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Spouse Overeducation and Family Migration: Evidence from the US

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Abstract Scholars have noted that marriage frequently results in a sub-optimal job search. This literature suggests that the overeducation of wives is a result of household migration (tied-mover) or the result of an inability to migrate (tied-stayer). Others have found that overeducation may also be a cause of migration. This study examines overeducation as both a cause and effect of migration. Some evidence shows that families with an overeducated husband are found to be more likely to migrate. In turn, this migration leads to increased levels of overeducation among wives and decreased levels of overeducation among husbands. Household migration is also found to lower the full-time employment rates of wives by more than their male counterparts.

Keywords Education · Migration · Overeducation · Overqualification

Introduction

It is well documented that households in the United States are both mobile and often dual-career. For example, it is estimated that 12% of the US population changed residences between 2007 and 2008 (US Census Bureau 2009). The percentage of two-earner households in the US has increased from 20% in 1950 to 48.5% in 2009 (Bureau of Labor Statistics 2010). These two phenomena make studying the impact of household migration on dual income earners increasingly relevant.

For purposes of this research, the term overeducation and overqualification are used interchangeably. While this need not be the case, measuring overeducation has clear precedents in the literature and is far less problematic than attempting to measure overqualification. This article defines an overeducated individual as having more schooling than typically required to obtain employment in their respective occupation. An undereducated individual has less schooling than required. Different technical definitions of "required" education will be introduced later in the article.

There is a substantial literature focusing on overeducation in labor markets. Three extensive surveys of this literature are Hartog (2000), McGuinness (2006) and Rubb (2003). This literature consistently finds that individuals who are overeducated for their position can increase their wages by finding employment that more fully utilizes their education. For instance, an individual with a bachelor's degree who is working in a position that requires only an associate's degree would be considered overeducated and could normally increase their wages by moving to a new job that requires a bachelor's degree.[1]

In contrast, individuals who are undereducated have less education than the average for their position. Such individuals have fewer wage incentives to change jobs because moving to a position requiring their current level of education would typically result in lower wages. For example, an individual with an associate's degree working in a

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[1] Ortiz and Kucel (2008) demonstrate that fields of study impact overeducation rates.

position that requires a bachelor's degree would likely see a decrease in their wages if a switch to an occupation requiring only an associate's degree occurs.

Given that over- or undereducation has a significant impact on wages, it is not surprising that it also impacts the migration decision; as switching jobs often requires expanding the labor market and job search area with a willingness to migrate. Specifically, overeducated individuals may benefit from migration if such migration reduces the level of overeducation (and therefore likely increase wages). If one has exhausted the local labor market and still cannot find employment that adequately utilizes their education, then expanding their job search area by being willing to relocate to a new labor market is a possible solution.

This paper assumes that all workers wish to move up the occupational ladder. This is the equivalent to wage maximizing mobility behavior (Hartog 2000). Given this, the assumption of workers desiring higher-level positions holds true for a multitude of reasons other than wages such as higher prestige and higher levels of job satisfaction. Indeed, overeducation has been shown to adversely impact job satisfaction (Allen and van der Velden 2001; Fleming and Kler 2008; Tsang and Levin 1985) and worker turnover/mobility (Alba-Ramirez 1993; Robst 1995; Rubb 2006; Sicherman 1991; Sloane et al. 1999).[2] Consequently, overeducated individuals may be more willing to migrate for family related reasons than undereducated workers because of the dissatisfaction associated with their current employment.

Evidence of the impact of over- and undereducation on migration decisions is first found in Quinn and Rubb's (2005) cross-sectional study of Mexico. While evidence of this hypothesis is found for individuals in Mexico, it is not necessarily applicable to households in the United States and other developed countries. Additionally, Quinn and Rubb find that the typical positive link between educational attainment and the likelihood of migration does not occur when controlling for overeducation. The present research is the first known study to see if overeducation impacts family migration using an overeducation framework within a developed country.

Additionally, scholars have noted that marriage often results in a sub-optimal job search, particularly if one is either a tied-mover or tied-stayer. The literature suggests that the "overqualification" of wives is a result of household migration (tied-mover) or the result of an inability to migrate (tied-stayer; Mincer 1978). In this literature, "overqualification" is often defined as occurring when an individual has more schooling than required for his/her occupation, that is to say the individual is "overeducated." This hypothesis has primarily been tested using the extent of the wage gap in various sized SMSAs (standard metropolitan statistical areas). This approach is done with the belief that if differential overqualification exists, it will be greater in small SMSAs because of the reduced employment opportunities associated with smaller labor markets (Frank 1978). Using this approach, evidence of differential overqualification is found in work by Sandell (1977), Frank (1978), Mincer (1978), Madden and Chiu (1990), Ofek and Merrill (1997) and Nivalainen (2004). However, this test is indirect as it captures pay differences but not differences in qualification levels. Costa and Kahn (2000) also note that professional dual-earner couples are more likely to locate in larger metropolitan areas; a phenomenon which they attribute to the tied-mover hypothesis without testing for it empirically.

To date, only two known studies test the link between metropolitan size and actual qualification levels by using an overeducation/undereducation framework similar to that found in this paper. McGoldrick and Robst (1996) find no evidence of differential overqualification in the United States. Buchel and Battu (2003) find mixed empirical results in Germany using a specification that has the added benefit of controlling for commute distances.[3]

This paper attempts to further improve upon the exiting literature by examining if women are more likely to be "tied-movers" or "tied-stayers" *directly*—that is to say by observing actual migration decisions rather than indirectly by looking at the size of the regional labor market. Furthermore, we analyze "tied movers" by observing the extent of overeducation post-migration. In doing so, this paper views overeducation as both a potential cause and effect of migration decisions. It also views migration as a potential cause of exiting full-time employment. This question is tested using data from the Panel Study of Income Dynamics with probit, regression and Heckman selection methods. Results find that reducing the overeducation of husbands and wives is a significant migration motivation. Recent migration is found to lead wives to exit fulltime paid employment in larger numbers than their male counterparts. Migration is also found to lower the level of overeducation for men more than for women.

The decision for the household to migrate is based on whether the household can increase its total utility by moving. This utility will be jointly determined by their wages, job satisfaction, and regional preferences**.** If cultural factors or gender differences in the household division of

[2] Allen and van der Velden (2001) show a stronger link between job satisfaction and skill mismatches.

[3] In a somewhat related work, Smits et al. (2003) examined the impact of male versus female education on family migration in the Netherlands. However, Smits et al. (2003) use absolute levels of education and not an over/undereducation framework.

labor were to cause a household utility preference biased towards male earners then migration patterns will benefit husbands' careers over those of wives.[4] Of course, migration need not occur solely to improve one's job match; however, finding a job match may be one additional incentive to migrate. An individual's wage is determined by their education level, the extent of their occupation-education match (i.e. whether the individual is overeducated), and other market specific factors.

As is standard in the overeducation literature (see surveys), wages vary based on how fully this education is being utilized by their occupation. Individuals who are overeducated are not fully utilizing their education and will likely have lower wages than those with a similar level of educational attainment who are not overeducated. Such an individual will likely attempt to increase their returns from education by finding employment that fully utilizes their educational attainment. In contrast, undereducated individuals typically earn more than others with a similar level of educational attainment who are not undereducated. Such individuals are less likely to attempt to increase wages via domestic migration. The level of overeducation also affects utility for non-wage related reasons, perhaps via a lower level of job satisfaction (discussed above). It is assumed that individuals prefer not to be employed in occupations for which they are overeducated. Finally, it should be noted that migration is based on increasing household utility and not necessarily household income. Therefore, the wage of one individual may increase and the other may decrease or go to zero (exiting labor force) and migration may still occur if household utility rises.

Individuals within a family setting may have an additional incentive to migrate when overeducation exists, although other incentives undoubtedly remain. Reducing the extent of overeducation tends to improve earnings and job satisfaction. As such, workers with an overeducated family member may be more likely to migrate, *ceteris paribus.* This results in three questions. Does overeducation of a family member increase the likelihood of migration? Does migration decrease the likelihood of an individual exiting full time employment? Does recent migration decrease the level of overeducation that may be occurring? This paper uses two common definitions of overeducation to analyze these three questions. Specific definitions of overeducation and undereducation are explained in detail in the next section, along with the empirical methodologies employed. This is followed by a discussion of the empirical results. The paper concludes with a summary and discussion of the paper's implications.

[4] Considerable research has been performed on the household division of labor. Some recent examples include Hundley (2001) and Estes et al. (2007).

Empirical Approach

The sample used in this survey is from the 1999 and 2001 waves of the panel study of income dynamics (PSID) conducted by the University of Michigan. The data set is publicly available at http://psidonline.isr.umich.edu. Since the PSID dataset is longitudinal by design, a variable that indicates migration occurs between 1999 and 2001 is generated. The PSID dataset is useful as it is large enough to make reliable statistical inferences, contains detailed income and demographic information, and contains 217 separate occupational categories with 6 or more observations.

The panel nature of the PSID makes possible studies of before and after migration employment and education. For our paper, we used the same households in 1999 and 2001, with migration defined as living in a new state when the second survey occurs. Except where noted, individual and household characteristics were measured as of the 1999 survey. As will be explained in detail later in the paper, in this research we used three different models. The first, a migration model, examined characteristics of households that migrate relative to those who do not migrate *ex ante*, using data from the 1999 survey. This analysis contained 4,691 families where both spouses were not self-employed and both worked full-time (>1,200 h) in paid employment during 1998. Individuals in these families were included in the additional models. The purpose of migration model was to examine the impact of education-occupation matching on the migration decision.

The second model, an employment likelihood model, included data from the 2001 survey to examine the impact migration since the last survey has had on the likelihood of individuals remaining in fulltime employment. These samples contained 4,579 men and 4,593 women. The third model, an education matching model, examined the impact of migration on an individual's overeducation level for the 2001 survey (2000 data) and was modeled for men and women separately, with migration as an independent variable. All samples excluded a small number of individual and families with individuals working in "unknown" occupations, those with negative incomes described below and families who divorced during the time frame in question.

The current PSID dataset does not contain information on the level of education generally required to obtain employment in one's occupation, such information must be estimated. This paper used two widely accepted technical definitions of required education, common in the overeducation literature, to check the robustness of the findings. The first assumed the level of education generally required to obtain employment in a particular occupation was the mean level of schooling ($ED_{OC(MEAN)}$) among individuals in the occupation. This estimate of generally required

education has been extensively utilized in the overeducation literature (see previously mentioned surveys). The second used the mode level of education within an occupational category ($ED_{OC(MODE)}$). This is a recent introduction into the literature and has been used by Kiker et al. (1997), Ng (2001) and Quinn and Rubb (2005, 2006).

For the purposes of incidences only, individuals were categorized as overeducated if they had more education than ($ED_{OC(MEAN)}$) by one standard deviation or more education than ($ED_{OC(MODE)}$). In order to maximize accuracy, the calculation of required education was made with both the married men/women (used in the analysis) and with single men/women from the PSID.[5] Table 1 breaks down the incidence of overeducation, undereducation, and education occupation matches by gender for each level of required education. The results mirror those found elsewhere in the overeducation literature (see surveys by Hartog 2000; McGuinness 2006; Rubb 2003) with a larger incidence of both overeducation and undereducation found using the mode definition of required education. This dummy variable approach to measuring over- and undereducation is used in the incidence table only as it is found to be problematic in analyzing the impact of overeducation and undereducation (Cohn 1992; Gill and Solberg 1992). The analyses used a continuous variable as is consistent with the literature.

Caution is advised in interpreting the incidence of overeducation and undereducation. The measurements are relative to their occupation and not relative to their skill set or desired occupation. The literature suggests that these measurement, particularly the method using ($ED_{OC(MEAN)}$) likely underestimate the extent of overeducation. Moreover, both educational quality and educational requirements are likely dynamic, changing overtime in a manner that leads older workers more likely to be labeled as undereducated. Accordingly, those labeled as overeducated in this study should be thought of as those most likely to be overeducated. While the issues of changing educational quality and requirements over time may be interesting, they are beyond the scope of this paper.

The amount of education generally required was also used to estimate the level of overeducation/undereducation measure in years relative to what is required. The approach

Table 1 Incidences of over- and undereducation

	Full		
	Sample	Husbands	Wives
Mean definition			
% Overeducated	14.7	13.2	16.2
% w/Match	69.8	71.9	67.7
% Undereducated	15.5	14.9	16.2
Mode definition			
% Overeducated	31.9	26.0	37.8
% w/Match	45.2	47.6	42.8
% Undereducated	22.9	26.4	19.5

The mode and mean definitions considers one overeducated if the individual's actual schooling exceeds the mode level of education in an occupation or mean level of education by one standard deviation. Such definitions are consistent with the overeducation literature when measuring the incidence of overeducation but not when measuring impact. We use continuous measures in that analysis

mirrors that commonly used in overeducation wage studies (see surveys) and by the international migration-overeducation model introduced by Quinn and Rubb (2005). In the migration analysis, overeducation was used as a *continuous* independent variable and is defined as

$$\begin{aligned} &OV_{1999,i} = E_{A,i} - E_{OC,i} \text{ if } E_{A,i} > E_{OC,i}; \\ &OV_{1999,i} = 0 \text{ otherwise.} \end{aligned} \quad (1)$$

$E_{A,i}$ and $E_{OC,i}$ were individual i's actual level of educational attainment and the generally required level of education in one's occupation in 1999, respectively. Conversely, individual i's undereducation level in 1999 was defined as

$$\begin{aligned} &UN_{1999,i} = E_{OC,i} - E_{A,i} \text{ if } E_{A,i} < E_{OC,i}; \\ &UN_{1999,i} = 0 \text{ otherwise.} \end{aligned} \quad (2)$$

The variables for over- and undereducation were continuous and bounded at zero. The required education variables take on occupational specific values. The over- and undereducation variables take on individual specific values. All of the analyses were run alternatively with the mean and mode approaches. It was expected that overeducation would have a positive impact on the likelihood of migration and undereducation would have a negative impact.

The first empirical methodology was a probit model used to analyze the sources of migration. In this case, the dependent variable (M_k) was a one/zero variable reflecting whether or not household k moved to a new state between 1999 and 2001. All of the independent variables were 1999 data. The probit is shown in Eq. 3 below. The individual and household level independent variables in vectors X_i and X_k, respectively, are as described in Table 2.

[5] The result is that overeducation and undereducation in the sample did not sum to zero. Individuals in occupational categories where ED_{OC}(MEAN) and ED_{OC} (MODE) have a difference greater than two are considered potentially flawed and eliminated. For example, 69 individuals are reported to be in occupation 822 (farm laborers, wage workers); 31 with 4 or fewer years of schooling and 13 had 17 or more years of schooling. This resulted values ED_{OC} (MEAN) and ED_{OC} (MODE) of 7.7 and 3.0, respectively. Since it was not known which estimate is correct, if any, the occupational category was removed.

Table 2 Description and summary statistics of select variables

Variable	Brief description	Mean	SD
Dependent variables			
Fulltime employment in 2001 (male/female)	Individual remains in fulltime employment	.94/.76	.24/.43
Over in 2001—mean (male/female)	Mean required—actual education	−.06/−.33	2.09/2.24
Over in 2001—mode (male/female)	Mode required—actual education	0.27/−0.81	2.37/3.35
Related independent variables			
Education (male/female)	Educational attainment	13.4/13.6	2.7/2.5
Over. & Male (mean/mode)	Years of schooling beyond required	.69/.69	1.37/1.55
Under. & Male (mean/mode)	Years of schooling less than required	.76/.77	1.45/1.64
Over. & Female (mean/mode)	Years of schooling beyond required	.68/.76	1.11/1.45
Under. & Female (mean/mode)	Years of schooling less than required	.70/.69	1.34/1.37
Other independent variables			
Age (male/female)	Age of individual	43.9/41.8	8.1/7.6
Black (male/female)	1 if individual is Black	.28/.28	.45/.45
Hispanic (male/female)	1 if individual is Hispanic	.05/.04	.21/.19
Number of children	Number of children in home under 18	1.43	1.14
Own home	1 if family owns home		
Potential experience (male/female)	Age—Education—5	25.2/23.2	8.3/7.8
Recent migration	Migrated between 1999 and 2001	0.08	0.27
State unemployment rate	State unemployment rate in prior year	4.14	0.85
Union (male/female)	Current job part of union	.23/.15	.43/.35

Based on longitudinal data from the panel study on income dynamics surveys for 1999 and 2001. The family migration model includes families where both spouses work fulltime in a paid non-self-employed position. Black and Hispanic variable equals one if either family member is of that category. The individual fulltime paid employment probit includes individuals in 1999 survey matched to the 2001 survey. The individual favorable employment match OLS includes only those in the other models who work fulltime in paid employment. All models exclude individuals categorized as working in an unknown occupation

$$\Pr(M_k = 1|X_k) = \alpha + \beta_1 X_i + \beta_2 X_k + \varepsilon \quad (3)$$

Essentially, the model estimated the probability that the dependent variable M_k was not equal to zero given the values of the independent variables X_i and X_k. The model was run on all households, on households where the male earns the majority of household income, and on households where the female earns the majority of household income. The error term is denoted as ε. More information on the probit methodology can be found in Greene (2002) and Maddala (1983).

The second model, the employment model, primarily attempted to capture the impact of recent migrations (of the household, denoted as k) moving to a new state in the prior 2 years, on the likelihood of individual (denoted as i) continued full-time employment. This model used a probit specification, specifically:

$$\Pr(F_i = 1) = \alpha + \gamma_1 M_k + \gamma_2 LnY_{S,i} + \gamma_3 LnY_{O,k} + \gamma_4 X_{\mathrm{i}} + \gamma_5 X_{\mathrm{k}} + \varepsilon_{\mathrm{i}}, \quad (4)$$

with $\Pr(F_i = 1)$ the probability that an individual i works full-time and X_i and X_k were vectors of individual and household level independent variables, respectively. This included controls for educational attainment, age, state employment and unemployment rates, geographic controls, and racial and ethnic differences. Also controlled for was other family non-labor income ($LnY_{O,k}$) and the labor income of one's spouse ($LnY_{S,i}$). Based on the results of an F-test, the hypothesis that there is no significant difference between the female coefficients and the male coefficients was rejected. Accordingly, results for men and women are presented separately. The model was also run for top earner males and top earner females.

For the analysis of education matching model using 2001 data, a new education-occupation matching variable was created for each individual (denoted as i). This variable was used as a dependent variable and was defined as

$$\mathrm{MATCH}_{2001,i} = E_{A,i} - E_{\mathrm{OC},i} \quad (5)$$

In this variable, overeducation was calculated in 2001 as a continuous variable equal to years of actual education ($E_{A,\ i}$) minus years of education required by one's occupation ($E_{\mathrm{OC},\ i}$). This variable is not bounded at zero. Values greater than zero constitute the individual's level of overeducation with values less than zero being the extent of

undereducation. As with the migration analysis, the post-migration analysis tested both the mean and mode approaches to measuring the level of education required to obtain employment in one's occupation.

The third model, the individual favorable employment match, used a Heckman procedure to estimate the level of overeducation of individual i in 2001 ($MATCH_{2001,i}$) as the dependent variable.

$$MATCH_{2001,i} = \varphi + \varphi_1\lambda_i + \varphi_2 V_i + \varepsilon_i \quad (6)$$

The equation was estimated with and without the inverse Mills ratio (λ) which corrects for the possible selectivity bias from individual's overeducation only being observed if they stay in the labor force. The variables in vector V_i were overeducation in 1999, undereducation in 1999, potential experience, education, black, Hispanic, and regional dummies. Potential experience was defined as age minus education minus five.[6] The error term is denoted ε_i. The model was run for all males and for males who were the top household earner in 1999 in addition to all females and for female who were the top household earner in 1999.

The primary variables of interest in our paper involve moving, education, employment, and the overeducation (undereducation) variables. A list and summary statistics of the key variables used in our analysis are included in Table 2. Other important independent variables include potential experience (age—years of schooling—5), whether or not the household owns a home, number of children under 18, a union employment dummy, years of education, age, household income (in logs), dummy variables for race and ethnicity, the state unemployment rate and eight geographic-regional dummies. It was expected that home ownership, children under 18, age and union employment will have a negative impact on the likelihood of migration. The number of children is especially important to account for work-family conflicts that may affect women more than men (Myrie and Daly 2009; Shreffler et al. 2010; Son and Bauer 2010). The expectations of the impact of the household income were ambiguous. On the one hand, higher income will signal an increased ability to afford the migration, on the other hand higher income may reflect higher opportunity costs (Quinn and Rubb 2005; Stark and Taylor 1991).

Checks were performed for multicollinearity and endogeneity. Variance inflation factor (VIF) tests were performed and showed no significant multicollinearity, with all test results being <3.5. The regression average VIF test statistics ranged from 1.60 to 1.89. The VIF statistics for the individual variables ranged from 1.02 to 3.35. Hausman tests failed to reject the null hypothesis of exogeneity for the independent variables, so endogeneity is not a significant issue. The p values of the Hausman tests ranged from .13 to .83. Having a p value larger than .05 implies that endogeneity is likely not a significant problem.

Results

The results are generally consistent with the predictions discussed above. The results of the migration probit are included in Table 3. The results of the regressions modeling staying/leaving labor force and MATCH by gender in 2001 are shown in Tables 4 and 5, respectively.

Examining the results in Table 3, it would appear that, relative to undereducation, the overeducation of husbands were found to be positive and significant with respect to the likelihood of migration. This effect is somewhat stronger, although less robust, if the husband is the top income earner in the household. Relative to undereducation, the overeducation of women also had a positive impact on the likelihood of migration.

The results also suggest that the absolute level of education (of either individual) is negatively linked to the likelihood of family migration, but not robust. Previous studies such as Mincer (1978), Nivalainen (2004) and Swain and Garasky (2007) find a positive link, but these studies do not control for the possibility of overeducation.[7] The results are consistent, however, with the findings of Quinn and Rubb (2005) for Mexico, which also does not show a positive link between educational attainment and the likelihood of migration when controlling for overeducation. Owning a home and union status of wife each have a negative impact on migration as expected. The number of children is negative but not statistically significant. Household income is positive and statistically significant, as expected.

The sample split by households with top male earner and top female earner yields some interesting results. The results tentatively seem to indicate a bias in favor of male top earners over female top earners. The dynamics between husband and wife earnings and their relative position in the household is complex. This may involve a weighting of career paths and the gendered division of labor within the

[6] The Heckman (1979) selection approach is a two-step procedure. In the first step, a probit is run as to whether or not the individual undertakes a certain behavior. In this case, the behavior is working full-time. This step generates a selectivity correction variable (the inverse Mills ratio) which is then used as one of the independent variables in the second step regression (designated as the variable Lambda). This Heckman approach is necessary because a value for the dependent variable in the second step is only observed if an individual chooses to take the action in the first step.

[7] Work such as Lucas (1985) and Curran and Rivero-Fuentes (2003) found a negative link between absolute levels of education and migration. Sahota (1968) and Emerson (1989) found no significant link between absolute levels of education and the likelihood of migration.

Table 3 Likelihood of family migration between 1999 and 2001; probit model

	All married couples		Husband top earner		Wife top earner	
	Mean	Mode	Mean	Mode	Mean	Mode
Over. & Male	0.117 (2.4)**	−0.039 (0.9)	0.136 (2.5)**	−0.027 (0.6)	0.108 (0.8)	−0.079 (0.6)
Under. & Male	−0.121 (2.0)**	−0.076 (1.8)***	−0.172 (2.6)*	−0.110 (2.4)**	0.032 (0.2)	0.059 (0.5)
Over. & Female	0.125 (2.0)**	0.205 (4.8)*	0.108 (1.5)	0.173 (3.5)*	0.173 (1.1)	0.285 (2.8)*
Under. & Female	0.077 (1.1)	0.052 (1.2)	0.099 (1.4)	0.064 (1.4)	0.128 (0.5)	0.164 (1.2)
Age of male	−0.004 (0.3)	−0.002 (0.1)	−0.028 (1.8)***	−0.026 (1.6)***	0.105 (3.0)*	0.100 (2.9)*
Age of female	0.034 (2.3)**	0.034 (2.3)**	0.050 (3.0)*	0.048 (2.9)*	−0.028 (0.7)	−0.022 (0.6)
Number of children	−0.001 (0.0)	0.005 (0.1)	0.011 (0.2)	0.008 (0.2)	−0.215 (1.3)	−0.192 (1.1)
Own home	−0.495 (3.5)*	−0.488 (3.4)*	−0.524 (3.3)*	−0.506 (3.2)*	−0.585 (1.6)	−0.574 (1.6)
Education of male	−0.094 (2.3)**	−0.026 (0.8)	−0.107 (2.4)**	−0.026 (0.7)	−0.124 (1.0)	−0.025 (0.3)
Education of female	−0.017 (0.4)	−0.064 (1.9)***	−0.009 (0.2)	−0.060 (1.6)	0.169 (1.1)	0.140 (1.3)
State Unemp. rate	0.516 (4.6)*	0.556 (4.9)*	0.457 (3.9)*	0.478 (4.1)*	0.725 (2.4)**	0.819 (2.7)*
Black family member	−0.199 (1.3)	−0.204 (1.4)	−0.012 (0.1)	0.004 (0.0)	−0.705 (1.7)***	−0.750 (1.8)***
Union & Male	−0.196 (1.4)	−0.221 (1.5)	−0.078 (0.5)	−0.113 (0.7)	−0.784 (1.7)***	−0.752 (1.6)
Union & Female	−1.428 (5.5)*	−1.440 (5.6)*	−1.450 (4.9)*	−1.463 (5.0)*	−1.839 (3.1)*	−1.866 (3.0)*
LN(Fam Oth. Y)	0.544 (3.8)*	0.538 (3.7)*	0.574 (3.6)*	0.550 (3.4)*	0.601 (1.6)	0.589 (1.6)
Observations	4691	4691	3658	3658	1033	1033
Chi squared	177.9	187.8	139.4	142.1	90.9	97.1
Significance	0.001	0.001	0.001	0.001	0.001	0.001

These models capture the likelihood of migration to a new state. The key variables are years of overeducation and undereducation interacted with the gender of the family member in question. A constant and eight regional dummy variables are included in each estimate. Mean and mode refer to method of measuring required education. *z*-values in parenthesis; * significant at 1% level; ** significant at 5% level; *** significant at 10% level

Table 4 Likelihood of individual remaining in fulltime employment; the probit selection model

	Male	Male top earner	Female	Female top earner
Recent migration	−0.247 (1.8)***	−0.382 (2.7)*	−0.686 (6.8)*	−0.539 (2.1)**
LN(Fam Oth. Y)	−0.034 (3.9)*	0.145 (3.6)*	−0.018 (3.2)*	−0.036 (2.7)*
Age	0.143 (4.0)*	−0.002 (4.1)*	0.078 (2.8)*	−0.030 (0.5)
Age squared	−0.002 (4.5)*	0.152 (4.1)*	−0.001 (2.2)**	0.001 (0.6)
Number of children	0.136 (4.0)*	−0.026 (2.7)*	0.008 (0.4)	0.014 (0.3)
LN (spouses income)	0.048 (6.2)*	0.035 (3.8)*	0.068 (5.5)*	0.026 (1.2)
Education	−0.011 (0.2)	−0.060 (1.0)	0.236 (5.1)*	1.000 (3.7)*
Education squared	0.001 (0.5)	0.004 (1.6)	−0.007 (3.9)*	−0.036 (3.8)*
State unemployment rate	−0.065 (1.2)	−0.089 (1.4)	−0.173 (4.5)*	−0.089 (0.9)
Black	−0.293 (3.8)*	−0.292 (3.3)*	0.561 (9.7)*	0.887 (6.3)*
Observations	4579	3548	4593	1027
Chi squared	19.06	17.54	11.33	5.54
Significance	0.001	0.001	0.002	0.010

These probit models capture the likelihood of an individual remaining in fulltime paid employment after family migration. This probit model is also used to create a variable that controls for selectivity issues in subsequent models (Lambda). A constant and 8 regional dummy variables are included in each estimate. *z*-values in parenthesis. * Significant at 1% level; ** significant at 5% level; *** significant at 10% level

household (Albanesi and Olivetti 2006; Pencavel 2007; Wion 1990).

Migration between 1999 and 2001 has a negative impact on the likelihood of staying in the full time labor force for both men and women as shown in Table 4. Note that the reasons to migrate are complex. In addition to migrate to better one's own career, migration may occur to better a spouse's career, for family reasons or for regional preferences. However, both the coefficient and the level of significance are far higher for women, than for men as

Table 5 Estimates of the level of overeducation

	Female				Male			
			Top earner 1999				Top earner 1999	
	Mean	Mode	Mean	Mode	Mean	Mode	Mean	Mode
Recent migration	0.171 (1.2)	0.215 (1.0)	−0.187 (0.6)	−1.002 (2.0)**	−0.315 (2.6)**	−0.111 (0.6)	−0.270 (2.0)**	−0.343 (1.7)***
Over. in 1999	0.653 (28.7)*	0.428 (17.4)*	0.709 (13.1)*	0.440 (7.7)*	0.322 (15.2)*	0.202 (8.7)*	0.423 (18.0)*	0.244 (9.5)*
Under. in 1999	−0.421 (17.4)*	−0.334 (13.8)*	−0.316 (4.6)*	−0.503 (8.2)*	−0.479 (19.4)*	−0.279 (11.3)*	−0.453 (17.0)*	−0.249 (9.3)*
Potential experience	0.010 (3.6)*	0.010 (2.5)**	0.003 (0.5)	0.012 (1.4)	0.006 (1.8)***	−0.002 (0.4)	−0.001 (0.2)	−0.008 (1.4)
Education	0.286 (20.1)*	0.398 (21.7)*	0.296 (8.4)*	0.358 (8.8)*	0.355 (25.1)*	0.443 (26.3)*	0.347 (22.3)*	0.468 (25.7)*
Black	0.205 (3.0)*	0.320 (3.1)*	−0.020 (0.1)	0.544 (2.1)**	0.243 (4.4)*	0.090 (1.1)	0.179 (2.9)*	0.008 (0.1)
Lambda	0.116 (0.5)	0.124 (0.4)	−0.101 (0.2)	0.992 (1.3)	0.572 (1.8)***	1.596 (3.3)*	0.931 (2.6)*	2.301 (4.3)*
Observations	3,423	3,423	821	821	4,219	4,219	3,264	3,264
F statistic	437.3	187.6	80.4	40 4	386.7	165.4	372.4	153.6
Significance	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Adj. *R* squared	0.657	0.450	0.592	0.419	0.578	0.369	0.631	0.412

This OLS model captures the extent of overeducation after a recent migration. Lamda controls for selectivity issues related to the likelihood of remaining employed as individuals not employed cannot be overeducated or undereducated. A constant and eight regional dummy variables are included in each estimate. *z*-values in parenthesis; * significant at 1% level; ** significant at 5% level; *** significant at 10% level. Lambda estimates from Table 4. The number of observation in models containing Lambda is less due to the elimination of those with negative incomes

expected. Household non-wage income has a negative effect on staying in the labor force. Age and age squared are both mixed in sign and statistical significance.

The results for the education-matching model are included in Table 5. Recall that in this estimation overeducation is not bounded by zero, with negative values representing undereducation. In general, the results for women show that having recently moved does not impact the extent of overeducation in 2001. It appears that in lieu of accepting positions for which they are overeducated some women are choosing to exit the full time labor force after migration. This is consistent with the significant negative coefficient on moving and staying in the labor force found for women in the sample. In the case where women are the top household earners, there are some borderline significant results suggesting that moving may reduce their overeducation. This is particularly interesting as one would expect that, at least in the case where women are the top household earners, moving might significantly reduce their level of overeducation.

In general, having recently moved has a significant negative impact on the level of overeducation of men in 2001. Recent migration particularly benefits top household earners who stay in the labor force, significantly lowering the levels of overeducation. The results tentatively suggest that married men may indeed be migrating to improve employment prospects.

The finding of women not benefiting as much as men from household migration is consistent with Lin and Christiadi (2006) who find that interregional migration results in a greater propensity for upward occupational mobility for males than for females by using a model that examines geographic and occupational mobility but without controlling for education-occupation matching.

Discussion

There has been considerable research on the effect of household migration on the labor market outcomes of husbands and wives. One branch of this research has examined whether moving causes women to accept positions for which they are overeducated. Quinn and Rubb (2005) took a different approach by examining overeducation as a cause of migration. The analysis in this paper connects these two approaches and adds to the literature by being the first to examine overeducation as both a cause and effect of migration.

The results suggest that reducing the overeducation of husbands and wives is a significant motivation for migration. Furthermore, the positive link between educational attainment and the likelihood of migration typically found the literature is not found when controlling for education-

occupation matching. The results also suggest that recent migration often leads wives to exit fulltime paid employment in larger numbers than their male counterparts. Finally, recent migration tends to lower level of overeducation for men more robustly than for women. This tentatively suggests that an overeducated wife may be more willing to migrate to improve her husband's career and/or to exit the labor force rather than remain overeducated. This has possible implications on family decision making theory. These results are consistent with a pooled approach to decision making with the household maximizing a joint utility function. In this type of collective decision making environment, labor market decisions result for pooled income and benefit outcomes (Jianakoplos and Bernasek 2008; Murasko 2008).

In terms of public policy, these results stress the importance of finding ways to reduce the negative impacts of moving on a spouse's career. For example, better job matching technologies reduce overeducation among workers. In the case of women with small children, adopting policies such as on-site childcare, flextime and working remotely may help more women to stay in the labor force and in jobs which fully utilize their education. In particular, flexible work schedules may increase women's full-time labor force participation and job satisfaction by helping to balance work-home life balance (Golden 2008).

References

US Census Bureau. (2009). *Current population survey: Annual social and economic supplement.* Accessed online April 30, 2009 at www.census.gov/population/www/socdemo/migrate/cps2008.html.

Albanesi, S., & Olivetti, C. (2006). Home production, market production and the gender wage gap. *National Bureau of Economic Research Working Paper,* 12212.

Alba-Ramirez, A. (1993). Mismatch in the Spanish labor market? *Journal of Human Resources, 28*, 259–278.

Allen, J., & van der Velden, R. (2001). Educational mismatches versus skill mismatches: Effects on wages, job satisfaction, and on-the-job search. *Oxford Economic Papers, 3*, 434–452.

Buchel, F., & Battu, H. (2003). The theory of differential overqualification: Does it work? *Scottish Journal of Political Economy, 50*, 1–16.

Bureau of Labor Statistics. (2010). *Employment characteristics of families—2009.* Accessed online June 3, 2010 at www.bls.gov.

Cohn, E. (1992). The impact of surplus schooling on earnings: Comment. *Journal of Human Resources, 27*, 679–682.

Costa, D. L., & Kahn, M. E. (2000). Power couples: Changes in the locational choice of the college education, 1940–1990. *Quarterly Journal of Economics, 115*, 1287–1315.

Curran, S., & Rivero-Fuentes, E. (2003). Engendering migrant networks: The case of Mexican migration. *Demography, 40*, 289–307.

Emerson, M. E. (1989). Migratory labor and agriculture. *American Journal of Agricultural Economics, 7*, 617–629.

Estes, S., Noonan, M. C., & Maume, D. J. (2007). Is work-family policy use related to the gendered division of housework? *Journal of Family and Economic Issues, 28*, 527–545.

Fleming, C. M., & Kler, P. (2008). I'm too clever for this job: A bivariate probit analysis on overeducation and job satisfaction in Australia. *Applied Economics, 40*, 1123–1138.

Frank, R. H. (1978). Why women earn less: The theory and estimation of differential overqualification. *American Economic Review, 68*, 360–373.

Gill, A. M., & Solberg, E. J. (1992). Surplus schooling and earnings: A critique. *Journal of Human Resources, 27*, 683–689.

Golden, L. (2008). Limited access: Disparities in flexible work schedules and work-at-home. *Journal of Family and Economic Issues, 29*, 86–109.

Greene, W. H. (2002). *Econometric analysis* (4th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hartog, J. (2000). Overeducation and earnings: Where are we, where should we go? *The Economics of Education Review, 19*, 131–147.

Heckman, J. (1979). Sample selection error as a specification error. *Econometrica, 47*, 153–161.

Hundley, G. (2001). Domestic division of labor and self/organizationally employed differences in job attitudes and earnings. *Journal of Family and Economic Issues, 22*, 121–139.

Jianakoplos, N. A., & Bernasek, A. (2008). Family financial risk taking when the wife earns more. *Journal of Family and Economic Issues, 29*, 289–306.

Kiker, B. F., Santos, M. C., & De Oliveira, M. M. (1997). Overeducation and undereducation: Evidence for Portugal. *Economics of Education Review, 16*, 111–125.

Lin, G., & Christiadi, C. (2006). Examining geographic and occupational mobility: A log linear modeling approach. *Papers in Regional Science, 85*, 505–522.

Lucas, R. E. B. (1985). Migration amongst the Botswana. *Economic Journal, 95*(378), 358–382.

Maddala, G. H. (1983). *Limited-dependent and qualitative variables in econometrics*. New York: Cambridge University Press.

Madden, J. F., & Chiu, L. C. (1990). The wage effects of residential location and commuting constraints on employed married women. *Urban Studies, 27*, 353–369.

McGoldrick, K. M., & Robst, J. (1996). Gender differences in overeducation: A test of the theory of differential overqualification. *American Economic Review, 86*, 280–284.

McGuinness, S. (2006). Overeducation in the labour market. *Journal of Economic Surveys, 20*, 387–418.

Mincer, J. (1978). Family migration decisions. *The Journal of Political Economy, 86*, 749–773.

Murasko, J. E. (2008). Married women's labor supply and spousal health insurance coverage in the United States: Results from panel data. *Journal of Family and Economics Issues, 29*, 391–406.

Myrie, J., & Daly, K. (2009). The use of boundaries by self-employed, home-based workers to manage work and family: A qualitative study in Canada. *Journal of Family and Economic Issues, 30*, 386–398.

Ng, Y. C. (2001). Overeducation and undereducation and their effect on earnings: Evidence from Hong Kong, 1986–1996. *Pacific Economic Review, 6*, 401–418.

Nivalainen, S. (2004). Determinants of family migration: Short moves vs. long moves. *Journal of Population Economics, 17*, 157–175.

Ofek, H., & Merrill, Y. (1997). Labor immobility and the formation of gender wage gaps in local markets. *Economic Inquiry, 35*, 28–47.

Ortiz, L., & Kucel, A. (2008). Do fields of study matter for overeducation? *International Journal of Comparative Sociology, 49*, 305–327.

Pencavel, J. (2007). Earnings inequality, labour supply and schooling in husband-wife families. *Bulletin of Economic Research, 59*, 83–124.

Quinn, M. A., & Rubb, S. (2005). The importance of education-occupation matching in migration decisions. *Demography, 42*, 153–167.

Quinn, M. A., & Rubb, S. (2006). Mexico's labor market: The importance of education-occupation matching on wages and productivity in developing countries. *Economics of Education Review, 25*, 147–166.

Robst, J. (1995). Career mobility, job match, and overeducation. *Eastern Economics Journal, 21*, 539–550.

Rubb, S. (2003). Overeducation in the labour market: A comment and re-analysis of a meta-analysis. *Economics of Education Review, 22*, 621–629.

Rubb, S. (2006). Educational mismatches and earnings: Extensions of occupational mobility theory and evidence of human capital depreciation. *Education Economics, 14*, 135–154.

Sahota, G. (1968). An econometric analysis of internal migration in Brazil. *Journal of Political Economy, 76*, 218–245.

Sandell, S. H. (1977). Women and the economics of family migration. *Review of Economics and Statistics, 59*, 406–414.

Shreffler, K. M., Pirretti, A. E., & Drago, R. (2010). Work-family conflict and fertility intentions: Does gender matter? *Journal of Family and Economic Issues, 31*, 228–240.

Sicherman, N. (1991). Overeducation in the labor market. *Journal of Labor Economics, 9*, 101–122.

Sloane, P. J., Battu, H., & Seaman, P. T. (1999). Overeducation, undereducation and the British labour market. *Applied Economics, 31*, 1437–1453.

Smits, J., Mulder, C. H., & Hooemeijer, P. (2003). Changing gender roles, shifting power balance and long-distance migration of couples. *Urban Studies, 40*, 603–613.

Son, S., & Bauer, J. W. (2010). Employed rural, low-income, single mothers' family and work over time. *Journal of Family and Economic Issues, 31*, 107–120.

Stark, O., & Taylor, J. E. (1991). Migration incentives, migration types: The role of relative deprivation. *Economic Journal, 101*, 1163–1178.

Swain, L. L., & Garasky, S. (2007). Migration decisions of dual-earner families: An application of multilevel modeling. *Journal of Family and Economic Issues, 28*, 151–170.

Tsang, M., & Levin, H. (1985). The economics of overeducation. *Economics of Education Review, 4*, 93–104.

Wion, D. A. (1990). Working wives and earnings inequality among married couples, 1967–1984. *Review of Social Economy, 48*, 18–40.

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