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Source: *Journal of Labor Economics*, Vol. 25, No. 3 (July 2007), pp. 475-512
Published by: The University of Chicago Press on behalf of the Society of Labor Economists and the NORC at the University of Chicago
Stable URL: http://www.jstor.org/stable/10.1086/512706

Why Are Power Couples Increasingly Concentrated in Large Metropolitan Areas?

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Using the Panel Study of Income Dynamics (PSID), we test Costa and Kahn's colocation hypothesis, which predicts that power couples—couples in which both spouses have college degrees—are more likely to migrate to the largest cities than part-power couples or power singles. We find no support for this hypothesis. Instead, regression analyses suggest that only the education of the husband and not the joint education profile of the couple affects the propensity to migrate to large metropolitan areas. The observed location trends are better explained by higher rates of power couple formation in larger metropolitan areas.

I. Introduction

Couples in which both husband and wife have college degrees are increasingly likely to be located in large metropolitan areas. In 1970, 39% of these couples—called "power couples" by Costa and Kahn (2000)—lived in metropolitan areas with a population of at least 2 million. In 1990, this number had jumped to 50%. By comparison, among couples in which

We would like to thank Bart Hamilton, Emek Basker, Scott Drewianka, and Courtney Lafountain for their helpful comments and suggestions and Michael Orlando for programming assistance. Pollak thanks the John D. and Catherine T. MacArthur Foundation for their support. The usual disclaimer applies. Contact the corresponding author, Janice Compton, at comptonj@cc.umanitoba.ca.

[*Journal of Labor Economics,* 2007, vol. 25, no. 3]

0734-306X/2007/2503-0001$10.00

only one spouse has a college education—"part-power couples"—the proportion living in large metropolitan areas increased more slowly, growing from 36% to 42% over the 2 decades. Couples in which neither spouse has a college degree—"low-power couples"—have the lowest probability of living in a large city and the lowest rate of increase, growing from 30% to 34% in 20 years (Costa and Kahn 2000).

Costa and Kahn consider two main explanations for the increasing concentration of power couples in large metropolitan statistical areas (MSAs). First, large metropolitan areas may be increasingly attractive to the college educated, regardless of their marital status. The increase in urbanization of the college educated may reflect higher returns to education in larger MSAs or urban amenities more commonly found there. Thus, the observed trends may be the result of college-educated singles moving to large urban areas and then marrying. Second, the labor markets found in large metropolitan areas may hold particular attraction for power couples. All married couples potentially face the possibility that their location preferences will differ. This "colocation problem" may arise from different preferences for amenities or proximity to family, but economists emphasize job opportunities. If husband and wife work in the paid labor market and if they live together, then they must both find acceptable employment in the same location. With the rise in married women's labor force participation, the potential for colocation conflict has increased for all couples but may be most acute for the college educated because they tend to have more specialized careers. Solving this type of colocation problem may be easier in the labor markets of large metropolitan areas, and thus these areas should be magnets for power couples.

Costa and Kahn conclude that the ability of large MSAs to solve the colocation problem explains most of the observed increase in the concentration of power couples in large MSAs. Although the data used in their analysis are cross-sectional, they suggest that the migration of power couples is the principal mechanism underlying the changes in observed location patterns.

In this article we investigate the relationship between migration and the education profiles of couples. We ask two questions. First, is there evidence that the colocation pressure faced by highly educated couples is a determinant of migration? That is, compared to other couples, are power couples more likely to migrate into, and less likely to leave, large MSAs? Second, do the migration patterns of power couples differ from those of other couples? Positive responses to these questions would support Costa and Kahn's colocation explanation for the concentration of power couples in large urban areas. We do not, however, find evidence supporting the colocation explanation.

Using data from the Panel Study of Income Dynamics (PSID), we find that, holding all else equal, power couples are more likely to migrate and, when they migrate, are more likely to migrate to large urban areas than are low-power couples. We find, however, that the factor determining couples' migration is not their joint education profile but the husband's education. More specifically, we find that the migration behavior of part-power couples in which only the husband is a college graduate is indistinguishable from that of power couples, while the migration behavior of part-power couples in which only the wife is a college graduate is indistinguishable from that of low-power couples. Our conclusion that migration is affected by the husband's education rather than the couple's joint education profile is unaltered when we include controls for post-graduate education and occupation to identify those couples most likely to have specialized careers.

Logic suggests that the observed location of power couples must be the result of four dynamic processes: migration, marriage, divorce, and human capital accumulation. Looking at the stock of power couples living in large metropolitan areas, we can conclude only that each spouse must have earned a college degree, married a spouse who earns/earned a college degree, remained married, and migrated to and/or chosen to remain in a large metropolitan area.

We argue that the migration of power couples into large urban areas is unlikely to be the primary mechanism behind the concentration of power couples in large MSAs. The formation of power couples in large MSAs provides a more plausible explanation. Although the differences between groups are not precisely estimated, the patterns suggest that differences in the migration rates of power singles, in assortative mating patterns, and in college enrollment rates by city size may be responsible for the increasing concentration of power couples in large MSAs. This suggestion is strengthened by the 2000 census data, data unavailable to Costa and Kahn. Between 1990 and 2000 the proportion of power couples living in large MSAs fell, while the proportion of low-power couples in large MSAs increased. This reversal of the earlier trend is difficult to explain in terms of power couple migration and colocation pressure.

The article proceeds as follows. Section II provides a brief review of the literature on couple migration. In Section III we describe the data, the econometric model, and the variables we use to investigate the relationship between the joint education profile of spouses and the probability of migration. Regression results are presented in Section IV. Section V provides an overview of couple migration patterns as well as the other mechanisms that may explain the location trends—migration of singles, assortative mating, marriage and divorce trends, and educational attainment by city size. Section VI reports on changes in power couple concentration in large urban areas using data from the 2000 census. Section VII concludes.

II. Migration of Couples

Economists frame individuals' migration behavior as human capital decisions (Sjaastad 1962; Mincer 1978). A person will migrate if the expected benefit of living in another location less migration costs exceeds the expected benefit of remaining in the current location. The main statistical trends of migration are consistent with this model—younger individuals are more mobile than older individuals, more educated persons are more mobile than those with less education, rural to urban migration is more common than the reverse, and the longer individuals have resided in an area the less likely they are to migrate. (For a review of the migration literature, see Greenwood [1997]).

Polachek and Horvath (1977), Sandell (1977), and Mincer (1978) were among the first to frame the migration decision explicitly in terms of family net gain rather than individual net gain. These researchers abstract from decision making within the family and assume that families migrate if and only if the sum of the benefits of migrating is greater than the sum of the costs, where the sums are taken over all family members. Family migration is less likely than individual migration since the costs of migrating increase with the number of family members while the benefits may not. The model suggests that one spouse, typically the husband, is often a "tied stayer" while the wife is often a "tied mover." Tied stayers forgo moves that would result in positive net returns for the individual but negative net returns for the family. Tied movers participate in moves that result in a loss for themselves but positive net returns for the family.

Empirical work confirms the importance of husbands' career opportunities in migration decisions. Using a sample of college graduates, Duncan and Perrucci (1976) show that the higher the occupational prestige and migration opportunities connected to the husband's occupation, the greater the probability that the couple will migrate. They find, however, that the occupational prestige and migration opportunities of the wife's career did not affect migration probabilities. Using data also from the 1970s, Bielby and Bielby (1992) link the migration behavior of couples to gender-role beliefs. Couples who subscribe to a more traditional "provider role" for husbands will not be deterred from moves that harm the wife's employment opportunities but will be deterred from moves that harm the husband's career opportunities. More recent studies continue to find similar gendered determinants of couple migration (Gardner, Pierre, and Oswald 2001; Nivalainen 2004).

Unlike these large-scale statistical studies, Green (1997) uses a case-study approach to investigate the migration/location decisions of dual-career households. On the basis of interviews with 30 such couples, she finds that the leader in migration decisions is most often the spouse with (*a*) the more highly paid career, (*b*) the more location-constrained career, and/or (*c*) the more insecure career. In the large majority of cases, the spouse with these job characteristics was the husband. Green notes that although the respondents appreciate the greater career opportunities in large urban centers, many are unwilling to incur the costs associated with such large areas—high costs of living, congestion, and so forth (Green 1997).

Because career choice is endogenous to beliefs about migration and marriage, Frank (1978) argues that expectations of migration based on the maximization of net family welfare help explain the male-female wage gap. Women are less likely to invest in their own human capital when their opportunity set is limited by their husbands' location choices. Similarly, if employers believe that the location decisions of women are determined largely by their husbands' careers and not their own, employers may be less likely to invest in firm-specific human capital for women. As a result, women may tend to enter more mobile careers—careers that build largely on general rather than specific human capital and careers in which opportunities are not concentrated in large urban areas. Studies of couple migration by Spitze (1984), Bird and Bird (1985), Morrison and Lichter (1988), Shihadeh (1991), Cooke and Bailey (1996), and Jacobsen and Levin (1997) are broadly consistent with Frank's argument.

Robst and McGoldrick (1996) investigate the impact of destination size on outcomes for tied movers. They began by hypothesizing that while a trailing spouse has a job search limited to the location that the leading spouse has chosen, if the location is a large MSA and this in turn reflects higher job vacancies, then the trailing spouse may find a wage offer near the maximum that could be obtained in a nationwide search. This hypothesis was not supported by the data. The authors found that the size of the local labor market had no significant effect on the likelihood of women being "overeducated," that is, having a higher level of education than the average within their occupation. They suggested that it is not the market's size that is important, but its job composition: a small local labor market with a relatively large concentration of white-collar employment is as beneficial to women as a large labor market without such a concentration.

III. Econometric Model and Data Description

Our econometric analysis addresses the following question: compared to part-power and low-power couples, are power couples more likely to migrate to and less likely to migrate from large cities? To answer this question, we consider the determinants of couple migration, focusing on couples' joint education profiles.

A. Data

The regression analyses presented in the following sections use data from the Panel Study of Income Dynamics (University of Michigan Institute for Social Research 2002). The PSID is a longitudinal survey of a representative sample of American individuals and families. The original sample included members of 4,800 families. All individuals from the original families are followed as they move or form new family units. For this study we have included all married couples who live together and all unmarried heterosexual couples who have lived together for at least 1 year.[1] In all that follows, we define "power couples" as those in which both husband and wife have a bachelor's degree; "part-power couples" as those in which only one spouse holds a bachelor's degree; and "low-power couples" as those in which neither spouse holds a bachelor's degree.[2] When we refer to an individual as "college educated" we mean that he or she holds a bachelor's degree. The sample is limited to men aged 25–39 and women aged 23–37. This restriction allows us to focus on those individuals and couples whose migration decisions would be most influenced by career considerations.[3]

The Geocode Match Supplement to the PSID provides detailed geographic identifiers necessary for a migration study. Building up from the county of residence, we sort observations into Metropolitan Statistical Areas (MSAs). The U.S. Census Bureau defines MSAs as agglomerations of counties that include a large population nucleus and adjacent communities that share a high degree of social and economic integration. We define migration as a move between MSAs, between an MSA and a non-MSA county, or between two non-MSA counties. Thus, moves within an MSA are not treated as migration. The changing definition of MSAs poses

[1] Dropping couples who were not legally married did not alter the results in preliminary analyses.

[2] Some imputation was required for the education variable. Education was asked of respondents when they entered the household but not at each subsequent round. In 1985, the education questions were re-asked of all individuals in the sample. Since year of graduation was asked, it was possible to work backward from 1985 to code the education attainment for previous years. For years after 1985, only new heads/spouses were asked the education questions. For those already in the sample, if they were enrolled in school in 1985, they were assumed to have finished their program and so a degree was imputed to them in following years. If individuals were not enrolled in school in 1985, their education level observed in 1985 was simply carried forward. The resulting imputations look reasonable in comparison to average education of the individual's occupation. A robustness test was performed in which education was raised to be at least the minimum level of education that individuals who reported the same occupation deemed necessary to perform the job. The results are not substantially different.

[3] These age categories are the focus of Costa and Kahn (2000). Similar trends in location are found with expanded age categories.

a problem for migration analysis. For example, according to the 1990 MSA definitions, Baltimore, MD, and Washington, DC, were distinct MSAs, but according to the 2000 definitions they are part of a single MSA. To prevent changing MSA definitions from creating the appearance of changes in migration rates, we apply the 1990 MSA definitions consistently throughout the sample.[4] In the analyses that follow, we define "large" metropolitan areas as MSAs with populations greater than 2 million, "midsize" metropolitan areas as MSAs with populations between 250,000 and 2 million, and "small" metropolitan areas as nonmetropolitan areas and MSAs with populations less than 250,000. We choose these categories to be consistent with those used by Costa and Kahn. Appendix A lists the large MSAs for the 1970–2000 period.

In our regression analyses we use data for the period 1980–93. We limit our analysis to these years because some of the relevant variables—most importantly, the education variables—were not available for any longer period. Since it is during this period that we observe the greatest increase in power couple concentration in large MSAs, we would expect the colocation effect to be strongest during this period. The panel data are pooled into 12 2-year cross-sections. For each couple-year observation, the dependent variable captures the migration behavior observed in year 2 and all independent variables measured in year 1. Our sample includes 21,955 couple-year observations with 638 observed migrations (3%). MSA attributes are dervied from the 1988 and 1993 County and City Data Books (U.S. Census Bureau 1988, 1993).

B. Econometric Model

We estimate two econometric models of migration. In the first we estimate the probability of migrating without regard to the destination. The dependent variable is binary, indicating whether or not the couple migrates. In the second model we distinguish migrants by the size of destination. Here, the couple chooses among four alternatives: staying in the current location, migrating to a small MSA, migrating to a midsize MSA, and migrating to a large MSA. The decision to migrate and the size of destination are determined simultaneously.

1. *Sample Selection Issues*

Two selection issues require attention. The first is attrition: the requirement that migration variables be defined in year 2 results in the loss of observations. The second is change in marital status: because our observations are at the household level—unmarried individual heads of

[4] Costa and Kahn (2000), whose focus is not dynamic, use the current year MSA definition for each census year that they consider, but they note that their results do not change substantially under alternative (stable) definitions.

households and married couples—and are defined over a 2-year period, the marital status must be constant over the 2 years. Hence, the location in year 2 is defined only for those couples that remain married. As a result, our samples are doubly selected to include only those observations that (i) have not been lost to attrition and (ii) have the same marital status in year 2 as in year 1. Beginning with a sample of 26,324 couple-year observations, we lose 2,264 observations to attrition and 1,354 observations to divorce. We dropped 751 additional observations due to missing values for key variables or death.

The model for the binary choice decision is a three-equation latent dependent variable model where equation (1) estimates the probability of remaining in the sample in year 2 (i.e., no attrition), equation (2) estimates the probability of remaining married in year 2, and equation (3) is the equation of interest, estimating the probability of migration:

$$q_i^* = V_i\delta + v_i, \quad i = 1 \ldots N_1, \tag{1}$$

$$z_i^* = W_i\gamma + \omega_i, \quad i = 1 \ldots N_2, \; N_2 < N_1, \tag{2}$$

$$y_i^* = X_i\beta + u_i, \quad i = 1 \ldots N_3, \; N_3 < N_2, \tag{3}$$

where q_i^*, z_i^*, and y_i^* are unobserved latent variables; V_i, W_i, and X_i are K, J, and M row vectors of exogenous explanatory variables; and δ, γ, and β are K, J, and M column vectors of parameters to be estimated. The full sample is denoted N_1, N_2 includes all couples who are present in both years, and N_3 includes all couples who remain married in year 2. We assume that all three disturbance terms are drawn from normal distributions. In the absence of selection bias, we assume that v_i, ω_i, and u_i are identically and independently normally distributed zero mean error terms.

Following Vella (1992, 1993, 1998) and Eklöf and Karlsson (1999), we test for sample selection in the binary choice model. Rewrite equation (1) as

$$y_i^* = X_i\beta + \lambda_1\omega_i + \lambda_2 v_i + \eta_i, \quad i = 1 \ldots N_1, \tag{4}$$

where λ_1 and λ_2 are equal to $\sigma_{u\omega}/\sigma_u^2$ and σ_{uv}/σ_u^2, respectively. The term η_i is a white noise error term. Replacing ω_i and v_i with the estimated generalized residuals from the probit models—which by Vella (1993) are equal to their respective inverse Mills ratios, we estimate

$$y_i^* = X_i\beta + \lambda_1\left[\frac{\phi(z_i'\gamma)}{\Phi(z_i'\gamma)}\right] + \lambda_2\left[\frac{\phi(q_i'\delta)}{\Phi(q_i'\delta)}\right] + \eta_i, \quad i = 1 \ldots N_1. \tag{5}$$

Under the null hypothesis, λ_1 and λ_2 are equal to zero and η_i is equal to u_1. The t-tests on λ_1 and λ_2 are tests of selection bias since under the null hypothesis the estimates are consistent. In general, however, under the alternative hypothesis, the estimates are not consistent.

The test results are presented in table 1. Shown are some key variables as well as the test statistics.[5] Column A presents the binary choice probit regression (eq. [1]) without adjusting for sample selection. Column B presents the results from equation (5), including the two test statistics. As indicated by the *t*-tests, neither λ_1 nor λ_2 are significant. In the regressions presented in columns C and D we alter the modeling of sample selection. In column C the two selection criteria are combined. In this model the first step equation estimates the probability of being observed in year 2 (i.e., no divorce *and* no attrition). In column D the observations that have been lost due to attrition are simply dropped, and we model only the sample selection arising from divorce.[6] In both variations, the *t*-test indicates insignificant test variables.

Column E estimates the abridged model of column D under a maximum likelihood probit estimation procedure outlined by van de Ven and van Praag (1981) and implemented through STATA using the HECKPROB command.[7] The estimates in this model are consistent and asymptotically efficient even in the presence of selection bias as it allows for the estimation of the correlation between the error terms ω_i and u_i. The likelihood ratio test of independent equations—testing the null hypothesis that $\rho = 0$—indicates again that sample selection bias is not a concern.

Overall, the *t*-tests on the inverse Mills ratios added to the regressions in columns B–D and the likelihood ratio test in column E indicate that sample selection bias is not significant in this model. In the analyses that

[5] Full regression results are available upon request.

[6] More formally, in col. C we present a variation of eq. (5):

$$y_i^* = X_i\beta + \lambda_3\left[\frac{\phi(z_i'\gamma)}{\Phi(z_i'\gamma)}\right] + \eta_i, \quad i = 1, \dots N_1,$$

$$z_i^* = W_i\gamma + \omega_i, \quad i = 1, \dots N_1,$$

where z_i^* estimates the probability that individual i is observed and married in year 2. Likewise, in col. D we present the following variation of eq. (5):

$$y_i^* = X_i\beta + \lambda_1\left[\frac{\phi(z_i'\gamma)}{\Phi(z_i'\gamma)}\right] + \eta_i, \quad i = 1, \dots N_2,$$

$$z_i^* = W_i\gamma + \omega_i, \quad i = 1, \dots N_2,$$

where observations lost to attrition are dropped from the sample and z_i^* estimates the probability that individual i is married in year 2.

[7] Maximum likelihood estimates in which the missing observations are dropped and selection is solely due to marital stability are similar.

Table 1
Effect of Power Status on Probability of Migrating: Testing Sample Selection

	Probit: Without Sample Selection Controls (A)	Probit: Tests for Sample Selection (B)	(C)	(D)	Maximum Likelihood Estimation (E)	ML Estimation without Past Behavior Variables (F)
Power: both spouses have college degrees	.378 (.060)*	.363 (.085)*	.396 (.076)*	.346 (.084)*	.383 (.059)*	.199 (.177)
Half power: only one spouse has a college degree	.245 (.000)*	.249 (.080)*	.266 (.078)*	.218 (.073)*	.254 (.053)*	.095 (.122)
Origin—midsize MSA	−.018 (.045)	−.016 (.045)	−.018 (.045)	−.017 (.045)	−.019 (.044)	−.020 (.030)
Origin—large MSA	−.165 (.065)*	−.162 (.066)*	−.165 (.065)*	−.163 (.065)*	−.163 (.064)*	−.094 (.058)*
Currently residing in home state of at least one spouse	−.543 (.040)**	−.542 (.040)*	−.543 (.040)*	−.543 (.040)*	−.531 (.043)*	
Head has previously moved for a job	.092 (.044)*	.094 (.045)*	.093 (.044)*	.092 (.045)*	.090 (.044)*	
λ_1		−.511 (1.129)		−.645 (1.114)		
λ_2		1.157 (1.163)				
λ_3			.389 (1.086)			
ρ					.478 (.511)	−.891 (.151)
Wald test of independent equations ($\rho=0$):						
Test statistic: $\chi^2(1)$					.62	3.76
Prob > χ^2					.432	.052

Note.—Coefficients and standard errors presented. Standard errors are adjusted for clustering on household identifier.
* Coefficients are significant at the 5% level.

follow, we present the binary choice estimation results from the maximum likelihood probit model.

For the second model, in which size of the destination is determined jointly with the decision to migrate, we rely on the above test results and estimate the model under the assumption that sample selection bias is not significant. Here we employ a multinomial logistic specification and estimate the following model using a maximum likelihood procedure.[8] Extending the binary model from (4), the probability that observation i chooses outcome j is

$$p_{ji} = \Pr(Y_i = j) = \begin{cases} \dfrac{1}{1 + \sum_{m=2}^{4} \exp(X_i\beta_m)} & \text{if } j = 1 \\ \dfrac{\exp(X_i\beta_j)}{1 + \sum_{m=2}^{4} \exp(X_i\beta_m)} & \text{if } j = 2, 3, 4 \end{cases},$$

where $j = 1, 2, 3, 4$ denotes the four categorical outcomes (not migrating, migrating to a small MSA, migrating to a midsize MSA, migrating to a large MSA); the base outcome ($j = 1$) is the choice of not migrating. In the results that follow, we present the relative risk ratios, which are equal to the exponentiated value of a coefficient. This allows for an easy interpretation: the relative risk ratio indicates the change in the probability of observing outcome k, relative to the probability of not migrating, for a one unit change in the corresponding variable.

2. *Endogeneity*

Migration and education are endogenous if individuals have unobservable characteristics that are reflected in a higher propensity to invest in human capital through both education and migration. To correct for unobserved heterogeneity in the propensity to invest in human capital, we control for whether the current state is the home state of either spouse and whether or not the household head (read: husband) has previously moved in order to take a job. The inclusion of these variables weakens the endogeneity concerns as they capture some of the otherwise unobservable propensity to invest in human capital. Indeed with the inclusion of these variables, Hausman tests allow us to reject the null hypothesis of endogeneity at the 5% confidence level. Column F in table 1 highlights

[8] Although we assumed a normal distribution in the first case, we assume a logistic error distribution here. As we have no a priori beliefs concerning the distribution of the errors, the choice of error form was determined solely by ease of computation. While it would have been more consistent to estimate multinomial probit regressions, convergence was difficult. The binary choice regressions were run under the assumption of logistic errors, and the results were very similar.

the importance of these variables. While the results are robust to inclusions and omissions of other control variables, the omission of these variables significantly alters the impact of the education variables.

3. *Control Variables*

In the following discussion, we focus on couples' joint education profile as a determinant of migration, controlling for other factors such as family, location amenities, employment, and occupation. Appendix B shows means and standard deviations for the full sample, which includes all couple-year observations, and separately for the migrant observations. The means show the strong importance of the couples' home state and previous migration behavior. Close to 80% of the couple observations are residing in the home state of at least one spouse. Compare this with only 45% of migrant observations. In 26% of all observations, the head had moved previously for a job; the corresponding figure for migrant observations is 38%. In our sample, migrants are younger, slightly less likely to have preschool children, less likely to be homeowners, and less likely to be nonwhite. Migrants' origins tend to be characterized by slower growth, higher housing value, and greater distance to any large MSAs. In terms of labor force attachment, migrants have lower job durations and are more likely to be unemployed or out of the labor force.

IV. Regression Results

The regression analysis provides no evidence that colocation pressure is a determinant of migration. Tables 2–5 provide key regression results. For the binary model, the marginal effects of the key variables are presented—the change in the probability of migrating due to a change in the dummy variable from zero to one. For the multinomial model, the results are presented as relative risk ratios. For a dummy variable, this is the change in the probability of migrating to the indicated destination size over the probability of not migrating that occurs due to a discrete change in the variable from 0 to 1.

A. The Effect of Power Couple Status on Migration

Table 2 presents the results for key variables in the binary model. Column A corresponds to column E in table 1 and controls for sample selection using maximum likelihood estimation. The regression results show that it is not the joint education profile of a couple but only the husband's education that affects the decision to migrate.

The analysis hinges on the behavior of couples in which one spouse has a college degree and the other does not (i.e., the part-power couples). In column A of table 2, we pool the part-power couples in which the husband is a college graduate with the part-power couples in which the

Table 2
Binary Model: Probability of Migration

	A	B	C	D
Power: both spouses have college degree	.022*	.022*		.026*
	(.000)	(.000)		(.010)
Half power: only one spouse has a college degree	.013*			
	(.000)			
Husband power: only husband has college degree		.020*		.021*
		(.000)		(.027)
Wife power: only wife has college degree		.001		−.016
		(.786)		(.126)
Husband power2: husband has a college degree			.019*	
			(.000)	
Wife power2: wife has a college degree			.001	
			(.614)	
Origin—midsize MSA	−.001	−.001	−.001	−.001
	(.666)	(.685)	(.686)	(.697)
Origin—large MSA	−.007*	−.007*	−.007*	−.013*
	(.011)	(.012)	(.012)	(.015)
Power × Large MSA				−.007
				(.491)
Husband power × Large MSA				−.002
				(.857)
Wife power × Large MSA				.057
				(.052)
Currently residing in home state of at least one spouse	−.022	−.021*	−.022*	−.044*
	(.000)	(.000)	(.000)	(.000)
Head has previously moved for a job	.004*	.004*	.004*	.008
	(.045)	(.047)	(.049)	(.058)
ρ	.478	.533	.511	−.807
	(.511)	(.376)	(.490)	(.181)
Wald coefficient tests (Prob > χ^2):				
Power = Half power	.054			
Power = Husband power		.707		.606
Power = Wife power		.000		.004
Husband power = Wife power		.001		.005
Husband power2 = Wife power2			.000	
Wald test of independent equations ($\rho = 0$)	.432	.258	.395	.032

Note.—For ease of interpretation, the marginal effects of the variables are presented. For the dummy variables, this is dy/dx for a discrete change of dummy variable from 0 to 1. $p > |z|$ in parentheses. For ρ, the coefficient is given, with its standard error in parentheses. Standard errors are adjusted for clustering on household identifier.

* Coefficients are significant at the 95% confidence level or higher.

wife is a college graduate. Point estimates indicate that power couples are more likely to migrate than both part-power couples and low-power couples, although the Wald test shows that the difference between the coefficients on power couples and part-power couples is not statistically significant at a 95% confidence level. Holding all else constant, the probability of migration for a power couple is 2.2% higher than the probability of migration for a low-power couple. In column B, we split the part-power couples into those in which the husband is a college graduate and those in which the wife is a college graduate. We find that the migration propensity of power couples is indistinguishable from that of part-power couples in which the husband has a college degree and that the migration propensity of low-power couples is indistinguishable from that of part-power couples in which the wife has a college degree. When we ignore joint education specifications and control for the husband's education, we find no statistically significant effect of the wife's education on the probability of migration (col. C). Wald tests on the coefficients confirm that the effects of husband's and wife's education on the propensity to migrate are statistically different. These results suggest that it is not the joint education profile of a couple that affects migration, but only the husband's education. Finally, in column D we find that while the probability of migrating is lower for couples living in large MSAs compared to couples living in small MSAs, the interaction variables show that there is no differential impact of origin size by education.

The coefficients on other variables are as expected. The variables included to capture past behavior—whether or not the couple is residing in the home state of at least one spouse and whether or not the head has previously moved for a job—remain constant in size and significance across model specifications. Living in the home state of at least one spouse reduces the probability of migrating by 2.2%, while prior migrants are 0.4% more likely to migrate compared to couples in which the head has never previously moved for a job.

As noted above, these binary regressions are run simultaneously with a sample selection equation. The statistical significance of the variable ρ provides a test of sample selection bias. In all but column D, we can accept the null hypothesis that $\rho = 0$, that is, that the two equations are independent and controlling for sample selection is not providing any further information.

Table 3 presents the results from the multinomial logit regressions, which confirm the crucial role of husband's education in migration, especially migration to large MSAs. These regressions do not control for sample selection because sample selection bias was significant in only one of the binary regressions. For columns A–C, then, this omission is unimportant.

The first regression, presented in column A, again does not distinguish between the two groups of part-power couples. The propensity to migrate to large MSAs is higher for both power and part-power couples, compared to low-power couples. The results for these regressions are presented as relative risk ratios, indicating that power couples are 2.8 times more likely to migrate to a large MSA compared to low-power couples, while part-power couples are 3.4 times more likely. Column B distinguishes between part-power couples in which the husband holds a college degree and part-power couples in which the wife holds a college degree. As in the binary regressions, this distinction is important. Compared to low-power couples, both power couples and part-power couples in which the husband has a college degree are more likely to migrate to medium MSAs and to large MSAs. Part-power couples in which the wife holds a college degree are indistinguishable from low-power couples in their propensity to migrate to cities of all sizes. Column C considers only the education of each spouse and not their joint profile. Again we find that couples in which the husband holds a college degree are more likely to migrate to a large MSA. The estimated effect of a wife's college education on the probability of migrating to a large MSA is negative, although the precision of this estimate is low.

In all three regressions presented in columns A–C, couples living in large MSAs are less likely to migrate to small MSAs. Couples living in midsize MSAs are more likely to migrate to large MSAs (with slightly lower levels of significance). These trends indicate a general reluctance to move to a smaller metropolitan area and a general preference for moving to a larger MSA. The regression results presented in column D indicate that the education category of the couple has some impact on this preference for larger MSAs. Couples in which only the wife has a college degree are less likely to migrate from one large MSA to another large MSA and more likely to migrate from a large MSA to a midsize MSA, compared to low-power couples. However, the results for column D are questionable. Not only is sample selection bias an issue in this specification, but we also find a violation of the assumption of independence of irrelevant alternatives. Hausman test results suggest that the omission of the small or medium alternatives alters the results for the large alternative.

We see again the robust significance of the past behavior variables. Residing in the home state of at least one spouse lowers the probability of migration to any sized destination. Interestingly, having previously moved for a job has no discernible effect on the probability of migrating to a medium or large MSA but increases the probability of migrating to a small MSA. This suggests that we may be capturing return migrants.

Both the binary probit regressions and the multinomial logit regressions show that the probability of migration, and the migration to destinations of different sizes, depends not on the number of spouses holding a college

Table 3
Multinomial Logit Model: Probability of Migrating to (Small, Medium, Large) Destination

	A			B		
	Small	Medium	Large	Small	Medium	Large
Power: both spouses have college degree	1.848 (.007)*	2.597 (.000)*	2.797 (.000)*	1.853 (.006)*	2.603 (.000)*	2.852 (.000)*
Half power: only one spouse has a college degree	1.191 (.397)	1.584 (.009)*	3.393 (.000)*			
Husband power: only husband has college degree				1.405 (.133)	1.751 (.007)*	5.074 (.000)*
Wife power: only wife has college degree				.766 (.493)	1.287 (.359)	1.016 (.973)
Origin—midsize MSA	.670 (.027)*	1.037 (.807)	1.593 (.057)	.673 (.029)*	1.041 (.788)	1.604 (.053)
Origin—large MSA	.468 (.003)*	.769 (.219)	1.093 (.790)	.472 (.003)*	.773 (.227)	1.126 (.721)
Currently residing in home state of at least one spouse	.267 (.000)*	.297 (.000)*	.318 (.000)*	.270 (.000)*	.299 (.000)*	.328 (.000)*
Head has previously moved for a job	1.575 (.000)*	.970 (.827)	1.179 (.425)	1.570 (.005)*	.969 (.821)	.117 (.448)
Wald χ^2	875.65			922.80		
Pseudo R^2	.1048			.1074		
Wald coefficient tests (Prob > χ^2):						
Power = Half power	.0735	.0148*	.4816			
Power = Husband power				.292	.082	.034*
Power = Wife power				.031*	.017*	.039*
Husband power = Wife power				.150	.339	.001*
Husband power2 = Wife power2						
Hausman test for IIA:						
Excluding small		.560	.933		.608	.970
Excluding midsize	.140		.501	.139		.677
Excluding large	.917	.414			.853	.402

	C			D		
	Small	Medium	Large	Small	Medium	Large
Power: both spouses have college degree				1.823 (.012)*	2.567 (.000)*	3.063 (.000)*
Half power: only one spouse has a college degree						
Husband power: only husband has college degree				1.589 (.049)*	1.654 (.037)*	4.796 (.000)*
Wife power: only wife has college degree				.671 (.379)	.702 (.420)	1.382 (.502)
Husband power2: husband has a college degree	1.594 (.011)*	1.826 (.000)*	4.685 (.000)*			
Wife power2: wife has a college degree	1.104 (.624)	1.401 (.047)*	.630 (.074)			
Origin—midsize MSA	.669 (.027)*	1.039 (.794)	1.609 (.051)	.672 (.029)*	.650 (.095)	1.602 (.053)
Origin—large MSA	.465 (.003)*	.768 (.219)	1.141 (.687)	.504 (.021)*	1.113 (.763)	1.201 (.663)
Power × Large MSA				1.073 (.874)	1.113 (.763)	.697 (.579)
Husband power × Large MSA				.360 (.204)	1.296 (.524)	1.197 (.713)
Wife power × Large MSA				1.687 (.564)	4.585 (.007)*	.000 (.000)*
Currently residing in home state of at least one spouse	.270 (.000)*	.299 (.000)*	.327 (.000)*	.271 (.000)*	.300 (.000)*	.328 (.000)*
Head has previously moved for a job	1.571 (.000)*	.970 (.827)	1.170 (.445)	1.559 (.005)*	.964 (.798)	1.189 (.400)
Wald χ^2	914.99			261.17		
Pseudo R^2	.1070			.1095		
Wald coefficient tests (Prob > χ^2):						
Power = Half power						
Power = Husband power				.624	.098	.144
Power = Wife power				.038*	.005*	.123
Husband power = Wife power				.078	.075	.013*
Husband power2 = Wife power2	.234	.379	.000*			
Hausman test for IIA:						
Excluding small		.593	.952		.657	.000*
Excluding midsize	.108		.580	.247		.000*
Excluding large	.824	.359		.950	.475	

Note.—The coefficients are presented as relative risk ratios. For dummy variables, this is the change in the ratio of the probability of migrating to the indicated destination size and the probability of not migrating due to a discrete change in the variable from 0 to 1. $p > |z|$ in parentheses. Standard errors are adjusted for clustering on household identifier.
* Coefficients are significant at the 95% confidence level or higher.

degree (low-power, part-power, and power) but only on whether the husband holds a college degree. In a recent paper, Jürges (2006) performs similar analyses on German panel data and finds no evidence of a colocation effect. He distinguishes between "traditional" and "egalitarian" couples, defined by the husband's relative share of the housework on weekends. His results are consistent with ours for "traditional" couples—only the husband's education is a significant determinant of migration. For more "egalitarian" families, migration is as likely for those in which either spouse has a high level of education as for those in which both spouses have a high level of education.

B. The Effect of Postgraduate Degrees and Urban Occupations on Migration

To link the colocation hypothesis to the education profile of couples we must assume that, for couples with college degrees, occupational specialization makes colocation pressure more acute. But many college-educated individuals, women especially, are in occupations that are relatively portable and are not concentrated in large urban areas—the occupational specialization story is more plausible for an economist married to a lawyer than for a high school teacher married to a nurse. Fifty percent of power couples and 55% of power singles lived in large urban areas in 1990. Economists and lawyers tend to have advanced degrees and are relatively concentrated in large areas: 59% of economists and 55% of lawyers lived in large MSAs in 1990. In contrast, teachers and nurses are less likely to have advanced degrees and are not concentrated in large areas: 33% of teachers and 38% of registered nurses live in large MSAs in 1990.[9] The migration behavior of couples in which both spouses have postgraduate degrees—call these "super-power couples"—or both spouses have occupations that are concentrated in large MSAs might be very different from the behavior of power couples without advanced degrees or urban occupations.

We apply the same regression analyses as above to investigate whether colocation effects can be found for couples in which both spouses have occupations that are concentrated in large MSAs or both spouses have advanced degrees (tables 4 and 5). There are 1,778 observations in which at least one spouse has an advanced degree. These include 257 observations in which both spouses have advanced degrees, 986 observations in which only the husband has an advanced degree, and 535 observations in which only the wife has an advanced degree. Likewise, there are 3,493 observations in which at least one spouse has an urban occupation, including 1,740 observations in which both spouses have urban occupations, 4,716 in which only the husband has an urban occupation, and 1,282 obser-

[9] Full results are available upon request.

Table 4
Binary Model: Probability of Migration Part II

	E	F	G	H*
Power: both spouses have college degree	.022*	.020*	.019*	.022*
	(.000)	(.000)	(.000)	(.000)
Husband power: only husband has college degree	.020*	.019*	.019*	.020*
	(.000)	(.000)	(.000)	(.000)
Wife power: only wife has college degree	−.0002	.001	.001	.001
	(.956)	(.840)	(.877)	(.909)
Percentage of husband occupation in large MSA	.004			
	(.661)			
Percentage of wife occupation in large MSA	−.009			
	(.514)			
Both spouses have urban occupations		.004		
		(.281)		
Only husband has urban occupation		.005*		
		(.037)		
Only wife has urban occupation		.005		
		(.225)		
At least one spouse has advanced degree			.004	
			(.225)	
Both spouses have advanced degrees				−.003
				(.653)
Only husband has advanced degree				.005
				(.266)
Only wife has advanced degree				.004
				(.537)
Origin—midsize MSA	−.001	−.001	−.001	−.001
	(.645)	(.629)	(.718)	(.724)
Origin—large MSA	−.007*	−.006*	−.006*	−.007*
	(.009)	(.015)	(.016)	(.008)
Currently residing in home state of at least one spouse	−.022*	−.021*	−.022*	−.035*
	(.000)	(.000)	(.000)	(.000)
Head has previously moved for a job	.004*	.004*	.004*	.005*
	(.041)	(.044)	(.042)	(.047)
ρ	.585	.631	.569	
	(.240)	(.172)	(.650)	
Wald coefficient tests (Prob > χ^2):				
Power = Half power	.785	.732	.972	.758
Power = Husband power	.0001	.001	.002	.001
Power = Wife power	.0004	.002	.002	.005
Wald test of independent equations (ρ = 0)	.067	.010	.381	

Note.—For ease of interpretation, the marginal effects of the variables are presented. For the dummy variables, this is *dy*/*dx* for a discrete change of dummy variable from 0 to 1. $p > |z|$ in parentheses. For ρ, the coefficient is given, with its standard error in parentheses. Standard errors are adjusted for clustering on household identifier. Due to convergence problems, the regression in column H is run as a single probit, without correcting for sample selection.
* Coefficients are significant at the 95% confidence level or higher.

Table 5
Multinomial Logit Model: Probability of Migrating to (Small, Medium, Large) Destination Size

	E			F		
	Small	Medium	Large	Small	Medium	Large
Power: both spouses have college degree	1.798 (.012)*	2.574 (.000)*	2.960 (.000)*	1.753 (.016)*	2.441 (.000)*	2.914 (.000)*
Husband power: only husband has college degree	1.414 (.128)	1.758 (.007)*	5.226 (.000)*	1.361 (.181)	1.629 (.018)*	5.178 (.000)*
Wife power: only wife has college degree	.532 (.165)	1.304 (.335)	1.034 (.944)	.749 (.461)	1.286 (.359)	1.016 (.972)
Percentage of husband occupation in large MSA	.629 (.544)	1.469 (.562)	.773 (.818)			
Percentage of wife occupation in large MSA	6.914 (.103)	.232 (.113)	.152 (.298)			
Both spouses have urban occupations				1.671 (.064)	.924 (.751)	.980 (.955)
Only husband has urban occupation				1.144 (.527)	1.516 (.005)*	.881 (.614)
Only wife has urban occupation				1.409 (.324)	1.290 (.292)	.952 (.893)
Origin—midsize MSA	.655 (.020)*	1.049 (.743)	1.637 (.046)*	.674 (.030)*	1.025 (.867)	1.613 (.052)*
Origin—large MSA	.434 (.001)*	.779 (.246)	1.135 (.705)	.483 (.004)*	.787 (.261)	1.122 (.730)
Currently residing in home state of at least one spouse	.276 (.000)*	.299 (.000)*	.329 (.000)*	.270 (.000)*	.298 (.000)*	.329 (.000)*
Head has previously moved for job	1.574 (.005)*	.983 (.900)	1.171 (.440)	1.563 (.005)*	.970 (.825)	1.170 (.445)
Wald χ^2	924.39			939.20		
Pseudo R^2	.1083			.1093		
Wald coefficient tests (Prob > χ^2):						
Power = Husband power	.365	.010*	.041*	.3411	.074	.039*
Power = Wife power	.010*	.023*	.038*	.040*	.033*	.037*
Husband power = Wife power	.043*	.353	.001*	.162	.462	.001*
Hausman test for IIA:						
Excluding small		.510	.924		.474	.974
Excluding midsize	.222		.746	.184		.633
Excluding large	.756	.292		.780	.215	

	G			H		
	Small	Medium	Large	Small	Medium	Large
Power: both spouses have college degree	1.505 (.111)	2.759 (.000)*	2.176 (.015)*	1.520 (.103)	2.758 (.000)*	2.304 (.008)*
Husband power: only husband has college degree	1.275 (.308)	1.800 (.007)*	4.511 (.000)*	1.253 (.355)	1.811 (.006)*	4.400 (.000)*
Wife power: only wife has college degree	.728 (.411)	1.301 (.336)	.953 (.920)	.745 (.441)	1.280 (.364)	.958 (.929)
At least one spouse has advanced degree	1.559 (.087)	.873 (.545)	1.715 (.079)			
Both spouses have advanced degrees				1.459 (.506)	.784 (.638)	.525 (.523)
Only husband has advanced degree				1.662 (.076)*	.831 (.466)	1.866 (.050)*
Only wife has advanced degree				1.310 (.563)	1.047 (.899)	1.625 (.335)
Origin—midsize MSA	.682 (.034)*	1.037 (.804)	1.636 (.045)*	.682 (.034)*	1.035 (.813)	1.626 (.048)*
Origin—large MSA	.487 (.005)*	.765 (.210)	1.181 (.621)	.486 (.005)*	.762 (.203)	1.156 (.667)
Currently residing in home state of at least one spouse	.273 (.000)*	.297 (.000)*	.334 (.000)*	.274 (.000)*	.296 (.000)*	.335 (.000)*
Head has previously moved for job	1.590 (.004)*	.961 (.773)	1.202 (.371)	1.598 (.004)*	.957 (.749)	1.200 (.375)
Wald χ^2	946.12			963.37		
Pseudo R^2	.1084			.1088		
Wald coefficient tests (Prob $> \chi^2$):						
Power = Husband power	.535	.0585	.014*	.481	.072	.030*
Power = Wife power	.088	.017*	.111	.093	.013*	.087
Husband power = Wife power	.187	.324	.001*	.221	.284	.002*
Hausman test for IIA:						
Excluding small		.673	.970		.706	.978
Excluding midsize	.197		.725	.148		.750
Excluding large	.792	.322		.855	.419	

Note.—The coefficients are presented as relative risk ratios. For dummy variables, this is the change in the ratio of the probability of migrating to the indicated destination size and the probability of not migrating due to a discrete change in the variable from 0 to 1. $p > |z|$ in parentheses. Standard errors are adjusted for clustering on household identifier.

* Coefficients are significant at the 95% confidence level or higher.

vations in which only the wife has an urban occupation. We first include a measure of the urbanization of occupations—the percent of all individuals in the occupation that reside in MSAs greater than 2 million.[10] This variable is added as a continuous variable (col. E) and as a dichotomous variable (col. F) that defines urban occupations as those in which at least 40% of individuals in the occupation live in large MSAs. This cutoff was chosen to correspond roughly to the proportion of all individuals living in large MSAs. In 1990, approximately 36% of all couples and 43% of singles lived in large urban areas. Urban occupations then are those that are more than proportionately located in large MSAs.[11] We create categories to describe "urban" and "part-urban" couples by occupation in the same way we describe power and part-power couples by education—controlling for couples in which both spouses have urban occupations, where only the husband has an urban occupation and where only the wife has an urban occupation. In columns G and H we add indicators for postgraduate college degrees, again creating categories to describe the joint profile of the couple.

We find few significant effects of urban occupation or advanced education in either the binary or the multinomial equations. Those variables that are significant confirm the importance of the husband's career in migration. Couples in which only the husband is employed in an urban occupation are more likely to migrate than couples in which neither has an urban occupation (table 4, col. F). The multinomial logit regression results (table 5) are difficult to interpret. Couples in which only the husband is employed in an urban occupation are more likely to migrate to a midsize MSA compared to couples in which neither spouse is employed in an urban occupation, while couples in which only the husband has an advanced degree are more likely to migrate to small and large MSAs. Thus even under a more stringent definition of who is most affected by occupation specialization we find no evidence that colocation pressure affects migration behavior. Our results here are consistent with a recent study by McKinnish (2006) in which the mobility rates of both spouses' occupations (measured by the percentage of workers in education/occupation groups who have moved across state lines in the past 5 years) affect the probability of household migration, but the result is considerably stronger for the husband's occupation mobility.

The coefficients for college education maintain statistical significance and have similar magnitude when we control for the concentration of occupations in large urban areas. The stability of the college education

[10] Rates of occupation urbanization are calculated from the 1990 public use files of the Census (Ruggles et al. 2004).

[11] The regression results are robust to alternative percentages used to define urban occupations.

variables after controlling for occupation suggests that in addition to employment opportunities, amenities and/or returns to education are pulling college graduates to large MSAs.[12]

V. The Four Processes Underlying the Location Data

The regression results presented above suggest that the colocation problem facing power couples does not manifest itself through differences in their migration behavior. If colocation pressure lies behind the concentration of power couples in large MSAs, it does not operate through couple migration. In this section, we argue that not only is colocation pressure not affecting the migration of power couples, but the migration of power couples is not likely to be important in affecting location patterns.

The observed location trends of power couples may arise through differences by city size in power couple migration, power couple formation—either through marriage or increased educational attainment—and/or power couple dissolution (divorce rates).[13] Using the PSID and Census data we examine these dynamic processes.

A. Migration

The overall migration patterns of couples and unmarried individuals reported in table 6 are broadly consistent with the predictions of human capital theory.[14] Higher skilled individuals are more mobile than lower skilled individuals, power couples are more likely to migrate than are low- and part-power couples, and power singles are more likely to migrate than are low-power singles. The observed patterns are not consistent with Mincer's hypothesis that dual-career couples are less mobile than single-career couples.

The PSID transition data suggest that the migration of power couples is not the primary explanation for the increasing concentration of power couples in large MSAs—the migration patterns of power couples are not substantially different from those of power singles or part-power couples in which the husband has a college degree. There is, however, some evi-

[12] This suggestion depends on the assumption that individuals do not change occupations: the insignificance of the urban occupation indicators may be caused by individuals changing occupations following migration so that their occupation premigration is not indicative of their occupation postmigration.

[13] We ignore the dynamics of employment, although these are likely to differ by education and occupation. Basker (2003) develops a model of job search and migration that highlights the distinction between highly educated individuals, who tend to search first and then migrate, and less educated individuals, who tend to migrate without a job and then search.

[14] Recent immigrants are underrepresented in the PSID sample. However the location patterns observed in the Census—those we are trying to explain—remain when immigrants are excluded from the Census sample.

Table 6
Migration Patterns, by Household Type

	Probability of Migrating			Destination, Conditional on Migrating		
		95% Confidence Interval			95% Confidence Interval	
	Mean	Lower	Upper	Mean	Lower	Upper
Power couple:						
Small metropolitan area	7.34	5.06	9.62	23.3	17.0	29.6
Midsize metropolitan area	8.01	6.12	9.90	36.4	29.2	43.5
Large metropolitan area	6.20	4.86	7.54	40.3	33.0	47.7
Part-power couple—husband has BA:						
Small metropolitan area	5.67	3.79	7.55	20.0	13.2	26.8
Midsize metropolitan area	9.61	7.23	11.99	39.3	30.9	47.6
Large metropolitan area	4.83	3.45	6.21	40.7	32.3	49.1
Part-power couple—wife has BA:						
Small metropolitan area	4.34	2.31	6.36	25.5	12.6	38.5
Midsize metropolitan area	4.24	2.20	6.29	42.6	27.9	57.2
Large metropolitan area	3.20	1.70	4.69	31.9	18.1	45.7
Low-power couple:						
Small metropolitan area	3.22	2.74	3.71	36.9	32.7	41.2
Midsize metropolitan area	4.29	3.70	4.89	37.7	33.5	42.0
Large metropolitan area	2.69	2.26	3.11	25.3	21.5	29.2
Single power men:						
Small metropolitan area	17.43	12.36	22.51	23.7	16.3	31.0
Midsize metropolitan area	12.35	9.13	15.56	33.6	25.4	41.8
Large metropolitan area	5.66	4.09	7.24	42.7	34.2	51.3
Single power women:						
Small metropolitan area	16.85	12.43	21.26	22.2	15.9	28.5
Midsize metropolitan area	10.55	8.08	13.02	38.0	30.7	45.4
Large metropolitan area	6.24	4.80	7.68	39.8	32.4	47.2
Single low-power men:						
Small metropolitan area	8.14	6.88	9.41	33.2	28.4	37.9
Midsize metropolitan area	5.27	4.34	6.20	31.1	26.4	35.7
Large metropolitan area	4.65	4.01	5.30	35.8	30.9	40.6
Single low-power women:						
Small metropolitan area	6.32	5.37	7.28	28.0	23.9	32.1
Midsize metropolitan area	3.96	3.37	4.54	35.7	31.6	40.1
Large metropolitan area	2.59	2.25	2.93	36.3	31.9	40.7

NOTE.—Annual migration rates from 1970 to 1996 estimated from PSID sample. The estimates assume that the migration rates for each category remain constant for 1970–96, but when we split the PSID sample into the 3 decades, we find no significant differences in the migration rates of power couples between the 1970s and 1980s nor between the 1970s and 1990s. Couples include those who are observed married or cohabiting in year 1 and year 2. Singles are also limited to those who did not change marital status during the year. Large metropolitan areas are those with at least a 2 million population, midsize metropolitan areas have populations between 250,000 and 2 million, and smaller metropolitan areas and counties that are not contained in a metropolitan area are included in the final category. Power couples are those in which both spouses have completed at least 4 years of college or hold college degrees, part-power couples include only one spouse with a college education, low-power couples are those in which neither spouse has a college degree. Couples are limited to those in which the wife was 23–37 years of age and the husband was 25–39 years of age. Singles fall into the same age categories.

dence of a revealed preference for large MSAs among power couples. The average rate of migration of power couples living in large MSAs is lower than the rates of those living in medium and small MSAs, although the differences are not statistically significant. Among migrants, power couples are more likely to migrate to medium and large MSAs than to small MSAs. These trends, however, are not limited to power couples and may simply reflect a general preference for large urban areas. For every group considered, migration rates of those in the large areas are lower than the rates of those in small areas, and this difference is much larger, and statistically significant, for single power men and women. An unmarried man or woman with a college degree is much more likely to migrate from a small MSA than a power couple. Conditional on migration, single power men and single power women are also more likely to migrate to large MSAs than small MSAs, as are part-power couples in which the husband has a college degree. Low-power couples are more likely to migrate to smaller areas than larger, and there is no statistically significant difference among the destination choices of part-power couples in which the wife has a college degree. The data suggest a revealed preference for large urban areas among college-educated singles and among all couples in which the husband is college educated. Again we see the need to distinguish between the two types of part-power couples, those in which the husband is college educated and those in which the wife is college educated.

B. Education by City Size

The proportion of power couples in large MSAs may have increased simply because individuals living in large MSAs have a greater incentive to invest in human capital than those living in small MSAs.[15] The wage premium that is earned by workers in large urban areas may be a compensating differential to offset higher living costs and urban disamenities but must also be due in part to higher productivity of workers in MSAs. Without higher productivity, it is difficult to explain why firms are willing to locate in these high-wage areas. The causes of this higher productivity may lie in the ability of MSAs to attract more able workers or because MSAs create more productive workers by inducing human capital accumulation and labor-market matching. Glaeser and Maré (2001) investigate this question using a variety of data sources and argue that the urban wage premium is due to a combination of wage-level effects and wage-growth effects. They find that recent migrants to MSAs do experience real wage gains but that the wage premium is highest for long-term residents of MSAs. Thus many of the urban wage gains accrue over

[15] Glaeser (1999) suggests that urban density may increase interactions with highly skilled role models and facilitate coordination, thus increasing the demand for human capital.

Table 7
Percent of Population Who Have a High School Diploma but Not a College Degree Who Are Enrolled in Credit Education

	1980	1990	2000	% Change 1980–90	% Change 1990–2000
Married men:					
Non-MSA or MSA fewer than 1 million	5.6	6.3	6.6	11.8	5.4
MSA population between 1 and 2 million	8.5	8.3	8.9	−2.1	6.6
MSA population over 2 million	8.2	9.0	8.2	9.8	−8.6
Married women:					
Non-MSA or MSA fewer than 1 million	5.0	8.0	7.8	58.8	−2.6
MSA population between 1 and 2 million	6.8	9.1	8.5	34.1	−6.8
MSA population over 2 million	7.1	10.0	9.5	40.5	−4.9
Unmarried men:					
Non-MSA or MSA fewer than 1 million	10.0	9.7	12.2	−2.9	25.4
MSA population between 1 and 2 million	12.2	11.4	14.3	−6.3	25.1
MSA population over 2 million	12.9	13.3	16.1	3.3	20.5
Unmarried women:					
Non-MSA or MSA fewer than 1 million	11.5	13.9	15.3	21.5	9.7
MSA population between 1 and 2 million	14.6	14.9	16.7	1.8	12.6
MSA population over 2 million	14.7	16.8	19.1	13.9	13.6

NOTE.—Calculated by authors using the Census integrated public use census samples (Ruggles et al. 2004).

time as urban workers accumulate more human capital and benefit from the better coordination of urban labor markets.

Table 7, which shows the proportion of high school graduates without college degrees currently enrolled in higher education, is consistent with this hypothesis. These data are from the integrated public use samples (IPUMS) of the U.S. Census for 1980, 1990, and 2000. The IPUMS samples are 1-in-100 national random samples of the U.S. population created by the Census Bureau as part of each decennial enumeration (Ruggles et al. 2004). The individual level records of the IPUMS samples include information on age, location, marital status, education, and current education enrollment. The samples also allow the linkage of spousal records enabling us to determine the joint profile of married couples. With a few minor exceptions, the probability of being enrolled in education increases with population size for all groups in each year.[16] For example, in 1990, among married men with high school diplomas, 6.3% of those living in small MSAs were enrolled in credit courses compared to 9.0% of those living in the largest MSAs, those with populations over 5 million.

The differences across city size indicate that the formation of power couples and power singles through educational attainment is more likely

[16] The categories of small, midsize, and large MSAs are different for this table than for the rest of the analyses because the public use files for 2000 do not identify places with populations less than 400,000.

in larger MSAs than in smaller MSAs. Holding marriage and migration constant, an increasing concentration of power couples in large MSAs would occur if the proportion of married individuals in large MSAs who are enrolled in credit education is higher than the proportion of married individuals in smaller areas enrolled in credit education. For both married men and married women, the gap in enrollment rates between the large and small MSAs grew or remained constant between 1980 and 1990 and then fell between 1990 and 2000.

C. Marriage and Divorce by City Size

The relationship between city size and marriage is not straightforward. Edlund (2005) suggests that since large cities attract highly skilled individuals they also attract individuals (i.e., women) who seek to marry highly skilled individuals. Drewianka (2003) argues that marriage rates are affected not by the size of the city itself but by the percentage of the adult population that is single. The effect is twofold. With a relatively large single population, the probability of meeting a potential spouse whose quality exceeds a specified level in a given period of time is higher because people meet potential matches at a faster rate. But the large pool of potential matches also causes marriage market participants to increase their reservation quality level. Drewianka's empirical results suggest that the reservation quality effect dominates such that a 10% increase in the single population lowers the hazard rate for entering marriage between 7% and 10%. Gould and Paserman (2003) find a strong negative relationship between women's marriage rates and the inequality of male wages within an urban area. They argue that higher levels of male wage inequality can explain 25% of the decline in marriage rates between 1970 and 1990. Taken together, these papers suggest a finding similar to that of Robst and McGoldrick (1996) on the relationship between city size and labor market success: it is not the size of the market that is important, but its composition.

The human capital model of migration suggests a link between migration, city size, and marital instability. Increased labor force attachment of wives makes it more likely that the location preferences of spouses will differ, which increases marital instability. This suggests two hypotheses. First, since power couples are more likely to experience colocation problems, they may be more likely to experience marital instability than part-power and low-power couples. Second, since colocation problems are less likely to occur in large labor markets, power couples living in small cities may have more marital breakups than those living in larger cities. Colocation problems may affect the location patterns observable in census data by increasing the relative stability of marriages in larger employment markets rather than by inducing migration.

Table 8
Marriage Patterns, by Size of Area

	Probability of Marrying			Conditional on Marrying, % with College-Educated Spouse		
		95% Confidence Interval			95% Confidence Interval	
	Mean	Lower	Upper	Mean	Lower	Upper
Unmarried men with less than BA:						
Small metropolitan area	14.0	12.5	15.5	9.9	6.3	13.6
Midsize metropolitan area	12.8	11.5	14.1	7.9	4.8	10.9
Large metropolitan area	11.5	10.6	12.4	10.9	8.1	13.8
Unmarried men with BA or more:						
Small metropolitan area	14.2	9.9	18.5	48.8	32.8	64.8
Midsize metropolitan area	14.0	10.9	17.2	51.4	39.4	63.4
Large metropolitan area	12.6	10.5	14.7	61.1	52.7	69.3
Unmarried women with less than BA:						
Small metropolitan area	11.8	10.6	13.0	7.6	4.6	10.7
Midsize metropolitan area	8.6	7.8	9.4	11.8	8.4	15.2
Large metropolitan area	7.6	7.1	8.2	11.7	9.1	14.4
Unmarried women with BA or more:						
Small metropolitan area	11.4	7.9	15.0	61.0	45.4	76.6
Midsize metropolitan area	10.9	8.5	13.3	59.3	48.7	69.9
Large metropolitan area	10.8	9.1	12.5	64.1	56.5	71.7

NOTE.—Annual rates from 1970–96 PSID data. Unmarried individuals are defined as becoming married if they are observed to be legally married or living common-law in year 2.

Mincer (1978) notes that expectations of marital instability reduce the incentives for either spouse to become a tied-mover or tied-stayer, further amplifying marital instability. If we allow for expectations of marital instability, modeling migration as a response to maximizing net family benefits may be less satisfactory than modeling migration as a potentially inefficient bargaining solution to the colocation problem; these issues are more fully explored in Lundberg and Pollak (2003).

The results reported in table 8 suggest that the formation of power and part-power couples through marriage is more likely to occur in large urban areas compared to smaller urban areas. Table 8 shows the probability that an unmarried individual in year 1 will be married in year 2, conditional on the size of the year 2 location.[17] The probability of marriage decreases by city size for low-power singles, but there is no statistically significant difference in marriage rates among power singles of either sex. That is, power singles are just as likely to marry if they live in a large

[17] These are higher than might be expected for the total population because individuals in the sample must have been the head or spouse of a household at some point during the survey years, but this should not bias the comparison across city size.

Table 9
Probability of Marriage Breakup, by Size of Area

	Means	95% Confidence Interval Lower	95% Confidence Interval Upper
Power couple:			
Small metropolitan area	1.95	.75	3.14
Midsize metropolitan area	1.60	.74	2.47
Large metropolitan area	1.27	.65	1.89
Part-power couple:			
Small metropolitan area	2.50	1.53	3.47
Midsize metropolitan area	2.61	1.62	3.60
Large metropolitan area	1.81	1.13	2.49
Low-power couple:			
Small metropolitan area	3.14	2.67	3.62
Midsize metropolitan area	3.77	3.22	4.32
Large metropolitan area	4.01	3.50	4.52

Note.—Annual rates calculated from 1970–96 PSID. Couples are defined as having a marriage breakup if they are no longer married or cohabiting in the second year.

MSA or a small MSA, but low-power singles are more likely to marry in a small MSA. The patterns of assortative mating also suggest that power couples are more likely to be created in large MSAs than in small MSAs. While there is no clear difference in assortative mating patterns for women by city size, there is a more distinct relationship between assortative mating patterns and city size for men: college-educated men living in small and midsize MSAs are as likely to marry a college-educated spouse as a non-college-educated spouse, that is, those that marry are equally likely to create a part-power couple as a power couple. College-educated men living in large MSAs, however, are more likely to marry college-educated women than non-college-educated women, that is, conditional on marrying, the probability of creating a power couple from that marriage is greater than 50%.

Finally, we consider the probability that a couple will divorce by city size. While the confidence intervals on these data are too large to make any definitive statements, the differences in the means shown in table 9 suggest that power couples are less likely to divorce than low-power couples. Furthermore, low-power couples are more likely to divorce if they live in large metropolitan areas than in small MSAs, whereas power couples are more likely to divorce if they live in a small city. These estimates, while not precise, suggest that the stability of power couple marriages may be higher in large MSAs.

VI. The Decline in Power Couple Concentration in 2000

Finally, we extend the time span of the census-based location analysis of Costa and Khan (2000) by using data from the 2000 census, data

Table 10
Proportion of Household Groups Living in MSAs Greater than 2 Million

	1970	1980	1990	2000
Power couple	40.1	43.3	49.7	46.9
Part-power couple	37.1	37.3	40.1	38.2
Part-power, husband has college degree	38.6	40.1	42.6	41.1
Part-power, wife has college degree	35.3	34.9	37.9	37.1
Low power couple	31.2	32.3	31.3	33.5
Single power men	51.3	53.4	55.1	55.5
Single power women	48.5	53.4	54.2	54.6
Single low-power men	38.7	42.3	39.8	40.2
Single low-power women	39.9	44.2	40.8	41.1
All couples in age range	32.9	35.0	35.7	37.3
All single men in age range	40.8	45.4	43.2	44.0
All single women in age range	41.1	46.3	43.9	44.9

Note.—Power couples are those in which both spouses have completed at least 4 years of college or hold college degrees, part-power couples include those couples in which only one spouse has completed at least 4 years of college or holds a college degree, and low-power couples are those in which neither spouse has 4 years of college or a college degree. Couples are limited to legally married couples residing in the same household. For married couples, the sample is limited to those in which the wife was 23–37 years of age and the husband was 25–39 years of age. Singles fall into the same age categories. Calculations by authors using the census integrated public use census samples (Ruggles et al. 2004).

unavailable to Costa and Kahn. Table 10 shows the proportions of power, part-power, and low-power couples living in large MSAs in each of the 4 census years (1970, 1980, 1990, 2000), using the 1990 MSA definitions for all years.

Since our regression results clearly show that the gender of the college-educated spouse matters for migration behavior, we separate part-power couples by which spouse holds a college degree. The data show that the proportions of couples living in large MSAs are lower when the wife is more highly educated than when the husband is more highly educated. The data also show that between 1970 and 1990, the proportion of power couples living in large MSAs increased dramatically, as noted by Costa and Kahn. However, the rising trend in concentration did not continue to 2000. Between 1990 and 2000 the proportion of power couples and part-power couples living in large MSAs declined, while the proportion of low-power couples living in large MSAs increased.

Can either of the two hypotheses put forth to explain the rising concentration of power couples in large MSAs also explain the fall? Trends in women's labor supply did not reverse during this decade: labor force participation of married women remained steady between 1990 and 2000, and the proportion of women in specialized professional occupations increased during the decade.[18] This suggests that the colocation pressure

[18] The labor force participation rate of married women aged 23–55 increased from 43.5% in 1970 to 58.0% in 1980, 70.8% in 1990, and 70.9% in 2000. The labor force participation rates for most subgroups—married women with and

facing power couples did not weaken over this decade. But neither do we see evidence of a weakening of the relative attractiveness of large MSAs for the college educated. The fall in the proportion of power couples living in large MSAs was not mimicked in the category of power singles, and the proportions of both college-educated single men and college-educated single women living in large MSAs increased modestly between 1990 and 2000 (from 55.1 to 55.5 and from 54.2 to 54.6, respectively).

VII. Conclusion

Using census data, Costa and Kahn (2000) show that between 1970 and 1990 couples in which both spouses were college graduates (power couples) were increasingly likely to be located in the largest metropolitan areas. Costa and Kahn argued that these changes in location patterns were driven by the migration of power couples trying to solve their colocation problem—a plausible-sounding hypothesis to anyone familiar with academic job markets.

In this article we investigate the dynamic processes underlying the changes in location patterns found by Costa and Kahn. Using data from the Panel Study of Income Dynamics, we find that power couples are not more likely to migrate to the largest metropolitan areas and are no less likely than other couples to migrate from such areas once they are there. The dynamic processes that appear to contribute most to the observed trends in location patterns include (i) the migration of power singles to large metropolitan areas, (ii) differences in rates of marriage and divorce of men and women with and without college degrees in cities of various sizes, and (iii) differences in the likelihood that individuals acquire additional education in cities of various sizes. The observed trends in location patterns are primarily due to differences in the rates at which power couples form and dissolve in cities of various sizes rather than to the migration of power couples to the largest metropolitan areas.

Our analysis of the PSID migration data hinges on our analysis of the behavior of part-power couples. Unlike Costa and Kahn, who group couples by the number of spouses with a college degree—power, part-power, and low-power couples—we decompose part-power couples into two subcategories: those in which only the husband has a college degree and those in which only the wife has a college degree. We find that couple migration patterns are determined by the husband's education profile, not by the couple's joint education profile. The migration patterns of couples in which both spouses have college degrees look like those of part-power

without young children, married women with and without college education—follow the same pattern, with a slight decline in the LFP rates between 1990 and 2000 for most groups (less than 1 percentage point fall). Calculations by authors using the census integrated public use census samples (Ruggles et al. 2004).

couples in which only the husband has a college degree. The migration patterns of part-power couples in which only the wife has a college degree look like those of low-power couples.

Our conclusion that trends in location patterns are not generated by power couples migrating to solve their colocation problem is strengthened by data from the 2000 census. The 2000 census shows a decline in power couple concentration between 1990 and 2000, a decline that is difficult to reconcile with the colocation hypothesis.

The plausible-sounding hypothesis based on academic job markets is misleading because the typical power couple is not one PhD married to another PhD but a high school teacher married to a nurse. These more typical power couples do not need to locate in New York or Los Angeles to solve their colocation problem. But even when we look at super-power couples we find no support for the colocation hypothesis.

Appendix A

Table A1
Large MSAs (Population over 2 Million)

	1970	1980	1990	2000
New York–Northern New Jersey–Long Island, NY-NJ-CT-PA	18,071,522	17,412,203	17,953,372	19,451,757
Los Angeles–Anaheim–Riverside, CA	9,980,859	11,497,549	14,531,529	16,036,587
Chicago–Gary–Lake County, IL-IN-WI	7,778,948	7,937,290	8,065,633	8,783,199
San Francisco–Oakland–San Jose, CA	4,754,366	5,367,900	6,253,311	6,873,645
Philadelphia–Wilmington–Trenton, PA-NJ-DE-MD	5,749,093	5,680,509	5,899,345	5,661,399
Detroit–Ann Arbor, MI	4,788,369	4,752,764	4,665,236	5,031,963
Washington, DC-MD-VA-WV	3,040,307	3,250,921	3,923,574	4,739,999
Dallas–Fort Worth, TX	2,351,568	2,930,568	3,885,415	4,909,523
Boston-Lawrence-Salem-Lowell-Brocton, MA-NH-ME-CT	3,709,642	3,662,888	3,783,817	4,440,881
Houston-Galveston-Brazoria, TX	2,169,128	3,099,942	3,711,043	4,493,741
Miami–Fort Lauderdale, FL	1,887,892	2,643,766	3,192,582	3,711,102
Atlanta, GA	1,684,200	2,138,136	2,833,511	3,857,097
Cleveland-Akron-Lorain, OH	2,999,811	2,834,062	2,759,823	2,910,616
Seattle-Tacoma, WA	1,836,949	2,093,285	2,559,164	3,023,741
San Diego, CA	1,357,854	1,861,846	2,498,016	2,820,844
Minneapolis–St. Paul, MN-WI	1,981,951	2,137,133	2,464,124	2,872,109
St. Louis, MO-IL	2,429,376	2,376,968	2,444,099	2,569,029
Baltimore, MD	2,089,438	2,199,497	2,382,172	2,491,254
Pittsburgh–Beaver Valley, PA	2,556,029	2,423,311	2,242,798	2,331,336
Phoenix, AZ	971,228	1,509,175	2,122,101	3,013,696
Tampa–St. Petersburg–Clearwater, FL	1,105,553	1,613,600	2,067,959	2,278,169
Denver-Boulder, CO	1,238,273	1,618,461	1,848,319	2,252,103

MSAs are defined as "large" if their population is greater than 2 million in 1990. The analysis here uses the MSA definitions, i.e., county components, from the 1990 definitions.

Appendix B

Table B1
Variable Means

	Nonmigrants		Migrants		Full Sample	
	Mean	SD	Mean	SD	Mean	SD
Sample size	21,317		638		21,955	
Education variables:						
Both spouses have college degree	.110	.312	.223	.416	.113	.316
Only one spouse has a college degree	.151	.358	.215	.411	.153	.360
Only husband has a college degree	.089	.285	.169	.375	.091	.288
Only wife has a college degree	.062	.241	.045	.208	.062	.240
At least one spouse has advanced degree	.079	.269	.161	.368	.081	.273
Both spouses have advanced degrees	.012	.107	.017	.130	.012	.108
Only husband has an advanced degree	.043	.203	.108	.311	.045	.207
Only wife has an advanced degree	.024	.153	.036	.186	.009	.096
Occupation variables:						
Percent of husband's occupation in large MSA	.348	.101	.349	.114	.348	.101
Percent of wife's occupation in large MSA	.316	.103	.303	.109	.316	.103
Both have urban occupation	.079	.270	.083	.277	.079	.270
Only husband in urban occupation	.213	.409	.276	.448	.215	.410
Only wife in urban occupation	.058	.234	.069	.254	.584	.234
Size of origin variables:						
Origin—midsize MSA	.422	.494	.475	.500	.423	.494
Origin—large MSA	.256	.436	.208	.407	.254	.435

Propensity to migrate variables:						
Either spouse living in home state	.798	.401	.448	.498	.788	.409
Head moved previously for a job	.262	.440	.378	.485	.265	.441
Labor force attachment:						
Number of months duration, husband's job	60.31	59.47	49.03	54.56	59.98	59.36
Number of months duration, wife's job	31.05	44.89	15.68	27.73	30.60	44.56
Husband unemployed	.044	.205	.050	.218	.044	.205
Wife unemployed	.029	.169	.042	.201	.030	.170
Husband not in the labor force	.021	.145	.044	.205	.022	.147
Wife not in the labor force	.332	.471	.408	.492	.338	.472
Total family income ($)	44,200	29,206	44,706	27,866	44,214	29,167
Basic demographics:						
Husband aged 25–29	.307	.461	.422	.494	.310	.463
Husband aged 30–34	.398	.489	.364	.481	.397	.489
Wife aged 23–27	.302	.459	.386	.487	.304	.460
Wife aged 28–32	.407	.491	.384	.487	.406	.491
Child aged 0–5 present in household	.563	.496	.539	.499	.562	.496
School aged child present in household	.310	.462	.343	.475	.311	.463
Homeowner	.656	.475	.455	.498	.650	.477
Either spouse nonwhite	.295	.456	.218	.413	.292	.455
Origin MSA attributes:						
Average growth rate of origin MSA	−.076	.124	−.109	.126	−.077	.124
Average housing value in origin MSA	108.74	74.57	120.37	82.27	109.09	74.83
Distance to nearest large MSA (pop. > 2 million)	148.43	170.40	207.28	343.28	150.14	178.07

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