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Does prospective migration increase marital instability? Evidence from Census 1980-2000 and NLSY79

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Does Prospective Migration Increase Marital Instability? Evidence from Census 1980-2000 and NLSY79

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Abstract

This paper tests the hypothesis suggested by Mincer (1978) that prospective migration can give rise to marital instability. I use occupation mobility as a proxy for the uncertainty concerning future migration. Occupation mobility is the probability of having to migrate within the same occupation, measured by the fraction of workers in an occupation who have moved across state lines in the past five years using Census data. If future optimal locations are not known with certainty before marriage, workers in occupations with higher mobility have a greater chance of facing conflicts on likely relocation with their spouses. I find some supportive evidence when using data from the single round of Census 2000. However, estimation results in general do not support the hypothesis that prospective migration may lead to family dissolution, when data from the National Longitudinal Survey of Youth 1979 are used. Instead, rational expectation is offered as a potential explanation of these findings.

Key Words: Prospective Migration; Occupation mobility; Marital Instability

JEL Classification: J11, J12

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1. Introduction

In his well-known paper, Mincer (1978; p.769) points out, "As I argued in the theoretical discussion, conflicting private locational incentives cannot always be reconciled, and prospective or actual migration may lead to family dissolution." To my best knowledge, this hypothesis has not been tested. For researchers who may intend to estimate the true marital effect of *actual* migration, the major obstacle is the endogeneity of actual migration choices. Another challenge is the lack of information on returns at each possible locational choice.

But is there an effect of prospective migration on marital stability? If there is uncertainty about future location preferences before marriage, locational conflicts can occur in the future and this increase the probability of divorce. In particular, this uncertainty may pose a greater threat to the marital stability of full-time working couples, since they are more likely to face joint-location issues than other couples. I use occupation mobility as the proxy for this uncertainty, which is the probability of having to migrate within the same occupation. It is measured by the fraction of workers in an occupation who have moved across state lines in the past five years.[1] The underlying assumption is that, all else being equal, a person working in an occupation with higher mobility has a higher chance of facing a locational conflict with the working spouse, and their marriage is thus more likely to break up.

Using linear probability models and data from the 5% Public-Use Microdata Samples (PUMS) of Census 2000, I find some evidence that higher occupation mobility does predict a larger probability of divorce for all four education-gender groups except for the college-educated male. In general, the effect is higher among the non-college-educated than among the college-educated,

[1] Occupation mobility is initiated and used by McKinnish (2008) in studying power couple migration decisions.

for both genders. But this positive effect is substantially dampened when occupation mobility is replaced by occupation-industry mobility, and when occupation and industry fixed effects are added.

The analysis is then extended to exploit both public data and the restricted Geocode data from the National Longitudinal Survey of Youth 1979 (NLSY79), which contains richer information on first marriage, spouse's occupation and individual characteristics. First marriage is examined here since NLSY79 allows us to separate first marriage from remarriages. But the disadvantages of using NLSY79 are a smaller sample with less statistical power and a relatively young population. To compute occupation mobility and other characteristics at different times in this part, three rounds of Census: 1980, 1990 and 2000 are used.

A main concern about the identification is that occupation mobility may in part reflect another factor, for instance, one's preference for moves to new towns or cities. That is, occupation mobility can be correlated with individual preferences for migration. This correlation can confound the true effect of occupation mobility, the proxy for prospective migration, on marital stability. This potential endogeneity is addressed by including pre-marriage migration history as a proxy for one's preference for migration. The independent variable of pre-marriage migration history is constructed using the restricted Geocode data from NLSY79. In a way, the analysis here is similar to the one conducted by Farber (1994), who uses "prior job change" variables to account for a person's taste for changing jobs in studying the causality from job tenure to job separation.

Without controlling for pre-marriage migration history, the coefficient estimates for either occupation mobility or occupation-industry mobility are never statistically significant. Even after this control is added, there is still no strong evidence that occupation mobility affects the stability

of first marriages. For the time being, my work indicates that rational expectation of future occupation migration before entering a marriage cannot be excluded as a candidate to explain these findings.

The remainder of this paper is organized as follows. In the next section, a literature review on divorce and on migration is presented. Section 3 describes data from Census 2000 and provides some estimation results. Section 4 discusses NLSY79 with the focus on its restricted Geocode data; more empirical results are then presented. Finally, Section 5 concludes.

2. Literature Review

2.1 Conceptual discussion

Theoretically, "persons get married when the utility expected from marriage exceeds the utility expected from remaining single" (Becker, Landes and Michael (1977). If a single individual could perfectly anticipate the post-marriage utility, he or she would easily choose either to remain as a single or to get married. And for a married couple, they would be unlikely to separate and end the marriage because their realization of the utility of the marital state would be equivalent to their expectation beforehand.

This assumption, however, is unrealistic. Married persons always receive updated information and experience unexpected shocks during marriage; therefore, they constantly re-evaluate their understanding of the utility of being married. And if the expected utility of remaining married strikes them as less than terminating a marriage, couples may divorce. As Becker et al. (1977) point out, "Couples separate when utility expected from remaining married falls below the utility expected from divorcing and possibly remarrying."

A prospective locational change by one party may give rise to spousal conflict over optimal locational choices, with marital instability being the result. Such locational conflicts may not be fully anticipated before marriage. Consider the case in which a husband working in a mobile occupation wishes to move, but the new location results in a substantial utility loss for his wife. If a suitable transfer of utility from the husband to the wife cannot be accomplished, the couple may divorce.

It is assumed that all else being equal, people working in an occupation with higher (lower) mobility are more (less) likely to face conflicts on optimal location choices with their spouses, and their families are thus more (less) prone to dissolutions. Suppose that there are two husbands: one works as an insurance salesman (a low mobility occupation) and the other is an economist (a high mobility occupation), with both wives being an elementary school teacher. In contrast to the economist, the insurance salesman has a stronger local social network and lower occupation mobility, which implies that the latter is less inclined to have future location conflicts with his wife and thus is less likely to have an unstable marriage due to prospective migration.

In this paper, I am mainly concerned with how marriage stability is affected by migration. Nevertheless, even if migration is by itself exogenous, this hypothesis cannot be tested directly for at least two reasons. First, no researcher can know every possible migration destination for every married person. Second, it is hard to set up a general form of utility function that represents one's preference regarding each possible locational choice. These factors prevent us from knowing whether a less desirable migration leads to family dissolution. Therefore, an indirect approach to the estimation by using one's occupation mobility will be used here.

As suggested in the introduction, occupation mobility is a proxy for the probability of being forced to do cross-state locational changes in a foreseeable future. With one spouse working in an occupation with higher mobility, the family tends to suffer more instability because of more conflicting locational choices for the husband and wife. Since it is not observed in the census data whether a divorce occurs before migration or after, the theoretical prediction in Mincer (1978) cannot be directly tested. In other words, our empirical study with census data is actually testing whether or not and to what extent the probability of a prospective spousal conflict on optimal locational choices predicts one's divorce status. But with individual historical information of location and marriage status change, the analysis based on the data from NLSY79 can study the effect of occupation mobility on divorce decision(s).

2.2 *Literature on divorce and family migration*

Amidst the sharply increasing number of divorce from the late 1960s in the U.S., the economic analysis on marital instability starting from Becker, et.al (1977) has made a large contribution to our understanding on this complicated issue. Often time, empirical studies examine the following factors on divorce: the variables in the optimal sorting such as men's income and women's attractiveness, deviations between actual and expected values such as one' earnings and fecundity, education, age of marriage, investment in marriage-specific capital, discrepancies between the traits of mates, duration of a marriage, number of marriages experienced and so on. Becker et al. conclude that a couple dissolves their marriage if and only if their combined wealth when dissolved exceeds their combined married wealth, which is a direct extension of the conclusion in Becker's (1974) classical analysis on marriage.

Many later works provide evidence that women's increasing labor-force participation and higher economic status are reasons to explain the jump in divorce rate from the late 1960s (Ross and Sawhill 1975; Michael 1988; Greenstein 1990; Ruggles 1997; and South 2001). The basic idea in these papers is that increasing labor market participation improves women's (expected) utility outside marriage and reduces their investment in marriage-specific capital, leading to higher marital instability.

Some sociological studies have contributed to the understanding of the relationship between migration and family instability. For example, Trovato (1986) examines the interrelationship between migration and divorce in 1970s Canada and finds that regions characterized by high rates of population mobility have high divorce rates. Using the 1990 and 1995 Current Population Surveys, Hill (2004) discovers that for women who have ever migrated, the likelihood of experiencing a first divorce around the time of migration is greater than at any other time. A main drawback in this body of studies is that instead of examining the causality from migration to divorce, it only estimates the relationship between them. Finally, Bramley, Champion and Fisher (2006) use the British Household Panel Survey to explore the relationship between migration and household formation. Their finding verifies the hypotheses that migration is associated with higher rates of household separations, at least for younger age groups.

Recent studies such as Friedberg, (1998) and Wolfers, (2006) use quasi-natural experiments to investigate divorce. For example, Wolfers (2006) explores variations in the timing of adopting unilateral divorce laws across states and finds that unilateral divorce laws can hardly explain the rise in aggregate divorce rate in the U.S. since the late 1960s. This line of inquiries does provide some insight into divorce analysis by using exogenous factors, but the data it uses are at the aggregate level. This is in contrast to the micro level data used in this paper.

Another set of recent studies considers the exogenous variation in one's occupational characteristics like occupational sex ratios as a predictor of divorce. South, Trent and Shen (2001) and Aberg (2003) discover some evidence of the effect of occupational sex mix on family divorce, but they do not attempt to address the possible endogenous selection on one's occupation. In contrast, with careful treatment of endogenous occupation choice by controlling one's occupation and industry fixed effects and applying an instrumental variable approach, McKinnish (2007) uses 1990 Census and the NLSY79 to finds that those with a larger proportion of co-workers of the opposite sex are more likely to get divorced, with female workers suffering more than their male counterparts.

Finally, this paper is also related to the recent empirical studies on occupational characteristics and family migration. Duncan and Perrcucci (1976) find that higher husbands' occupational prestige is associated with higher probability of familial migration, but wives' work roles do not affect migration probability. Another occupational characteristic is mobility, a measure of how likely people in certain occupations are to move across states in a prior five- years period. Occupation mobility has been shown to significantly affect family migration and post-migration income (McKinnish 2008; Li 2008). Specifically, both the husband's and the wife's occupation-education migration rate positively affects a family's migration probability for all couple groups, with the husband's migration rate considerably larger. Testing the effect of occupation mobility on family stability is an extension of this literature on occupational characteristics.

3. Empirical Analysis Using Census Data

3.1 Census Data

I first report some descriptive statistics using data of 5% PUMS from Census 2000. The full sample includes 18-to-55-year-old non-Hispanic white men and women who were married at least once and resided in U.S in 1995. Sample means of key variables are presented in Table 1. The occupation mobility measure is the fraction of workers in that occupation class who migrated across state lines in the prior five-year period, i.e., from 1995-2000. Occupation-industry mobility is the fraction of workers in that occupation-industry class who migrated across state lines in the same period. Occupation wage is the average wage in each occupation, which is computed among workers with wages between $3 and $300 per hour.

Individuals are classified into four groups by gender and education. The divorce rate is higher in the non-college group than that in the college group both for men and for women. College men and college women have higher mobility than their non-college counterparts. As is expected, both male and female with a college degree or higher have higher earnings and work for more time.

Table 1 Descriptive Statistics, Census 2000

	College male	**college female**	**Non-college male**	**Non-college female**
Variable	Mean	Mean	Mean	Mean
Divorce rate	.13	.16	.21	.21
	(.34)	(.36)	(.41)	(.40)
Occupation Mobility	.12	.10	.08	.087
	(.05)	(.04)	(.03)	(.03)
Occupation-Industry Mobility	.12	.107	.07	.086
	(.06)	(.05)	(.04)	(.04)
Occupation wage	25.65	21.62	18.06	15.88

	(9.53)	(6.89)	(5.25)	(5.81)
Age	42.20	40.6	40.99	41.23
	(9.17)	(9.53)	(9.18)	(9.85)
Education	5.52	5.45	3.33	3.42
	(.81)	(.70)	(.75)	(0.70)
Earn	64048.44	36424.97	34281.12	19855.16
	(66192.12)	(35539.09)	(30840.67)	(19991.52)
Hour	46.51	38.15	45.08	34.67
	(11.840)	(14.1)	(11.84)	(14.62)
observations	210,401	225,739	467,433	518,828

3.2 Methods with Census 2000

The following linear probability model is used as the baseline to estimate the effect of occupation mobility on an individual's divorce status.

Equation 1

$$divorce_i = \propto_0 + \propto_1 M \quad + \propto_2 Wage \quad + \propto_3 earn_i + \propto_4 hour_i + X_i\theta + State_{cs}\delta + State_{cs} * Urban_c\gamma$$

Where *M* is the occupation mobility and *Wage* is the logarithmic occupation wage; $earn_i$ is an individual's logged earnings; $hour_i$ is the individual's weekly working hours. X_i is a vector of demographic controls including age, age squared, education level as well as the interaction between age and education. State and state-urban fixed effects are added in order to control for both across state and within state urban-rural differences in divorce. Two additional controls:

children under six or children between six and 18 are included for women. I estimate Equation 1 separately for college males, non-college males, college females and non-college females. [2]

Personal earnings and weekly working hours are included in Equation 1 because they are possibly correlated with one's occupational characteristics and can affect family divorce decisions. For example, it is likely that people are in general better compensated for working in more mobile occupations. Notice that controlling for occupation wage, to some extent, already alleviates our concerns. In addition, earnings and weekly working hours are post-divorce information, and there may exist a feedback effect from divorce to one's post-divorce working hours and earnings. Therefore I have excluded personal earnings and weekly hours from Equation 2 (By the same token, child dummies are excluded from female groups). [3]

Equation 2

$$divorce_i = \propto_0 + \propto_1 M \quad + \propto_2 Wage \quad + X_i\theta + State_{cs}\delta + State_{cs} * Urban_c\gamma$$

Another concern is the unobserved heterogeneity. People in different occupations may differ in other ways that affect divorce. For example, it is possible that those working in higher- mobility occupations do prefer for children, career investment and stability. This might lower the probability of divorce. In order to control for such unobserved heterogeneity, I put occupation fixed effect in Equation 3, and use occupation-industry mobility to allow for variation of mobility within the occupation-industry cell, rather than just across occupations,

Equation 3

$$divorce_i = \propto_0 + \propto_1 M^* + \propto_2 Wage^* + X_i\theta + Occ_i + State_{cs}\delta + State_{cs} * Urban_c\gamma$$

[2] All Standard errors are clustered at the occupation level.

[3] All Standard errors are clustered at occupation level.

where M^* denotes one's occupation-industry mobility, and $Wage^*$ is now the corresponding occupation-industry wage.

3.3 Results with Census 2000

The results for Equation 1 are reported in Table 2. Overall, a husband's occupation mobility does not have a significant effect on his divorce status, while wife's occupation mobility is positively associated with her divorce status.[4] In particular, occupation mobility has a larger effect on the divorce status of non-college women than on divorce status of college women. For a non-college-educated woman, increasing the occupation mobility by one standard deviation (.04) raises her probability of being divorced by 2.24 percentage points.[5] In contrast, for a college-educated woman, the same increase in the occupation mobility increases her probability of being divorced by 1.24 percentage points. Finally, in each group, the occupation wage is negatively associated with a person's divorce status with the impact being statistically insignificant among college men.

Table 2 OLS Estimates of Probability of Divorce Status[6]

(controlling for personal earnings and weekly working hours)

[4] The coefficient of college-educated men's occupation mobility is significantly different from that of college-educated women, (F-statistics is 5.37). The coefficient of non-college-educated men's occupation mobility is significantly different from that in non-college-educated women, (F-statistics is 18.23).

[5] This is pooled standard deviation, which is also used in the following interpretations.

[6] Logit Estimations are also applied in addition to Linear Probability Models. The results are similar to the conclusion of OLS estimates. For example, the effect of occupational mobility on college men is insignificantly negative (-.47), and the effect on non-college men is .87 and significant. Comparing the effect of occupation mobility on college and non-college women, I have much larger coefficient among non-college-educated women than that of college-educated female peers (5.01 V.S 2.51).

	College male	College female	Non-college male	Non-college female
mobility	-.08	.31	.058	.56
	(.11)	(.14)	(.08)	(.18)
Occ wage	-.01	-.04	-.068	.06
	(.02)	(.01)	(.009)	(.02)
Earn	-.034	.008	-.060	.005
	(.002)	(.002)	(.0023)	(.002)
N	194127	202675	421740	445087

Table 3 reports the results of Equation 2, which has the same specification except that it excludes personal earnings and weekly work hours as well as children dummies for female groups. Using Equation 2 occupation mobility significantly increases the probability of divorce status of non-college men who have been married, while in Equation 1 it has barely an effect on the divorce status of non-college men when controlling for their personal earnings and weekly working hours in Equation 1. In contrast, for women who are or have been married, results using both equations indicate that, being in a more mobile occupation significantly increases their probability of being divorced, with a disproportional effect on non-college-educated females. Specifically, in Equation 2, increasing the occupation mobility of a non-college-educated female by one standard deviation (.04) makes her family more likely to break up by 1.8 percentage points. This is a moderate effect, considering that the average divorce rate among families with non-college wives is 21%.

For all four cases in Table 3, occupation mobility has a larger and more positive effect on the divorce status of non-college-educated persons than on that of the college-educated regardless of gender. A one-standard-deviation (.04) increase in a non-college-educated woman's occupation mobility reduces her family's stability by 1.8 percentage points, while the same one-standard-deviation increase in a college-educated female's occupation mobility is associated with 1.0 percentage point higher family instability. Similar divorce effects are estimated for male workers, but the coefficient of college-educated men's occupation mobility is in a wrong sign, and statistically insignificant.

An explanation of why the divorce status of more educated persons is less likely to be affected by the occupation mobility is provided as follows. All married people have higher expected utility from marriage than remaining single. Obtaining more education improves the efficiency of searching for mates or helps a couple better plan for their future. So compared with less educated people, for whom marital utility surplus might be marginal, the more educated people have larger martial surplus and are more resilient to shocks.

Last, the divorce status of a college-educated man receives less impact from his occupation mobility than that of a college-educated woman. However, it is observed that college-educated men get married later than college-educated women (2 years later on average in our sample), and therefore may have a lower number of recorded divorces at the time when sample is available to researchers.[7]

[7]To check whether our results are robust to different samples, both Equation 1 and 2 are replicated using those ever-married full-time employed. Full-time employed workers are those who work at least 32 hours a week. The results are similar to those in the full sample case, and are reported in the first row of Table 4.

Table 3 OLS Estimates of Linear Probability of Divorce Status

(Without controlling for personal earnings, weekly working hours, and children dummies)

	College male	**College female**	**Non-college male**	**Non-college female**
mobility	-.056	. 25	.21	.45
	(.11)	(.14)	(.09)	(.17)
Occ wage	-.06	-.006	-.12	-0.02
	(.02)	(.01)	(.01)	(.02)
observations	210,250	225,619	467,132	518,480

Table 4 reports the coefficient estimates of occupation-industry mobility based on Equation 3, using the full-time employed sample. To alleviate the concern on personal endogenous selection of an occupation or/and an industry, the third row reports results controlling for occupation fixed effect, and the fourth row does a similar job by including both occupation and industry fixed effects.

There are several interesting findings. For both genders, mobility effects are larger for workers without a college degree than college-educated workers. For instance, in Row 2, a one-standard-deviation (.04) increase in occupation-industry mobility raises the divorce of non-college-educated women rate by 1.12 percentage points; while, the same increase is only associated with a rise of .84 percentage point of divorce rate among families with college-educated women. The effects estimated using models with the fixed-effects are considerably smaller in magnitude than using without fixed-effects. In particular, controlling for both occupation and industry fixed effects, occupation-industry mobility now reduces the probability of being married

for college-educated female and non-college-educated female by coefficient estimates of .05 and .064 respectively. Moreover, for a non-college-educated male the effect becomes larger than that for a non-college-educated female. A one-standard-deviation (.04) increase in the occupation-industry mobility raises the probability of divorce status by a .4 percentage point.

Table 4 The Effects of Mobility on Divorce Status, Fixed Effect Model[8]

	College male	**College female**	**Non-college male**	**Non-college female**
Occupation mobility	-.06	.37	.19	.52
	(.11)	(.18)	(.09)	(.17)
Occupation-Industry Mobility	-.022	.21	.089	.28
	(.046)	(.07)	(.02)	(.06)
Occupation-industry mobility controlling for occupation fixed effects	.007	.1	.17	.18
	(.015)	(.02)	(.03)	(.03)
Occupation-industry mobility controlling for occupation and industry fixed effects	-.01	.05	.10	.064
	(.02)	(.02)	(.02)	(.02)

I also estimate the coefficient of mobility for the old (at least 35) and the young (under 35) separately. In most cases, the effect of mobility on one's divorce status is higher for the relatively old than for the young. This is not surprising, given the fact that spouses of the old are typically older and may have invested more on location-specific human capital than spouses of the young.

[8] Standard errors are clustered in the occupation-industry level for Row 2 to 4.

Ceteris Paribas, the older spouses are more likely to resist a possible future migration, resulting in more marriage instability.

4. Empirical Analysis Using NLSY79 Data

The analysis in this section uses NLSY79 data covering the period of 1979-2006. NLSY79 is a nationally representative sample of 12,686 young men and women who were 14-22 years old when they were first surveyed in 1979. These individuals were interviewed annually through 1994 and have been interviewed on a biennial basis since 1994.

NLSY79 has several advantages over the Census. First, using Census data, it is impossible to separate re-marriages from first marriages；however, NLSY79 contains each individual's marriage history, and thus allows us to separately study divorces in first marriages. Second, unlike the Census, NLSY79 reports the information on spouse's occupation, even for divorced couples. Third, pre-marriage migration history can be used as a proxy for one's taste for migration and be controlled for. Finally, pre-divorce occupation and/or industry information, as well as other useful individual characteristics are accessible in NLSY79. A major disadvantage of NLSY79, however, is the smaller sample with less statistical power. One may also be concerned with the relatively young sample in NLSY79, which cannot represent the whole population in the U.S.

It is assumed in this paper that all else equal, higher occupation mobility is more likely to result in the conflicts of optimal location choices between two married spouses, and thus tends to generate larger marital instability. Nonetheless, whether occupation mobility should be interpreted as an exogenous occupational characteristic or as the selection of workers with similar low

migration costs into the same occupation is open to discussion. It is possible that our measure of occupation mobility is correlated with one's unobserved preferences for migration, which in turn affects one's marital stability. To address this unobserved heterogeneity, then restricted geocode data from NLSY is used to control for one's migration history before the first marriage as a proxy for one's taste for migration. In a way, this technique is similar to the analysis by Farber (1994), who uses "prior job change" variables to account for one's taste for job changes in the study of the causal effect of job tenure on job separation.

4.1 Descriptive Statistics

The sample used in our primary analysis contains individuals who ever report first marriages and are not in the military sample. Individuals whose spouses were in the military during their year of first marriage are also excluded from the analysis. Among 8,724 ever-married individuals, 5,561 report valid personal occupation and industry information and their spouses' occupation information.[9] Since this study focuses on how occupation mobility affects the probability of divorce, I merge occupation mobility and wage rate as well as the corresponding industry-occupation characteristics from 5% PUMS of three rounds of Census into the NLSY data sets. Specifically, for first marriages during 1979 and 1985, occupation/industry-occupation mobility and wage rate are calculated from the 1980 Census data set; for first marriages between 1986 and 1995, these occupation and industry-occupation features are computed using the 1990 Census data set; and the 2000 Census data set is used to provide the occupation and industry-occupation mobility and wage rate for first marriages after 1995.

[9]Spouses' industry information is not available from NLSY79.

Table 5 reports the descriptive statistics. For individuals whose occupation, industry, and income are not available at the year of first marriage, the most recent information from the prior five years is used. Since spouses' past occupational information is not reported, I am unable to fill spouses' missing value. Using mobility and wage rate in the industry-occupational cell substantially decreases the sample size more than that in the occupation cell because some industry-occupation combination information is not available in the Census 5% PUMS. Individual controls also include the highest grade completed, highest grade completed by spouses, age at the first marriage, race indicators, on indicator of living with both biological parents at age 14, and the expected number of children in 1979.

There is a slightly higher divorce rate among women who are or have been married in our sample than once or currently married men. An explanation is that women usually marry ealier, have a longer period of being observed in our sample, and therefore are more likely to have reported divorced. Occupation mobility and industry-occupation mobility are a little bit higher among women on average, and this finding is also true for their spouses in terms of occupation mobility. Men's average occupation wage rate and industry-occupation wage rate are higher than that of women. For average individual annual income, men enjoy a nearly three quarters premium compared with women. One possible reason is that men who have been or are married work more hours than married women in our sample. The average individual income of women is about 58% lower than that of their spouses in the women's sample; whereas, men earn 75% more than their spouses in the first year of their marriage in the men's sample.

Table 5 Descriptive Statistics for Variables in Cross-section Regressions (NLSY79)

	Women		**Men**	
	Mean	Standard Deviation	Mean	Standard Deviation
Percent divorced from first marriage	.36		.35	
Age of first marriage	23.8	(4.87)	24.9	(4.82)
Year of first marriage	1985	(4.96)	1986	(5.08)
Duration of first marriage in years (if divorced)	7.89	(5.67)	7.69	(5.31)
Occupation mobility	.22	(.09)	.20	(.09)
Occupation wage rate	9.06	(4.1)	10.89	(4.4)
Spouses' occupation mobility	.22	(.09)	.20	(.09)
Spouses' occupation wage rate	10.79	(4.63)	9.49	(4.54)
Income	12267	(11165)	21052	(91450)
Working hour (weekly)	32	(12)	39	(12)
Percent of black	.19		.20	
Percent of Hispanic	.15		.14	
Highest grade completed	13.31	(2.14)	13.02	(2.44)
Spouses' highest grade completed	13	(4.2)	13	(3.2)
Percent living with both biological parent in 1979	.72		.72	
Number of Children expected (measured 1979)	2.4	(1.44)	2.36	(1.43)
Industry-occupation mobility	.24	(.14)	.22	(.16)
Industry-occupation wage rate	8.86	(4.42)	10.76	(4.9)

Spouses' income	19207	(17244)	12158	(13173)
Spouses' working hour (weekly)	40	(14.00)	34	(12)
N	2194		2072	

4.2 Information in the Geocode files of NLSY79

The Geocode files of NLSY79 provide us with migration information that the public-use files do not. To be specific, the history before his/her first marriage can be constructed using the Geocode data.[10] I argue that to some extent this migration history can reflect and thus be treated as a proxy for one's preference for migration. Recall that in using Census data, individual heterogeneous preferences for migration is one of the main confounding factors in the OLS regression of marriage status on one's own spousal occupation mobility. This is because the selection of one's occupation in part due to migration preferences, and such prefer can also affect family stability. Being able to control heterogeneity in the taste for migration should have the potential to lessen concern on identifying the real causal effect of occupation mobility on one's marriage.

I create two different sets of controls for prior migration history. One consists of indicators of the number of pre-marriage migrations; the other is the duration (in years) since the most recent pre-marriage migration. Notice that this approach is analogous but not equivalent to what Farber (1994) does in the identification of the causal effect of job tenure on the probability of job separation. In that paper, he actually controls for the number of prior jobs started in each year preceding the start of the current job.

[10] Migration preferences are assumed to be constant over time.

4.3 Methodologies Overview

Following McKinnish (2007), the regression analysis includes two parts: a linear probability model using cross-sectional data and a discrete-time hazard model using panel data. In the linear probability model, the information of respondents' occupation, industry and location at the time of first marriage is used. Unlike work and location decisions made during the marriage, these decisions before or at the time of first marriage may be less endogenous to the quality or stability of the marriage. But, if one believes that occupation and location at the year of divorce are more likely to affect people's divorce decision, then the linear probability model becomes problematic. To address this possibility, I also use a discrete-time hazard model to predict how likely a person will end up divorced in a certain year when she/he remained married in the past year, controlling for occupation and personal characteristics in that current year.

Economic control variables such as individual and spouses income and working hours are also available in NLSY79. As discussed when using Census data, since these economic controls could be correlated with both marriage status and occupation/industry characteristics, adding them into the linear probability models will help reduce the omitted variable bias. However, one's income reported in NLSY79 is the occupation income or income from the major occupation (if he/she has at least two occupations). If there are only small income or working-hour variations within an occupation, controlling occupation fixed-effects already purges mean income and mean working hours in that occupation. In addition, the reverse causality of an unsuccessful marriage on one's income and working hours cannot be simply ignored. An example is that one can adjust working hours and thus income, forecasting a divorce in the near future. In the following regression, I will separately test the effect of occupation mobility with and without personal economic controls.

Although actual migration may affect one's marriage stability, it should not enter the right-hand side of the divorce regression. The reason is that actual migration is more likely to be correlated with unobserved personal characteristics and family structure that lead to divorce; plus there is reverse causality from an unstable marriage to actual migration. Since the Geocode files provide information on the specific date of respondents' (first) marriage(s), I can separate respondents who actually migrate after their first marriage from those who do not do so. Thus, potentially different patterns of marital stability between migrants and non-migrants can be investigated in detail.

4.4 Regression Specifications

Baseline Regressions

The baseline regression considers a linear probability model. Equation 4 estimates the effect of occupation mobility on divorce status controlling for occupation wage rate and individual characteristics as well as state,1-digit occupation, and 1-digit industry fixed effects.

Equation 4

$$
\begin{aligned}
Y_{ions} = \beta_0 + \beta_1 occ\_mobility_o + \beta_2 occ\_wage_o + \beta_3 occ\_mobility\_spouse_o \\
+ \beta_4 occ\_wage\_spouse_o + income_i\beta_5 + income\_spouse_i\beta_6 + hour_i\beta_7 \\
+ hour\_spouse_i\beta_8 + control_i\beta_9 + \mathrm{STATE_s}\delta + (\mathrm{STATE_s} * Urban_i)\emptyset + \mathrm{occ_o}\gamma_1 \\
+ \mathrm{ind_n}\gamma_2 + \mathrm{occ\_spouse_o}\gamma_3 + \varepsilon_i
\end{aligned}
$$

Where for person *i* in occupation *o* and industry *n*, living in state *s*, Y_{ions} is an indicator that equals one if the individual reports ending their first marriage in divorce at any time in the NLSY79 survey. $mobility_o$ is occupation mobility of the respondent's occupation at the year of first marriage. $wage\_spouse_o$ denotes occupation wage rate of the respondent's occupation at

the year of his/her first marriage. $mobility\_spouse_o$ and $wage\_spouse_o$ are occupation variables with respect to spouses' occupation at the year of their first marriage. $income_i$ and $income\_spouse_i$ are the annual income from wages and salary in logarithm for respondents and their spouses. $hour_i$ and $hour\_spouse_i$ are the number of hours worked during the year of marriage in logarithm for respondents and their spouses. $control_i$ are individual controls including highest grade completed, highest grade completed by spouse, age at first marriage, race indicators, an indicator of living with both biological parents at age 14, whether living in the South at age 14, and the expected number of children in 1979.

$\mathrm{STATE_s}$ is a vector of state indicator variables, and $\mathrm{STATE_s} * Urban_i$ is the interaction between state and urban fixed-effects. Since $occ\_mobility_o$, occ_wage_o , $mobility\_spouse_o$ and $wage\_spouse_o$ are measured using three-digit level occupations, $\mathrm{occ_o}$ and $\mathrm{ind_n}$ are measured in one-digit level in order to avoid perfect multi-collinearity. As a consequence, value of mobility and wage rate can vary within broader occupation and industry cells.

To address the potential reverse causality arising from adding economic controls, I also estimate Equation 5 in which individuals' and spouses' income and working hours are excluded.

Equation 5

$$Y_{ions} = \beta_0 + \beta_1 occ\_mobility_o + \beta_2 occ\_wage_o + \beta_3 occ\_mobility\_spouse_o + \beta_4 occ\_wage\_spouse_o + control_i\beta_5 + \mathrm{STATE_s}\delta + (\mathrm{STATE_s} * Urban_i)\emptyset + \mathrm{occ_o}\gamma_1 + \mathrm{ind_n}\gamma_2 + \mathrm{occ\_spouse_o}\gamma_3 + \varepsilon_i$$

Similar to the analysis of using Census data, Equation 6 differs from Equation 5 by instead using the industry-occupation mobility and the industry-occupation wage rate to account for the mobility differences at the occupation level within the same industry, and vice versa.

Equation 6

$$Y_{ions} = \beta_0 + \beta_1 ind\_occ\_mobility_{on} + \beta_2 ind\_occ\_wage_{on} + \beta_3 occ\_mobility\_spouse_o + \beta_4 occ\_wage\_spouse_o + control_i\beta_4 + \mathrm{STATE_s}\delta + (\mathrm{STATE_s} * Urban_i)\emptyset + \mathrm{occ_o}\gamma_1 + \mathrm{ind_n}\gamma_2 + \mathrm{occ\_spouse_o}\gamma_3 + \varepsilon_i$$

Pre-Marriage Migration History

If the pre-marriage migration history is a proxy for one's preference for migration, people with more such migrations or with more recent one are more likely to have post-marriage migration. Alternatively, the learning-by-doing migration could offer the other side of story: those who migrate more frequently before their first marriage are more likely to choose their post-marriage destination successfully, and thus more likely to enjoy a stable marriage.

Equation 7 is used to test those two competing hypotheses. Dependent variable $Post\_mig_{ions}$ is an indicator which has a value of one if a respondent reports a cross-state migration five years after his/her first marriage. There are two main sets of explanatory variables: occupation mobility and pre-marriage migration history. Occupation mobility consists of one's own occupation mobility ($occ\_mobility_o$) and spousal occupation mobility ($occ\_mobility_{spouse_o}$) at the time of the first marriage. Pre-marriage migration history (pre_mig) includes three migration dummies: whether the respondent migrated once, twice, or more three years before first marriage. This arrangement allows each additional migration to have a different effect on post-marriage migration.

Other controls include occupation wage rate for both parties, state fixed effects, urban fixed effects, occupation fixed effects for both parties, highest education completed by both parties, the age and the year of first marriage, race indicators and a dummy indicating living in the South at age 14.

Equation 7

$$Post\_mig_{ions} = \beta_0 + \beta_1 occ\_mobility_o + \beta_2 occ\_mobility_{spouse_o} + pre\_mig\beta_3 + \beta_4 occ\_wage_o + \beta_5 occ\_wage_{spouse_o} + individual\ control_i\beta_6 + state_s\delta + urban_i\emptyset + occ_o\gamma_1 + occ_{spouse_o}\gamma_2 + \varepsilon_i$$

Results are shown in Table 6 for the sample of all respondents who report their first marriages between 1983 and 1996 in NLSY79. This period is chosen so that each respondent can have consecutive three years to be observed on migration(s). Having migrated once, twice, or three times are the three dummies of pre-marriage migration. The first two columns report the effects of pre-marriage migration history for males and for females separately. The last two columns are the effects for a smaller group of respondents whose first marriages did not break up within 5 years.

If the learning-by-doing hypothesis is correct, it would be expected that the coefficients of migration dummies would decline in the magnitude as one becomes a more experienced migrant. Although the coefficient estimates among non-divorced females (last column) display a decreasing pattern, those of second- and third-migration dummies are never statistically significant. Overall, the results in Table 6 do not provide sufficient evidence to support this hypothesis.

Table 6 Relationship between Pre-marriage and Post-marriage Migration

	Five years after first marriage		**Five years after first marriage (not divorced)**	
	Male	Female	Male	Female
Migrate once	.37	.30	.32	.32
	(.04)	(.05)	(.05)	(.05)
Migrate twice	.23	.31	.18	.11
	(.08)	(.10)	(.10)	(.11)
Migrate three times	.99	.95	1.04	-.01
	(.36)	(.31)	(.35)	(.42)
N	1710	1732	1354	1335

Migration history dummies are included as one set of the main explanatory variables in Equation 8, and the results will be reported in the next section. The dependent variable (Y_{ions}) is an indicator that equals one if the respondent has ended his first marriage in divorce at any time in the NLSY79 through 2006.

Equation 8

$$Y_{ions} = \beta_0 + \beta_1 occ\_mobility_o + \beta_2 occ\_mobility_{spouse_o} + pre\_mig\beta_3 + \beta_4 occ\_wage_o + \beta_5 occ\_wage_{spouse_o} + individual\ control_i\beta_6 + state_s\delta + urban_i\emptyset + occ_o\gamma_1 + occ_{spouse_o}\gamma_2 + \varepsilon_i$$

Several issues are summarized concerning pre-marriage migration history as an appropriate proxy for migration history. First, the pre-marriage migration history can be correlated with other unobserved individual characteristics suppressed in the error term of the OLS divorce regression. Second, there are other possible channels through which one's taste for migration is reflected. For example, one's average job tenure in an occupation. Third, one's preference for migration can be associated with family migration(s) before adulthood but can also be related to psychological issues beyond the scope of this study. Finally, we should be cautious of the extent to which these "prior migration history" variables can generate sufficient variations to help identify the causality from occupation mobility to divorce status.

Hazard Model

The purpose of using occupation mobility and other controls at the year of first marriage is that they are relatively exogenous to one's marriage quality and stability. In an alternative model, I also explore a discrete-time hazard model (Equation 9) to estimate how likely a person is to divorce in a certain year given that his/her first marriage remained intact in the past year, controlling for occupation, industry and personal characteristics in the current year.

Equation 9

$$\begin{aligned} \mathrm{H(t)} &= \Pr(\text{Divorce in year t}|\text{Married but Not Divorced in Year t}-1) \\ &= \mathrm{F}[\beta_0 + \beta_1 mobility_{ot} + \beta_2 wage_{ot} + \beta_1 mobility_{spouse_{ot}} + \beta_2 wage_{spouse_{ot}} \\ &+ control_i\beta_3 + \mathrm{STATE_{st}}\delta + (\mathrm{STATE_{st}} * Urban_{it})\emptyset + \mathrm{occ_{ot}}\gamma_1 + \mathrm{ind_{nt}}\gamma_2 \\ &+ \mathrm{occ_{spouse_{ot}}}\gamma_3 + \mathrm{Year_t}\lambda + \mathrm{g(Year_t - year\ of\ marriage_i)} + \varepsilon_i \end{aligned}$$

for person *i* working in occupation *o* and industry *n*, living in state s in year *t*.

Equation 9contains an individual's occupation mobility and wage rate for both an individual and the spouse. State and urban controls as well as occupational and industry fixed effects are all measured at time t. Individual controls are the same as those when using Census 2000 in Equations 1 and Equation 2. Year effects are also included in the model. I consider a non-parametric baseline and create g(.) as a vector of dummy variables for the duration of marriage, where the hazard is assumed to be constant after ten years of marriages. Discrete-time logit estimation is applied in which the right censor is assumed, and the "hazard" is getting divorced in a certain year.

The hazard model applies unbalanced panel data. People who got married before 1979 could be included in this panel data as long as they didn't divorce prior to 1979. Occupational and industry information for the current year is used. If this information is not available from the individual or his/her spouse for a specific year, the most recent occupation or industry reported in the past five (5) years will be used. This approach avoids selection bias in labor force participation. The disadvantage is that I might estimate how the past occupations instead of the present ones affect the marital stability of those respondents. Observations are dropped if there are no individual occupation or spousal occupation available for the past five (5) years.

4.5 *Results of NLSY79*

Baseline Regression Results

Some preliminary results of Equations 5 and 6 are reported in Table 7-1 and Table 7-2 respectively, for the main coefficients of interest in this study. Standard errors are clustered at the occupational level for Equation 5 and at industry-occupational level for Equation 6. As mentioned before, I do not control for respondents' working hours and income in the OLS regression because

this has by and large been done by adding occupation/industry fixed-effects, and there are possible feedback effects from a (potential) divorce to post-divorce working hours and earnings. To make a comparison, I first run the regressions without controlling for spouses' occupation mobility and then include spouses' occupation mobility. Dummy variables for pre-marriage migration history, state indicators and state-urban interactions are not included in these baseline regressions. [11]

Table 7-1 OLS Estimation of Probability of Divorce (Occupation Mobility)

OLS Estimates of Probability of Divorce, NLSY—without controlling for spouses' occupation mobility		
	Women	**Men**
Occupation mobility	.26	.10
	(.14)	(.14)
OLS Estimates of Probability of Divorce, NLSY—controlling for spouses' occupation mobility		
	Women	**Men**
Occupation mobility	.13	-.22
	(.24)	(.25)
Spouses' occupation mobility	.15	.39
	(.23)	(.26)
	N=2765	N=2611

[11]Using Logit to estimate the effect of occupational mobility on divorce, I obtain similar result in which the coefficient for women is significantly positive, but the coefficient for men is insignificant.

Table 7-2 OLS Estimation of Probability of Divorce (Industry-Occupation Mobility)

OLS Estimates of Probability of Divorce, NLSY—without controlling for spouses' occupation mobility		
	Women	**Men**
Industry-Occupation mobility	.14	.03
	(.07)	(.06)
OLS Estimates of Probability of Divorce, NLSY—controlling for spouses' occupation mobility		
	Women	**Men**
Industry-Occupation mobility	.08	-.05
	(.08)	(.07)
Spouses' occupation mobility	.25	.35
	(.15)	(.15)
	N=2673	N=2487

Both the coefficient estimates for male occupation mobility and for male industry-occupation mobility are never statistically significant. And in the latter scenario, they even display wrong signs. Without controlling for the husband's occupation mobility, the effect of female occupation mobility is almost statistically significant at 5% level in Equation 5, and the effect of female industry-occupation mobility is almost statistically significant at 1% level in Equation 6. However, after controlling for the husband's occupation mobility, neither of the coefficient estimates is still statistically significant at the conventional confidence intervals. A possible explanation is that since one's own occupation mobility is highly correlated with the spousal occupation mobility,

controlling for both creates multi-collinearity and results in a large standard error for the coefficient estimates.

Regression results with Geocode information

Table 8 reports results of Equation 8 with Geocode information using four different samples. The full sample includes all respondents who reported their first marriage in NLSY79. Columns 3 and 4 report coefficient estimates for these respondents whose first marriage was in or before 1996, because NLSY79 records consecutive migration history every year before 1994 and every other year after 1994. Since the year of first marriage affects the observed length of migration history before marriage, I further restrict the sample so that all respondents have equivalent observed years of per-marriage migration records. As a result, Columns 5 and 6 are for respondents who were married for the first time between 1983 and 1996, and whose pre-marriage migrations can be observed for three consecutive years. As a sensitivity test, the last two columns report results for respondents whose first marriage occurred between 1985 and 1996, and whose pre-marriage migration(s) can be observed for five consecutive years. In all four samples, respondents are eliminated if they entered first marriage before starting a formal work. For those with missing industry or occupational information in the year of their first marriage, information from their most recent reported job in the past five years is used.

Table8 OLS Estimation of Probability of Divorce Controlling for Pre-marriage Migration

	Full Sample		**First-marriage before 1996**		**First-marriage 1983 to 1996**		**First-marriage 1985 to 1996**	
	Male	Female	Male	Female	Male	Female	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Own occupation mobility	-.22	.13	-.23	.24	-.43	.05	-.41	.006
	(.25)	(.24)	(.27)	(.25)	(.29)	(.27)	(.31)	(.29)
Spousal occupation mobility	.39	.15	.32	.13	.43	.22	.31	.22
	(.26)	(.23)	(.28)	(.25)	(.30)	(.27)	(.32)	(.29)
Migration once	-	-	.05	-.01	.003	.04	.05	.01
			(.04)	(.04)	(.03)	(.03)	(.03)	(.04)
Migrate twice	-	-	.04	.06	.17	.06	.03	.04
			(.05)	(.06)	(.06)	(.08)	(.05)	(.06)
Migrate more	-	-	.12	.08	-.25	.005	.17	.14
			(.10)	(.06)	(.28)	(.23)	(.11)	(.16)
N	2611	2765	2313	2615	1710	1732	1318	1211

I do not find sufficient evidence that higher pre-marriage occupation mobility (for either spouse) results in higher instability of first marriage. For male respondents, a higher mobility in their occupation reduces the instability of the marriage; whereas a higher mobility in the wife's occupation makes the marriage more unstable. But both effects are insignificant at the conventional confidence interval. For female respondents, both own effect and spouse effect are positive statistically insignificant.

However, this does not necessarily mean the failure of the prediction by Mincer (1978) that prospective migration may lead to family dissolution. Our measure of occupation mobility, calculated from several rounds of Census data, is far from being perfect. Also, whether occupation mobility is a good proxy for prospective migration is an open question. Still, one may contend whether and to what extent pre-marriage occupation mobility is an appropriate predictor of family divorce, which in general takes place at least several years after first marriage. Finally, a linear probability model effectively assumes that the marginal effect of occupation mobility is the same, regardless of the level of occupation mobility.

Can the framework of rational expectation hold? It is possible that for important lifetime decisions like forming a marital relationship, both spouses have fully expected a potential future migration due to occupational requirements, and have thus internalized its cost into their respective optimal location choices. If that is the case for most couples, it won't be surprising to see that prospective migration has no effect on marital stability.

To check the robustness of this finding, Table 9 reports results using the most recent pre-marriage migration as the other measure of pre-marriage migration history. The sample

includes those who were married for the first time between 1983 and 1996. Again, coefficient estimates of occupation mobility are never statistically significant.

Table 9 OLS Estimation of Probability of Divorce Controlling for Most Recent Pre-marriage Migration

	Male	**Female**
Own occupation mobility	-.43	.04
	(.30)	(.27)
Spousal occupation mobility	.43	.24
	(.3)	(.27)
Last migration is one year ago	.05	.10
	(.05)	(.05)
Last migration is two-year ago	.08	.008
	(.06)	(.05)
Last migration is three-year ago	-.01	.02
	(.05)	(.06)
N	1710	1732

Regression result of hazard model

The results using logit discrete hazard model are reported in Table 10. For both male and female groups, the hazard of getting divorced increases with occupation mobility, but the coefficients are not statistically significant. The coefficients of male occupation wage rate are negative, while the coefficients of female occupation wage rates are positive, but both are a statistically insignificant. The coefficient estimates of spousal occupation mobility and wage rate are also reported in a similar pattern.

Table 10 Discrete Divorce Hazard Model

	Male	**Female**
Occupation mobility	1.33	1.9
	(.78)	(.68)
Occupation wage rate	-.012	.0008
	(.009)	(.007)
Spouse occupation mobility	.9	.27
	(.76)	(.6)
Spouse occupation wage rate	.004	-.014
	(.008)	(.008)
N	27,453	35,102

5. Conclusion

In this paper, data sets from Census 1980 to 2000 and NLSY79 are used to test the predication by Mincer (1978) that prospective migration may cause marital instability. For the single round of Census 2000, there is some evidence that the probability of divorce among couples is positively associated with occupation mobility, and the effect of women's occupation mobility is larger than that of men's. However, the empirical results with NLSY79 are insignificant in various econometric specifications. While rational expectation before marriage on future migration is offered as an explanation, several factors that can conceal the identification of the potential effect are briefly discussed below.

First, an occupation already compensates for its higher mobility in terms of some unobserved benefits like a more flexible work schedule. Second, across occupations people differ in other ways that also affect divorce. For example, occupation mobility is correlated to one's ability to maintain a marriage. Third, within the same occupation people differ in their reasons for cross-state migrations; for example, some migrate because of promotions while others do so simply as a job requirement. That is, occupation mobility is not a homogeneous measure.

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