation in the job market in Nordic countries have been attributed to generous maternity policies, public child care and the existence of a 'woman-friendly' labor market (Petit and Hook 2010). This is not at all the case in the US; women friendly policies are almost nonexistent in the United States. In 1993, the US congress passed the Family and Medical Leave Act (FMLA), a pivotal moment in work-family policy. Yet, the central provision of the FMLA (twelve weeks of unpaid, job protected leave) seems meager in cross-national comparison (Petit and Hook 2010). In addition, child care policy in the US is also less generous, in contrast to what is offered by some

advance industrialized nations. Denmark is the leader in Europe, although Sweden, Norway, Finland and France all exhibit relatively high rates of young children in public care (Morgan 2006). This unusual (even paradoxical) combination of factors makes the U.S labor market an interesting scenario and suggests that transitions from male to female-dominated jobs could be a strategy of female workers in order to balance work and family responsibilities.

One more pragmatic -but equally important- reason for choosing the US as a case study is the availability of nationally representative databases that are exceptionally extensive in terms of sample size (they provide a sizable sample of occupation changers), longitudinal design (which is required for the analyses of job histories) and the richness of information (as far as I am aware, no other country offers such detailed information on occupational attributes). These data, which will be described in the next section, enable us to carry out accurate and sophisticated analysis.

Finally, it could be argued that the cost of eliminating institutional variations between countries is too high, as the results obtained cannot be automatically extrapolated to other contexts. However, it is only by holding constant all the institutional macro-level effects that we can focus on the micro-level mechanisms of gender type mobility.

2.4. Data

The methodological strategies described here involve exhaustive work on data management, as they require data collection on individual attributes, job histories and work-related characteristics. Throughout this dissertation I make use of four different data sources. The first data source (Chapters Three and Five) is the Current Population Survey (CPS). This monthly survey, sponsored jointly by the Census Bureau (CB) and the Bureau of Labor Statistics (BLS), is primarily a labor force survey. It covers about 57,000 households, in which approximately 112,000 persons aged 15 and over are interviewed. The March surveys include information on the longest job held during the previous year as well as data on the current job, thus allowing for an analysis of occupational mobility over a one-year time period. The CPS surveys provide detailed (3-digit) occupational data, which enable us to code the gender composition of specific occupations and to capture occupational shifts that would be missed if only a limited set of broad occupations were measured. Additionally, the large sample size provides a large group of occupational changers that is considerably higher than for other surveys, and is particularly interesting for the purposes of this thesis.

Chapter four requires the use of longitudinal micro-data in order to apply event history modeling. Specifically, this chapter uses the National Longitudinal Survey of Youth Labor Market Behavior for 1979 (NLSY79) as the main source of data. Sponsored by the

Bureau of Labor Statistics (BLS), this survey comprises a nationally representative sample of 12,686 young men and women born in the 1950s and 1960s. The interviewees were 14 to 22 years of age when first surveyed in 1979, and were followed annually until 1994 and biannually after that. During the years since the first interview, these young people typically had finished their schooling and entered the labor market. However, although a primary focus of the NLSY79 survey is labor force behavior (labor force information includes hours worked, earnings, occupation details, industry, benefits, and other specific job characteristics), the content of the survey is considerably broader. For example, the survey includes detailed questions on educational attainment, investments in training, and marital and fertility histories. Among those considered eligible for interview, retention rates for NLSY79 remained close to 90 percent during the first 16 interview rounds, and were approximately 85 percent for posterior rounds, and around 78 percent by the end.

Information on occupational attributes (Chapter Five) is provided by the O*Net dataset, which is overseen by the US department of Labor/Employment and Training Administration. This dataset contains occupation-specific descriptors for 449 occupations in the United States. Previous literature dealing with occupational characteristics used to draw on information from the Dictionary of Occupational Titles (DOT). However, the O*net database offers some advantages over the DOT. For example, DOT information is mostly limited to occupational tasks, while the O*net program

offers more varied information. Specifically, it offers up to 227 descriptors on job-specific tasks plus information on the knowledge, skills and abilities required for each occupation. In addition, the DOT was last published about two decades ago, and that was only a revision of the 1977 4th edition. The O*net database is completely updated every 5 years, with partial (15-25%) annual revisions. Moreover, data were initially collected from occupational analysts and then updated by the use of rolling surveys of each occupation's worker population, with added information from occupational experts. This method of data collection represents another advantage of this data source, as it permits us to overcome the dilemma between objective and subjective indicators, and allows accurate factors to be created.

Finally, Census data from 1980, 1990 and 2000 are also employed to measure the gender composition of occupations. In all three chapters, census categories have been standardized to enable a comparison across years. At this point, it is worth mentioning that the changes between the 1980 and 1990 census categories were relatively minor, while the changes between 1990 and 2000 were more substantial.

2.5. The dependent variable

Throughout this dissertation, the dependent variable is operationalized as a three-category nominal variable that classifies

occupations into male-, neutral and female-dominated, according to their sex-composition. Male-dominated or female's "nontraditional" employment is defined according to the Women's Bureau of the U.S. Department of Labor as encompassing all occupations in which women represent 25% or fewer of the total employees (Women's Bureau 2007). By symmetry, female dominated or women's traditional occupations are those where the female labor force represents over 75% of the total. The definition of (a)typical employment in this work is a little bit wider. Specifically, I classify occupations as *male-dominated* when females represent 33.3% or fewer of total employees, and as *female-dominated* when the proportion of men is one third or less. The remaining occupations are defined as *sex-neutral*¹⁶. The reasons to enlarge the standard definition of traditional employment are basically twofold. Firstly, it makes my analyses comparable with results for the 60s and 70s (Jacobs, 1989), which allows me to assess whether mobility patterns for men and women remain the same or have changed over the past thirty years.

Secondly, by using this definition, I am able to capture a more equivalent percentage of professionals and management level employees in male and female occupations. Some previous studies have been concerned with the number of typically male or female occupations (Oppenheimer 1969). Indeed, as we can observe in

¹⁶ The full list of occupations by sex-type composition and year is shown in Appendix 1. Occupational categories are standardized into 1990 categories.

Table 2.1.¹⁷, both the number of male- and female-dominated occupations has decreased in benefit of the number of neutral-occupations from 1980 to 2000.

(Table 2.1. about here)

Nevertheless, the number of occupations tells us little or nothing about their relative significance in the labor market. For this reason, the classification proposed here gives weights to occupations according to the number of employees. In the 1990 census, managers and professionals represented 25.4 % of workers employed in male-dominated occupations, and 32.9% were employed in female occupations. These percentages increased to 36.5% and 36.4% respectively in the 2000 census. This equivalence is of key importance in order to deal with endogeneity problems that may derive from an unequal distribution of professional and managerial representation in male and female sectors. In other words, guaranteeing that professional and managerial employment rates are about the same in both male and female-dominated fields, ensure that moves between gender-typed occupations are not unavoidably linked to the composition of the occupational structure in itself. A more detailed occupational classification (four-digit detail) would be ideal for us to be able to distinguish between high-status and low-status professional/managerial occupations.

¹⁷ Occupational categories standardized into 1990 categories. Male-, neutral and female-dominated occupations defined as above.

Unfortunately, only three-digit codes are available in the data sets employed here.

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Table 2.1.: Number of occupations by main occupational groups and sex-type occupations, 1980-2000.

	1980		1990			2000			1980		1990		2000	
	Total	Total	Total	*M	N	F	M	N	F	M	N	F		
Managers	26	28	49	13	13	0	8	17	3	12	33	4		
Professionals	113	127	114	64	30	19	63	41	23	44	46	24		
Sales	23	23	19	10	7	6	8	12	3	3	13	3		
Clerical	61	55	54	10	20	31	5	17	33	5	15	34		
Service	44	44	53	17	10	17	15	8	21	21	16	16		
Farming	18	19	13	14	3	1	15	3	1	10	1	2		
Blue-collar	186	175	169	146	31	9	141	27	7	137	23	9		
Total	471	471	471	274	114	83	255	125	91	232	147	92		

M=male-dominated; N=Neutral; F=Female-dominated

Source: Calculated by the author from Census 1980, 1990, 2000.

CHAPTER THREE

The gender mobility paradox: Gender Segregation and Women's Career Mobility, 1970-2006

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This paper reexamines career mobility among male-dominated, gender-neutral, and female-dominated occupations. Earlier research, employing data from the 1970s and early 1980s, showed that along with significant net movement by women into male dominated fields, there was also substantial attrition from male-dominated occupations. In this paper, we examine whether this pattern of mobility is still evident in the U.S. labor market. There are several reasons to expect that the patterns evident during the 1970s may have changed since that time. While increased opportunities for women since the 1970s might lead to the expectation that women's career mobility has increased, in fact the results point in the opposite direction. The findings indicate that levels of occupational mobility among female, gender neutral and male occupations have decreased considerably over time. We suggest that this is the result of increasing differentiation among

women, and in particular that a segment of women seek to enter male-dominated fields and are more successful in achieving these goals than they were four decades ago.

Keywords: gender segregation, sex-type mobility, women's career, women's heterogeneity

3.1. Introduction

Recent decades have seen dramatic changes in women's labor force participation, educational levels, and earnings prospects. Nonetheless, women and men continue to be concentrated in different occupations. In 2008 we find that 50 percent of women in the USA would have had to change occupations in order to be distributed in the same manner as men. This level of segregation is substantially lower than the index of 70 found in 1970, and has been inching down slowly since 1990. A detailed study of trends since 1990 concludes that there has been virtually no progress on this indicator since 1996 (Hegewish et al. 2010).

Gender segregation in the workplace continues to be the subject of considerable scholarly inquiry (Krymkowski and Mintz 2008; Cohen and Huffman 2007, 2004, 2003; Huffman and Cohen 2004; Cotter et al. 2003; Cotter et al. 1997; Tomaskovic-Devey 2006). However, few of the recent studies of gender segregation have

examined this topic from the point of view of women's careers. What career dynamics underlie this trend toward declining segregation? Are the patterns the same as those first documented during the 1970s?

It is natural to assume that high levels of gender segregation must make career mobility between male-dominated and female-dominated occupations difficult, if not impossible. A starkly segregated occupational landscape must be built upon formidable barriers to entry. However, Jacobs (1989) documented extensive movement between male-dominated, sex-neutral and female-dominated occupations. In Jacob's study, evidence documenting extensive sex-type mobility was drawn from a variety of large-scale data sets. Sex-type movement was found not to be restricted to occupational mobility, as the same general pattern was evident with respect to career aspirations, as well as movement across college majors.

Later Levine and Zimmerman (1995) reexamined Jacob's findings and argued that he actually understated the extent of women's career mobility. In particular, they reported that the connection between gender-typed aspirations and career outcomes is extremely weak. Specifically, they found little change in the overall association across gender-typed jobs between the 1968 cohort and the 1979 cohort of young women. However, in some of their analyses Levine and Zimmerman suggest that there might be an increased tendency for women in the more recent cohort to aspire

to, and succeed in, pursuing a career in a male-dominated occupation.

This pattern seems paradoxical: How can high segregation coexist with high rates of mobility? Why do high rates of mobility not ‘whittle away’ at the edifice of segregation, and ultimately undermine this enduring structure? The answer is that gender segregation persists because of substantial attrition of women from male-dominated fields. The findings presented here deepen the paradox. Not only do high levels of segregation coexist with high levels of mobility, but declines in the level of gender segregation coincided with declines in the level of sex-type mobility.

The majority of the empirical evidence on gender-type mobility was amassed during the 1970s, although some pertained to the late 1960s and the early 1980s as well. It may be that mobility during this period was higher than usual. Women in the middle of their careers during the 1970s faced a much broader set of opportunities than they had anticipated when they were young. Indeed, many more found themselves employed, and employed more intensively, than they had anticipated during their formative years. Lois Shaw (1983) captured this process well with the term “unplanned careers.” Thus, it may be that during this period, the connection between aspirations and subsequent outcomes was weaker than is generally the case. We develop this possibility along with several other hypotheses regarding trends in sex-type mobility since the 1970s. However, as we will see, trends since that time are consistent

with more than one kind of framework. In order to differentiate fully between these alternatives, we use a data set on women's career mobility from after the turbulence of the 1970s, which enable us to effectively test alternative explanations.

The organization of the paper is as follows. The next section presents the three possible competing predictions for Trends in Gender-Type Mobility. This is followed by the hypotheses and the basis for our view that the third scenario is the most plausible. Next, we describe the data to be analyzed and the methodology employed, followed by the results of these analyses. The last section discusses the conclusions.

3.2. Predictions for trends in gender-type mobility

Taking into account changes in women's prospects in education and job market participation, three possible competing predictions for trends in gender-type mobility are offered here.

Prediction 1. The Declining Significance of Gender

The first prediction regarding gender-type mobility is that declines in gender segregation coincide with declines in barriers to movement between male-dominated and female-dominated occupations. If gender has become less salient as a defining feature

of occupations, then it stands to reason that gender would become less salient to demarcate origin and destination jobs. Thus, barriers to gender-type mobility could be expected to ease as the level of gender segregation in the labor market declines.

Prediction 2. Period Turbulence

This hypothesis suggests that career mobility peaks during periods of rapid social change. In other words, the remarkably high levels of gender-type mobility documented during the late 1960s, '70s and early '80s, may have reflected the turbulence of those times. Specifically, there was a 'disconnect' for many between the traditional gender roles that young women grew up with and the expanded opportunities they found available as they entered the labor market. This disconnect may have been responsible for the 'revolving door' pattern of gender mobility documented by Jacobs and others. If the 1970s period was distinctive in this regard, the gradual transition to a 'new normal' level of gender segregation in the labor market since that time could be link with a greater association between origin and destination jobs, and lower mobility between them. In other words, during periods with a broad congruence between gender-role socialization and the labor market that young women will enter, the gender-type association will be relatively strong, while during periods of disconnect, the relationship may diminish in strength.

Prediction 3. Increasing Differentiation Among Women

A final possibility is that increasing career opportunities resulted in the emergence of new lines of demarcation among women. Declining gender segregation in part reflects the increasingly developed careers plans of a minority of women who seek to pursue their careers in male-dominated fields. Whereas the unplanned careers of the 1970s resulted in substantial mobility, increasing differentiation among women could lead one group to pursue jobs in male-dominated fields and another to plan to take jobs in more traditional female-dominated occupations. Consequently, career mobility among those pursuing jobs in male-dominated fields could involve moves to other male-dominated occupations, rather than switches to female-dominated fields. This increasing differentiation among women could simultaneously be associated with lower levels of gender segregation in the labor market, as well as lower degrees of mobility between male-dominated and female-dominated jobs. Thus, an inverse relationship is predicted: namely that declining gender segregation in the labor market coincides with increasing association between the gender-type of jobs.

These three expectations are mapped in Figure 3.1. Panel 1.A shows the expectation that declines in gender segregation would coincide with a decline in gender-type association. Thus, declining segregation would erode barriers to mobility between male-dominated and female-dominated fields, resulting in a declining association between the gender-type of origin and destination jobs.

Panel 1.B depicts the turbulence hypothesis, which proposes that the historical trajectory of gender-type immobility is curvilinear: high during periods of traditional gender-roles, high during periods of greater gender-role integration, and low during the turbulent transitional period. Panel 1.C depicts the expectations derived from increasing differentiation among women, and shows gender-type association increasing as the level of gender segregation across occupations declines.

(Figure 3.1. about here)

To recap, the main goal of this paper is to show that women plan their careers in a more efficient manner than they did 25 years ago, thus contributing to mobility rates that are considerably lower than in past decades. The reasons why we agree with the last of the three scenarios outlined above, will be detailed in the next section.

3.3. New patterns of occupational mobility: Increasing differentiation among women.

The increasing number of women entering professional and managerial fields in the U.S. in recent decades is not in doubt. In fact, the surge in the number of female managers is perhaps the most dramatic shift in sex composition within an occupation since clerical work became a female-dominated field in the late

nineteenth century, and it accounts for one-quarter of the decline in occupational sex segregation since 1970 (Jacobs 1992). The gains of women who enter high status jobs have been widely studied in the literature, in terms of (in)equality with respect to their male counterparts (Reskin and Roos 1992; Smith 1990; Jacobs 1992). Also, there is little doubt that professional and managerial women have made enormous improvements in their professional situation when compared to other women employed in other sectors of the economy; such as blue collar occupations, clerical, service or sales jobs.

This relative improvement among professionals and managers has resulted in deeper divisions among women (those devoted to high-status careers, on the one hand, and those more marginally connected to the labor force on the other); and represents the basis for two different observable patterns of mobility among these two groups. The first group is expected to be characterized by two main features: greater career stability accompanied by an increase in gender-type association mobility. High-status workers not only register lower fertility rates (Brewster and Rindfuss 2000), but they also have more resources available to be able to afford private child-care and attend to other domestic responsibilities, without having to abandon their positions. In fact, empirical evidence also shows that they return to work more quickly than women with lower levels of education (England and Folbre 2005). Besides, women in high-ranking positions are required to develop specific skills that are frequently less transferable than general skills (Tam

1997, 2000; Polavieja 2008). That lack of transferability makes workers more likely to remain longer in the same occupational field, and means that occupational fields are more often gender-defined. Based on these two reasons, we expect professional and managerial women to enjoy higher rates of stability in the following sense:

- i) High-status female workers will have a lower probability of changing occupations
- ii) When changing occupations, high-status female workers will show high levels of sex-type association

The second group includes all other female workers; that is, women employed in the clerical, sales and service sectors, as well as those in other blue collar occupations. On the one hand, withdrawal penalties may be lower in these kinds of jobs than in higher-level jobs (Polachek 1976). On the other hand, work is less effort-intensive and requires less specific-skills, allowing women to shift from one labor market field to another, where only general and transferable skills are required. Following the logic of the last two points, it seems reasonable to expect the following:

- iii) Low-status women will exhibit greater probabilities of changing occupations than professional or management level female workers.
- iv) When changing occupations, low-status women will exhibit lower sex-type association levels

In brief, our intuition is that women's capacity for planning careers does not apply to all women in the same way. In recent years, women have become increasingly differentiated; whereas a minority of women now tend to plan their job careers more efficiently, (resembling men), this process still represents a challenge for other groups of women.

3.4. Data

The data set used is the March Current Population Survey (CPS), a monthly survey conducted by the Bureau of the Census for the Bureau of Labor Statistics in the United States. The sample covers about 57,000 households, in which approximately 112,000 persons who are 15 years old or over are interviewed. The March surveys include information on the longest job held during the previous year as well as data on the current job, thus allowing for an analysis of occupational mobility over a one-year time period. Specifically, we analyze the March 1992 and 2006 CPS data, which provides information about occupational changes between 1991-1992 and 2005-2006 respectively. The results are contrasted with Jacob's 1981 CPS findings (1989).

These surveys offer several advantages over other available surveys in the United States. The CPS surveys provide detailed (3-digit) occupational data, which enable us to code the gender composition

of specific occupations and to capture occupational shifts that would be missed if only a limited set of broad occupations were measured. Additionally, it provides a sizable sample of occupation changers that is considerably higher than is present in other surveys. Since our analyses are mostly limited to female occupation changers, it is important to be able to draw upon a substantially sized sample.

Census data from 1990 and 2000 are also employed to measure the gender composition of occupations. We classified occupations into female, neutral or male, according to the proportion of men or women in each job, and these categories have been standardized to enable a comparison across years¹⁸. Male-dominated occupations have been defined as having a proportion of females below 33.3%. Those with female composition of between 33.3% and 66.6% are called Gender Neutral; while occupations with female participation higher than 66.6 % have been defined as Female.

3.5. Methodology

We examine trends in mobility via occupational mobility tables. Additionally, multivariate analyses are applied to indicate whether

¹⁸ The changes between the 1980 and 1990 census categories were relatively minor, while the changes between 1990 and 2000 were more substantial. We reclassified the 2006 data using the 1990 occupational categories in order to determine whether any changes observed might be due to changes in occupational coding, rather than changes in women's behavior. The results obtained did not differ substantially with the recoded data.

the patterns found apply to a broad range of labor market settings and to individuals with a variety of demographic characteristics.

Occupational mobility

In this article we deal with intra-generational or career mobility. Here, the concepts of ‘origin’ and ‘destination’ represent two different points in each individual occupational trajectory.

Our analysis focuses on individuals who change occupation over a one year period; especially women. In other words, we take into account only those individuals who have worked over the previous year; and exclude the unemployed, those who dropped out of the labor market, and those who entered it, during this period. The potential selectivity of women into employment must also be taken into account when making empirical generalizations (Petit and Hook 2008; Salido 2001)

The probability of changing occupation

As discussed in the literature reviewed, both socio-demographic characteristics of the individual and employment features are commonly associated with women’s probability rate of occupational change, as well as with female mobility patterns. We expect occupational shifts to be explained both by individual characteristics and the characteristics of current and new jobs. [If we define a dichotomous dependent variable that equals 1 if women

change occupations from one year to the next, and 0 otherwise, the probability of occupational change can easily be estimated using a probit model¹⁹. More specifically, the estimated model can be formally written as:

$$(1) \quad \Phi^{-1}(p_i) = \beta X_i + \gamma L_i + \varepsilon_i$$

where p_i is the probability that $y_i=1$ and $\Phi^{-1}(p_i)$ is the inverse of the cumulative distribution function of a standard normal variable. X is a vector of demographic variables that includes controls for women's age, educational attainment, marital status and the presence of young children (under 15) in the household. Additionally, we add L , a vector of variables that describes work-related characteristics; namely the gender composition of the last occupation, full-time vs. part-time employment, and an indicator to distinguish high-status workers (professionals and managers) from low-status workers (the rest). Statistical descriptive for 1992 and 2006 are shown in Table 3.1.

(Table 3.1. about here)

¹⁹ All regressions have been estimated using a probit and a logit model, with no significant differences. The chief differences between probit and logit rests on the distributional assumptions of the latent variable; while the logistic has slightly flatter tails, the probit curve approaches the axes more quickly. The conventional wisdom is that in most cases the choice of the link function is largely a matter of taste, and that both provide identical substantive conclusions (Greene 1997; Gill 2001).

However, the relevant literature has frequently argued that analyses of the socioeconomic achievements of women are potentially affected by the nonrandom selection of women in the labor market (for example, see Winship and Mare 2002; Heckman 1979). In our particular case, the rationale behind this is very simple; women's choices regarding whether or not to work are not made independently of perceived occupational opportunities. If being in the labor market is not random, given a woman's observed characteristics, the average observed rate of occupational change is potentially subject to a self-selection bias. As result, probit coefficients may be biased too (Heckman 1979).

Self-selection bias is tackled using Heckman's two-stage procedure. The selection equation is estimated by maximum likelihood as an independent probit model to determine the decision to join the labor market using information from the whole sample of members and nonmembers. The following selection equation estimates the probability of women i being in the labor force:

$$(2) \quad \alpha_0 + \alpha_1 * \text{age} + \alpha_2 * \text{age}^2 + \alpha_3 * \text{educational attainment} + \alpha_4 * \text{children in household} + \alpha_5 * \text{married} + \alpha_6 * \text{relative size of major occupational groups} + \varepsilon_{2i} > 0$$

where socio-demographic variables are defined as in equation (1). To improve identification, we add an extra variable that is included only in the selection equation (Pearl 2000). As we were unable to find any useful instruments that provide measurement at the

individual level, we constructed an aggregate instrumental variable following Holms and Jaeger (2010). Specifically, we constructed a measure of the relative size of each major occupational group at t-1. The idea behind the use of this variable is to capture the structural difficulty of entering the job market, depending on the kind of position that an individual seeks to fill.

An Inverse Mills Ratio (estimated expected error) is generated from the parameter estimates (Greene 2000). The probability of occupational change in equation (1), p_i , is then regressed on the explanatory variables and the Inverse Mills Ratio from the selection equation. Thus, the second stage re-estimates the regression with the estimated expected error included as an extra explanatory variable, removing the part of the error term correlated with the explanatory variable and avoiding the bias. Sample selection bias has been corrected by the selection equation, which determines whether an observation makes it into the nonrandom sample. The existence of selection bias can be investigated by testing the statistical significance of the Mills coefficient (Kennedy 1998).

Critics of this procedure have pointed out however that the covariance matrix generated by OLS estimation of the second stage can be inconsistent. To deal with this limitation, corrected standard errors are additionally generated by bootstrapping (Fox 2002). The bootstrap is a method that derives properties of the sampling distribution of estimators by using the sample data as a population from which repeated samples are drawn. It is especially suited for

multi-stage estimators, such as the two-stage estimator of the Heckman sample selection model (Cameron and Trivedi 2009; Schmidheiny 2010). Specifically, the bootstrap takes the sample (the values of the independent and dependent variables) as the population and the estimates of the sample as true values. Instead of drawing from a specified distribution (such as the normal) by a random number generator, the bootstrap draws with replacement from the sample. It therefore takes the empirical distribution function (the step-function) as true distribution function (Schmidheiny 2010)

The second part of the analysis focuses on women's shifts from female- to male-dominated occupations and *vice versa*. In the case of women entering into male-dominated occupations, the dependent variable y_i' equals 1 when women change from a female-dominated job to a male dominated job and 0 otherwise. The estimated model can be written as follow:

$$(3) \quad \Phi'^{-1}(p'_i) = \beta'X_i + \gamma'L_i + \varepsilon'_i$$

where p'_i is the probability that $y'_i=1$ and vectors X and L are defined as in equation (1). Again, potential sample selection bias is controlled as specified above.

Finally, we analyze women's attrition from male-dominated jobs. Here, p''_i represents the probability that $y''_i=1$, in other words, the probability that a woman i shifts from a male- to a female-

dominated occupation. Consistent with the previous model, the estimated model is:

$$(4) \quad \Phi^{-1}(p_i) = \beta'X_i + \gamma'L_i + \varepsilon_i$$

However, a new problem of sample selection has now arisen, because it could be argued that the universe of women working in the typical male sector is not random. In the same manner as in the previous section, we deal with potential self-selection bias using the Heckman two-stage method of estimation for Probit models, with sample selection and additional bootstrapping to obtain corrected standard errors. In this case, the selection equation estimates the probability of a woman i to be working in a male-dominated occupation and is defined by:

$$(5) \quad \mu_0 + \mu_1*age + \mu_2*age^2 + \mu_3*educational\ attainment + \mu_4*children\ in\ household + \mu_5*marital\ status + \mu_6*full-time\ employment + \mu_7*\text{professional/manager} + \mu_8*\text{relative size of major occupational groups in the male-dominated sector} + \varepsilon_{3i} > 0.$$

with the last variable being a measure of the relative size of major occupational groups in the male-dominated field at $t-1$. This instrument is aimed at capturing the difficulty of being employed in the male sector in function of the desired position of the individual. The remaining variables are defined as above.

3.6. Results

In this section, we examine patterns of movement for both men and women over three different periods; 1980-81, 1991-92 and 2005-06. To do so, we first examine mobility through occupational mobility tables. Second, we present multivariate analyses to determine to what extent mobility patterns are related to socio-demographic and work-related characteristics.

Patterns of mobility

The upper panel on Table 3.2. presents the ratios of mobility between male-dominated and female-dominated occupations in the three transitions under study. The values, as can be observed, increase notably over time for both men and women, indicating that the destination of occupation is becoming more dependent on the sex type of origin occupation for both sexes. Specifically, for females, the odds ratio value raises from 1.9 in 1981 to 6.7 in 2006, while the increase for men is still higher, rising from 3.3 in 1981 to almost 10 points in 2006.

(Table 3.2. about here)

The second panel in Table 3.2. presents a cross-tabulation of the sex type of a woman/man's detailed occupation in 1980 by the sex-type of woman/man's detailed occupation in 1981. The same is repeated for the transitions between 1991-92 and 2005-06. Cross-tabulations

are based on three categories: male dominated (less than 33.3 percent female); sex-neutral (33.3-66.6 percent female) and female dominated (over 66.6 percent female) and restricted to individual occupational changers. In general terms, the degree of female movement has diminished in recent decades, as the relative number of women entering male dominated occupations has decreased over time, as well as the number of women who have left these occupations. Moreover, sex-type association has increased from 1980 to 2005 (the group found in the main diagonal), with the increment being considerably higher within female and neutral occupations than within male-dominated occupations. For males, levels of sex-type association are also higher in 2006 than 25 years ago, and particularly within female occupations.

Summing up, we observe a pattern of greater occupational stability compared to the early 1980s, with a sex-type correlation rising from 0.11 in 1981 to 0.28 in 2006 for women, and to 0.36 for men. To observe this result graphically, Figure 3.2. displays the trends for both women's sex-type association and segregation in the job market from the 1970s to the present day. The sex-type association level indicates, as pointed out above, the correlation between the sex-type of origin and the destination occupation. To measure the level of segregation, we use the index of dissimilarity D^{20} (Duncan and Duncan, 1995), which reflects the proportion of either group

$$D = \sum_{i=1}^n \left| \left(\frac{W_i}{W} \right) - \left(\frac{M_i}{M} \right) \right| \times 100 \times \frac{1}{2}$$

W_i = number of women in occupation i ; W =total number of women; M_i =number of men in occupation i ; M =total number of men; n =number of occupations.

(men or women in our case) that would have to change occupation to bring about a perfect correspondence between the sex-composition of each occupation.

(Figure 3.2. about here)

Segregation levels have declined almost 20 percentage points since the 1970s, the decrease being more noticeable from 1970 to 1980 and relatively constant since the 1980s. The sex-type association trend goes in exactly the opposite direction, increasing from nearly 0% in the 1970s to more than 30% in 2007. That ascent has not been uniform; it also accelerates significantly from the 1980s to the present day. Therefore, the empirical findings support the aforementioned third scenario; since mobility and segregation levels are both declining.

However as previously argued, we suspect that this stability does not affect all female workers in the same way, and plausible reasons have been provided above to posit a dual pattern in women's occupational mobility. According to our hypothesis, professionals and managers possess certain characteristics, both personal and professional, that make them more likely to remain in the same field when changing occupation. To see whether this is the case, Table 3.3. shows the correlation in sex-composition for men and women changing occupations in 1991 and 2005, disaggregated by socio-demographic characteristics.

(Table 3.3. about here)

Sex-type mobility has been, and still is, significantly lower for men than for women. Independently of their age, educational level, marital status or parental situation, men who change occupations are more prone to end up working in jobs with a similar gender composition than their female counterparts. This tendency holds for both 1992 and 2006; despite the fact that the degree of difference attenuates over time for particular groups. Among women, the destination of occupation becomes more dependent of the sex-type of origin in 2005-06. According to our expectations, this association is especially remarkable for women in the mid age range (35-54), and for highly educated women (some college education or more), and slightly higher among non-mothers.

The same general picture applies when we disaggregate sex-type association by professional category or work status. The broad spectrum shows that men tend to enjoy greater levels of gender-composition stability when changing jobs, with the only exceptions being workers from the farming and construction sectors. However, it is worth mentioning that there is a notable increase in sex-type association for female professionals in 2006, which rises from 22 to 43 percentage points, and even surpasses the male score (at 42 percentage points). On the contrary, for workers in the service, sales and clerical²¹ sectors, the sex-composition of origin and destination

²¹ The number of women working in farming or construction occupations is considerably lower than it is for men. Results must be carefully interpreted.

occupations continue to be highly independent, confirming our expectation that there is an increasing divide between high- and low-status workers. Finally, females changing within full-time jobs have closely matched male levels, with an increase of 11 points from 1992 to 2006. The increase in women ending up in part-time occupations is also striking, with what could be a collateral effect resulting from the progressive concentration of part-time jobs in sales and clerical occupations within the female-dominated category. In this case, these results would represent a statistical anomaly, since clerical and sales occupations were not proportionally distributed across male, neutral and female fields.

(Table 3.4. about here)

Multivariate analyses

The following multivariate analyses are designed to test whether the recent patterns found above in the mobility tables apply to a broad range of labor market settings and to individuals with a variety of demographic and work-related characteristics. As outlined above, we are going to deal with this question in two steps. First, we examine whether some women are more prone than others to changing occupation. Second, we determine which of these features will affect sex-type mobility once those women have changed occupations.

Table 3.5. shows the results of the simple and the two-stage probit model²² estimated for 1992 and 2006. In general terms, results are quite consistent across models and time, especially concerning work-related characteristics. On the other hand, for both years the Inverse Mills Ratio coefficient is not statistically significant, which means that our models would not suffer from any self-selection bias.

(Table 3.5. about here)

Surprisingly, we do not observe any effect of educational level on the probability to change occupations. Everything else being equal, no significant differences between high- and low-educated women are observed for either 1992 or 2006. Other socio-demographic variables appear more relevant in explaining the probability of changing jobs. As we were able to anticipate from the correlation tables, the age effect is a non-linear one, indicating that women are most stable in the middle of their professional careers. However, this effect vanishes after controlling for potential sample selection in 2006. Having young children in the household also has a negative impact on the probability of changing jobs, but the effect is only significant at the marginal level in 2006.

As for work-related controls, variables behave in the expected way and results are very consistent after controlling for selection bias.

²² Results of the Heckman two-stage probit model before and after bootstrapping are mostly the same. Due to space limitations, I only present the results of the model after bootstrapping. Other results are available upon request.

First, professionals and managers change jobs at a lower rate, confirming our prediction that women in the most prestigious occupations have consolidated their gains (at least in terms of stability) over the other female workers. Also, greater levels of stability are found among full-time employees. It is striking that the effect of being employed in a typical male occupation exhibits reverse effects across time. While being employed in a male-dominated occupation significantly increased the likelihood of changing occupations between 1991 and 1992, exactly the opposite happened in 2005.

In summary, full-time workers, employed in the professional and managerial sectors and working in typical male occupations, have experienced lower levels of occupational mobility over time. To what extent has this occupational stability been accompanied by an increase in sex-type association? Once workers change jobs, what is the relationship between the sex-composition of the occupation of origin and destination?

To answer these questions Table 3.6. reports results for the probability of changing occupations across sex-type boundaries in 1991 and 2006. The left side of the table corresponds to changes from a typical female to a typical male job, and here again, we do not observe any evidence for selection bias.

(Table 3.6. about here)

As in 1981, the only socio-demographic variable that explains change is the level of education; more highly educated women have a lower probability of moving to male dominated jobs. This effect, however, moderates, or even vanishes, in 2006 after controlling for sample selection. Also relevant for our purposes is the reverse on the coefficient of the professional category. The change in the coefficient (it becomes significant and negative in 2006) shows that sex-type association, as we expected, is higher for professional and managerial female workers than for other women in the labor market. When changing occupations, professional and managerial women employed in the female-dominated sector are significantly less likely to move out of it. None of the other variables examined is significant; indicating that the pattern of women entering into male-dominated occupations does not vary with age, marital status, maternity or number of hours worked.

The scenario is slightly different if we observe women's attrition from typical male-jobs. First, evidence for sample selection bias emerges in 2006²³, which could be interpreted as the result of an increase of unobserved heterogeneity of women employed in the male sector. Furthermore, we observe a decrease in the significance of socio-demographic characteristics in explaining women's exits from typical male jobs. Whereas in 1992 both the age and the educational level of the individual had an impact

²³ Due to limitations of space, we only present results for the Heckman two-stage model that accounts for potential bias due to women's selection in male-dominated jobs. As in the previous models, we did not find evidence for sample selection due to women's participation in the job market. Full results are available upon request.

on women's probability of moving out (middle-age and more highly educated women were more prone to move out), women's attrition from typical male occupations in 2006 is completely independent of their attributes.

Conversely to socio-demographic attributes, work-related features are consistently significant, both across models and years. Both full time workers and women employed as professionals or managers are significantly less prone to exit towards female-dominated jobs.

As stated above, sex-type patterns observed in 1981 were significantly independent of individual features (Jacobs 1989). The results presented in this section indicate that the general scenario remains quite similar after two decades, as the observed patterns of mobility across different occupational settings continue to be independent of women's attributes. However, women's fluxes across sex-type boundaries have become highly dependent on women's occupational status in the job market. On the one hand, mobility among professional and managerial workers has declined over time and become more dependent on the sex-composition of the occupation of origin. In other words, women employed in the male-dominated sector are more likely to keep their jobs or move within male-dominated occupations. The same occurs among those women employed in the female-dominated field. On the other hand, women employed in other sectors of the economy are more likely to change occupations in a more unstructured way, switching across sex-type boundaries. These results support the third scenario

presented above, and confirm the idea that a small segment of women have gained stability in the labor market, while others remain trapped in “revolving doors”.

3.7. Conclusions and further research.

In this paper, we have examined several hypotheses regarding trends since the 1970s in sex-type mobility. Results indicate that sex-type mobility is clearly dependent on professional background and women are now more able to plan their professional careers in a more efficient manner, to the same degree that men do. Nevertheless, the situation is not as optimistic as might seem at first glance. Even though the general picture indicates a considerable decline in sex-type mobility, a more detailed analysis offers evidence that this does not equally apply for all women. In other words, declining gender segregation reflects, at least in part, the progressively more developed career plans of a minority of women who seek to pursue their careers in male-dominated fields, resulting in a polarization of trajectories among women in the labor market. Among the various plausible frameworks presented, our findings are consistent with the one predicting increasing differentiation among women.

On the one hand, female professionals and managers have enhanced their professional trajectories and widened their career opportunities. Elite education has been central to women’s ability to

access high-status occupations, unlock the door to male occupations, and maintain their jobs. As we have seen, this group of women is less prone to change occupations and, at the same time, displays higher rates of sex-type occupational mobility (probably due to having more resources at their disposal to deal with their maternity and other domestic responsibilities without needing to leave the labor market). In short, their careers tend to converge with men's. On the other hand, women who fill service and blue-collar jobs do not have the same opportunities. These women often hold part-time jobs, and without support for child care, they are more vulnerable to rigidity in the labor market. Additionally, the observed decrease in sex-type mobility among these women is, at least in part, a mere result of a high concentration of these occupations in the female-dominated field. In other words, lower occupational mobility levels for these women are partially caused by their inability to escape from female-dominated occupations. Women are commonly trapped in sales, clerical and service jobs, which makes it difficult for them to earn more money and/or progress in the work hierarchy.

In short, the findings confirm the idea that women in the most prestigious occupations have consolidated their gains (at least in terms of stability) in contrast to other female workers. Thus, and despite the advances that women have achieved in the last 25 years, patterns of mobility remains considerably non-structured for a big majority of women.

3.8. References

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Table 3.1. Statistical descriptives 1992, 2006²⁴

	1992				2006			
	Women (N=37,048)		Men (N=42,107)		Women (N=59,956)		Men (N=54,500)	
	Mean or %	S.D.	Mean or %	S.D.	Mean or %	S.D.	Mean or %	S.D.
<i>Socio-demographic characteristics</i>								
Age	38.07	13.03	38.73	13.34	40.01	13.23	40.3	13.39
High school or higher	0.85	0.35	0.82	0.39	0.88	0.31	0.85	0.36
Children under 15 in household	0.41	0.49	0.40	0.49	0.56	0.5	0.54	0.5
Married	0.57	0.49	0.63	0.48	0.55	0.5	0.63	0.48
<i>Work-related characteristics</i>								
Professional	0.29	0.45	0.26	0.44	0.35	0.47	0.29	0.45
Male dominated job	0.14	0.35	0.67	0.47	0.13	0.34	0.59	0.49
Full-time worker	0.63	0.48	0.83	0.38	0.68	0.47	0.84	0.36

All the variables except age (>16) range between 0-1

Source: CPS, March Supplement 1992, 2006

²⁴ Only workers

Table 3.2. Occupational Mobility Table. 1981, 1992, 2006

2.1 Odds ratios, mobility between male-dominated and female-dominated occupations, 1981-2006

Women		
1980-81	1991-92	2005-06
1,9	2,8	6,7

Men		
1980-81	1991-92	2005-06
3,3	8,0	9,9

2.2 Three-by-Three Sex-Type Mobility Table

		1981			row total
		male	neutral	female	
1980	male	243 28,6	240 28,2	367 43,2	850 21,2
	neutral	274 24,4	270 24	579 51,6	1123 27,9
	female	388 19,0	543 26,6	1114 54,5	2045 50,9
	column total	22,5 905	26,2 1053	51,3 2060	4018 100%

		1981			row total
		male	neutral	female	
1980	male	2701 76,6	763 18,1	187 5,3	3651 76,9
	neutral	559 69,3	182 22,6	66 8,2	807 17,6
	female	157 62,5	58 23,1	36 14,3	251 5,5
	column total	3417 74,6	877 19,1	289 6,3	4583 100%

		1992			
		male	neutral	female	row total
1991	male	150 24,5	199 32,5	264 43,1	613 15,5
	neutral	211 15,9	492 37,1	622 46,9	1325 33,41
	female	251 12,4	521 25,7	1256 61,9	2028 51,13
column total		612 15,4	1212 30,6	2142 54,0	3966 100%

		1992			
		male	neutral	female	row total
1991	male	1986 69,8	658 23,1	203 7,1	2847 63,2
	neutral	603 49,5	451 37,1	163 13,4	1217 27,0
	female	157 35,4	159 35,8	128 28,8	444 9,8
column total		2746 60,9	1268 28,1	494 11,0	4508 100%

		2006			
		male	neutral	female	row total
2005	male	129 29,2	164 37,1	149 33,7	442 10,5
	neutral	213 14,5	653 44,5	601 41,0	1467 34,71
	female	187 8,1	687 29,6	1444 62,3	2318 54,84
column total		529 12,5	1504 35,6	2194 51,9	4227 100%

		2006			
		male	neutral	female	row total
2005	male	1717 68,6	602 24,1	184 7,4	2503 53,3
	neutral	626 41,5	633 42,0	249 16,5	1508 32,1
	female	202 29,4	272 39,5	214 31,1	688 14,6
column total		2545 54,2	1507 32,1	647 13,8	4699 100%

Source: 1981:Jacobs (1989); 1992 & 2006: created by the authors from the CPS: March Supplement 1992, 2006

Table 3.3. Sex-type association by socio-demographic characteristics: 1991-1992, 2005-2006

	1991-1992					2005-2006					▼/▲ 1991- 2006
	N(m)	Men	N(w)	Women	Men- Women	N(m)	Men	N(w)	Women	Men- Women	
<i>All occupational changers</i>	4484	0.36	2951	0.21	0.15	4619	0.4	4214	0.28	0.12	▼
<i>By age</i>											
18-24	1353	0.24	1164	0.05	0.19	1176	0.28	1088	0.14	0.14	▼
25-34	1333	0.4	1194	0.23	0.17	1207	0.43	1029	0.25	0.18	▲
35-44	925	0.4	815	0.23	0.17	1001	0.41	962	0.34	0.07	▼
45-54	511	0.45	497	0.32	0.13	744	0.52	736	0.35	0.17	▲
55-64	277	0.35	216	0.27	0.08	366	0.46	314	0.29	0.17	▲
>64	85	0.42	65	0.49	-0.07	125	0.46	85	0.58	-0.12	▲
<i>By educ. attainment</i>											
Less than high school	875	0.34	595	0.19	0.15	826	0.32	550	0.16	0.16	▲
High school diploma	1497	0.31	1385	0.16	0.15	1449	0.39	1192	0.22	0.17	▲
Some College	1255	0.33	1218	0.22	0.11	1319	0.41	1477	0.32	0.09	▼
College graduate	857	0.37	753	0.27	0.1	1025	0.37	995	0.34	0.03	▼
<i>By marital status</i>											
Married	2121	0.37	1793	0.21	0.16	2264	0.41	1815	0.29	0.12	▼
Widowed	20	0.54	107	0.45	0.09	34	0.5	104	0.36	0.14	▲
Divorced	348	0.43	491	0.22	0.21	376	0.46	560	0.35	0.11	▼
Separated	118	0.38	171	0.08	0.3	79	0.5	156	0.29	0.21	▼
Never married	1877	0.31	1389	0.2	0.11	1866	0.37	1579	0.25	0.12	▲
<i>By children</i>											
No children	2884	0.34	2321	0.22	0.12	2211	0.43	1843	0.29	0.14	▲
One or more children	1600	0.37	1630	0.19	0.18	2408	0.48	2371	0.27	0.21	▲

Source: calculated by the authors from the CPS. March Supplement 1992, 2006

Table 3.4. Sex-type association by work-related characteristics. Men and women occupation changers. Years 1992, 2006

	1991-1992					2005-2006					▼/▲	
	N(m)	Men	N(w)	Women	Men- Women	N(m)	Men	N(w)	Women	Men- Women	1991- 2006	
<i>By professional category</i>												
Professional	895	0.31	907	0.22	0.09	1140	0.42	1210	0.43	-0.01	▼	
Service	650	0.17	937	0.13	0.04	600	0.2	966	0.08	0.12	▲	
Sales	505	0.09	572	0.08	0.01	426	0.12	542	0.06	0.06	▲	
Clerical	330	0.35	1054	0.05	0.3	424	0.15	968	0.06	0.09	▼	
Farming	185	-0.1	44	0.22	-0.32	120	0.13	55	0.42	-0.29	▼	
Construction	347	0.12	11	0.14	-0.02	417	-0.14	12	0.02	-0.16	▲	
Bluecollar	1572	0.16	426	0.09	0.07	1418	0.22	456	0.22	0,00	.	
<i>By hours worked</i>												
Full-time to Part-time	657	0.31	536	0.13	0.18	611	0.34	619	0.21	0.13	▼	
Part-time to Part-time	564	0.24	1021	0.13	0.11	520	0.38	949	0.18	0.2	▲	
Full-time to Full-time	2237	0.4	1420	0.28	0.12	2677	0.43	1758	0.39	0.04	▲	
Part-time to Full-time	329	0.21	446	0.22	-0.01	320	0.37	438	0.21	0.16	▲	

Source: calculated by the authors from the CPS. March Supplement 1992, 2006

Table 3.5. Probability of change occupations. 1992, 2006

	1992		2006	
	Single Probit	Two-Stage Probit + Bootstrap	Single Probit	Two-Stage Probit + Bootstrap
<i>Socioeconomic variables</i>				
Age	-.032*** (.004)	-.015 (.010)	-.027*** (.003)	-.011 (.017)
Age (squared)	.000*** (.000)	.000 (.000)	.000*** (.000)	-.000 (.000)
Education level (<i>r.c.: high school</i>)	-.001 (.027)	.092 (.058)	.009 (.027)	.092 (.095)
Young children at home	-.060*** (.019)	-.118*** (.036)	-.032* (.018)	-.057* (.032)
Marital Status (<i>r.c.: single</i>)	-.151*** (.019)	-.171*** (.022)	-.166*** (.018)	-.188*** (.030)
<i>Work-related variables</i>				
Full-time worker	-.216*** (.019)	-.214*** (.021)	-.048** (.018)	-.049** (.018)
Professional or manager	-.135*** (.021)	-.128*** (.022)	-.137*** (.018)	-.138*** (.017)
Male-dominated occupation	.109*** (.025)	.086*** (.027)	-.158*** (.025)	-.158*** (.027)
IMR		.287 (.142)*		.241 (.262)

Log-Likelihood	-11728.148	-	-13701.675	-
N	34506	155139	47223	208579

Source: calculated by the authors from the CPS. March Supplement 1992, 2006

***Significant at 1% **Significant at 5% *Significant at 10%

Standard errors in parenthesis

Table 3.6. Probability of change occupations across sex-type boundaries. 1992, 2006

	From female to male-dominated occupations				From male to female-dominated occupations			
	1992		2006		1992		2006	
	Probit	Two-Stage Probit + Bootstrap	Probit	Two-Stage Probit + Bootstrap	Probit	Two-Stage Probit + Bootstrap	Probit	Two-Stage Probit + Bootstrap
<i>Socioeconomic variables</i>								
Age	.058** (.018)	.083** (.041)	.015 (.017)	-.038 (.082)	-.064*** (.015)	-.061*** (.016)	-.002 (.019)	-.005 (.019)
Age (squared)	-.000** (.000)	-.000* (.001)	-.000 (.000)	.000 (.001)	.000** (.000)	.000** (.000)	-.000 (.000)	-.000 (.000)
Education level (<i>r.c.: high school</i>)	-.297** (.102)	-.129 (.248)	-.285** (.109)	-.578 (.439)	.247** (.093)	.206 (.125)	.149 (.109)	.186 (.126)
Young children at home	-.119 (.078)	-.212 (.142)	-.036 (.082)	.051 (.159)	.020 (.065)	.030 (.067)	.001 (.080)	.016 (.091)
Marital Status (<i>r.c.: single</i>)	-.034 (.080)	-.065 (.096)	-.074 (.086)	-.000 (.145)	-.029 (.066)	-.030 (.069)	.000 (.081)	-.006 (.085)
<i>Work-related variables</i>								
Full-time worker	-.003 (.075)	.003 (.075)	-.033 (.081)	-.031 (.079)	-.182** (.069)	-.206** (.077)	-.182** (.083)	-.201** (.088)
Professional or manager	.022 (.106)	.025 (.109)	-.244** (.109)	-.242** (.110)	.067*** (.085)	-.220*** (.085)	-.430*** (.094)	-.372*** (.105)
IMR		.456 (.627)		-.850 (1.258)		.010 (.225)		-.280*** (.113)
Log-Likelihood	-743.7257	-	-637.9989	-	-963.6989	-	-616.69899	-

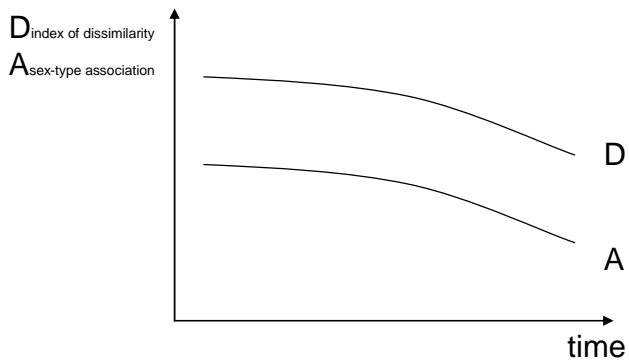
N	2004	155139	2297	208579	5050	155139	4969	208579
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Source: calculated by the authors from the CPS Survey. 1992, 2006 March Supplement

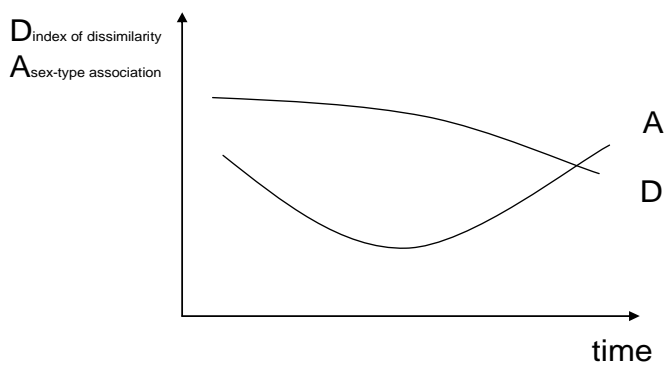
***Significant at 1% **Significant at 5% *Significant at 10%. Standard errors in parenthesis

Figure 3.1. Theoretical predictions for trends in segregation and mobility

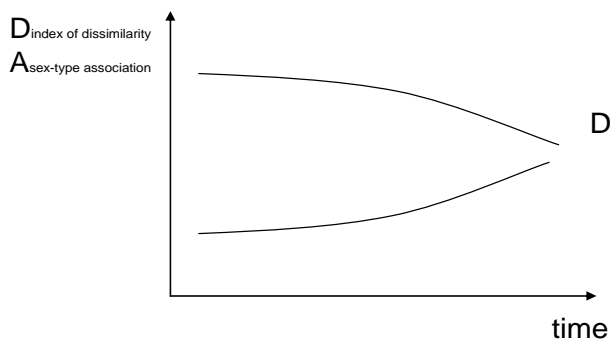
1.A. Declining Significance of Gender Model.



1.B. Period Turbulence Model

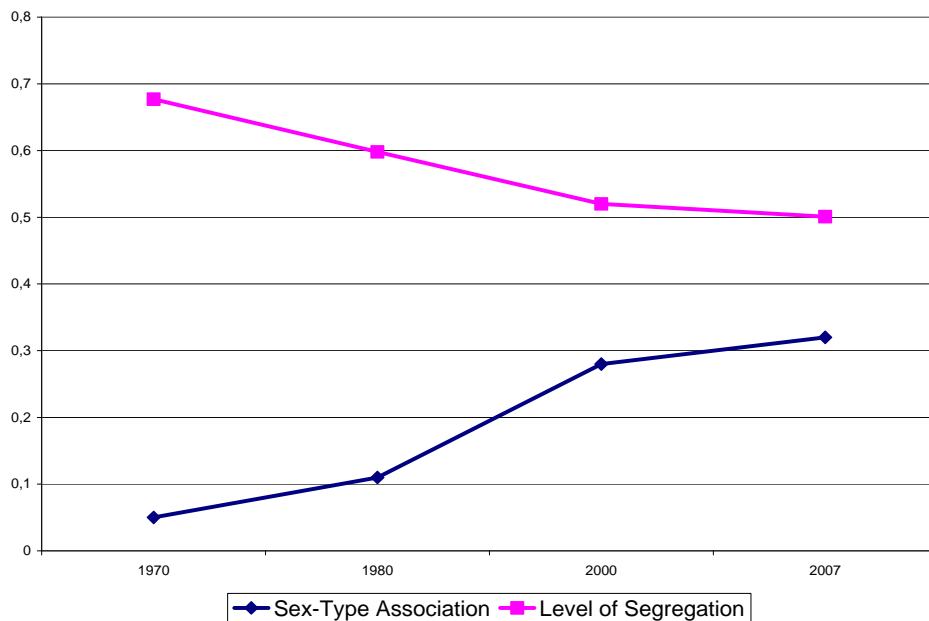


1.C. Increasing Differentiation among Women model.



Source: created by the authors

Figure 3.2. Trends of sex-segregation and sex-type association in the labor market, 1970-2007



Data sources: 1970, 1980: Jacobs (1989); 2000: Census Bureau; 2007: CPS, March Supplement.

CHAPTER FOUR

The Causes and Long-Term Consequences of Women's Attrition from Male-dominated Occupations

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This paper contributes to our understanding of the process of women's attrition from male dominated occupations throughout women's careers. First, it explores the determinants of women's exits from male-dominated occupations in the U.S. Both individual-level and occupational-level attributes are considered. Second, it evaluates the long-term effects of attrition from male- to female-dominated occupations on women's careers.

The NLSY79 dataset is used to analyze the job history of 3,108 women employed in the United States between 1979 and 2006. Results corroborate both that: 1) mechanisms of attrition vary depending on the occupation of destination; and 2) the mobility pattern of professionals and managers differs from that of non-professional workers. Additionally, the evidence indicates the existence of a "scar" effect of time spent out of the male-dominated field on women's occupational trajectories, especially among high-status workers.

Keywords: sex segregation, male-dominated occupations, career trajectories, women's employment

4.1. Introduction

Gender segregation in the workplace continues to be a topic of considerable scholarly research (see, for example, Cohen and Huffman 2003, 2007; Huffman and Cohen 2004; Cotter et al. 1997; Cotter et al. 2003; Tomaskovic-Devey et al 2006; Charles and Grusky 2004). Usually, the relevant literature has focused on self-selection processes to explain levels of segregation. However, high levels of occupational segregation (in 2009 about 50 percent of women in the USA would have had to change occupations in order to be distributed in the same manner as men (Hegewish et al. 2010)) persist despite increasing female presence in male-dominated occupations, in part because women continue to leave sex-atypical occupations at higher rates than their male counterparts (Torre and Jacobs 2011; Jacobs 1989; Sheridan 1997). Specifically, in the early 1980s, the “revolving doors” were shown to send back 10 out of every 11 women from male-dominated occupations (Jacobs 1989). This proportion was still over two-thirds in the 1990s (Sheridan 1997).

This study has its roots in the extensive sociological and economic research on sex segregation, and seeks to improve the understanding of women's attrition from male-dominated occupations. To do so, this paper

analyses the movement of women across sex-type boundaries over the work cycle from two perspectives. First, it explores the determinants of women's exits from male-dominated occupations. Both individual-level and work-related attributes are considered. Second, it evaluates the short- and long-term effects of previous occupational trajectory on women's careers. The empirical section then exploits the National Longitudinal Youth Survey 1979 dataset (hereafter NLSY79), by drawing on the work histories of 3,108 women employed in the United States between 1979 and 2006. On the one hand, the main findings in this paper corroborate that mechanisms of attrition vary depending on the occupation of destination. On the other, that the mobility pattern of professionals and managers differs from that of non-professional workers. Additionally, the evidence indicates the existence of a "scar" effect of time women spend working out of the male-dominated field on women's occupational trajectories, especially among high-status workers.

The rest of the paper is structured as follows. The next section reviews previous research on women's attrition from typical male jobs and develops testable theoretical hypotheses that link between occupational trajectories and sex-typed mobility. This is followed up by a description of the data used in this article, measurement of key concepts and the methodological strategy of the paper. Empirical findings are presented in Section 4.4. Finally, Section 4.5 summarizes the results and discusses the main conclusions.

4.2. Sex-segregation and women's careers

Supply-side explanations of sex-segregation levels are traditionally based on the idea that both men and women self-select into sex-typical occupations. Drawing on this approach, labor economists claim that rational women choose jobs that involve lower investment in education (Becker 1981; Mincer and Polacheck 1974) and specialization (Polacheck 1981), because they anticipate discontinuous employment careers mainly due to periods of childrearing. To avoid the foregone depreciation of human capital (atrophy) which occurs when they leave the labor force, because educational and job-related qualifications are outdated women self-select themselves into typical female jobs, which entail less depreciation of human capital than male dominated occupations²⁵ (Polacheck 1981). In contrast, socio-cultural theories highlight the role of non-market factors, which economists take as given, in sorting men and women into stereotypical occupations. The basic premise is that sex-role differences acquired through socialization processes result in sex-stereotypes that both women and men carry over into the labor market (Reskin 1993; Correll 2001; England et al. 1994).

²⁵Okamoto and England (1999) and Desai and Waite (1991) show, however, that lifetime wages would be maximized by choosing male-dominated occupations even for discontinuous employment. Moreover, intermittent employment is unrelated to women's likelihood of working in a female-dominated occupation.

Recent developments in the U.S. include changes in institutional and legal systems (Tomaskovic-Devey et al. 2006; Petit and Hook 2010), and in attitudes and values (David and Greenstein 2009; Cunningham et al. 2005; Rokeach 1974;), but especially gains in education (Buchmann et al. 2008). These changes together have resulted in significant shifts in the distribution of men and women in the labor market.

What is the effect of these changes? First, women's occupational mobility levels are considerably higher in the US than in other developed economies. In fact, only Denmark among the European countries has approximately the same job mobility as the US when measured by the average number of years spent working for the same employer (OECD 1996). This is predominantly because Denmark has very few tenure-related benefits, coupled with very little job protection (Datta Gupta and Smith 2000). Moreover, increasing sex equalization in U.S. education levels have facilitated mobility considerably between typical female and male occupations, which has been described as a general credentialing system (Estévez-Abe 2005; Charles 2005). Charles and Grusky (2004) argue that egalitarian forces reduce vertical segregation in "non-manual" occupations (predominantly managerial, professional, sales and service jobs) by facilitating women's entrance into high-status professional and managerial occupations. In fact, women's entrance into professional and managerial fields in the U.S. has been perhaps the most dramatic shift in the sex composition of an occupation since clerical work became a female-dominated field in the late nineteenth century (Jacobs 1992). This new mobility pattern has brought more women into male-dominated

occupations; however, the increasing presence of females in traditionally male occupations has been accompanied by a substantial movement out of, or attrition from, these occupations, reproducing in this way the overall level of sex segregation (Jacobs 1989). This bidirectional pattern of mobility was summarized by the metaphor “revolving doors” (Jacobs 1989), and more recent studies still confirm its prevalence in the current labor market (Sheridan 1997; Torre and Jacobs 2011). This empirical evidence therefore represents a challenge to socialization theories as well as human capital theories (based on a long-term investment’s rationale), by highlighting the fact that self-selection models are, despite their intuitive appeal, insufficient to explain the current paradox of mobility. The conundrum of the flows of women into, and exits out of, typical male occupations continues to be unresolved. This paper argues that understanding women’s departure from typical male jobs requires moving beyond the study of women’s access to traditional male occupations and focusing on what occurs after women manage to enter.

In doing so, some authors assert that early socialization provides women with less information and training for traditionally male jobs, resulting in them having fewer performance-relevant skills than their male counterparts to develop typically male tasks, even when educational attainment is held constant (Reskin 1993). This deficit in training “increases the chances of errors of choice that can be *corrected*²⁶ by occupational exit” (Waite and Berryman 1986).

²⁶ Emphasis added by the author

More recently, scholars have explained women's departures from typical male jobs as the result of the increasing time demands of high-status occupations in recent years, potentially making it harder for workers to balance work and family responsibilities (Jacobs and Gerson 2004; Perchesky 2008). In other words, women's investment in high-status occupations does not prevent them later moving out, as time pressures (usually because of child rearing) force women to abandon their occupational path and move into part-time female orientated work (Blackwell 2001). While this provides a strong argument, however, the empirical evidence is not entirely convincing. For example, some studies show that women with children are shown to move faster into male jobs than single women, as the higher pay and better benefits of male-dominated jobs are generally more attractive to women who support families (Padavic 1992; Rosenfeld and Spenner 1992). Moreover, although female occupations are frequently part-time, other job characteristics that are supposed to facilitate childrearing, such as flexible working hours, are more common among typically male jobs than among female jobs (Glass 1990).

A separate body of research links women's exits to the significant problems of acceptance and integration that they encounter when they enter male-dominated occupations (Smith 2002; Waite and Berryman 1986). It is argued that this is because homophile behavior tends to benefit those who share the majority background (sex in this case) (Walby 1986; Tomaskovic-Devey 1993). Indeed, Maume (1999) found that the percentage of males in an occupation increases the probability of male

promotions; while it also increases the number of women leaving those kinds of jobs. Following a similar exclusionary logic, *homosocial reproduction* explanations stress the lack of personal information and infrequent opportunities to build trust relationships between male authority elites and female subordinates. As defined by Moore (1988), women in male-dominated occupations are often “outsiders on the inside”; that is, token workers who are less integrated in informal discussion networks, and outside the influential circles of power (Kanter [1977] 1993; Moore 1988; Davies-Netzely 1998). Such isolation hampers women’s performance at work -especially at the top-levels- and makes women’s promotion and progress in the firm and/or particular occupations difficult, compared to their male counterparts (Kanter [1977] 1993; Cassirer and Reskin 2000; Smith 1999), and therefore precipitates their exit from such occupations (Reskin 1993; Taylor 1981; Kanter [1977] 1993).

Finally, a significant segment of the literature has focused on sex-differences in ‘preferences for work’ to explain sex-segregation in the job market. Several authors contend that women and men have different desires for the tasks involved, the work environment of the work group, working hours, and the physical strain or danger of responsibility (Markham et al. 1985); and that women -more than men- avoid working in dangerous and physically demanding jobs, as well as in jobs which require more on-the-job training and cognitive skills (Filer 1985 1989; Tam 1997). Others, conversely, argue that mobility is determined by the gender composition of occupation rather than preferences, and that the

labor market constrains opportunities for women (Reskin 1993; Glass 1990; Jacobs and Steinberg 1990; Maume 1999).

Despite the considerable attention that this topic has received, some relevant aspects have not yet been tackled in the literature. On the one hand, scholars have mainly focused on individual attributes to explain women's attrition from traditional male jobs, but little is known about the role of career dynamics on segregation. Also, the explanations put forward – that are mostly based on cross-sectional analyses - implicitly assume women's retention in female jobs after leaving the male field, and widely ignore the possibility of women's returns to into male dominated jobs. Thus, it can be asked: What are the effects of occupational trajectories on women's careers? Can we assume that first and posterior exits are the same? And: What are the consequences (if any) of attrition from male-dominated jobs on subsequent mobility?

A separate issue is that women have frequently been treated as a homogeneous group, with homogenous behavior. However, increased polarization among women in the labor market can lead to different career paths (Torre and Jacobs 2011). To the extent that this variance has been shown to increase, an average value would represent neither one group nor the other; and so differentiated analyses for both high- and low-status workers are required.

4.3. The role of occupational trajectories: Hypotheses

Job mobility has frequently been linked to the process of occupational attainment as “generated by the individual to maximize status and income” (Sorensen 1974). Thus, the term ‘career’ has not been limited to the idea of mere occupational transitions, but implies some sort of progress or at least coherence to the posts people hold during their working life; that is, a defined pattern of job histories (Spilerman 1977; Rosenfeld 1992). Consistently, only those who expect some kind of gains are willing to change occupations, and gains are linked both to access and success in the new occupation.

As only those with the level of appropriate training and the necessary skills will gain access to a new position, prior experience plays an important role in sorting out workers for a job position (Becker 1981; Mincer and Polacheck 1974). Accordingly, it seems reasonable to think that being employed in a traditional female occupation might act as a hindrance for women who wish to move into a typical male job, especially when compared to other workers who are already working in other, more similar, male-dominated occupations. Thus, occupational trajectory matters for all individuals to the extent that it contributes to discriminating between those who get the job and those who do not. What happens next, once individuals hold the new job, is less evident and rather more complex. In order to explore the relationship between work experience and women’s probability of survival in a male-dominated job,

I establish three alternative empirically plausible scenarios, with different implications for mobility patterns and, therefore, segregation levels.

Following the classical rational logic we can picture a first scenario in which there is little room to expect that job trajectories will play a role in occupational changes and, specifically, on women's attrition from typical male jobs. Firstly, human capital scholars contend that only those individuals with appropriate levels of human capital -both general and specific- who anticipate continuous careers will be willing (and eligible) to work in male-dominated jobs (Becker 1981; Mincer and Polacheck 1974). Secondly, as returns on job specialization are linked to tenure, rational employees are expected to remain in their firm in order to recoup their investments in training (Breen 1997; Sorensen 2000; Polavieja 2008). In this scenario, all individuals are on equal terms once they overcome initial filters and get hired, and it seems reasonable to anticipate that they will enjoy high rates of survival in the same job or will move within male-dominated occupations. Furthermore, mobility following the hiring stage would vary both with changes in personal attributes and the desirability of new vacant jobs, but it would be unrelated to any former occupational path. Two hypotheses can therefore be generated, that:

H1.A. *Previous occupational path does not have any effect on survival rates in male-dominated occupations.*

H1.B. *Attrition from male- to female-dominated occupations is explained by individual and work-related attributes.*

However, prior trajectories can arguably have a perverse effect on women's survival in male-dominated jobs in a way that women cannot fully anticipate before entering; bringing us to a different second scenario. For example, women's entry into traditional male occupations can be made at the cost of occupying less desirable positions (e.g. same occupation but different job; same job but different tasks), which can result in an increase in women's dissatisfaction, and accelerate their exits from male occupations. Also, women's provenance from outside the male field can exacerbate any of the above mentioned mechanisms and contribute to pushing women out. To the extent that informal networks in the job and relationships between male authority elites and subordinates are convenient for gathering information; promotion and progress in the occupation (Kanter [1977] 1993; Moore 1988; Davies-Netzely 1998), from non-male occupations could intensify women's difficulty to survive in the male sector, and hasten their exit. Thus, all other things being equal, women's attrition from male-dominated occupations can be related in the short term to newcomers' relative disadvantages when compared to current insiders, both men and women, already employed in typical-male occupations.

Still, long-term effects can also be expected. As pointed out by Reskin (1993), certain kinds of occupational paths can be interpreted as a sign of a lack of commitment, loyalty or devotion to male job-features. To the extent that this is interpreted as a threat for the status, prestige and even pay of the occupation, it might raise current incumbent's interests in hampering integration. Specifically, irregular trajectories, time out of the

labor market, attrition episodes from typical male to typical female jobs, and in general any manner of discontinuous career events could have a *scar effect* that may end up constraining women's opportunities in the male sector. Thus, both short- and long-term mechanisms would help to shape a scenario in which women's access to typically male jobs is insufficient to ensure their permanence. Despite the fact that intrinsic mechanisms would rarely be identifiable, we would observe the following at the aggregate level:

H2. *Previous occupational path affects attrition from male-dominated to female-dominated occupations:*

H2.A. *In the short-term: those previously working in a non-male occupation are more prone to move out*

H2.B. *In the long-term: the more unstable the occupational trajectory, the higher the probability of moving out*

Finally, it could be claimed that the observed mobility in the labor market is simply the byproduct of the *random mobility* of a group of women who have low attachment to the labor market and high levels of job volatility. In this scenario, occupational mobility is arbitrary and therefore not related to personal, occupational or career attributes:

H3.A. *Occupational mobility is not explained by individual and/or occupational characteristics*

H3.B. Attrition processes are related to the number of previous mobility episodes: the higher the number of occupational spells, the higher the probability of changing occupations

H3.C. Attrition from male-dominated jobs is independent of the occupation of origin and destination.

Consequential differences can be derived from each of these scenarios. In the first case, women's access to traditional-male occupations would entail a decrease in the levels of sex-segregation in the long-run, as more and more women progressively join the male sector. If the second scenario holds true, however, increasing access would not be sufficient to guarantee a decrease in segregation levels; inasmuch as obstacles to women's integration in typical-male occupations go beyond women's entry to the male field. Moreover, under these circumstances women's departures would not strictly be a gender issue, since newcomers are not only in a disadvantageous position compared to men, but also with respect to women who are already in the job. Finally, consequences for segregation levels are hard to anticipate if the third scenario holds true, and mobility in the job market is arbitrary and, consequently, unpredictable.

However, whether one of these scenarios prevails over another might be a function of women's relative position within the labor market, so that differences between high- and low-status workers can result in different patterns of mobility. On the one hand, the higher up in the occupational structure a person is, the fewer the options for both upward and lateral

mobility. On the other hand, top occupations are characterized by higher levels of investment in firm-specific and job-specific skills (Tam 1997), that increases the costs associated with occupational changes. General skills, in contrast, are more frequently found in low-status occupations and are more easily transferable both from one to another job, and from male to female-dominated occupations. In addition, it is well-known that the opportunity cost per unit of time out of the labor force (both in terms of skill's deterioration and income loss is considerably higher for better-educated, high-status workers (England and Folbre 2005). However, these workers have more available resources to afford private child-care and attend to other domestic responsibilities without having to abandon their positions (Pettit and Hook 2009), and empirical evidence shows that they return to work more quickly than women with lower levels of education (England and Folbre 2005). Taking everything into consideration, we can expect that, all other things being equal:

H4. High-status workers are less likely than low-status workers to change occupations

In contrast, high status workers are expected to be more susceptible to potential penalty effects, to the extent that opportunities narrow at the top of the occupational structure and the ability of men to exclude women depends on their own power (Reskin 1993)

H5: Penalties associated with episodes out of the male sector are stronger for high-status workers than for low-status workers

4.4. Data

This study draws on the National Longitudinal Survey of Youth Labor Market Behavior for 1979 (NLSY79) as the main source of data. These data comprise a nationally representative sample of 3,108 young women and 3,003 young men in the civilian population born in the 1950s and 1960s. They were first surveyed in 1979 and were then interviewed annually until 1994, and biannually after that. Although a primary focus of the NLSY79 survey is labor force behavior, the content of the survey is considerably broader. For example, the survey includes detailed questions on educational attainment, investments in training, and marital and fertility histories. Additional labor force information includes hours worked, earnings, occupation, industry, benefits, and other specific job characteristics.

Cumulative retention rates for NLSY79 respondents were over 90 percent during the first half of the period, and around 78 percent by the end. Individual's job histories are analyzed from two years after the individual has left school for the first time. This cutoff point aims to avoid statistical noise produced by the high number of temporary jobs and the unstructured mobility that men and women have during school time. For those individuals who do not report being enrolled in school in either of the two first waves, I take their whole job history into consideration. After applying this restriction, the number of women employed at each point of time is the following:

(Table 4.1. about here)

Appended to the NLSY79 is the sex composition of the three-digit census occupations for 1980, 1990 and 2000. Census codes are standardized and expressed in the 1990 three-digit occupational codes, to make them comparable over time²⁷.

This study represents an examination of a single cohort. Studying a single cohort has some clear advantages, as it allows us to analyze differences in behavior among women who pertain to the same socio-cultural and economic generation. However, extrapolations to other cohorts should not be made automatically.

4.5. Methods and covariates

Occupations are classified as male-dominated (when female presence in the occupation falls below 33.3 percent), female-dominated (if women's representation is 66.6 percent or more) and gender neutral (the rest). The female cutoff point percentage is the same throughout the study. However, as it would be incorrect to assume that an occupation classified

²⁷ The changes between the 1980 and 1990 census categories were relatively minor, while the changes between 1990 and 2000 were more substantial. We reclassified all the data using the 1990 occupational categories in order to determine whether any changes observed might be due to changes in occupational coding rather than changes in women's behavior. The results obtained did not differ substantially with the recoded data.

as male-dominated in 1979 continues to be male-dominated in 2006, I account for the shifting gender composition of occupations by updating it every 10 years, using census data over the last three decades^{28, 29}.

For each employment spell, the sex composition of the occupation is held constant. In other words, if a woman starts a job in 1982, her occupation is assigned the 1980 sex composition, even if she stays in that some occupation for 20 years. Similarly, if she starts an occupational spell in 1995, her occupation will be assigned the 1990 sex composition. Thus, for each occupational spell, the most appropriate occupational data is assigned. However, for each employment experience, the occupational sex composition stays the same; in other words, individuals move, but occupations are held constant.

A discrete-time hazard model is used to model career experiences (Allison 1984). The strategy in this kind of event history analysis is to estimate the conditional probability (P_{it}) that individual i has an event at time t , [given? Do you mean ‘assuming’] that it has not already occurred to that individual. The event that will be analyzed is a career move from a typical male occupation and the analyses are carried out in three-steps. First, the probability of changing occupations from a male-dominated

²⁸ Occupations in 1979 are classified using 1980 census data.

²⁹ Analyses have been replicated fixing the sex-composition of the occupations over time. Results are essentially the same, and the correlation among variables runs between .97 and .99. Results are available upon request.

occupation is estimated, without specifying the state of destination³⁰. The probability of moving within male-dominated jobs is estimated in the second model. Finally, the third model estimates the probability of attrition to a typical female job.

Let X_{it} , Z_{it} and W_{it} be vectors of explanatory variables observed for individual i at time t (some of the variables in the vector may not vary with time). The probability P_{it} defined above is related to the covariate vectors by a logistic regression equation, which can be specified as follows:

$$(1) \quad \text{Log} \left(\frac{P_{it}}{1 - P_{it}} \right) = \alpha_i + \beta X_{it} + \gamma Z_{it} + \delta W_{it}$$

Since the observation period runs from 1979 to 2006, repeated events are addressed by clustering individuals. Furthermore, possible heterogeneity among groups of women is taken into account by running separate regressions for managers and professionals on the one hand, and for other working women on the other. Nevertheless, controls for major occupational groups are added, to capture possible inter-group differences.

The vector X_{it} is a vector of socio-demographic variables which includes measures for education, marital status and motherhood status. Subsequent re-entries to the school system are taken into account and controlled for through a dummy variable that scores 1 when the individual is attending

³⁰ Possible states of destination are male-, neutral-, female-dominated occupations that exist in the labor market.

school and 0 otherwise. Regarding education, two different variables are included, a dummy variable for education level (college degree or more; versus less than college degree) and type of education. For the latter, I created the variable “male-dominated major”, which scores 1 for those women who studied a typical male major (male presence in the major over 66 percent) and 0 otherwise. This variable is a good proxy for women’s socialization, preferences and opportunities in the labor market. The NLSY also includes a question about the job position that women expect to have in the future. However, this question was asked a few times in the very first years of the survey and then removed from the questionnaire. As preferences are not necessarily fixed overtime; I do not use this variable.

Changes in marital status are captured through dummy variables which score 1 when marriage or divorce (respectively) occurs. Finally, controls for child births are introduced together with the variable “mother’s age at first born”. The purpose of this variable is to control for possible endogenous relationships between job trajectory and maternity preferences, as women working in top-ranking positions are more likely than other female workers to remain childless, or to delay first born to an older age, which can stimulate interests that compete with the parental role (Kholer et al. 2002).

Vector Z_i is composed of work-related variables, such as full-time employment (vs. part-time) and occupational categories; namely, managers, professionals (non-teachers), teachers, and service, clerical,

sales and blue-collar workers. However, due to the general proliferation of managerial titles between 1970 and 1980 (Jacobs 1992; Smith 1990), important divergences among women within the same occupational category will probably not be fully captured by the three-digit census occupations. To account for this potential heterogeneity in the managerial categories, I re-distribute managers into three sub-categories, according to their individual hourly-rate of pay relative to the average hourly-rate of pay of the occupation (both weighted by year and job tenure). Women whose hourly-rate of pay is in the 75 percentile and over are classified as high-status managers. Those whose hourly-rate of pay is equal to or below the 25 percentile are classified as low-level managers. All the rest are defined as medium-level managers.

The W_i vector complements the two former with a set of variables that identify an occupational trajectory from the time that a woman first leaves the education system. Recent trajectory is measured through two different variables: work-leave over the previous year (1 if yes, 0 otherwise) and sex-composition of the last occupation (1 if non-male, 0 if male-dominated). Long-term effects are captured by four different indicators: years of experience in the labor market, (to measure whether mobility is related to accumulated experience); number of job-spells, (which allows us to observe whether attrition is higher among more mobile individuals); years spent out of the labor market, and episodes of attrition from male to female-dominated occupations. Together, these four indicators test whether discontinuous careers affect survival probability.

Finally, I take into consideration possible changes in the occupational structure that could be altering mobility patterns (such as, for example, the increase in the number of female oriented occupations over time). To do so, I include the “period” variable, which scores 0 when the event occurs before 1990 and 1 otherwise. According to Census data (1980, 1990, 2000) the number of managerial female-dominated occupations before this moment was virtually zero³¹; though they began to increase in the nineties. Additionally other variables, such as tenure in the job and age of entry into the labor market, are introduced as control variables.

Table 4.2. summarizes the main descriptive statistics for the above defined variables. The table differentiates four groups of women; namely, all women in the sample, women who have ever worked, women who have ever worked in a male-dominated job and finally, women who worked exclusively in the male sector.

(Table 4.2. about here)

To a certain extent, women who have ever worked in a male-dominated occupation are noticeably different from the average group of female workers. For example, they are slightly more likely to hold a college degree as well as slightly more likely to have chosen a typical male major. On average, they are more likely to work full-time and are overrepresented in managerial and blue-collar positions. Their average duration in jobs is similar, and they experience more occupational spells.

³¹ Results available upon request

They also spend less time out of the labor market. The main differences are observed between the group of women who worked exclusively in the typical male sector and the remainder of the women; although the first group is numerically much reduced, as it contains only 25 women. In general terms, this small group of women are more likely to have a college degree and typically male-dominated specialties. Also on average, they are less likely to be married and to have a child, but when they do, they are more likely to have second and subsequent children, despite starting to have children considerably later in life. As for their occupational positions, they are mainly full-time workers and are overrepresented among high- and medium-managers and professional workers, as well as blue-collar workers. On average, they join the labor market around three years later than other women workers, a fact that is probably explained by their longer period of enrollment in the school system. Finally, they spend less time out of the labor market, and occupational spells are more infrequent among those women who register longer tenure in the job.

4.6. Mobility in the sample

Evidence for the “revolving door” phenomenon described by Jacobs (1989) is also present in the NLSY79 sample. Figure 4.1. shows the person-year fluxes among male- female- and neutral dominated

occupations and unemployment, for the whole period 1979-2006³². There is more mobility during the early years of the sample than in the period after 1991, which, however, does not translate into a reduction of exits towards typical female jobs. On the contrary, the relationships between inflows and outflows in typical male occupations are maintained over time, as well as the rate of occupational changes within male-dominated occupations. This stable correlation seems to indicate that women's occupational changes are more frequent at the start of their careers; while shifts between male and female occupations are not simply a byproduct of mobility rates.

(Figure 4.1. about here)

Women are not concentrated in a few occupations, but rather are spread over the entire male field. We find women working in 172 out of the 206 occupations classified as male-dominated. Furthermore, women are quite evenly distributed between high status workers (51.7 percent) and low-status workers (48.3 percent).

Specifically, female managers and professionals are spread among 55 of the 62 occupational titles of our sample. Attrition to female-dominated jobs is observed from 41 of these occupations, principally, from: "Managers and administrators, n.e.c.", "Managers, marketing, advertising

³² This figure includes only females. Total male attrition from male dominated occupations is about 10% of male's mobility within male-dominated occupations (including withdrawals from the labor market). Attrition from male to female jobs is less than 3.5%.

and publicity”; “Lawyers”; and “Computer systems analyst and scientist”. When leaving from male-dominated jobs, high-level managers mostly fall into the categories of “Sales workers” (22.3 percent); “Bookkeepers” (9.57 percent); and “Administrative support occupations” (9.55 percent); while only 8.81 percent obtain a management position, such as “Managers, medicine and health”. Medium- and low-level managers and professional workers mostly become “Secretaries” (15.12 percent) and occupy “Administrative support occupations” (7.95 percent). About 3.3 percent continue to be a manager after change.

Female presence in the remaining categories spreads to 117, from a total of 144 traditional male jobs. Attrition to typical-female jobs takes place from at least 77 of these occupations, largely from “Machine operators, not specified”; “Stock handlers and baggers”; “Janitors and cleaners”; “Laborers, except construction”; and “Traffic, shipping and receiving clerks”. After change occupations, they can frequently be categorized into “Cashiers” (11.27 percent); “Housekeepers and Butlers” (10.48 percent); “Secretaries” (6.42 percent); and “Sales workers, other commodities” (5.64 percent). Scarcely 5 percent experience upward mobility towards professional or managerial positions.

The data also shows that mobility has different consequences for women working in professional and non-professional sectors, with those in the first group being more likely to experience a loss of occupational status. This happens, to a large extent, because of the differences between the occupational structure of the typical male and the traditional female

boundary, which offers fewer opportunities for employment in high-status positions (particularly in the first years of the survey). Because of this endogeneity, this kind of occupational mobility becomes even more intriguing, as it implies a worsening in the work trajectory of women, at least in terms of occupational achievement. In fact, turnover in male-dominated jobs is quite frequent among women. Almost 33 percent of women who are professionals and managers and 23 percent of women in other occupational categories, go back into a male-job after attrition at least once in their working life. The next section takes a more detailed look at the determinants of mobility in, and across, sex-type boundaries.

4.7. Findings

Table 4.3. displays the odds ratios for the logistic regressions for professionals and managerial workers. The first model corresponds to the general risk of attrition for women working in a male-dominated occupation, without specifying the occupation of destination. The last two columns respectively model transitions from male-dominated to male- and female-dominated occupations. The results clearly indicate that the two processes are intrinsically different, as the predictors frequently have opposite effects depending on final destination.

(Table 4.3. about here)

Consistent with the findings in the previous literature, women working in male-dominated jobs are more likely to change occupations when they get married or divorced (compared to single women), when they have the first child, and when they have an older age at first born. Nevertheless, none of the human capital indicators (educational level and typical male major) are related to the likelihood of changing jobs. However the non-significance of the educational level can be interpreted here as a statistical artifact, since most women in these occupations are highly-educated. As regards work-related characteristics, everything else being the same, medium- and low-level managers, together with teachers, are significantly more likely to change jobs than both professionals and high-status managers; a fact that indicates higher levels of stability or lower opportunities for lateral and upward mobility for the last group. The probability of changing jobs does not vary with the sex-composition of last occupation. Conversely, the number of years out of the labor market and the accumulation of job spells decrease the risk of changing jobs, suggesting that mobility is higher at the start of the job career.

To this point, these results suggest a mixture between the first and second scenario, as both individual characteristics and discontinuous careers explain mobility. However, the picture looks quite different once we split the sample by the sex-composition of the occupation of destination. Clearly, transitions within-male and transitions to female-dominated occupations follow different patterns, with many predictors showing reverse effects.

Interestingly, the sex-composition of the major become highly significant once we distinguish for the occupation of destination. Thus, women with a male-major in college are more prone to change occupations within the male field, but significantly less prone to move to female-dominated occupations. This result indicates the relevance of socialization, aspirations and job opportunities in explaining attrition from typical male jobs. Women are also more likely to move towards female-dominated jobs when they get married or divorced. However, it is hard to link this result with a rise in family responsibilities, as other variables measuring the potential conflict between work and family do not have a clear impact on women's exit from male-dominated jobs; on the contrary, the effect of having children and/or mother's age at first born dilute, and even disappear, once we split by the occupation of destination.³³

In comparison to professional workers, medium- and low-rank managers are more prone to experience attrition to female-occupations, which seems consistent with the increase in managerial titles during the 70s and 80s (Jacobs 1992; Smith 1990). Top managers, however, do not show a higher propensity to move to female jobs, but they are less likely to move within male-dominated occupations. As anticipated, this could be explained by the scarcity of job positions at the top of the occupational hierarchy and the consequent lesser alternatives for both lateral and upward mobility. Unsurprisingly, the likelihood of remaining in the male-dominated field is higher among full time workers.

³³ Analyses show that new mothers are more likely to drop out of the labor market than to change occupations. Estimates for the transition to unemployment are not shown. Results are available upon request.

The most novel findings are connected to the third block of variables. As shown in Columns 2 and 3, both short- and long-term job trajectories contribute to explaining women's attrition from typical male jobs. First, newcomers from a non-male dominated occupation are more likely to move back out and, at the same time, less likely to move within male jobs. To be more precise, for those who were formerly working in a non-male dominated occupation, the probability of changing within-male occupations is about 70% lower (all other things being equal). Conversely, newcomers are 2.3 times more likely to move back to a female-dominated job. Besides, previous exits from male- to female-dominated occupations play a similar role, increasing the probability of new departures out of the male field. Finally, the accumulation of job spells has a marginal effect on the probability of moving to other male occupations and shows no relationship with attrition towards a female job; a finding that challenges the idea of women's random mobility. These results indicate that occupational trajectories matter when explaining women's attrition from male jobs and, especially, those indicators measuring sex-composition of the occupations.

Table 4.4. reports the outcomes for service, clerical and blue-collar female workers. If we do not take into consideration the occupation of destination (first column), the results are quite similar to those of professionals and managers, with two significant exceptions. On the one hand, human capital indicators become significant and having a college degree decreases significantly the probability of changing occupations. On the

other, we do not observe difference between full- and part-time low-status workers.

(Table 4.4. about here)

Additionally, as in the case of professionals, processes of attrition vary according to the final destination. However, there are some remarkable patterns that distinguish the experiences of low-status workers. First, once we split the sample by the occupation of destination, individual attributes do not seem to be related to mobility in one direction or any other. Interestingly, human capital indicators are not good predictors of mobility of low-status women in male-dominated jobs, as both level and type of education become non significant. In the same way, the effect of childbirths vanishes once we take into consideration the final destination. However, mother's age at first born continues to be statistically significant; that is, postponed motherhood decreases the probability of moving out of typical male jobs.

Regarding the second block of variables, the likelihood of changing to a female occupation is significantly higher for service, sales and clerical workers than for other blue-collar worker employees (the largest category); which seems consistent with the predominance of service and sales jobs in the female oriented sector. Moreover, differences between full-time and part-time employees emerge when we differentiate among types of transitions, with full-time workers being less prone to move

towards female-dominated occupations and more likely to move within typical-male occupations.

Finally, results further confirm the relevance of our main variables of interest; former work trajectories. Yet again, those women who were working outside of the male sector are 1.61 times more likely to move back out, and about 50 percent less likely to change occupations within the male sector. Prior episodes of attrition, however, do not have any effect among non-professional workers' risk of attrition. These results corroborate our intuition that long-term penalties principally affect women working in the more current and prestigious occupations. Finally, the accumulation of job spells has been found to lower the risk of changing occupations again.

Both for high- and low-status workers, the effect of job tenure is the same; the risk of leaving is very high when the person starts to work in a new job, decreases over time, and increases again after a few years. The probability of changing jobs also decreases with years of experience in the labor market; indicating that when the person first enters the labor market they have higher levels of volatility. However, all other things being equal, those who enter the labor market later (probability due to longer periods in the education system) are also less prone to change occupations. Finally, attrition is not dependent on the period of analysis, neither for high-status nor for low-status workers, which indicates that sex-typed mobility is not a mere byproduct of changes in the occupational structure.

According to the results above, survival in typical male occupations is highly dependent on women's trajectory in the labor market, although it varies depending on women's occupational status. The following graphs illustrate the probability of attrition to female jobs during the first five years working in a male-dominated job. The figure on the left stands for high-status workers and the graph on the right side corresponds to non-professional workers. Specifically, professionals (non-teachers) and blue-collar workers are represented, respectively, as they are both the largest groups and also the most stable according to the results above. In both cases, I set up a scenario particularly unfavorable to attrition³⁴, so that we observe the lowest predicted probabilities of changing to a female occupation.

(Figure 4.2. about here)

Under these conditions, the figure shows some remarkable differences between professionals and non-professional workers. First of all, in the presence of controls, the probability of attrition for those previously working in the male sector is higher for blue-collar workers than it is for professionals. Specifically, women's probability of leaving after one year of work is under 25 percent for professionals previously working in the male dominated field; while it rises to over 40 percent for newcomers from a non male-dominated occupation. Secondly, the increase in the probability of moving out due to provenance from non-male occupations

³⁴ Full-time workers. The remaining dummy variables (except college degree for the professional group) are set at 0 and continuous variables at their mean.

is lower for blue-collar workers. In particular, the probability of attrition to female jobs rises from 24 to over 40 percent for newcomers from a non male-dominated occupation in the case of professionals, while the increase for non-professional workers is about 10 points. Finally, if we add the effect of earlier attrition episodes, the probability of exit goes up to about 50 percent for professionals; almost double that for those coming from a male occupation. Among blue-collar workers, we do not observe penalties associated with early episodes of attrition.

Summarizing the results presented in this section, we can state that the findings contradict the hypotheses in the first scenario, as women's attrition is far from being exclusively related to individual characteristics and job desirability. In other words, entrance into a typical male job does not guarantee their survival and success in the male-dominated field. Neither are findings consistent with the third scenario, as attrition is not the mere consequence of random mobility, but the result of combinations of individual, work and career history characteristics. Therefore, the results corroborate the significance of women's trajectories on women's performance in the male-dominated field. Specifically, we observe a two-sided effect. In the short-term, newcomers from the male field have a higher risk of attrition to a female occupation. In the long-term, penalties are also identifiable, confirming the *scar effect* of women's attrition from male- to female-dominated jobs. However, this holds only for professionals and managers, who are those attempting to take up the most desirable jobs

4.8. Discussion

The entry of women into traditionally male occupations has intensified in recent decades; however, the outflows continue to be significant today. Thus, identifying the reasons why women continue to leave traditional male occupations is a key element in understanding segregation in the labor market. This paper contributes to the literature by analyzing the impact of career dynamics on sex-segregation in the labor market and, specifically, on women's attrition from traditional male jobs.

The main findings of this study can be summarized in three parts. First, women's mobility patterns depend on the occupation of destination. Occupational changes within-male occupations are substantively different from exits towards female-dominated jobs. For this reason, any results are inaccurate if both origin and final occupations are not taken into account. Second, labor history plays a key role in women's mobility after they manage to become a part of the male sector. Beyond the initial filters that grant or deny access to male-dominated occupations, individual and occupational attributes are insufficient to explain women's stability in traditional male jobs, in particular in the case of low-status workers. In fact, women's behavior in the male sector cannot be understood without considering previous work paths. Conventional indicators of experience in the labor market, such as years of experience and job spells, show a negative impact on women's attrition, suggesting that stability increases with cumulative experience. However, particularly interesting is the effect of the sex-composition of the last occupation on the probability of

changing occupations. In the short term, women entering the male sector are the most likely to move back out, introducing a ‘non-gender dimension’ into the debate. Whether or not the risk of exiting is always higher among women than men, it is also higher for women who have recently arrived. Also remarkable is the effect of previous transitions between male and female occupations. Although it would seem reasonable to think that women with previous experience in the male sector are more likely to survive, the fact is that the analyses show the opposite. All other things being equal, women who enter the male sector for the second time (or more) are more prone to leave it again, at least among women working in the upper middle section of the occupational structure.

Finally, women’s mobility patterns also vary according to their position in the labor market. First, professionals and managers are more stable, in general occupational terms. Second, low-status workers predominantly seem to have unplanned careers. Third, women employed at the top of the occupational structure are workers who are more likely to suffer from penalties associated with time spent in the female sector, both in the short- and long-term.

Taking everything into account, we can confirm that women’s access to traditional male jobs is not enough to guarantee a decrease in the levels of segregation in the job market. Despite women’s ability to ‘unlock the door’ of male occupational fields, career dynamics are still key to the maintenance of their jobs. The male-dominated sector rewards those

whose career path converges to men's, while time spent out of the male-field seems to constrain women's opportunities. Further research is needed to disentangle the social mechanisms operating behind this fact. More detailed data on jobs and specific tasks, social networks at work and job attributes would be necessary to provide a further step in understanding whether newcomers exits are related to incomplete information at the moment of entry, differences in preferences for market work or integration constraints on women's choices and opportunities.

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Table 4.1. Number or women in the labor market between 1979 and 2006

Year	Number of women in the labor market	Year	Number of women in the labor market
1979	609	1993	2308
1980	862	1994	2245
1981	1099	1995	2231
1982	1636	1996	2311
1983	1863	1997	2328
1984	2035	1998	2323
1985	2171	1999	2345
1986	2297	2000	2241
1987	2361	2001	2259
1988	2432	2002	2138
1989	2363	2003	2165
1990	2374	2004	2035
1991	2350	2005	2073
1992	2380	2006	1985

Source: Calculated by the author from NLSY79

Table 4.2. Descriptive statistics on predictors of women's attrition from male-dominated jobs.

	Ever worked		Ever worked in a male-dominated occupation		Only worked in male-dominated occupations	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Socio-demographic variables						
Some college/college degree	0,01	0,12	0,02	0,12	0,19	0,39
Male-dominated major	0,04	0,19	0,04	0,20	0,24	0,25
School attendance	0,04	0,20	0,04	0,21	0,05	0,21
Married	0,58	0,49	0,56	0,50	0,43	0,50
Marriage dissolution	0,17	0,37	0,18	0,39	0,19	0,39
First born	0,47	0,50	0,46	0,50	0,36	0,48
Second born	0,30	0,46	0,29	0,46	0,31	0,46
Mother's age at first born	0,65	0,48	0,65	0,48	0,72	0,45
Work-related variables						
Full time employment	0,75	0,43	0,76	0,43	0,80	0,41
High-level managers	0,02	0,12	0,02	0,15	0,07	0,26
Medium-level managers	0,04	0,19	0,05	0,22	0,14	0,35
Low-level managers	0,02	0,15	0,03	0,18	0,03	0,16
Professionals (non teachers)	0,11	0,32	0,11	0,31	0,31	0,46
Teachers	0,05	0,21	0,03	0,17	0,01	0,08
Service workers	0,19	0,40	0,18	0,38	0,02	0,13
Sales workers	0,08	0,27	0,08	0,28	-	-
Clerical workers	0,22	0,41	0,20	0,40	0,02	0,14
Blue-collar workers	0,26	0,42	0,27	0,45	0,36	0,48
Work trajectory						
Work-leaves over t-1	0,12	0,32	0,12	0,33	0,06	0,24
Exits from male-dominated occup.	0,26	0,43	0,38	0,47	-	-
Years out of the labour market	0,20	0,37	0,19	0,37	0,05	0,18
Job spells	0,55	0,32	0,56	0,32	0,44	0,40
Job tenure	0,05	0,18	0,07	0,21	0,24	0,36
Age first joined the labor market	20,70	27,3	20,60	25,20	23,90	32,60
Years of experience	0,47	0,31	0,48	0,30	0,44	0,36
N	69400		44162		350	
Clustered	3028		1950		25	

"Age first joined the labor market" is continuous. The other variables score between 0 and 1

Source: Calculated by the author from NLSY79

Table 4.3. Odds ratios for women's attrition from male-dominated jobs. Professionals and managerial workers in Year_t, 1979-2006.

	Exits from male-dominated jobs		
	destination not specified	to male-dominated jobs	to female-dominated jobs
Socio-demographic variables			
Attending school	1545 (0.226)	0.966 (0.200)	1249 (0.227)
Colege or more (rc: less than college)	0.922 (0.228)	1028 (0.293)	1087 (0.276)
Male-dominated major (rc: non-male dominated major)	0.870 (0.083)	1.431** (0.208)	0.618*** (0.100)
Getting married (rc: single)	1320*** (0.099)	0.800* (0.098)	1.390*** (0.146)
Marriage dissolution (rc: single)	1388*** (0.157)	0.824 (0.137)	1.409** (0.205)
First born	1652*** (0.203)	1.391* (0.253)	1206 (0.191)
Second born	0.986 (0.114)	1081 (0.223)	0.781* (0.116)
Mother's age at first born	1025*** (0.006)	1008 (0.010)	1000 (0.008)
Work-related variables			
High-level managers (rc: professionals)	0.929 (0.090)	0.729* (0.121)	1081 (0.131)
Medium-level managers (rc: professionals)	1174** (0.075)	0.887 (0.115)	1.436*** (0.141)
Low-level managers (rc: professionals)	1139* (0.080)	0.880 (0.120)	1.291** (0.135)
Teachers (rc: professionals)	1888** (0.563)	2.681*** (0.818)	0.565 (0.212)
Working full-time (rc: part time)	0.767*** (0.077)	1.452* (0.277)	0.694*** (0.084)
Occupational trajectory indicators			
Work leaves in the previous year	0.867	0.923	1001

	(0.096)	(0.153)	(0.130)
Last occupation female (rc: male)	0.987	0.299***	2.342***
	(0.081)	(0.034)	(0.282)
Previous exits from male to female	1000	0.990	1.160**
	(0.047)	(0.090)	(0.068)
Years out of the labor market	0.892***	0.991	0.896***
	(0.016)	(0.030)	(0.020)
Job spells	0.952**	0.907*	1003
	(0.022)	(0.048)	(0.032)
Job tenure	0.263***	0.493***	0.411***
	(0.012)	(0.034)	(0.022)
Job tenure (sq)	1056***	1.021***	1.035***
	(0.003)	(0.005)	(0.004)
Age first joined the labor market	0.944***	0.980	0.933***
	(0.014)	(0.026)	(0.021)
Years of experience in the labor market	1004	0.979	1022
	(0.014)	(0.017)	(0.015)
Period 1990-2006	0.893	1034	1015
	(0.087)	(0.156)	(0.128)
Constant	50552***	1612	4.624***
	(20.128)	(1.094)	(2.481)
N	4258	4258	4258
Clusters (individuals)	1048	1048	1048
Pseudo Chi2	.37	.18	.20

*** p<0.01, ** p<0.05, * p<0.1. Robust z-statistics in brackets.

Source: Calculated by the author from NLSY79

Table 4.4. Odds ratios for women's attrition from male-dominated jobs. Service, clerical, sales and blue-collar workers in Year_t, 1979-2006

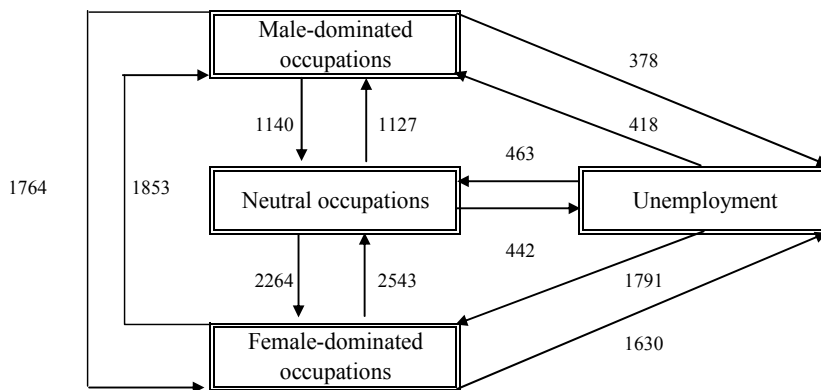
	Exits from male-dominated jobs		
	destination not specified	to male-dominated jobs	to female-dominated jobs
Socio-demographic variables			
Attending school	1.473 (0.422)	1.119 (0.412)	1.602 (0.502)
Colege or more (rc: less than college)	0.342** (0.164)	1.000 (0.000)	0.206 (0.215)
Male-dominated major (rc: non-male dominated major)	0.943 (0.146)	1.325 (0.304)	0.809 (0.228)
Getting married (rc: single)	1.421*** (0.130)	1.011 (0.156)	1.027 (0.136)
Marriage dissolution (rc: single)	1.335** (0.155)	1.357* (0.228)	1.040 (0.175)
First born	1.451** (0.236)	0.984 (0.220)	0.793 (0.163)
Second born	1.051 (0.127)	1.338 (0.254)	0.924 (0.162)
Mother's age at first born	1.027*** (0.007)	1.021** (0.010)	0.985* (0.009)
Job-related variables			
Service (rc: blue-collar workers)	0.805* (0.102)	0.610*** (0.115)	1.840*** (0.272)
Clerical (rc: blue-collar workers)	1.081 (0.148)	0.738 (0.159)	1.221 (0.229)
Sales (rc: blue-collar workers)	0.676** (0.133)	0.362** (0.160)	1.664** (0.421)
(rc: part time)	0.878 (0.092)	1.900*** (0.297)	0.653*** (0.079)
Occupational trajectory indicators			
Work leaves in the previous year	1.068	1.048	0.936

	(0.121)	(0.153)	(0.135)
Last occupation female	0.924	0.526***	1.614***
(rc: male)	(0.081)	(0.058)	(0.201)
Previous exits from male to female	0.977	1.062	0.953
	(0.054)	(0.098)	(0.088)
Years out of the labor market	0.871***	0.922***	0.943*
	(0.019)	(0.027)	(0.031)
Job spells	0.908***	0.965	0.915***
	(0.022)	(0.026)	(0.031)
Job tenure	0.239***	0.463***	0.387***
	(0.016)	(0.033)	(0.030)
Job tenure (sq)	1.067***	1.033***	1.042***
	(0.006)	(0.005)	(0.006)
Age first joined the labor market	0.939***	0.922**	1.039
	(0.020)	(0.031)	(0.030)
Years of experience in the labor market	1.008	1.012	1.006
	(0.015)	(0.018)	(0.021)
Period 1990-2006	1.030	1.137	1.070
	(0.128)	(0.207)	(0.181)
Constant	71.476***	2.344	1.377
	(33.152)	(1.653)	(0.866)
N	3.063	3.047	3.063
Clusters (individuals)	759	759	759
Pseudo Chi2	.42	.16	.19

*** p<0.01, ** p<0.05, * p<0.1. Robust z-statistics in brackets.

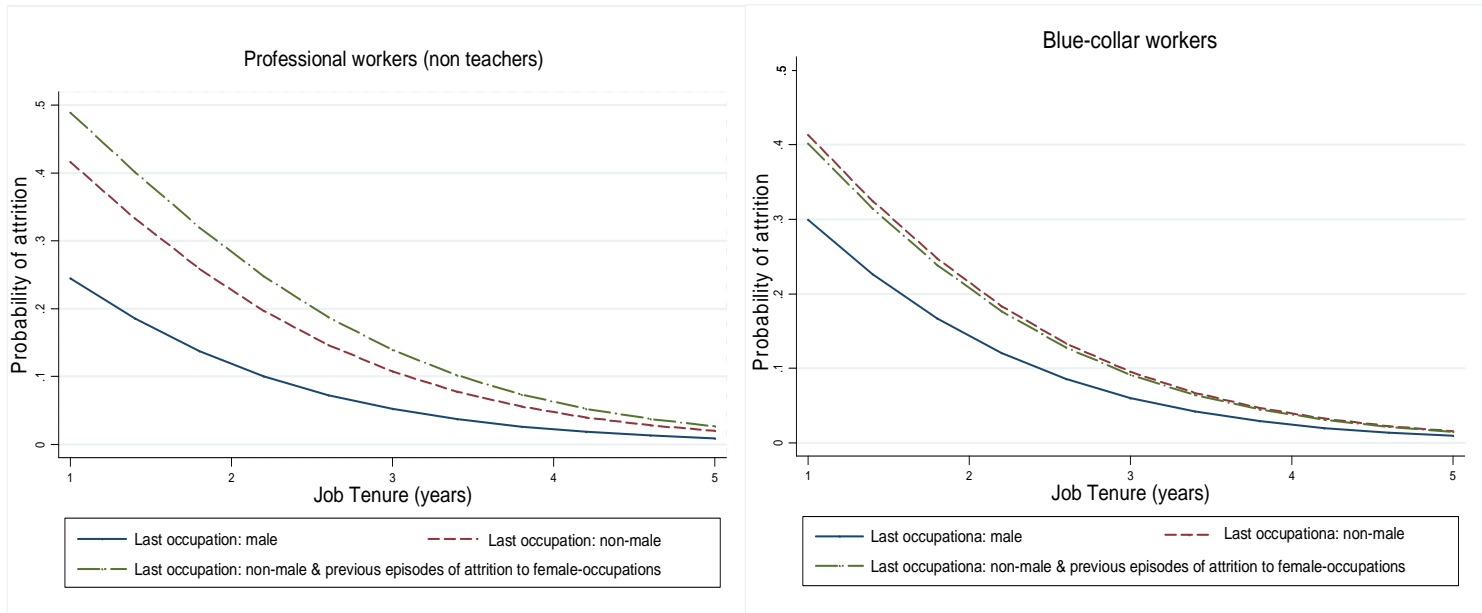
Source: Calculated by the author from NLSY79

Figure 4.1. Event history model. Flux diagram for females 1979-2006



Source: Calculated by the author from NLSY79

Figure 4.2. Probability of attrition from male- to female-dominated occupations. High- and low-status workers.



Source: Elaborated by the author from NLSY79

CHAPTER FIVE

Constrained Choices. Occupational attributes and sex-type mobility in the labor market.

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A major source of controversy in the literature on occupations is whether men and women's behavior in the labor market can be explained by the latter's preference for certain kinds of market work (on the supply side), or whether the labor market constrains opportunities for females (on the demand side). By means of an exhaustive analysis of working conditions and job attributes in over 400 occupations, this paper seeks to contribute to the debate by directly testing the supply side argument about sex differences in preferences for certain kinds of job. The empirical findings of this paper lend virtually no support to this approach. First, sex differences within occupations are virtually non-existent. Second, neither men's, nor women's, distribution when entering the male sector - nor women's departures from it - can be explained as the result of women's preferences for certain kinds of work or gender differences in human capital investments, especially among high-status workers. Instead it is hard to make sense of this pattern of entry and exit without reference to constraints on women's choices and opportunities.

Keywords: occupational attributes, sex-type mobility, preferences, women.

5.1. Introduction

A major source of controversy in the literature on occupations is whether men and women's behavior in the labor market can be explained by their preference for certain kinds of market work (on the supply side), or whether the labor market restricts opportunities for females (on the demand side). On the supply side, human capital scholars mainly explain sex differences in the job market as a consequence of sex differences in human capital investment and preferences for work. These academics argue that women's interest in combining both work and family responsibilities pushes them both to invest less in education (Becker 1993[1964]; Mincer and Polachek 1974) and to choose jobs that offer a lower depreciation of human capital while unemployed. They also contend that women prefer jobs with flexibility and more pleasant working conditions, even though they may have lower wages, probabilities of promotion, prestige and authority than those of men (Polachek 1981; Marini and Briton 1984; Tam 1997; Filer 1985, 1990, 1989). Socio-cultural researchers, on the other hand, seek explanations in the socialization process, discrimination, institutional practices and feedback effects among them to explain the perpetuation of occupational

segregation (Fernandez and Sosa 2005; Glass 1990; Reskin 1993; England et al. 1988; Jacobs and Steinberg 1990)

Among the main contributions of this study is the use of new sources of information on occupational-related attributes. By means of an exhaustive analysis of working conditions and job attributes in over 400 occupations, this paper seeks to improve the understanding of men's and women's behavior in the job market by directly testing the supply side assumptions about sex differences in preferences for certain kinds of jobs, with the aim of explaining whether such differences can account for women's behavior in typical male jobs. Empirical findings are highly inconsistent with such human capital statements, since neither women's entries into the male sector nor women's departures from it, can be explained as the result of women's preference for work or gender differences in human capital investment. Consequently, other mechanisms that are unrelated to job characteristics seem to be operating behind women's continuation in traditional male jobs.

The next section reviews prior research on job segregation and develops testable hypotheses for analyzing the link between job-related factors and occupational mobility. This is followed by a discussion on the data used in this study, empirical descriptors and the estimation of multivariate analysis for analyzing two kinds of career mobility: women's entry and exit into male-dominated occupations. A discussion of the main findings and concluding remarks are offered at the end of the paper.

5.2. Theoretical Framework

The increase of women's participation in the labor market has been accompanied by a prolific growth in the literature on job segregation, women's working conditions and occupational achievement (see Cohen and Huffman 2007, 2003; Huffman and Cohen 2004; Cotter et al. 2003; Cotter et al. 1997; Tomaskovic-Devey et al. 2006; Charles and Grusky 2004; Grusky and Sorensen 1998; among others). In an attempt to explain men's and women's behavior in the labor market, both human capital and socio-cultural scholars initiated a debate that still remains open four decades later.

Human capital researchers explain job segregation as the result of sex differences in human capital investments, whether general (obtained in the school system) or specific (obtained in the job market) (Becker 1993 [1964]; Mincer and Polachek 1974; Polachek 198; Tam 1997). The basic rationale behind this perspective is that women anticipate intermittent employment, mainly due to periods of maternity, while men plan continuous careers. Accordingly, rational women will choose to work in jobs where human capital does not depreciate when they move out of the labor market, while men choose jobs that offer high returns on experience. As the result of this operating mechanism, it is argued; we find a sex segregated labor market. Other studies, however, fail to support human capital assumptions and highlight the fact that male and female employees with equivalent human capital levels end up in different jobs, with different characteristics and different wage rates (Glass 1990; Concoran et

al. 1984; England 1982, 1992). This, they argue, remains true even after controlling for specific skills (England et al. 2000; see Tam 1997, 2000 for contrary evidence).

In the light of this evidence, the following question immediately arises; if women have achieved (or even surpassed) men's educational level, why do they continue to be concentrated in low-status, typical female jobs? As suggested by England and her colleagues (1988) both segregation and discrimination against female jobs would disappear if women responded by moving into male posts, but discrimination in recruitment, institutional socialization practices, limited information on jobs and 'feedback effects' among these factors, inhibit such mobility. Human capital scholars respond to this by arguing that it is occupational skill requisites and working conditions which determine mobility, rather than the gender composition of occupations (Filer 1990; Tam 1997, 2000). Employees have differences in preferences regarding work, and one possible cause of these different preferences is the gender of the worker (Filer 1985). In other words, advocates of the human capital theory expand their individual choice model by incorporating a new explanatory factor of job segregation, namely, preferences for job attributes. As women are often concerned about the conciliation of work and family responsibilities, they voluntarily choose to enter occupations that offer more flexibility and ease of work, at the cost of missing promotion opportunities, higher salaries and prestige.

The same logic is used by human capital scholars when addressing why comparable skills offer different pay. Any job may differ in many respects from every other job that an individual might have taken. Thus, the wage must be regarded as more than just a return on the individual's human capital; it also contains compensation for the disagreeable aspects of the job. Therefore, the compensating differential notion (Smith 1937[1776]; Filer 1985, 1989) is built on the idea that more unpleasant working conditions must pay premiums in order to be attractive, and unattractive jobs are more frequently filled by men. Sex differences in wages are in this way explained by differential choices in the tradeoff between pecuniary and non pecuniary job rewards.

Empirical evidence on these grounds raises polemic for many reasons. On the one hand, some researchers have found that predominantly female jobs are not necessarily jobs with characteristics that easily accommodate family responsibilities (Glass 1990). Moreover, if it is true that some classes of workers, particularly those with greater market power, may obtain some concessions to conciliate work-and family (e.g. flexibility to schedule work at will, childcare facilities), such concessions are unlikely to be extended to the rest of the labor force (Glass and Estes 1997). This finding is reinforced by recent research by Berg and his colleagues (2003). By means of a suggestive analysis, the authors found that the nature of jobs and the work-place environment play a key role on workers ability to balance their work and family life. To be precise, the opportunity to participate in decisions, informal training, pay for performance and good promotion opportunities -what they termed high-

work practices- have a positive effect on work-family balance. On the other hand, long working weeks and conflict with coworkers tend to reduce worker's ability to balance work and family obligations. Taken together the evidence available suggests that there has been a collective failure to provide effective policies to those who are most in need, such as low-income workers, young people and/or single parents at the early stages of their work careers (Glass and Estes 1997).

Furthermore empirical evidence also suggests that typical female jobs do not necessarily impose low penalties for intermittent employment or offer high starting wages (England et al. 1988), and that female-dominated jobs offer lower wages even when the underlying dimension of skills demands and working conditions have been controlled for (Jacobs and Steinberg 1990; England and McLaughlin 1979). In the light of these facts, scholars assert that sex differences in pay respond to a process of female work devaluation, rather than being the result of a compensating differential process. The "devaluation theory" claims that gender biases infect the decision that managers or consultants make about the remuneration for particular jobs, making them tend to underestimate the relative contribution of work undertaken in "female" jobs (Petersen and Morgan 1995; England 1992, England et al. 1994; England et a. 2000). Academics that support this thesis argue that first, the bias results from generalizing to women's work the relatively low value assigned to women. Later, bureaucratic inertia and institutional practices build on these prejudices, and the consequences of these biases become 'set in stone' (Fernandez and Sosa 2005; England et al. 2000). In sum, they contend that

discriminatory practices in the market create limited options that may be interpreted as preferences. However they conclude that it is not women's preferences for 'soft-work', but institutional inertia and feedback effects between the supply and the demand sides of labor markets that allow segregation and its effects to persist indefinitely.

Although both sets of theories anticipate a persistent self-selection of both men and women into sex typical occupations (whether it is because of an individual's preferences, or because of discriminatory institutional practices), the fact is that the participation of women in male jobs has rapidly increased over recent decades. For over thirty years, more and more women have moved into male jobs, especially in the professional occupations (Jacobs 1992). However, as Jacobs pointed out (1989), it is also true that they continue to leave typical male occupations, to the point that aggregate levels of segregation decrease very slowly or remain almost constant over time. More recent studies confirm that the current situation continues to be very similar to that of 25 years ago; women's absence in traditional male jobs turns out to be not only a matter of access, but also of survival in such kind of jobs (Sheridan 1997; Torre and Jacobs 2011; Torre 2011). Do women avoid male-dominated jobs because these jobs have attributes that pose a problem for women – long hours, inflexibility, heavy work, etc.? And when they leave male-dominated jobs, is women's attrition from male-dominated jobs due to these jobs attributes? In other words, are the women 'running away' from male-dominated jobs *per se* or only those with the job attributes that are most problematic for women?

Using the Panel Study of Income Dynamics (PSID), Maume (1999) found that, in the presence of controls, the percentage of males in a particular occupation was both negatively related to women's upward mobility and positively related to women's movement to joblessness. These results confirm the idea that women in male-dominated occupations are often token workers who are less integrated in informal discussion networks and outside the influential circles of power (Kanter [1977] 1993; Moore 1988; Davies-Netzely 1998) and that such isolation hampers women's performance at work, most especially at the top-levels. Using Moore's (1988) words, women are still "outsiders on the inside". However, Maume limited the analyses to occupational promotions and exits from the job market, largely ignoring other possible occupational changes, as transitions towards traditional female occupations. Also, the index used to measure occupational attributes -cognitive skills, exposure to hazards and physical requirements- overlook other relevant characteristics for women's mobility, such as time-demand factors, working conditions and levels of autonomy and authority.

5.3. Hypotheses

As pointed out in the previous section, the human capital explanation of sex segregation is built on the basis of men and women's differences in preferences for jobs. Some scholars argue that the jobs men hold require more on-the-job training and cognitive skills than women's jobs, which

explains men's overall pay advantage over women (Fuchs 1988; Tam 1997). Furthermore, Filer (1990) claims that men are more willing than women to work in dangerous and physically demanding jobs; and that higher pay and enhanced promotion opportunities compensate for the greater danger that men face in these jobs. In other words, he argues that the demands and skill requisites of the occupation determine mobility rather than the gender composition of occupations. These arguments are directly tested here, by measuring the impact of skill requisites and job demands on women's decisions in the job market.

For these arguments to be true, I contend that two different conditions must hold. The first of these conditions is related to women's entry into the male sector. As any job may differ in many respects from every other job that an individual might have taken men and women with different preferences will choose different jobs (Filer 1985, 1990). So, if we assume (as human capital scholars do) that an individual's preferences for work are the basis for individual choice and that the gender of the worker is the basis for an individual's preferences, occupational attributes should explain men's and women's distribution across male-dominated occupations.

However, some occupational attributes can be directly related to tenure and experience in the sector (e.g., high levels of authority can be achieved only after a certain time in the occupation). For this reason, to avoid the noise produced by potential post-sorting processes (Maume 1999b; Hymowitz and Schellhardt 1986; Steinberg et al. 1990), I focus on men and women's decisions at the precise moment that they enter the male

sector. Taking all these factors into account, the first hypothesis can be formulized as follows:

H1. *When men and women enter male-dominated occupations, they systematically choose occupations with a specific subset of attributes.*

The second condition refers to women's exits from male dominated jobs. Following the human capital logic described above, women are expected to leave for female-dominated occupations as a strategy to avoid performing particular tasks and to keep away from working under certain conditions. Here, I claim that to the extent that this premise holds true, occupational attributes should explain women's departures from male-dominated occupations and we should observe the following:

H2. *That there is a pattern of occupation-related attributes that differentiate women who remain or depart from a male-dominated sector.*

Frequently in the literature scholars have made *reasonable* assumptions both about women's preferences for work-related attributes -social vs. technical, safe versus hazardous or strenuous jobs, and flexible versus time-demanding occupations (Anker 1998; Anker and Hein 1985, 1986)- and about the agreeability of jobs (Jacobs and Steinberg 1990). However, all analyses of individual's preferences must be *post hoc* since researchers can never know in advance whether a job characteristic will be positively

or negatively valued in the labor market (Filer 1990). To assert otherwise is to maintain that all members of the labor force view the characteristic similarly. However, there are few, if any, characteristics on which workers show such uniformity of preferences (Filer 1990). For this reason – and in seeking to avoid the debate on the subjective evaluation of the agreeability or disagreeability of jobs- I will focus here on observed patterns of job-related characteristics, instead of making assumptions on single issues.

Finally, there are substantive reasons to think that women do not form a homogenous group of workers. High-status workers not only register lower fertility rates (Brewster and Rindfuss 2000) but they also have more available resources than low-status workers to afford private child-care and attend to other domestic responsibilities without having to abandon their positions. Besides, women in high-ranking positions are required to develop specific skills that are frequently less transferable than general skills (which are more common among low-status occupations) (Tam 1997, 2000; Polavieja 2008), hindering the possibilities of changing the field of work. The differences in the availability of material resources and the degree of transferability of skills may result in a deepening division among women and represent the basis for two different observable patterns of mobility among these two groups (Torre and Jacobs 2011). To account for these differences, the analytical part of this paper will therefore be undertaken separately for high- and low-status workers.

5.4. Data

Two main data sources are employed in the paper. Information on occupational attributes is provided by the O*Net dataset, which is overseen by the US department of Labor/Employment and Training Administration. This dataset contains detailed occupation-specific descriptors for 449 occupations in the United States. Specifically, it offers up to 227 descriptors on job-specific tasks plus information on the knowledge, skills and abilities required for each occupation. Data was initially collected from occupational analysts and then updated by the use of rolling surveys of each occupation's worker population, with added information from occupational experts. This data collection allowed the dilemma between objective and subjective indicators to be overcome and allowed accurate factors to be created in order to be able to measure a particular occupation's attributes.

Additionally, I employed the March Current Population Survey (hereafter, CPS) from 2006 to obtain the information on socio-demographic characteristics and the occupational situation of individuals. The sample covers about 57,000 households in which approximately 112,000 persons 15 years old and over were interviewed. The March survey includes information on the longest job held during the previous year as well as data on the current job, thus allowing for an analysis of occupational mobility over a one-year time period. These surveys offer some advantages over other available surveys in the United States. The CPS surveys provide detailed (3-digit) occupational data, which enable us to

code the gender composition of specific occupations and to capture occupational shifts that would be missed if only a limited set of broad occupations were measured. Additionally, the large sample size provides a sizable sample of occupation changers, even though it is considerably higher than it is in other surveys, such as the Panel Study of Income Dynamics (PSID) or the National Longitudinal Survey of Youth 1979 (NLSY79). Since our analyses are mostly limited to female occupation changers, it is important to have a large enough sample. Moreover, the CPS sample is nationally representative, which allows us to observe possible differences between men and women at different age stages, and who have been socialized at different moments.

Census data from 2000 are also employed to measure the gender composition of occupations. Occupations are classified into female, neutral or male, according to the proportion of men or women in each job, and these categories have been standardized to enable a comparison across years³⁵. Male-dominated occupations have been defined as having a proportion of females below 33,3%. Those with a female membership between 33,3% and 66,6% are called Gender Neutral, while occupations with a female participation higher than 66,6 % have been defined as Female.

³⁵ The changes between the 1980 and 1990 census categories were relatively minor, while the changes between 1990 and 2000 were more substantial. We reclassified the 2006 data using the 1990 occupational categories in order to determine whether any changes observed might be due to changes in occupational coding rather than changes in women's behavior. The results obtained did not differ substantially with the recoded data.

5.5. Occupation-related and socio-economic descriptors

A factorial analysis was run to tap the main dimension of job-related characteristics and to avoid multicollinearity. This approach has frequently been used in previous studies dealing with work-related dimensions (Jacobs and Steinberg 1990; Glass 1990; Kalleberg 1977). Appendix 1 contains a brief description of the 41 descriptors used to create the scales, selected on the basis of previous literature, according to their impact on an individual's mobility in the labor market. Once created, scales are standardized and score between 0 and 1. Final factors appear listed in the following table³⁶.

(Table 5.1 about here)

The reliability of the scales is regularly high for all the factors. The first two factors (“Math-“ and “Strength abilities”) basically refer to the

³⁶ Despite the fact that it seems reasonable to think that occupational changes are predominantly economically driven, this is not always the case. According to our data, about 42% of high-status workers experience an increase of 10% (or more) in their pay when changing occupations within male-dominated jobs. Only a 28% among those moving from typical male to typical female occupations experience a similar increase. Among non-professional workers the proportion of women who experience some improvement in their wages rates when moving out of the male field is about a fifth; while among those who are changing occupations within the male sector, this proportion is double. Taking this into account, it is hard to assume that women's attrition from male-dominated occupation is mainly motivated by the possibility of finding a better remunerated job, and it becomes necessary to find new explanations by introducing new elements into the analyses. Due to the high endogenous relationship between earnings and other characteristics of the occupations (Glass 1990; Jacobs and Steinberg 1990), I decided not to include this variable in the analyses.

enduring attributes of the individual that influence their performance. “Social”, “Security”, “Competition” and “Authority” scales capture occupational values and preferences for work environment. “Technical”, on the other hand, measures the technical worker’s requirements for each occupation. The three factors “Conflict situations”, “Hazards” and “Bad working conditions” measure a variety of *unpleasant* situations at work. Finally, “Time pressures” and “Long working weeks” are aimed at determining the time-demands of the occupations in the short term; while the conventional index “Level of on-the-job-training” captures the level of training that individuals working in a particular occupation are supposed to invest.

Analyses also include controls for age, educational level (less than high school, high school, some college and college or more), marital status (single, married and separated or divorced) and the presence of young children in the household. The weekly number of worked hours is coded as full-time employment if the person worked over 30 hours, and part-time employment otherwise. Finally, the individual’s occupational category is measured at 3 digits of detail. I use the occupational category to differentiate high-status (professionals and managers) from low-status workers (the remainder), in order to run separate regressions on both groups. However, I do not introduce controls for occupational dummies in the final analyses. Filer’s (1990) criticism of Jacobs and Steinberg’s study (1990) warned about the problems derived from including work-related attributes together with controls for occupational dummies in multivariate regressions. In his own words, “occupational dummies and a full set of

job characteristics are simply alternative ways of defining the same thing”, and the simultaneous analyses of both sets of variables is redundant. Table 5.2. summarizes the main descriptive statistics for these indicators, differentiating by the sex of the individual.

(Table 5.2. about here)

Average age of the working population is about 40 years old both for men and women. Regarding educational level, men are overrepresented among those with less than high school, although they are more likely to complete high school. The proportion of individuals with a college degree is quite similar among men and women, and represents about one third of the working population. We do not observe differences in the proportion of single men and women employed, while the percentage of married women working is significantly lower than their male counterparts. Conversely, women are overrepresented among separated, divorced and widowed workers.

As regards their participation in the labor market, the amount of men working full-time is 15 percentage points higher than women. However, more women work in the professional sector, as well as in the service and clerical sector; while men are overrepresented among blue-collar workers.

5.6. Methods

The empirical part of this paper has a double approach; the first is descriptive while the second is analytical. The descriptive part of the analysis has a double goal. First, it aims to show differences among sex-type occupations; that is, to what extent occupation-related attributes are currently (un-)equally distributed across male-, neutral and female-dominated occupations. Secondly, it aims to account for gender differences within sex-type occupations. Are men and women working in the same field equally, or are they unequally distributed?

Multivariate analyses also follow a double strategy. In first place, a probit³⁷ regression is run to estimate the probability of finding a male or a female employee in a male-dominated occupation. As the main goal here is to account for sex distribution across male occupations at the outset, the sample is restricted to those entering typical male occupations at the moment of the interview. So, the dependent variable Y is a dichotomous variable that equals 1 if the occupational mover is a man and 0 if it is a woman. The estimated model can be formally written as:

$$(2) \quad \Phi^{-1}(p_i) = \beta X_i + \gamma W_i + \varepsilon_i$$

³⁷ All regressions have been estimated using a probit and a logit model, with no significant differences. The main differences between probit and logit rests on the distributional assumptions of the latent variable; while the logistic has slightly flatter tails, the probit curve approaches the axes more quickly. The conventional wisdom is that in most cases the choice of the link function is largely a matter of taste, and that both provide identical substantive conclusions (Greene 1997; Gill, 2001).

where p_i is the probability that $y_i=1$ and $\Phi^{-1}(p_i)$ is the inverse of the cumulative distribution function of a standard normal variable. X_i is a vector of socio-demographic and economic controls and W_i includes the occupational attributes scale in moment t , as defined in the previous section.

In second place, the probability of women's attrition from a typical male job is estimated. However, limiting the analysis to individuals working in the male sector may introduce sample selection problems. A two-stage Heckman's selection correction model has been used in order to assess for this potential problem and correct subsequent bias. The selection equation estimates the probability of a woman i to be working in a male-dominated occupation and is defined by:

$$(2) \quad \varphi^{-1}(p'_i) = \sigma X_i + \lambda W_i + \tau \text{Instrument} + \varepsilon'_i$$

being X_i and W_i defined as above. Additionally, an instrument is included to improve identification (Pearl 2000). In the face of the impossibility of finding any useful instrument measured at the individual level, I constructed an aggregate instrumental variable (following Holm and Jaeger 2010), that measures the relative expansion/contraction of each major occupational category in the male-dominated sector between $t-1$ and t . This variable is meant to capture the difficulty of making the transition to the male sector depending on the current/desired position of the individual.

A vector of the Inverse Mills Ratio (estimated expected error) is generated from the parameter estimates (Greene 2000) and included in the main equation (IMR in equation 3 below) as an extra explanatory variable; removing the part of the error term correlated with the explanatory variable and avoiding the bias.

$$(3) \quad \Phi^{-1}(p'_i) = \beta'X_i + \gamma'L_i + \alpha\text{IMR} + \varepsilon''_i$$

In this case, the dependent variable Y' equals 1 when a woman changes job from a male-dominated to a non male-dominated occupation and 0 otherwise (occupational changers within male occupations and non-occupational changers). Vectors X_i and W_i are again defined as in previous models. The existence of selection bias can be investigated by testing against zero the coefficient of the expected error term from performing the Heckman two-stage procedure (Kennedy 1998).

In addition to the Heckman two-stage procedure, corrected standard errors are additionally generated by bootstrapping (Fox 2002). The bootstrap is a method to derive properties of the sampling distribution of estimators by using the sample data as a population from which repeated samples are drawn. It is especially suited for multi-stage estimators, such as the two-stage estimator of the Heckman sample selection model (Schmidheiny 2010; Cameron and Trivedi 2009).

5.7. Distribution of occupation-related attributes in the sample.

The first step to understanding women's and men's mobility in the job market is to observe how occupational attributes are distributed across sex-type occupations. Are occupational attributes distributed according to the sex-composition of the occupations? Are male and females employed in the same sector working on similar occupations? To answer these questions, I will follow a two-step strategy. First, Table 5.3. reports the mean values and statistical deviation for the 13 indexes for male-, neutral- and female-dominated jobs, with the aim of establishing similarities and differences among sex-type occupations. Next, I split the sample for men and women. This enables us to observe to what extent female and male workers in the same sex-boundary are equally or unequally distributed within occupations.

The results in Table 5.3. corroborate the fact that typical male and female occupations are, as anticipated in the literature, significantly different in many regards. However, some unexpected results can also be emphasized. First of all, remarkable differences emerge between high- and low-status occupations, to the point that both sets of jobs merited a separated analysis. Regarding the first group, the pattern of typical male and typical female occupation-related attributes is not as clear as expected. As highlighted by previous research, professional and managerial male-dominated occupations stand out in the level of math abilities, authority and level of competition required; while typical female jobs register

higher levels of social skills. However, more surprisingly, both male- and female-dominated occupations score rather similarly in the level of security in the job, contrary to the general belief that female jobs offer more security.

Regarding time demands indicators, we also find noticeable differences in long-working weeks (male jobs score almost double) and required level of on-the-job training. Nevertheless, time-pressure levels are pretty much the same across sex-type boundaries. Finally, results are also mixed as regards working conditions as individuals in female-dominated jobs are more likely to face conflict situations, while male jobs scored higher on bad working conditions. Yet again, our measure for exposure to hazards has almost the same in both male and female occupations. Understandably, neutral occupations rank most often at some point in between male- and female-dominated occupations.

(Table 5.3. about here)

Among low status workers, sex differences in the distribution of occupational characteristics are more evident, although it is also difficult to identify a clear pattern in this case. When compared to typical female jobs, male jobs score higher in the level of strength needed to perform the job, the technical skills required, and the levels of authority and competition in the job. However it is worth mentioning that the highest scores are registered in the gender neutral occupations which, in addition, offer more advancement opportunities than both female and male jobs. Time-demands are also higher within male-dominated jobs than in female

occupations, which is unsurprising as most of the part-time jobs are concentrated in the latter group. Again, we find mixed results for *unpleasant* working conditions. Whereas exposure to hazards and bad working conditions are more likely to be found among typical-male occupations, individuals working in the female sector are more likely to face conflict situations. In sum, we could conclude that the distribution of occupation-related attributes of low-status jobs respond to a more *conventional* pattern.

Taking one step further, I break down the sample by gender. A quick glance at Table 5.4. is sufficient to confirm that men and women are quite similarly distributed within sex-type occupations.

(Table 5.4. about here)

For high-status employees working in male-dominated jobs, sex differences virtually disappear. With only a few exceptions, sex difference scores differ from below two percentage points. However, some results are noteworthy. First, men enjoy higher levels of authority when working together with a majority of females, while paradoxically, the opposite holds for women. Exactly the same is observed for time pressures and long-working week factors. Second, in contrast to the human capital premises, differences in the level of on-the-job training disappear once we split the sample by gender, and no significant differences are found between female and male workers.

The scenario is slightly different for low-status workers. After breaking down the sample by gender we can still observe noticeable divergences between the sexes, largely among workers within the male-dominated sector. For example, males surpass females by 12 percentage points at the level of strength abilities, 11 percentage points at the level of bad working conditions and technical requirements, and 9 percentage points at the level of exposure to hazardous conditions. Differences between sexes, nevertheless, are considerably moderated for individuals working in the female field, as well as in neutral occupations.

The results of this section can be summarized in three main points. First, typical male and female occupations are still different in many regards, but not in others. Although some occupational attributes continue to be unequally distributed across sex-type occupations, many differences that were mentioned in the previous literature have attenuated over time, or even disappeared. Second, within occupations men and women start looking similar. Third, the last two points are especially true among professional and managerial workers, while sex differences persist mainly among low-status workers.

5.8. Findings

Multivariate analyses in this section are the last tests to determine whether gender mobility in the job market can be explained by men's and

women's preferences for particular occupations. The first step is to assess whether occupation-related attributes are able to explain men's and women's distribution in a male-dominated field at the moment they enter. To do so, Table 5.5. reports the estimated probabilities of finding a male or a female employee in the male sector, among newcomers from a non male-dominated occupation.

(Table 5.5. about here)

In general terms, men's and women's presence in the male-dominated sector does not vary with their attributes, and especially at professional and managerial level. The first thing to note is the low explanatory power of human capital indicators, as no systematic divergences in the educational level of males and females are observed. Among high-status workers, some differences are found among the less and the most educated workers, but the coefficient is significant only at the marginal level. Also in discrepancy with supply-side expectations, the presence of young children at home does not show any significant effect, although the sign of the coefficients is in the expected direction; suggesting an under representation of women with young children entering the male sector.

A glance at the estimated coefficients is sufficient to see that occupational attributes neither are able to explain men's and women's distribution within male-dominated jobs. In fact, only two attributes show a significant effect at the moment they enter typical male jobs and curiously, in a very contradictory way. Whereas the social content of the

occupation increases the probability of finding a female employee (as expected from the literature), the same happens in occupations with hazardous conditions; a finding that is directly opposed to the idea that women avoid working in unpleasant or dangerous conditions. In fact, even when the explanatory power of the occupational measures is left aside, a clear pattern of attributes that are positively and negatively related to females and males presence in typical male jobs cannot be established. While some results go in the expected direction in the literature (Anker and Hein 1985, 1986) (for example, males appear overrepresented in occupations which required high levels of math abilities, technical knowledge and bad working conditions), others point in exactly the opposite direction (the level of competition and strength abilities increases the likelihood of female participants). Neither do time-demanding factors show a homogeneous direction. As anticipated by human capital advocates, the conventional index for the level of on-the-job training has a positive coefficient, indicating a higher (although not statistically significant) representation of men in occupations demanding an investment in on-the-job training. However, in contrast with their expectations, there is a positive relationship between level of time pressures and long working weeks, and the presence of female workers.

Remarkable differences emerge when we look at the results for non-professional workers. First, individual's attributes explain men's and women's presence in the male sector to a greater extent. For example, males are underrepresented among those workers who reported to have "some college" (when compared to individuals with college or more).

Also worth mentioning is the fact that women's presence in male-dominated jobs decreases in their mid range age, (possibly coinciding with maternity periods; although the presence of young children in the household is not statistically significant). Finally, low-status women are still overrepresented among part-time workers, even when employed in typical male occupations.

Second, some job-related attributes have a reverse effect for low-status workers than for high-status workers, forming to some extent a more conventional pattern. For instance, men are significantly more likely to fill jobs which require high levels of strength, authority, competition level, technical content and on-the-job training. Yet, as for professionals, we observe a positive relationship between female participation and the hazard levels, math abilities and long working weeks needed in the occupation. These results, although not significant, make us reflect on conventional assumptions about the preferences between the sexes.

Let us now see what happens on the other side of the coin, which means to what extent preferences for certain occupational attributes are able to explain women's departures from the male sector. Table 5.6. reports both simple probit and bootstrapped two-stage probit coefficients for the probability of women's attrition from male-dominated jobs³⁸. With the inverse Mills ratio included, the coefficients represent consistent estimates of the population attrition equation; but we do not find evidence of sample

³⁸ Two-stage probit coefficients are mostly the same before and after bootstrapping. For space reasons, only the latter results are presented here. Two-stage probit results are available upon request

selection in the model for professionals and managers. The coefficient of IMR is, however, significant and negative in the case of low-status workers, indicating that there are unobserved variables that increase the probability of selection and the probability of a lower than average score on the probability of attrition.

(Table 5.6. about here)

Again, women in the mid range age category are less prone to move out of their male occupations than younger and older women. It could be argued that mobility is lower once women reach a certain degree of career maturity. However, attrition from typical male jobs tends to increase again over time, discarding this hypothesis. Female attrition from typical male jobs also varies with female's educational level, but curiously, the effect is the opposite for high- and low-status workers. Whereas highly educated women in high-status occupations are significantly more likely to keep their jobs, the probability of continuing to work in the male sector decreases with education among low-status workers. This effect however is only significant at the marginal level. Marital status is also statistically related to low-status women's exits from typical male jobs, because it is single women who are more likely to stay. Nevertheless, this result cannot easily be linked to the potential conflict between work and family among married (or divorced) women, as we do not observe any effect of the presence of children at home on the probability of women's exits. No differences are either observed between part-time and full-time workers.

Attrition from high-status positions does not vary a lot with occupational-related attributes. First, the coefficients of the measured attributes are, in the majority, not statistically significant. Second, they often show opposite signs to what is expected by the supply-side theory. For example, women's attrition is lower from occupations with high levels of social content, but also from occupations with high levels of mathematical and strength abilities, technical knowledge, conflictual situations and hazardous working conditions. Time-demanding tasks, however, are positively related to women's departures from typical male jobs.

Occupational attributes do play a more relevant role in explaining female attrition from low-status occupations. However, despite its higher explanatory power, the results continue to be inconsistent with conventional assumptions regarding women's preferences for work. To illustrate this point, we can point out that women are less likely to move out from occupations that demand high levels of technical knowledge, and neither from those with high levels of hazardous conditions, conflictual situations and bad working conditions. Additionally, increases on the time-demanding indicators are also negatively related to women's departures.

Summarizing these results, we can highlight four facts. First, in general terms entries and exits from typical male jobs do not vary with women's attributes, although educational level has some relevance in explaining women's permanence in the male sector. Second, the explanatory power of the occupation-related attributes is quite limited, since many of these

predictors are not statistically significant. Third, regardless of significance, the sign of the coefficients show men's and women's 'shapeless patterns' of mobility, which prevent us making clear propositions about men's and women's preferences at work. Finally, the latter affirmations are especially true among high-status workers. Taken together, we can conclude that occupation-related attributes do not account for the distribution of men and women in the male sector at the moment they start to work in it; and regardless of possible post-sorting after entering, neither are they good predictors of women's attrition from typical male jobs. As these two conditions do not hold, supply side arguments on women's preferences for market work are found to be flawed from an empirical perspective, and further mechanisms are required to explain sex segregation in the job market. In the next section, findings and alternative explanations are discussed.

5.9. Discussion

For over four decades, research on sex segregation in the job market has been divided into two main schools of thought; the socio-cultural (demand side) and the human capital (supply side) approaches. In this paper, I employed a new set of data that allowed us to go deep into the debate in a twofold way: First, it enabled us to assess to what extent occupational characteristics vary according to the sex-composition of the

occupation. Second, it allowed us to test the supply side hypothesis about sex differences in preferences for work.

The empirical findings of this paper are inconsistent with a supply side approach. On the one hand, sex differences within occupations are virtually non-existent. On the other, both women's entry and exit into the male-field are highly independent from the characteristics of the occupations. Furthermore, occupation-related attributes follow a particularly unstructured pattern, making it difficult to outline what attributes are typical "male taste" or typical "female taste". Taken together, we can conclude that women's mobility is not determined by women's preferences for certain kinds of work, as human capital researchers suggest. This, however, is especially true in the case of high-status workers. Indeed, the logic of job choice is almost orthogonally different between high- and low-status workers.

However, it is hard to make sense of this pattern of entry and exit without reference to constraints on women's choices and opportunities. Demand-side explanations focus on the constrictions that women face in seeking to access typical male jobs (Fernandez and Sosa 2005) and link women's exits to the significant problems of acceptance and integration that they encounter after entering into male-dominated occupations (Smith 2002; Reskin 1993; Kanter 1977; among others). However, women's patterns of attrition are also too ambiguous to be explained by socio-cultural arguments. For example, if as Reskin (1993) suggested, the ability of men to exclude women depends on their own power, which would explain

low-status worker's continuance in the *bad jobs*; that is, in occupations which entail high risks and unpleasant working conditions. However, from this perspective, it is hard to explain why the level of authority of the occupation is negatively related to women's departures.

An alternative explanation for women's mobility could be that women performing highly specific or sex-typed specific tasks will have more difficulty in finding a new job. The former would especially affect women working in top-level positions; investing in specific and un-transferable skills. The latter would be more likely among low status workers, since as we have seen in section 5.6, male- and female-dominated occupations are still quite different. If this is true, a woman employed in a male-dominated job that requires high levels of technical content, for example, will encounter more problems to find a similar job outside of the male sector. Similarly, women working in the *bad jobs* at the bottom of the occupational structure will be less able to negotiate a position in a new occupation. The lack of alternatives could push them downward in the occupational structure, or even push them out of the labor market altogether. Consequently, these effects could result in the observed unstructured pattern of mobility. Admittedly, however, this argument is purely speculative. Further research on women's destinations and comparison between occupational attributes from both origin and destination occupations is needed in order to better understand current levels of sex-segregation.

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Table 5.1. Factors created from O*Net 2006 database.

Factors and Reliability Scale	Items
Math abilities (.93)	1.Mathematical reasoning
Strength abilities (.92)	2.Numerical facility
	3.Static strength
	4.Dynamic strength
	5.Control precision
	6.Manual dexterity
	7.Finger dexterity
Authority (.92)	8.Authority
	9.Leadership
	10.Autonomy
	11.Independence
Social (.82)	12.Social abilities
	13.Relationships
	14.Cooperation
	15.Adaptability
Technical (.90)	16.Operations
	17.Installation
	18.Repairing
Conflict situations (.83)	19.Dealing with unpleasant people
	20.Dealing with dangerous people
	21.Facing conflict situations
Hazards (.88)	22.Exposure to hazards
	23.Exposure to contaminants
	24.Exposure to hazardous equipment
	25.Risk of cuts, burn, etc
Bad working conditions (.86)	26.Level of bad working conditions
	27.Working outdoors
	28.Extreme temperatures
SINGLE FACTORS	
	29.Security
	30.Competition
	31.Time pressures
	32.Long working weeks
	33.Level of on-the-job training

Source: calculated by the author from the O*net, 2006. Regression scoring assumed

Table 5.2. Descriptive for women and men in the labor market.

	Women		Men	
	N=49,956		N=54,500	
	Mean	S.D.	Mean	S.D.
Socio-demographic variables				
Age	40.01	13.23	40.30	13.39
Less than high school	.12	.32	.15	.36
High school	.28	.45	.31	.46
Some college	.32	.47	.26	.44
College or more	.29	.45	.28	.45
Single	.27	.44	.27	.44
Married	.55	.50	.63	.48
Divorced/Separated or widowed	.18	.39	.10	.30
Young children in the household	.56	.50	.54	.50
Employment variables				
Full-time worker	.67	.47	.82	.39
Professional or manager	.36	.48	.31	.46
Service	.22	.41	.14	.34
Clerical	.22	.41	.06	.24
Blue-collar	.08	.26	.38	.49

Age is a continuous variable. Rest of variables: min=0, max=1.

Source: Calculated by the author from the CPS 2006

Table 5.3. Occupational characteristics by sex-type of occupation. Mean values.

	Professionals and managers			Non-professionals		
	*Male	Neutral	Female	*Male	Neutral	Female
Math abilities (Mean)	.42	.41-	.31	.28	.34	.34
(S.D.)	.09	.13	.10	.11	.10	.16
Strength abilities	.41	.37	.35	.76	.53	.48
	.18	.14	.15	.15	.18	.16
Authority	.67	.57	.50	.23	.34	.16
	.13	.12	.19	.19	.26	.17
Social	.26	.35	.60	.08	.18	.32
	.20	.16	.15	.14	.14	.14
Security	.70	.67	.71	.53	.55	.57
	.10	.09	.08	.10	.10	.08
Level of competition	.64	.62	.52	.60	.64	.51
	.08	.10	.07	.11	.14	.09
Time pressures	.78	.76	.74	.78	.76	.68
	.09	.07	.11	.08	.10	.13
Long working weeks	.69	.54	.36	.48	.40	.18
	.19	.19	.21	.24	.26	.16
Level of training	.48	.32	.26	.37	.33	.22
	.13	.14	.15	.17	.11	.13
Technical	.49	.38	.34	.60	.43	.32
	.32	.15	.12	.17	.14	.06
Conflict situation	.32	.33	.44	.30	.34	.36
	.13	.11	.09	.11	.08	.10
Exposure to hazards	.23	.15	.22	.54	.30	.19
	.17	.12	.14	.18	.17	.11
Bad working conditions	.47	.40	.38	.89	.55	.41
	.24	.17	.06	.20	.18	.13

*Male-dominated: <33% females; female-dominated: >66% females; neutral: rest
Source: Calculated by the author from the O*net 2006

Table 5.4. Occupational characteristics by gender and sex-type of occupation. Mean values and standard deviations.

		Professionals				Non-professionals			
		*Male-dom.		Female-dom.		*Male-dom.		Female-dom.	
		**M	F	M	F	M	F	M	F
Math abilities	(Mean)	.42	.42	.33	.30	.28	.25	.39	.33
	(S.D.)	.08	.08	.11	.10	.11	.12	.15	.16
Strength abilities		.41	.41	.43	.46	.77	.67	.49	.48
		.18	.19	.16	.15	.14	.19	.16	.16
Authority		.67	.68	.54	.49	.23	.21	.17	.16
		.12	.13	.18	.19	.19	.22	.19	.16
Social		.26	.28	.58	.61	.07	.11	.31	.32
		.20	.22	.15	.15	.14	.15	.14	.14
Security		.70	.72	.71	.70	.53	.54	.57	.57
		.10	.10	.07	.08	.10	.09	.09	.08
Level of competition		.64	.65	.53	.51	.60	.57	.52	.51
		.08	.09	.07	.07	.11	.15	.09	.08
Time pressures		.78	.79	.75	.74	.78	.77	.68	.69
		.09	.09	.08	.11	.07	.08	.14	.13
Long working weeks		.69	.71	.38	.36	.48	.45	.20	.18
		.19	.19	.21	.21	.23	.27	.17	.15
Level of training		.48	.49	.26	.26	.38	.32	.22	.22
		.14	.12	.16	.15	.17	.15	.14	.13
Technical		.50	.47	.34	.34	.62	.52	.32	.32
		.17	.18	.11	.13	.17	.14	.06	.06
Conflict situations		.31	.33	.45	.44	.30	.31	.38	.36
		.12	.13	.09	.09	.11	.11	.09	.10
Exposure to hazards		.24	.21	.19	.22	.56	.47	.18	.20
		.17	.17	.14	.15	.18	.19	.09	.12
Bad working conditions		.48	.45	.37	.39	.91	.78	.44	.41
		.24	.24	.06	.06	.19	.19	.15	.13

*Male-dom:<33% females; female-dom:>66% females

**M=Males; F=Females

Source: Calculated by the author from the O*net 2006

Table 5.5. Probability of finding a man/woman employed in a male-dominated occupation. Newcomers from non-male dominated jobs.

	Professional and managerial workers		Non-professional workers	
	B	S.E.	B	S.E.
Socio-economic variables				
Age	-.018	.050	-.085 ***	.018
Age2	.001	.001	.001 ***	.000
Educational level (r.c.: college or more)				
Less than high school	-1.097 *	.624	-.207	.139
High school	-.288	.326	-.008	.097
Some college	-.315	.205	-.175* *	.095
Young children at home	-.113	.187	-.049	.079
Marital Status (r.c.: single)				
Married	.235	.239	.228 *	.112
Divorced/Separated/Widowed	-.6480 *	.341	-.374 **	.133
Full-time worker	.333	.240	.504 ***	.091
Occupational attributes:				
Math abilities	1.527	1.125	-.287	.852
Strength abilities	-.034	1.063	1.359 **	.628
Social abilities	-2.478 **	1.203	-1.170 **	.580
Authority level	.854	.907	1.447 **	.701
Competition level	-.641	2.001	3.418 ***	.684
Security on the job	.262	2.019	-.050	.849
Technical level	.336	1.092	1.116 *	.644
Hazards level	-1.939 *	1.074	-.217	.526
Bad working condition	1.123	1.084	.389	.393
Conflict Situations	.244	2.215	.402	.784
Time pressures	-1.329	1.940	1.270	.965
Long working weeks	-.089	.845	-.256	.315
On-the-job training	.104	.731	1.167 **	.450
N		281		1579
Log-Likelihood		-170.392		-861.294

Source: Calculated by the author from the CPS, March Supplement 2006 and O*Net 2006

*** p<0.01, ** p<0.05, * p<0.1

Table 5.6. Probability of women's attrition from male-dominated occupations.

	Professional and managerial workers				Non-professional workers			
	Probit		Two-stage probit + bootstrapping		Probit		Two-stage probit + bootstrapping	
Socio-economic variables:	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Age	-.057 **	.022	-.057 **	.024	-.0278 **	.009	-.022 **	.010
Age2	.000 **	.000	.001 *	.000	.000 **	.000	.000	.000
Educational level (r.c.: college or more)								
Less than high school	.450	.339	.443	.334	-.195 **	.089	-.199 **	.085
High school	.616 ***	.134	.600 ***	.159	-.123	.080	-.144 *	.074
Some college	.487 ***	.115	.469 ***	.137	-.124	.081	-.160 **	.076
Young children at home	-.048	.100	-.046	.105	-.013	.050	.016	.051
Marital Status (r.c.: single)								
Married	-.119	.129	-.119	.137	.094	.066	.118 *	.067
Divorced/Separated/Widowed	.083	.160	.074	.168	.171 **	.077	.172 **	.078
Full-time worker	-.156	.132	-.148	.144	-.096 *	.052	-.069	.057
Occupational attributes:								
Math abilities	-.710	.507	-.550	.590	.688 *	.354	1.624 ***	.447
Strength abilities	-.210	.589	-.257	.608	-1.673 ***	.315	-1.290 ***	.344
Social abilities	-.458	.600	-.457	.888	.390	.420	.457	.446

Authority level	-.392	.496	-.718 *	.434	-1.386 ***	.288	-1.249 ***	.309
Competition level	-.004	.881	.638	1.004	1.156 **	.369	1.221 ***	.388
Security on the job	-.042	.976	.723	.906	-1.847 ***	.447	-1.790 ***	.478
Technical level	-.336	.445	-.103	.513	-.333	.288	-1.033 **	.361
Hazards level	.247	.640	.023	.559	-.367	.302	-.409	.313
Bad working condition	-.948	.631	-1.204	.703	-.006	.276	-.790 **	.322
Conflict Situations	-1.84 *	1.09	-1.854 **	.925	-1.304 ***	.315	-1.185 ***	.329
Time pressures	1.10	1.34	1.05	1.21	-1.775 ***	.479	-1.940 ***	.494
Long working weeks	.498	.454	.601	.715	.770 ***	.179	-.242	.297
On-the-job training	.013	.466	.183	.887	.724 ***	.221	.747 **	.241
IMR			.046	.211			-.471 ***	.114
Log-Likelihood	-479.73487			-	-2053.2789			-
N	2056			18,350	4552			33,064

Source: Calculated by the author from the CPS, March Supplement 2006 and O*Net 2006

*** p<0.01, ** p<0.05, * p<0.1

APPENDIX 5.1.

Ítem	Description
1. Mathematical reasoning	The ability to choose the right mathematical methods or formulas to solve a problem.
2. Numerical facility	The ability to add, subtract, multiply, or divide quickly and correctly.
3. Static strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects
4. Dynamic strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue
5. Control precision	Abilities related to the control and manipulation of objects in time and space
6. Manual dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.
7. Finger dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.
8. Authority	Workers on this job give directions and instructions to others.
9. Leadership	Job requires a willingness to lead, take charge, and offer opinions and direction.

- | | |
|---|---|
| 10. Autonomy | Workers on this job plan their work with little supervision. |
| 11. Independence | Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy |
| 12. Social abilities | Social abilities involve working with, communicating with, and teaching people. These occupations often involve helping or providing service to others. |
| 13. Relationships | Occupations that satisfy this work value allow employees to provide services to others and work with co-workers in a friendly non-competitive environment. Corresponding needs are Co-workers, Moral Values and Social Service. |
| 14. Cooperation | Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude. |
| 15. Adaptability | Job requires being open to change (positive or negative) and considerable variety in the workplace |
| 16. Operations | Analyzing needs and product requirements |
| 17. Installation | Installing equipment, machines, wiring, or programs to meet specifications. |
| 18. Repairing | Repairing machines or systems using the needed tools. |
| 19. Dealing with unpleasant people | How frequently does the worker have to deal with unpleasant, angry, or discourteous individuals as part of the job requirements? |
| 20. Dealing with dangerous people | How frequently does the worker have to deal with unpleasant, angry, or discourteous individuals as part of the job requirements? |

- | | |
|--|--|
| 21. Facing conflict situations | Amount of conflict that the worker will encounter as part of this job |
| 22. Exposure to hazards | How often does this job require exposure to hazardous conditions? |
| 23. Exposure to contaminants | How often does this job require being exposed to contaminants (such as pollutants, gases, dust or strong odors)? |
| 24. Exposure to hazardous equipment | How often does this job require exposure to hazardous equipment? |
| 25. Risk of cuts, burn, etc | How often does this job require exposure to minor burns, cuts, bites, or stings? |
| 26. Level of bad working conditions | Workers on this job have bad working conditions. |
| 27. Working outdoors | How often does this job require working outdoors, and being exposed to all weather conditions? |
| 28. Extreme temperatures | How often does this job require working in very hot (above 90 F degrees) or very cold (below 32 F degrees) temperatures? |
| 29. Security | Workers on this job have steady employment. |
| 30. Competition | Amount of competition that the worker will face as part of this job |
| 31. Time pressures | How often does this job require the worker to meet strict deadlines? |

- 32. Long working weeks** Number of hours typically worked in one week is over the mean
- 33. Level of on-the-job training** The systematic acquisition of attitudes, concepts, knowledge, roles, or skills that result in improved performance at work

Source: O*Net 2006

CHAPTER SIX

Main findings, conclusions and further research

6.1. Summary and findings

This dissertation accounts for the persistence of sex-segregation levels in the US labor market. In 2008, about 50 percent of women in the U.S. would have had to have changed occupations in order to be distributed in the same manner as men. This level of segregation is substantially lower than the index of 70 found in 1970, and this figure has then inched down in the early 1990s. However, a detailed study of trends over the last two decades concludes that there has been virtually no progress on this indicator since 1996 (Hegewish et al. 2010). In fact, these and other results confirm that segregation is one of the most enduring forms of gender inequality (Charles and Grusky 2004).

As can be deduced from Chapter One, the majority of the literature during the last three decades explains sex segregation levels as the result of women's self-selection processes into female-dominated occupations. From the supply side perspective, human capital scholars claim that rational women choose jobs that involve lower investment in education and specialization (Becker 1993; Mincer and Polacheck 1974) because

they anticipate discontinuous employment careers mainly due to childrearing periods. Therefore, to avoid the depreciation of human capital that occurs when women leave the labor force, they self-select themselves into typical female jobs. Socio-cultural researchers, on the other hand, attribute women's pursuit of female-dominated occupations to sex-role differences that both women and men acquire through the socialization process, and later carry over into the labor market (Reskin 1993; Correll 2001; England et al. 1994). As result of these processes, it is argued that the labor market is segregated.

It is natural to assume that high levels of gender segregation must make career mobility between male-dominated and female-dominated occupations difficult, if not impossible. It is contended that a starkly segregated landscape must be built upon formidable barriers to entry. However, Jacobs (1989) documented extensive movement between male-dominated, sex-neutral and female-dominated occupations during the 1970s and 80s. These decades represented a period of significant net movement by women into male-dominated fields. However, they also displayed substantial movement out of male-dominated occupations, thereby reproducing the overall level of sex segregation despite the fact that the mobility pattern was bringing more women into male-dominated occupations. In sum, persistent gender segregation depended, at least in part, on substantial attrition of women from male-dominated fields; by decreasing the high rate at which women leave male-dominated jobs, it would be possible to significantly reduce the sex segregation of occupations (Jacobs 1989).

The fluxes between female and male occupations continue to be high to the present day. In the early 1980s, the “revolving doors” were shown to send back 10 out of every 11 women (Jacobs 1989), and this proportion was still over two-thirds at the end of the 1990s (Sheridan 1997; see Chapter Four in this dissertation). In this thesis, I have argued that there is a need to re-examine mobility patterns from the 1970s to date, and also analyze in-depth women’s attrition from typical male jobs. Therefore, this dissertation has sought to contribute to the literature by offering a comprehensive analysis of a variety of theoretical statements and empirical strategies which have allowed us to evaluate the scope, determinants and impact of women’s exits from traditional male occupations on women’s careers.

In Chapter Three³⁹, we examined whether the pattern of mobility describe by Jacobs (1989) in the 1970s and 80s is still evident in the U.S. labor market. Certainly, there are several reasons to suggest that the patterns evident during the 70s may have changed since that time. While increased opportunities for women since the 70s may have led to the expectation that women’s career mobility has increased, in fact the results point in the opposite direction.

The findings presented here deepen the paradox observed three decades ago. Not only do high levels of segregation coexist with high levels of mobility, but a decline in the level of gender segregation coincided with declines in the level of sex-type mobility. We found that declining gender

³⁹ Chapter Three is co-authored with Jerry Jacobs (University of Pennsylvania)

segregation in part reflects the increasingly developed careers plans of a minority of women (mainly high-status workers) who seek to pursue their careers in male-dominated fields. Whereas the unplanned careers of the 1970s resulted in substantial mobility, this increasing differentiation among women has led one group to pursue jobs in male-dominated fields and another group to plan to take jobs in more traditional female-dominated fields. Consequently, career mobility among those pursuing jobs in male-dominated fields involves moves to other male-dominated fields rather than switches to female-dominated fields. In this way, this increasing differentiation is simultaneously associated with lower levels of gender segregation in the labor market as well as lower degrees of mobility between male-dominated and female-dominated jobs.

Chapter Four took one step further and contributes to our understanding of the process of women's attrition from male dominated occupations throughout women's careers. Previous research has mainly focused on individual attributes (Jacobs 1989, Sheridan 1997; Jacobs and Gerson 2004). Here, I expanded previous studies and analyzed the job history of 3,108 women employed in the United States between 1979 and 2006. Thus, this chapter makes an important contribution to the existing analysis by applying event history modeling that takes into account long-term work trajectories, which I believe has been a key missing element in most previous studies. First, this chapter explored the determinants of women's exits from male-dominated occupations, taking into account both individual-level and career-level attributes. Second, it evaluated the long-

term effects of attrition from male- to female-dominated occupations on women's careers.

Results show that women's mobility patterns depend on the occupation of destination. Occupational changes within-male occupations are substantively different from exits towards female-dominated jobs, the latter being highly unstructured both for high- and low-status workers. In fact, women's attrition from male-dominated occupations is very loosely related to individual attributes. It does not vary dramatically with women's age, educational level, child births or mother's age at first birth. However, the effect of the sex-composition of the college major is particularly interesting

As suggested in Chapter 3, women in mid-career during the 1970s faced a much broader set of opportunities than they had anticipated when they were younger. Thus, it might be that during this period, the connection between aspirations and subsequent outcomes was weaker than is generally the case. This result here supports this idea and represents an important shift in attitudes with respect to Jacobs' findings (1989). Women who studied a typical male major during college are significantly less likely to move towards female-dominated occupations, indicating a greater coherence between educational aspirations and labor market outcomes. However, this effect is only significant among managerial and professional workers, while no effect of a major's sex-type is observed among low-status workers.

Changes in marital status also relate to women's exits from typical male jobs, but again, only for a particular group of workers. Single women in top-level occupations are significantly more likely to stay in their jobs, while both marriage and divorce have a positive effect on women's moves towards female occupations. Nevertheless, this result cannot easily be linked to a rise in family responsibilities after marriage (or divorce), as has been suggested in the economic literature (see for example Mincer and Polachek 1974). The variables measuring the potential conflict between work and family does not have a significant impact on women's exits from male-dominated jobs. As pointed out above, neither child births nor mother's age at first born seem to be affecting women's mobility. An alternative explanation could be that single women do not move because male-dominated occupations offer a better marriage market. Admittedly, this is at best suggestion; further analyses would be required in order to test it.

Undoubtedly, the most novel finding in Chapter Four is that women's attrition depends, to a great extent, on the sex-composition of the previous occupation. Specifically, I found that women's probability of leaving after one year of work is under 25 per cent for professionals previously employed in the male dominated field, while it rises to over 40 per cent for newcomers from a non male-dominated occupation. The same tendency is observed for non-professional workers; although the increase on the probability of attrition is slightly lower in this case (about 10 percentage points). Furthermore, women's attrition from male-dominated jobs has a long-term effect on women's careers. Women working in top-

level positions are susceptible to penalties derived from previous departures from male-dominated jobs. Although it would be reasonable to think that women's entry into the male-dominated sector for the second time would provide them with more information and consequently, higher probabilities of survival, the truth is that empirical evidence points in the opposite direction. This effect, however, is not observed among low-status workers.

As from Chapter Three, we can conclude that women's ability to 'unlock the door' to male occupational fields has been insufficient to decrease levels of segregation in the job market. Career dynamics matter more than women's individual attributes for them to maintain their jobs; the male-dominated sector rewards those women whose career path converges to men's, while time spent out of the male-field seems to constrain women's opportunities. This finding enlarges our understanding of the processes of attrition considerably; as far as I am aware, no other study to date has revealed the key role of the sex-composition of the previous occupation in explaining women's mobility. However, this finding inevitably raises new questions and further research is needed in order to disclose the mechanisms operating behind women's departure during their first years in male-dominated jobs.

Finally, Chapter Five dealt with another major source of controversy in the literature on occupations; whether segregation in the labor market can be explained by men and women's preference for certain kinds of market work (on the supply side), or whether the labor market restricts

opportunities for females (on the demand side). On the supply side, human capital scholars contend that women's interest in combining both work and family responsibilities pushes them to choose jobs with flexibility and more pleasant working conditions, even though they may have lower wages, probabilities of promotion, prestige and authority than those of men (Polachek 1981; Tam 1997; Filer 1985, 1990, 1989). In other words, they argue that the demands and skill requisites of an occupation determine mobility, rather than the gender composition of occupations. Socio-cultural researchers, on the other hand, seek explanations in the socialization process, discrimination, institutional practices and feedback effects, among others, to explain the perpetuation of occupational segregation (Fernandez and Sosa 2005; Glass 1990; Reskin 1993; England et al. 1988; Jacobs and Steinberg 1990).

By means of an exhaustive analysis of working conditions and job attributes in over 400 occupations, I have gone deep into the debate in a twofold way: First, I assess to what extent occupational characteristics vary according to the sex-composition of the occupation. Second, I test the supply side hypotheses on sex differences in preferences for work.

As regards high-status occupations, results show that while some differences among typical male and female occupations persist over time (e.g. level of authority and on-the-job training), others have attenuated, or even disappeared (e.g. time pressures, exposure to hazards, security on the job). Interestingly enough, for employees working in male-dominated occupations, sex differences virtually disappear. In other words, within

occupational fields, men and women have started to be quite similar. The scenario is slightly different for low-status workers. Differences across sex-type occupations continue to be more evident than for high-status workers. Moreover, after breaking down the sample by gender we can still observe noticeable divergences between the sexes, largely among workers within the male-dominated sector, and to a lesser extent among individuals working in the female field, as well as in neutral occupations.

In second place, I tested to what extent work-related attributes explain women's entry and exit from typical male jobs. Do women avoid these jobs because they have attributes that pose a problem for women – long hours, inflexibility, heavy work, etc.? Turning to women's attrition from male-dominated jobs; Is it due to these job's attributes? As for high-status workers, the answer is clearly no. Certainly I found no association between the characteristics of the job and women's mobility in managerial and professional occupations; neither women's entry into, nor exit from, the male-field vary with the characteristics of the occupations.

The logic of job choice is almost different between high- and low-status workers. Moreover, the explanatory power of work-related attributes is moderately higher among the former. Some occupational characteristics, such as the mathematical abilities required and the competition level in the occupation, significantly increase the likelihood of women's attrition from male-dominated jobs. However, occupation-related attributes follow a particularly unstructured pattern, making it difficult to outline what attributes are typically to the "male taste" or typically to the "female

taste”. Taken together, empirical evidence does not support the idea that women’s mobility is determined by women’s preferences for certain kinds of work, as human capital researchers suggest. However, it is difficult to explain women’s mobility without making reference to labor market constraints.

In sum, the findings reported here provide broad support to the prediction of increasing differentiation among women. As discussed in the Introduction and Chapter One, Hakim (2000, 2003) based her typology on women’s preference with respect to the trade off between work and family life differences. Differences in preferences are, according to the author, responsible for a large share of the observed sex-differences among labor-market women. Thus, most of the women –*adaptive women*– who prefer to combine family and work without giving priority to either, are interested in schemes that offer a work-life balance and family-friendly employment. In Hakim’s own words, these women “want to enjoy the best of both worlds”. Consequently, they choose part-time jobs, seasonal jobs, and temporary jobs or even school-term-time jobs, which offer a better work-family balance than typical full-time jobs. Yet, the highly responsive reaction of women to the opportunities provided by the weakening of discriminatory barriers –women moved into male-dominated occupations as opportunities expanded– is hard to reconcile with Hakim’s definition of women as “self determined” actors.

Charles and Grusky (2004) on the other hand, argue that egalitarian forces reduce vertical segregation in “non-manual” occupations (predominantly

managerial, professional, sales and service jobs) by facilitating women's entrance into high-status professional and managerial occupations. Nevertheless, because ideals of gender equality are combined with notions of gender essentialism -the belief that men and women are essentially different and have different skills and abilities- horizontal segregation persists. Again, the high-levels of mobility observed among male- neutral and female-dominated occupations are hard to explain from this perspective. Throughout this dissertation, we have observed that women's entrance into high-status occupations does not prevent them from making future movements out, which means that the pressure of egalitarian forces is insufficient to explain changes in the segregation patterns.

Here, instead, I proposed a classification on grounds of the (dis-)advantages associated with women's position in the labor market. Thus, I distinguish between two groups of women; professionals and managers, on the one hand, and workers from other sectors, on the other. The rationale behind this differentiation is twofold. First, women in high-ranking positions are required to develop specific skills that are frequently less transferable than general skills (that are more common among low-status occupations) (Tam 1997, 2000; Polavieja 2008), which hinders their possibilities to change their field of work. In other words, high-skilled women are less prone to change occupations across sex-type boundaries. Second, high-status workers in the US have significantly more resources than low-status workers to balance work and family life. For example, highly skilled professional workers are either covered by the

FMLA or may already have more generous employer-sponsored parental leave (Pettit and Hook 2009). On the other hand, low-status workers not only are not always covered by the FMLA, but frequently cannot afford to take unpaid leave from work or pay for private childcare' (Pettit and Hook 200; Gerstel and McGonagle 1999). Throughout this dissertation, I argued that the combination of these two factors form the basis for the different observed patterns of mobility among these two groups; a small group of women who adopt career trajectories that increasingly resemble men's, versus the big majority who follow more traditional female and unstructured career patterns.

Arguably, this division of female workers into two big categories is far too broad. Clearly, it offers some advantages, (e.g. it can be readily operationalized into two sizeable samples) and it strikingly facilitates the interpretation of women's mobility in the job market. Admittedly, some *intra-group* heterogeneity may be expected, especially in the group of low status workers. For example, results in Chapter Four showed that blue-collar workers are significantly less prone to move out from male-dominated jobs than women employed in clerical, service and sales occupations. These divergences lead us to think that this group may be internally bimodal, with some occupations basically immobile and very skill-specific, while others are the opposite. In fact, Chapter Five showed that among low-status occupations, work-related attributes are differently distributed among male-, neutral and female-dominated jobs. These results invite further investigation into the internal dynamics of this group, analyzing the characteristics of both origin and destination occupations.

Finally, methodological constraints have been found when dealing with sample selection bias in the analyses. Unfortunately, I was unable to find any useful instruments that measure at the individual level in any of the three data sets used in this dissertation. As a solution, I have created an aggregate variable that allowed me to carry out sample selection correction techniques (Holm and Jaeger 2010). However, researchers who collect data on the labor market in the future should strive to develop proper instruments at the individual level.

6.2. Final remarks

How can high segregation coexist with high rates of mobility? Why do high rates of mobility not whittle away at the edifice of segregation, and ultimately undermine this enduring structure? Three decades ago, Jacobs (1989) answered this question by explaining that persistent gender segregation depended, at least in part, on substantial attrition of women from male-dominated fields. Now, paradoxically, not only do high levels of segregation coexist with high levels of mobility, but declines in the level of gender segregation coincide with declines in the level of mobility between female, gender neutral and male occupations. I suggest that this is the result of increasing differentiation between women, in which a segment of women plan to enter male-dominated fields and are able to realize these plans more consistently than they were able to several decades ago.

Now, like 25 years ago, the prevalence of sex-type mobility in the labor market continues to be inconsistent with an economic explanation of sex segregation based on the maximization of lifetime earnings. On the one hand, the constantly increasing number of women entering into male-dominated occupations continues to be hard to reconcile with the rationale that women's pursuit of female-dominated occupations represent the rational pursuit of individual self-interest over their lifetimes. On the other hand, high-levels of female attrition from male-dominated occupations contradict the rationality of both employees and employers. From an economic point of view, women entering the male-dominated sector are expected to stay there the necessary time to recoup their initial investments (Becker 1993; Mincer and Polacheck 1974). Likewise, employers should want exactly the same, to invest in employees who are unlikely to quit their jobs (Breen 1997; Sorensen 2000; Tam 1997; Polavieja 2008). Certainly, I found a disproportionate risk of attrition among newcomers that could be attributed to lack of information at the moment women at the hiring stage. In other words, it could be argued that women may be making decisions to enter the male sector in a state of uncertainty, because of a lack of information about their new working conditions and work environment. Thus, exits could be the result of a posterior weighing up of the advantages and disadvantages of staying in the male. However, Chapter Four in this dissertation reports a substantial percentage of women return to the male-dominated sector after exiting, contradicting the rational choice logic.

In addition, transitions to female occupations cannot be interpreted as a tactic for women to overcome the *work-and-mother* dilemma as has been suggested in other contexts with similar rates of job mobility (Datta Gupta and Smith 2000). Despite the scarcity of maternity policies and the lack of public provisions for child care in the U.S. (Pettit and Hook 2009; Morgan 2006; Boeri et al. 2004; Rosenfeld and Birkelund 1995), most of the indicators that measure the potential conflict between work and family (number of children, mother's age at first born, marital status) are not significant, challenging the idea of women's exits towards female-dominated jobs as a strategy of conciliation.

New patterns of mobility are also difficult to explain by employing the socio-cultural approach. Contrary to the logic offered by the socialization approach, I found that occupational changes take place at any stage in life, and are evident among all age groups; not only among young females. Furthermore, changes in mobility patterns can not be entirely attributed to increasing pressures of egalitarian forces on the labor market structures (Charles and Grusky 2004). On the one hand, while it is true that inclusive education and equality between the sexes has been central to women's ability to access high-status occupations and unlock the door to male occupational fields, this did not prevent them from making future movements out. On the other hand, most people were probably not trying to change the structure deliberately, but simply deal with specific problems that they encountered. However, because of the nature of the opportunities they face, the resources they control, and the choices they

ultimately make, they make decisions that cumulatively contribute to the transformation of gender relations (Wright 2010).

In summary, sex segregation in the labor market has not changed significantly in the last three decades. In fact, sex segregation remains as one of the most persistent forms of gender inequality (Charles and Grusky 2004). According to Jacobs's reflections (1989), the maintenance of sex segregation depends on a lifelong system of social control. In other words, it depends on the differential socialization of young men and women, sex-typed tracking in the educational system and sex-linked social control at the workplaces (Jacobs 1989:48). However it is true to say that over the last three decades a small group of female workers have successfully overcome all the barriers that they have faced, and in doing so have enhanced their professional trajectories and widened their career opportunities. Indeed, this minority of women who sought to pursue their careers in male-dominated fields is one of the main causes for the (meager) decrease in segregation levels. The more women can overcome the barriers encountered, the more rapid our advance towards less segregation.

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FINAL APPENDIX
List of occupations by year and sex-composition of the
occupation
(U.S Census Bureau 1980, 1990, 2000)

1980

Male-dominated Occupations

Neutral Occupations

Female-dominated Occupations

Managers

Business and promotion agents

Construction inspectors

Funeral directors

Inspectors and compliance officers, exc.

Legislators

Management analysts

Managers and administrators, n.e.c.

Personnel and labor relations managers

Postmasters and mail superintendents

Pruchasing agents and buyers, n.e.c.

Purchasing agents and buyers, farm products

Accountants and auditors

Administrators, education and related functions

Buyers, wholesale and retail trade

Chief executives and general administrators

Financial managers

Managements related occupations, n.e.c.

Managers, marketing, advertising and purchasing

Managers, medicine and healht

Managers, properties and real estate

Other financial officers

Personnel, training and labor relations

Underwriters

Professionals

Actuaries

Aerospace

Agricultural and food scientists

Air traffic controllers

Airplane pilots and navigators

Actors and directors

Archivist and curators

Artists, performers, and related workers

Authors

Biological technicians

Clinical laboratory technologists

Dental hygienists

Dietitians

Health record technologists and technicians

Legal assistants

Announcers	Broadcast equipment operators	Librarians
Athletes	Clergy	Licensed practical nurses
Atmospheric and space scientists	Counselors, educational and vocational	Occupational therapists
Biological and life scientists	Designers	Physical therapists
Biological science teachers	Editors and reporters	Postsecondary teachers, subject not specified
Chemical	Health technologists and technicians	Radiologic technicians
Chemical technicians	Law teachers	Recreation workers
Chemistry teachers	Medical scientists	Registered nurses
Chemists, except biochemists	Painters, sculptors, craft-artists	Science technicians, n.e.c.
Civil	Psychologists	Speech therapists
Clergy	Physicians' assistants	Teachers, prekindergarten and kindergarten
Computer programmers	Postsecondary teachers, subject not specified	Teachers, special education
Computer systems analysts and scientist	Psychology teachers	Therapists, n.e.c.
Dentists	Respiratory therapists	
Drafting occupations	Science technicians, n.e.c.	
Economics teachers	Social scientists	
Economists	Social workers	
Education teachers	Sociologists	
Electrical	Statisticians	
Electrical and electronic technicians	Teachers, n.e.c.	
Engineering teachers	Teachers, secondary school	
Engineers, n.e.c.	Technical writers	
Forestry and conservation scientists		

Geologists and geodesists
Health diagnosing practitioners, n.e.c.
History teachers
Industrial engineering technicians
Judges
Lawyers
Mathematical science teachers
Mathematical scientists, n.e.c.
Mechanical
Mechanical engineering technicians
Metallurgical and materials
Musicians and composers
Operations and systems researchers
Optometrists
Petroleum
Pharmacists
Photographers
Physical scientists, n.e.c.
Physicians
Physicists and astronomers
Physics teachers
Podiatrists
Postsecondary teachers, subject not specified

Surveying and mapping technicians
 Teachers, special education
 Technicians, n.e.c.
 Urban planners
 Veterinarians

Sales

Insurance sales occupations	Advertising and related sales occupations	Administrative support occupations, n.e
Sales engineers	Real state sales occupations	Cashiers
Sales workers, other commodities	Sales workers, other commodities	Demonstrators, promoters and models
Securities and financial services sales		Sales counter clerks
Supervisors and proprietors, sales occupations		Street and door-to-door sales workers

Clerical

Clerical	Bill and account collectors	Bank tellers
Computer operators	Computer operators	Billing clerks
Dispatchers	Duplicating machine operators	Billing, posting, and calculating machine operators
Messengers	Expeditors	Bookkeepers, accounting, and auditing
Meter reader	Investigators and adjusters	Correspondence clerks
Traffic, shipping and receiving clerks	Mail clerks, exc. postal service	Cost and rate clerks
Insurance adjusters, examiners	Mail preparing and paper handling machines	Eligibility clerks, social welfare
	Personnel clerks, except payroll and timekeeping	File clerks
	Postal clerks, exc. mail carriers	General office clerks

Stock and inventory clerks
 Supervisors, general officers
 Telephone operators
 Transportations ticket and reservation
 Insurance adjusters, examiners
 Withers, measurers, checkers and samplers

Hotel clerks
 Information clerks, n.e.c.
 Interviewers
 Library clerks
 Office machine operators, n.e.c
 Proofreaders
 Receptionist
 Records clerks
 Secretaries
 Statistical clerks
 Stenographers
 Teachers' aides
 Telephone operators
 Typist

Service

Barbers
 Elevator operators
 Firefighting occupations
 Guards and police, exc. public service
 Janitors and cleaners
 Pest control occupations
 Police and detectives, public services

Attendants, amusement and recreation
 Bartenders
 Cookers
 Guides
 Miscellaneous food preparation occupations
 Protective service occupations, n.e.c.
 Supervisors, personal service occupations

Child care workers, n.e.c.
 Crossing guards
 Dental assistants
 Fare service aides
 Food counter, fountain and related occupations
 Hairdressers and cosmetologists
 Health aides, except nursing

Sheriffs, bailiffs, and other law enforcers
Supervisors, cleaning and building service
Supervisors, guards
Ushers

Waiters'/waitresses' assistants

Housekeepers and butlers
Kitchen workers, food preparation
Nursing aides, orderlies and attendants
Personal service occupations, n.e.c.
Private household cleaners and servants
Waiters and waitresses

Farming

Farm workers
Farmers, except horticultural
Fishers
Groundskeepers and gardeners, except farm
Horticultural specialty farmers
Inspectors, agricultural products
Managers, farms, except horticultural
Managers, horticultural specialty farms
Supervisors, related agricultural occupations
Timber cutting and logging occupations

Animal caretakers, except farm
Marine life cultivation workers
Nurse workers

Graders and sorters, agricultural producers

Blue-collar

Aircraft engine mechanics
Assemblers
Automobile body and related repairers

Bakers
Bookbinders
Bus drivers

Adjusters and calibrators
Dressmakers
Laundering and dry cleaning machine operators

Automobile mechanics
Boilermakers
Brickmasons and stonemasons
Bridge, lock and lighthouse tenders
Bus, truck, and stationary engine mechanics
Butchers and meat cutters
Cabinet makers and bench carpenters
Camera, watch and musical instrument rep.
Carpenters
Cushing and grinding machine operators
Construction trades, n.e.c.
Data processing equipment repairers
Dental laboratory and medical appliance
Drillers, earth
Drillers, oil well
Drilling and boring machine operators
Drywall installers
Electrical power installers and repairers
Electricians
Electronic repairers, communications
Elevator installers and repairers
Excavating and loading machine operators
Explosives workers

Cementing and gluing machine operators
Engravers, metal
Fabricating machine operators, n.e.c.
Folding machine operators
Food batch makers
Graders and sorters, exc. agricultural
Hand molders and shapers, except jeweler
Knitting, looping, taping and weaving
Machine operators, not specified
Miscellaneous precision apparel
Miscellaneous textile machine operators
Molding and casting machine operators
Nailing and tacking machine operators
Optical goods workers
Packaging and filling machine operators
Photographic process machine operators
Printing press operators
Production inspectors, checkers and examiners
Shaping and joining machine operators
Tailors
Textile cutting machine operators
Typesetters and compositors

Pressing machine operators
Shoe machine operators
Solderers and brazers
Textile sewing machine operators
Winding and twisting machine operators

Extruding and forming machine operators
Farm equipment mechanics
Forging machine operators
Furnace, kiln, and oven operators, exc.
Furniture and wood finishers
Glaziers
Grinding, braiding, buffing and polishing
Hand painting, coating and decorating
Heat treating equipment operators
Heating, air conditioning and refrigerators
Heavy equipment mechanics
Helpers, construction trades
Helpers, mechanics and repairers
Hoist and winch operators
Household appliance and power tool repairers
Industrial machinery repairers
Insulation workers
Lathe and turning machine set-up operators
Lay-out workers
Locomotive conductors and yardmasters
Machine operators, not specified
Machinery maintenance occupations
Machinists

Mechanical controls and valve repairers
Metal plating machine operators
Millwrights
Mining machine operators
Mining occupations, n.e.c.
Miscellaneous electrical and electronic
Miscellaneous plant and system operators
Miscellaneous precision woodworkers
Miscellaneous precision workers, n.e.c.
Miscellaneous woodworking machine operators
Mixing and blending machine operators
Motion picture projectionists
Not specified mechanics and repairers
Office machine repairers
Operating engineers
Painters, construction and maintenance
Painting and paint spraying machine operators
Paperhangers
Parking lot attendants
Patternmakers and model makers, metal
Paving, surfacing, and tamping equipment
Photoengravers and lithographers
Plasterers

Plumbers, pipe fitters, and steam fitter
Power plant operators
Precision glinders, filers
Printing press operators
Punching and stamping press machine operators
Railroad conductors and yardmasters
Roasting and baking machine operators,
Rolling machine operators
Roofers
Sailors and deckhands
Sawing machine operators
Separating, filtering and clarifying ma
Sheet metal workers
Sheet metal duct installers
Shoe repairs
Slicing and cutting machine operators
Small engine repairers
Stationary engineers
Stevedores
Structural metal workers
Supervisors, mechanics and repairers
Supervisors, motor vehicle operators
Supervisors, production occupations

Supervisors, construction n.e.c.
 Taxicab drivers and chauffeurs
 Telephone line installers and repairers
 Tool and die markers
 Truck drivers
 Typesetters and compositors
 Upholsterers
 Washing, cleaning and pickling machine
 Water and sewage treatment plant operators
 Welders and cutters
 Wood lathe, routing, and planning machines

1990		
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Male-dominated Occupations

Neutral Occupations

Female-dominated Occupations

Managers

Administrators, protective services	Accountants and auditors	Managements related occupations, n.e.c.
Chief executives and general administrators	Administrators and officials, public administrators	Managers, medicine and health
Construction inspectors	Administrators, education and related functions	Underwriters
Funeral directors	Business and promotion agents	
Inspectors and compliance officers, exc	Buyers, wholesale and retail trade exec.	
Managers and administrators, n.e.c.	Financial managers	
Managers, marketing, advertising and purchasing	Legislators	

Purchasing agents and buyers, farm producers

Management analyst

Managers, food serving and lodging

Managers, properties and real estate

Managers, service organizations, n.e.c.

Other financial officers

Personnel and labor relations managers

Personnel, training and labor relations

Postmasters and mail superintendents

Purchasing agents and buyers, n.e.c.

Purchasing managers

Professionals

Aerospace

Actors and directors

Clinical laboratory technologists

Agricultural

Actuaries

Dancers

Agricultural and food scientists

Archivist and curators

Dental hygienists

Agriculture and forestry teachers

Art, drama and music teachers

Dietitians

Air traffic controllers

Artists, performers, and related worker

Foreign language teachers

Airplane pilots and navigators

Authors

Health record technologists and technicians.

Announcers

Biological and life scientists

Health technologists and technicians

Architects

Biological science teachers

Health specialties teachers

Athletes

Biological technicians

Home economics teachers

Atmospheric and space scientists

Business, commerce and marketing teachers

Legal assistants

Broadcast equipment operators

Computer science teachers

Librarians

Chemical	Counselors, educational and vocational	Licensed practical nurses
Chemical technicians	Designers	Occupational therapists
Chemistry teachers	Economists	Physical therapists
Chemists, except biochemists	Editors and reporters	Radiologic technicians
Civil	Education teachers	Recreation workers
Clergy	English teachers	Registered nurses
Computer systems analysts and scientists	Mathematical science teachers	Social workers
Dentists	Medical scientists	Speech therapists
Drafting occupations	Operations and systems researchers	Teachers, elementary school
Earth, environmental and marine science	Painters, sculptors, craft-artists, and	Teachers, pre- and kindergarten
Economics teachers	Pharmacists	Teachers, special education
Electrical	Psychologists	Therapists, n.e.c.
Electrical and electronic technicians	Physical education teachers	
Engineering teachers	Physicians' assistants	
Engineering technicians, n.e.c.	Postsecondary teachers, subject not spec.	
Engineers, n.e.c.	Psychology teachers	
Forestry and conservation scientists	Public relations specialists	
Geologists and geodesists	Religious workers, n.e.c.	
Health diagnosing practitioners, n.e.c.	Respiratory therapists	
History teachers	Social science teachers	
Industrial	Social scientists	
Industrial engineering technicians	Social work teachers	
Judges	Sociologists	

Law teachers
Lawyers
Marine and naval architects
Mathematical scientists, n.e.c.
Mechanical
Mechanical engineering technicians
Medical science teachers
Metallurgical and materials
Mining
Musicians and composers
Natural science teachers
Nuclear
Optometrists
Petroleum
Photographers
Physical scientists, n.e.c.
Physicians
Physicists and astronomers
Physics teachers
Podiatrists
Political science teachers
Science technicians, n.e.c.
Surveying and mapping technicians

Sociology teachers
Statisticians
Teachers, n.e.c.
Teachers, postsecondary, n.e.c.
Teachers, secondary school
Technical writers
Trade and industrial teachers

Surveyors
Technicians, n.e.c.
Theology teachers
Tool programmers, numerical control
Urban planners
Veterinarians

Sales

Securities and financial services sales	Supervisors and proprietors, sales occupations	Sales workers, apparel
Sales engineers	Insurance sales occupations	Cashiers
Sales representatives, mining, manufacture	Real state sales occupations	Demonstrators, promoters and models
Sales workers, motor vehicles and boats	Advertising and related sales occupations	
Sales workers, radio, TV, hi-fi.	Sales occupations, other business services	
Sales workers, hardware	Sales workers, shoes	
Sales workers, parts	Sales workers, furniture and home furniture	
Auctioneers	Sales workers, other commodities	
	Sales counter clerks	
	Street and door-to-door sales workers	
	New vendors	
	Sales support occupations, n.e.c.	

Clerical

Mail carriers, postal service	Bill and account collectors	Administrative support occupations, n.e.c.
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Messengers	Chief communications operators	Bank tellers
Meter reader	Communications equipment operators, n.e.c.	Billing clerks
Supervisors, distribution, scheduling, Traffic, shipping and receiving clerks	computer operators	Billing clerks
	Dispatchers	Billing, posting, and calculating machine workers
	Duplicating machine operators	Bookkeepers, accounting, and auditing
	Expeditors	Classified-ad clerks
	Mail clerks, exc. postal service	Correspondence clerks
	Mail preparing and paper handling machine oper.	Cost and rate clerks
	Office machine operators, n.e.c	Data-entry keepers
	Peripheral equipment operators	Eligibility clerks, social welfare
	Postal clerks, exc. mail carriers	File clerks
	Production coordinators	General office clerks
	Stock and inventory clerks	Hotel clerks
	Supervisors, general office	Information clerks, n.e.c.
	Supervisors, computer equipment operators	Interviewers
	Weighers, measurers, checkers and samplers	Investigators and adjusters, except ins
		Library clerks
		Material recording, scheduling and dispatching
		Order clerks
		Personnel clerks, except payroll and timekeeping
		Proofreaders
		Receptionists
		Records clerks

Secretaries
 Statistical clerks
 Stenographers
 Supervisors, financial records process.
 Teachers' aides
 Telephone operators
 Transportations ticket and reservation
 Typist
 Insurance adjusters and examiners

Service

Baggage porters and bellhops	Attendants, amusement and recreation	Child care workers, n.e.c.
Barbers	Bartenders	Child care workers, private household
Correctional institution officers	Cookers	Cooks, private household
Elevator operators	Guides	Crossing guards
Fire inspection and fire prevention occupations	Miscellaneous food preparation occupations	Dental assistants
Firefighting occupations	Protective service occupations, n.e.c.	Early childhood teacher's assistants
guards and police, exc. public service	Supervisors, food preparation and service	Family child care providers
Janitors and cleaners	Waiters'/waitresses' assistants	Fare service aides
Pest control occupations		Food counter, fountain and related occupations
Police and detectives, public services		Hairdressers and cosmetologists
Sheriffs, bailiffs, and other law enforcers		Health aides, except nursing

Supervisors, firefighting
 Supervisors, guards
 Supervisors, police and detectives
 Ushers

Housekeepers and butlers
 Kitchen workers, food preparation
 Launderers and ironers
 Maids and housemen
 Nursing aides, orderlies and attendants
 Personal service occupations, n.e.c.
 Private household cleaners and servants
 Public transportation attendants
 Supervisors, personal service occupations
 Waiters and waitresses

Farming

Captains and other officers
 Farm workers
 Farmers, except horticultural
 Fishers
 Forestry workers, except logging
 Groundskeepers and gardeners, except farm
 Horticultural specialty farmers
 Hunters and trappers
 Managers, farms, except horticultural
 Managers, horticultural specialty farms

Animal caretakers, except farm
 Inspectors, agricultural products
 Nursey workers

Graders and sorters, agricultural producers

Marine life cultivation workers
Supervisors, farm workers
Supervisors, forestry and logging workers
Supervisors, related agricultural occupations
Timber cutting and logging occupations

Blue-collar

Adjusters and calibrators	Assemblers	Dressmakers
Aircraft engine mechanics	Bakers	Folding machine operators
Aircraft mechanics, exc. engine	Bookbinders	Shoe machine operators
Automobile mechanic apprentices	Bus drivers	Solderers and brazers
Automobile body and related repairers	Cementing and gluing machine operators	Textile sewing machine operators
Automobile mechanics	Dental laboratory and medical appliance	Typesetters and compositors
Boilermakers	Electrical and electronic equipment ass	Winding and twisting machine operators
Brickmason and stonemason apprentices	Engravers, metal	
Brickmasons and stonemasons	Food batch makers	
Bus, truck, and stationary engine mechanics	Graders and sorters, exc. agricultural	
Butchers and meat cutters	Hand cutting and trimming occupations	
Cabinet makers and bench carpenters	Hand engraving and printing occupations	
Camera, watch and musical instrument repairers	Knitting, looping, taping and weaving	
Carpenter apprentices	Laundering and dry cleaning machine operators	
Carpenters	Miscellaneous hand working occupations	
Carpet installers	Miscellaneous precision apparel	

Cushing and grinding machine operators	Miscellaneous textile machine operators
Compressing and compacting machine operators	Miscellaneous printing machine operators
Concrete and terrazzo finishers	Optical goods workers
Construction trades, n.e.c.	Packaging and filling machine operators
Data processing equipment repairers	Photographic process machine operators
Drillers, earth	Precious stones and metals workers
Drillers, oil well	Pressing machine operators
Drilling and boring machine operators	Production inspectors, checkers and examiners
Driver-sales workers	Production samplers and weighers
Drywall installers	Tailors
Electrical power installers and repairers	Textile cutting machine operators
Electrician apprentices	
Electricians	
Electronic repairers, communications	
Elevator installers and repairers	
Explosives workers	
Extruding and forming machine operators	
Fabricating machine operators, n.e.c.	
Farm equipment mechanics	
Forging machine operators	
Furnace, kiln, and oven operators, exc.	
Furniture and wood finishers	
Glaziers	

Grinding, brading, buffing and polishing
Hand molders and shapers, except jewelers
Hand molding, casting and forming occupations
Hand painting, coating and decorating
Heat treating equipment operators
Heating, air conditioning and refrigeration
Heavy equipment mechanics
Household appliance and power tool repairers
Industrial machinery repairers
Inspectors, testers and graders
Insulation workers
Lathe and turning machine operators
Lathe and turning machine set-up operators
Lay-out workers
Locksmiths and safe repairers
Locomotive conductors and yardmasters
Machine operators, not specified
Machinery maintenance occupations
Machinists
Machinists apprentices
Mechanical controls and valve repairers
Metal plating machine operators
Milling and planning machine operators

Millwrights
Mining machine operators
Mining occupations, n.e.c.
Miscellaneous electrical and electronic
Miscellaneous machine operators, n.e.c.
Miscellaneous metal and plastic process
Miscellaneous metal, plastic, stone and
Miscellaneous plant and system operator
Miscellaneous precision metal workers
Miscellaneous precision woodworkers
Miscellaneous precision workers, n.e.c.
Miscellaneous woodworking machine operators
Mixing and blending machine operators
Molding and casting machine operators
Motion picture projectionists
Motor transportation occupations, n.e.c
Nailing and tacking machine operators
Not specified mechanics and repairers
Numerical control machine operators
Office machine repairers
Painters, construction and maintenance
Paperhangers
Parking lot attendants

Patternmakers and model makers, metal
Patternmakers and model makers, wood
Patternmakers, lay-out workers and cutters
Paving, surfacing, and tamping equipment
Photoengravers and lithographers
Plasterers
Plumbers, pipe fitters and steamfitter app
Plumbers, pipe fitters, and steam fitter
Power plant operators
Precision assemblers, metal
Precision grinders, filers and tool shapers
Printing press operators
Production testers
Punching and stamping press machine operators
Rail vehicle operators, n.e.c.
Railroad brake, signal and switch opera
Railroad conductors and yardmasters
Roasting and baking machine operators,
Rolling machine operators
Roofers
Sawing machine operators
Separating, filtering and clarifying ma
Shaping and joining machine operators

Sheet metal worker apprentices
Sheet metal workers
Sheet metal duct installers
Ship captains and mates, except fishing
Shoe repairs
Slicing and cutting machine operators
small engine repairers
Specified mechanics and repairers, n.e.
Stationary engineers
Structural metal workers
Supervisors, extractive occupations
Supervisors, mechanics and repairers
Supervisors, motor vehicle operators
Supervisors, production occupations
Supervisors, construction n.e.c.
Supervisors; brickmasons, stonemasons,
supervisors; carpenters and related works
Supervisors; electricians and power
Supervisors; painters, paperhangers
Supervisors; plumbers, pipe fitters
Taxicab drivers and chauffeurs
Telephone installers and repairers
Telephone line installers and repairers

Tile setters, hard and soft
 Tool and die makers apprentices
 Tool and die markers
 Truck drivers
 Upholsterers
 Washing, cleaning and pickling machines
 Water and sewage treatment plant operators
 Welders and cutters
 Wood lathe, routing, and planning machines

2000		
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Male-dominated Occupations

Neutral Occupations

Female-dominated Occupations

Managers

Chief executives and general administrators
 Construction inspectors
 Funeral directors
 Managers and administrators, n.e.c.
 Other financial officers
 Purchasing agents and buyers, farm products

Accountants and auditors
 Administrators, education and related functions
 business and promotion agents
 Buyers, wholesale and retail trade executors
 Financial managers
 Inspectors and compliance officers, executors
 Legislators
 Management analysts

Managers, medicine and health
 Managers, service organizations, n.e.c.
 Underwriters

Managements related occupations, n.e.c.
 Managers and administrators, n.e.c.
 Managers, food serving
 Managers, marketing, advertising and purchasing
 Managers, properties and real estate
 Other financial officers
 Personnel and labor relations managers
 Personnel, training and labor relations
 Postmasters and mail superintendents
 Purchasing agents and buyers, n.e.c.

Professionals

Aerospace	Actors and directors	Artists, performers, and related workers
Agricultural and food scientists	Actuaries	Counselors, educational and vocational
Air traffic controllers	Archivist and curators	Dancers
Airplane pilots and navigators	Artists, performers, and related worker	Dental hygienists
Announcers	Athletes	Dietitians
Architects	Authors	Health record technologists and technicians
Atmospheric and space scientists	Biological and life scientists	Legal assistants
Biological technicians	Biological technicians	Librarians
Broadcast equipment operators	Chemical technicians	Licensed practical nurses
Chemical	Clergy	Occupational therapists
Chemists, except biochemists	Computer systems analysts and scientist	Physical therapists

Civil
Clergy
Computer programmers
Computer systems analysts and scientist
Dentists
Drafting occupations
Economists
Editors and reporters
Electrical
Engineers, n.e.c.
Forestry and conservation scientists
Geologists and geodesists
Health diagnosing practitioners, n.e.c.
Industrial
Industrial engineering technicians
Lawyers
Mechanical
Metallurgical and materials
Optometrists
Physicians
Physicists and astronomers
Podiatrists
Science technicians, n.e.c.

Designers
Economists
Editors and reporters
Health diagnosing practitioners, n.e.c.
Health technologists and technicians
Judges
Legal assistants
Mathematical scientists, n.e.c.
Medical scientists
Mining
Musicians and composers
Natural science teachers
Operations and systems researchers and
Painters, sculptors, craft-artists, and
Pharmacists
Photographers
Psychologists
Physical scientists, n.e.c.
Physicians' assistants
Recreation workers
Respiratory therapists
Social scientists
Teachers, n.e.c.

Radiologic technicians
Registered nurses
Social workers
Speech therapists
Teachers, elementary school
Teachers, n.e.c.
Teachers, pre-kindergarten and kindergarten
Teachers, special education
Therapists, n.e.c.

Surveying and mapping technicians

Teachers, secondary school

Technical writers

Urban planners

Veterinarians

Sales

Sales engineers

Advertising and related sales occupations

Demonstrators, promoters and models, sa

Sales workers, other commodities

Insurance sales occupations

Real state sales occupations

Sales counter clerks

Securities and financial services sales

Street and door-to-door sales workers

Supervisors and proprietors, sales occupations

Clerical

Expeditors

Computer operators

Administrative support occupations, n.e.c.

Messengers

Correspondence clerks

Bank tellers

Meter readers

Dispatchers

Bill and account collectors

Traffic, shipping and receiving clerks

Expeditors

Billing clerks

Mail carriers, postal service

Bookkeepers, accounting, and auditing

Mail clerks, exc. postal service

Data-entry keepers

Mail preparing and paper handling machine

File clerks

Office machine operators, n.e.c

General office clerks

Postal clerks, exc. mail carriers	Hotel clerks
Records clerks	Interviewers
Stock and inventory clerks	investigators and adjusters, except ins
Insurance adjusters, examiners	Library clerks
Weighers, measurers, checkers and samplers	Personnel clerks, except payroll and timekeeping
	Proofreaders
	Receptionists
	Records clerks
	Secretaries
	Statistical clerks
	Stenographers
	Supervisors, general officers
	Telephone operators
	Transportations ticket and reservation
	Typist
	Insurance adjusters, examiners, and inv

Service

Baggage porters and bellhops	Attendants, amusement and recreation	Child care workers, n.e.c.
Barbers	Bartenders	Dental assistants
Cookers	Crossing guards	Hairdressers and cosmetologists
Elevator operators	Fare service aides	Health aides, except nursing
Firefighting occupations	Guides	Housekeepers and butlers

guards and police, exc. public service
 Housekeepers and butlers
 Janitors and cleaners
 Miscellaneous food preparation occupations
 Personal service occupations, n.e.c.
 Pest control occupations
 Police and detectives, public services
 Protective service occupations, n.e.c.
 Public transportation attendants
 sheriffs, bailiffs, and other law enforcers
 Ushers

Miscellaneous food preparation occupations
 Personal service occupations, n.e.c.
 Police and detectives, public services
 Protective service occupations, n.e.c.
 Supervisors, cleaning and building services
 Supervisors, personal service occupations
 Waiters'/waitresses' assistants

Kitchen workers, food preparation
 Nursing aides, orderlies and attendants
 Personal service occupations, n.e.c.
 Public transportation attendants
 Waiters and waitresses

Farming

Farm workers
 Farmers, except horticultural
 Fishers
 Groundskeepers and gardeners, except farm
 Inspectors, agricultural products
 Managers, farms, except horticultural
 Supervisors, related agricultural occupations
 Timber cutting and logging occupations

Animal caretakers, except farm
 Graders and sorters, agricultural producers

Blue-collar

Aircraft engine mechanics	Bakers	Data processing equipment repairers
Assemblers	Bookbinders	Dental laboratory and medical appliance
Automobile body and related repairers	Bus drivers	Dressmakers
Automobile mechanics	Cementing and gluing machine operators	Optical goods workers
Boilermakers	Dental laboratory and medical appliance	Paperhangers
Brickmasons and stonemasons	Engravers, metal	Pressing machine operators
Bus, truck, and stationary engine mechanics	Folding machine operators	Shoe machine operators
Butchers and meat cutters	Food batchmakers	Textile sewing machine operators
Cabinet makers and bench carpenters	Graders and sorters, exc. agricultural	Winding and twisting machine operators
Camera, watch and musical instrument repairers	Knitting, looping, taping and weaving	
Carpenters	Laundering and dry cleaning machine operators	
Concrete and terrazzo finishers	Machine feeders and off bearers	
Construction laborers	Machine operators, not specified	
Construction trades, n.e.c.	Miscellaneous textile machine operators	
Data processing equipment repairers	Packaging and filling machine operators	
Drillers, earth	Photographic process machine operators	
Drillers, oil well	Slicing and cutting machine operators	
Drilling and boring machine operators	Textile cutting machine operators	
Drywall installers		
Electrical power installers and repairers		
Electricians		
Electronic repairers, communications		

Elevator installers and repairers
Excavating and loading machine operators
Explosives workers
Extruding and forming machine operators
Forging machine operators
Freight, stock and material handlers, n.e.c.
Furnace, kiln, and oven operators, exc.
Furniture and wood finishers
Garage and service station related occupations
Garbage collectors
Glaziers
Grinding, brading, buffing and polishing
Heat treating equipment operators
Heating, air conditioning and refrigerating
Heavy equipment mechanics
Helpers, construction trades
Helpers, mechanics and repairers
Hoist and winch operators
Household appliance and power tool repairers
Industrial machinery repairers
Insulation workers
Laborers, except construction
Lathe and turning machine set-up operators

Lay-out workers
Locksmiths and safe repairers
Locomotive conductors and yardmasters
Machine operators, not specified
Machinery maintenance occupations
Machinists
Mechanical controls and valve repairers
Metal plating machine operators
Millwrights
Mining machine operators
Mining occupations, n.e.c.
Miscellaneous electrical and electronic
Miscellaneous plant and system operator
Miscellaneous textile machine operators
Miscellaneous woodworking machine operators
Mixing and blending machine operators
Molding and casting machine operators
Motion picture projectionists
Not specified mechanics and repairers
Operating engineers
Painters, construction and maintenance
Painting and paint spraying machine operators
Paperhangers

Parking lot attendants
Patternmakers and model makers, metal
Paving, surfacing, and tamping equipment
Plasterers
Plumbers, pipe fitters, and steam fitters
Power plant operators
Precision grinders, filers and tool shapers
Printing press operators
Punching and stamping press machine operators
Rail vehicle operators, n.e.c.
Railroad brake, signal and switch operators
Railroad conductors and yardmasters
Rolling machine operators
Roofers
Sailors and deckhands
Sawing machine operators
Separating, filtering and clarifying machine operators
Sheet metal duct installers
Shoe repairs
Small engine repairers
Stationary engineers
Structural metal workers
Supervisors, handlers, equipment cleaners

Supervisors, mechanics and repairers
Supervisors, motor vehicle operators
Supervisors, production occupations
Supervisors, construction n.e.c.
Taxicab drivers and chauffeurs
Telephone line installers and repairers
Tool and die markers
Truck drivers
Typesetters and compositors
Upholsterers
Vehicle washers and equipment cleaners
Washing, cleaning and pickling machine
Water and sewage treatment plant operators
Welders and cutters
Wood lathe, routing, and planning machine operators