

The Effects of Military Change of Station Moves on Spousal Earnings

Jeremy Burke and Amalia R. Miller

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Preface

The Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy sponsored RAND NDRI assistance to help it assess whether and how frequent Permanent Change of Station (PCS) moves impact military spouse careers. This report documents the extent to which these moves adversely impact spousal earnings and employment.

This research should be of interest to policymakers responsible for programs or oversight of programs supporting military spouse employment and quality of life, as well as scholars who study military spouse issues. It may also interest scholars who study labor economics, family migration and career outcomes, and the gender pay gap.

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For more information on the RAND Forces and Resources Policy Center, see <http://www.rand.org/nsrd/ndri/centers/frp.html> or contact the director (contact information is provided on the web page). Comments or questions on this report should be addressed to the project leaders, Jeremy Burke and Amalia Miller, at jeremyb@rand.org and amiller@rand.org.

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Summary

This report studies how changes in job location for active duty members of the US military affect the earnings of their civilian spouses. Previous research has found that military spouses have lower earnings and employment than people with the same age, sex and education who are married to civilians, and that having experienced more military moves in the past is associated with lower spousal earnings. But military spouses may differ from civilian spouses along other dimensions that also affect their earnings – such as labor force attachment. We investigate the causal impact of military moves on spousal earnings by creating a unique longitudinal database that tracks over 900,000 military spouses over the period 2001-2012, based on data from two administrative sources – military records on personnel and their dependents, and Social Security earnings records. This database allows us to estimate the effects of moves controlling for some key observable characteristics of the member and household. More importantly, because we observe spousal earnings before and after moves, we can estimate regression models that control for unmeasured heterogeneity across spouses that affect earnings.

We find that moves cause a substantial decline in spousal earnings in the year of the move, on the order of \$2,100, or 14% of average spousal earnings. Moves also increase the likelihood that the spouse has no earnings for the year. We find larger effects for moves that cross state lines, consistent with job transition costs being larger for those moves. Older spouses, those with young children, and male spouses experience larger reductions in earnings following PCS moves than their respective counterparts. Importantly, we find persistence to the career costs, as spouses continue to experience significantly lower earnings 2 years after the move. This is especially concerning for the potential of military spouses to accumulate human capital in light of the fact that military members move every two to three years on average. The results indicate that programs and policies that alleviate the job transition costs associated with moves can have a meaningful impact on the financial wellbeing of military families.

Acknowledgments

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Abbreviations

AFQT	Armed Forces Qualification Test
BLS	Bureau of Labor Statistics
DEERS	Defense Enrollment Eligibility Reporting System
DMDC	Defense Manpower Data Center
DoD	Department of Defense
MEF	Master Earnings File
MSEP	Military Spouse Employment Partnership
OLS	Ordinary Least Squares
PCS	Permanent Change of Station
QRMC	Quadrennial Review of Military Compensation
SECO	Spouse Education and Career Opportunities
SSA	Social Security Administration
USDA	United States Department of Agriculture
WEX	Work Experience File

1. Introduction

In the first decade of the 21st century, hundreds of thousands of married individuals served in active duty roles in the US military. These jobs often impose demands, such as deployment to combat zones, that also affect their spouses. Even in peacetime, changes of duty location within the US are a typical feature of military life to which military spouses are forced to adapt.¹ These moves, while necessary for the servicemember’s military career, can present a special challenge for spousal careers.

This report quantifies the empirical impact of military moves on spousal earnings during the 2001-2012 period by measuring deviations in earnings around the time of “permanent change of station” (PCS) moves. PCS moves can impede military spouses who seek to develop and maintain rewarding careers. Because job-specific tenure is an important correlate of long-run employment and earnings, it is natural to expect that moves of this sort would have a detrimental effect on labor market outcomes. After establishing a productive relationship with a specific employer in a specific location, a military spouse will lose their valuable job-specific human capital when they leave a job to follow their husband or wife to a new duty station. The inherently disruptive nature of moving could have negative effects on productivity, thereby lowering wages. Moreover, spouses seeking work in occupations that require state certification or licensing may face employment barriers if their previous credentials are not recognized at their new location.

Previous studies that have considered the question of how PCS moves affect spouses have relied entirely on self-reported career outcomes from survey data and employed a cross-sectional comparison relating current earnings to past moves (e.g., Cooney et al., 2009; Hosek et al., 2002; Cooke and Speirs, 2005). This study is the first to use panel data and estimation approaches. Crucially, this means that we can observe spousal earnings both before and after PCS moves, and we can control for unobservable heterogeneity in spousal earnings. It is also the first to use high-quality administrative data for both spousal career outcomes and military moves. Because our data are drawn from official records, they can include the universe of military spouses (who meet our selection criteria), rather than a limited sample. This leads to large estimation sample sizes that improve the precision of our estimates and provides some additional confidence that our estimates are reflective of the full population of interest (and not affected by survey non-response bias).

¹ As elsewhere in the literature, we use the term “military spouse” to refer to individuals (civilian or military) married to members of the military.

We find that PCS moves result in substantial reductions in spousal earnings. Spouses exposed to a PCS move earn approximately \$2,100 to \$3,700 less in the year of the move than spouses married to a servicemember who does not move, representing a 14 percent to 24 percent reduction in average earnings. PCS moves that cross state lines result in larger reductions in earnings, approximately \$4,200 on average, consistent with job transition costs being larger for these moves. Older spouses, those with young children, and male spouses experience bigger reductions in earnings following PCS moves than their respective counterparts, suggesting family and life situation have important impacts on how PCS moves influence spouse labor market outcomes. In addition to reducing earnings, PCS moves also result in lower labor force participation – spouses exposed to a PCS move are 4 to 5 percentage points less likely to have any earnings in the year of the move.² Importantly, we find that the impacts of PCS moves are persistent as spouses continue to earn significantly less up to 2 years after a PCS move. This is especially concerning for the potential of military spouses to accumulate human capital in light of the fact the military members move every two to three years on average. Our results suggest that programs designed to mitigate the adverse impacts on spouses careers associated with PCS moves may have meaningful impacts on financial wellbeing of military families by improving current earnings and future retirement security.

Although it seems natural that residential moves imposed exogenously on spouses based on “the needs of the military” could hinder their labor market progress, it is also possible that self-selection of individuals who choose to marry into the military (by marrying a servicemember or staying married to someone who joins the service) makes them a group that is less affected by frequent moves. This could be because of very low levels of labor force attachment, so that wages and wage growth would be low irrespective of moves, or because of selection into specific job types (possibly lower-paying on average) that are easily “portable” from one location to the next. For example, anticipating barriers to working in occupations that require state certification or licensing follow future cross-state PCS moves, spouses may not invest in occupational training in the first place. For these reasons, studying the population of military spouses is particularly interesting because they provide a plausible lower-bound for the short-term effects of moves on career outcomes. Although the impact of moves is likely lower on our population than it would be in the general population, it is worth noting that the self-selection that may apply to military spouses could also be operating for people who marry individuals in other jobs with a high probability of future relocation. In that case, we should expect the impact of moves that we estimate to be more reflective of the impact of moves among the population of movers than the average impact for the general population.

² Because our outcome data are only on earnings, we define participation as having positive earnings for the year; we are not able to identify spouses who were in the labor force but not employed during the year.

The military population is also important to study because of the practical relevance of the question for federal policy. The US Department of Defense (DoD) currently offers several programs to assist military spouses advance their career and educational goals, mainly through the Office of Military Community and Family Policy. Some programs, such as the recently developed Military Spouse Employment Partnership (MSEP) and My Career Advancement Accounts, are partly aimed at addressing residual harms from PCS moves for military spouses by helping them develop more “portable” careers.³ The results of our analysis, conducted for the most part before the broad expansion of these programs, offer substantial support for the concern that PCS moves may be harming spousal careers and indicate a potential value of programs that help military spouses find more portable careers.

Finally, the military setting is attractive because it provides a cleaner setting to study the general issue of family migration and career outcomes. A long literature in economics, sociology and demography studies relationships between career opportunities and location decisions, including many studies of married couples. A key empirical challenge is how to isolate the effect of migration from the effects of other factors, such as labor market opportunities or individual preferences, related to moves. Although previous papers in the broader literature on family migration make use of longitudinal data to control for earnings or employment prior to migration (Mincer, 1978; Jacobsen and Levin, 1997; Taylor, 2007), their estimates may still suffer from bias if wage growth is related to migration through these omitted variables. We address this concern in part by estimating models that allow wage growth to vary based on observable characteristics, but primarily by exploiting the fact that military moves are largely exogenous. Finding an exogenous source of migration in the general population that is not related to labor market opportunities of both partners is extremely challenging. Military changes of station provide a unique setting in which to study this important question as the exact timing and location of the move is externally determined by needs of the military, not by spousal career opportunities.⁴

³ Since October 2010, DoD's My Career Advancement Account Scholarship provides up to \$4,000 in financial tuition and examination assistance for spouses of E1-E5, O1-O2, and W1-W2 active duty members serving on Title 10 orders who are themselves not active duty members serving on Title 10 orders. The scholarships can be used toward associate's degrees, occupational certificates or licenses in portable career fields. Military spouses of servicemembers of any pay grade or status can also access free career and education counseling from DoD's Spouse Education and Career Opportunities (SECO) Call Center the Military OneSource program. For more information about the design and inter-related goals of the SECO program elements, see Gonzalez, Miller and Trail (forthcoming).

⁴ Our approach is similar in spirit to Lleras-Muney (2010), who uses military transfers within the US as an exogenous source of variation to study the effects of air pollution on child health, and Carrell and Zinman (2014), who similarly exploit the random assignment of duty station within the air force to study the effects of payday loan access on job performance.

2. Theory and Related Literature

Family Migration

For several decades, economic research on migration and employment has recognized the importance of family structure. Mincer (1978)'s pioneering study on the topic argued that migration can affect labor market outcomes for both spouses and that couples making such decisions would consider the effects on household earnings rather than earnings for only one spouse.

The model in Mincer (1978) has several implications for migration decisions and much of the literature focuses on studying the determinants of migration. An important feature of these studies is the notion that moves may be undertaken when they improve total household income, even if one of the spouses suffers a wage loss. When a move is made at the expense of one person's labor market opportunities in order to advance their partner's, that person is considered a "tied mover." There is also a concept of a "tied stayer" – a person who doesn't move to a place with better job opportunities because of their spouse's job. While both of these concepts can be important for military spouses, by studying the impact of PCS moves, our analysis is focused on estimating the effects of moves on "tied movers." It is not generally possible to identify the primary or tied mover in the data prospectively, rather than inferring status retrospectively from wage changes around the time of moves. Our setting provides a unique ability to identify the tied mover as the civilian spouse because we focus exclusively on moves induced by changes in military duty location.

One of the major results of this literature is that women are more likely to be tied migrants than men. A common argument is the women's earnings are lower than men's, on average, so have less impact on the total household budget. Based on that reasoning, Mincer (1978) predicts that as spousal income becomes more equal, migration will be less likely, because moves won't always occur whenever it favors the higher earner. On the other hand, when spousal wage opportunities are more positively correlated, the models predict more moving and fewer tied spouses. These predictions are similar to those in Sandell (1977), whose model of family migration decisions is based on maximizing family utility. That paper argues that job opportunities for the husband will affect location decisions more because wives are less likely to work (because of their tastes) and have lowering paying job options. In that paper, the cost of moving for a husband's job is the wife's lost earnings, which means we should expect fewer

moves among dual working couples. Ofek and Merrill (1997) offer a slight variation, where primary earners have more elastic labor supply curves that respond more to wage differences.

It is also possible that families put more weight on the husband's career outcomes, in part because of traditional gender norms. In that case, women would still be tied migrants when their pay represents a substantial portion of family income. The finding in Jacobsen and Levin (2000) that migration decisions respond symmetrically to predicted income gains for the husband or the wife suggests that the family income model may be correct. Even so, after decades of substantial increases in women's labor force participation and education investments, Taylor (2007) still finds that women are twice as likely as men to self-report being tied migrants.

Irrespective of the reason, the fact that women are more likely to be tied migrants has implications for how moves will tend to affect the earnings of men and women. In particular, there will be opposite effects, with moves tending to raise men's earnings and lower women's. In Mincer, being a tied mover lowers employment outcomes because of fewer employment opportunities for spouses at the new location and because of temporary withdrawal from labor market to engage in "nonmarket activity" related to establishing a new household. For spouses who work in careers with wage and skill growth from experience, there are other costs stemming from the interruption of work experience and wage growth progress, and the loss of tenure at the particular job and of job-specific human capital. These career interruptions, or periods out of the workforce (if not necessarily out of the labor market) may be longer for couples moving longer distances and for spouses working occupations that require state level licensure or credentials, such as teaching and nursing (but also including jobs such as child care worker, manicurist, cosmetologist or makeup artist in many states; The rise of state-level occupational licensing regulation since the late 19th century has been documented, for example, in Marks and Law, 2009).⁵

If these costs are disproportionately borne by women, then family migration, especially for the husband's job, may be a factor contributing to the overall gender gap in pay. Sandell (1977) finds empirical support for these ideas using the National Longitudinal Surveys: migrant husbands have relative wage growth and migrant wives have relative wage declines compared to non-migrants. More generally, the estimated effects of moves have been negative for women. Mincer (1978) finds higher unemployment rates of migrant wives at destination with a larger

⁵ The cost of career interruptions for women have extensively documented, mainly in studies estimating the effects of childbearing. Mincer and Ofek (1982)'s early work on the topic using panel data found that married women who exit the labor force tend to return at lower wages, which is attributed to human capital depreciation during the interruption. That paper finds evidence of catch-up, or restoration of wages, which is also found in data for immigrants to the US. However, unlike immigrants, "returnees from the nonmarket" remain at permanently lower levels. This is also found in the panel data evidence in Miller (2011).

negative effect for longer distance moves. Ofek and Merrill (1997) argue that labor immobility is a source of the gender pay gap among married adults based on their finding that the gap is smaller in larger metropolitan areas.⁶ The bulk of the recent literature on the differential effects of migration on earnings confirms the finding of relatively larger costs for wives than husbands, though studies have uncovered heterogeneous effects for different women (McKinnish, 2008). For example, Bailey and Cooke (1998) find no negative effect of migration for childless women with high education, though Boyle et al. (1999) do find negative effects of migration on earnings for wives who are in higher-status occupations than their husbands.

Gender is an important feature of our setting as well. Because the vast majority of the civilian spouses in the data are female, our study of PCS moves on civilian spouse careers will contribute to the broader literature on the sources of gender pay differences in the US. Furthermore, because of our large sample sizes, we are also able to measure effects of PCS moves on male and female spouses separately.

Although our estimation approach is focused on changes in earnings around the time of the move, it is possible that the expectation of future moves also imposes costs on military spouses if it shortens expected duration of jobs and therefore leads to less investment in human capital. This is similar to the model in Mincer and Polachek (1974) in which women's expected drops in labor force attachment after childbearing lead to lower equilibrium wages and wage growth even before motherhood. In addition to the anticipatory effects of childbearing, there are also direct local effects of the labor market disruption when it occurs (as in Miller, 2011).

Hosek et al. (2002) make a similar argument for how PCS moves affect military spouses in particular – that anticipation of future moves might affect career investments and choices. For the general population, McKinnish (2008), provides empirical evidence of the importance of these anticipatory effects in showing that women married to men with education-occupation combinations associated with higher geographic mobility have significantly lower own earnings (if the man is college-educated) and lower labor market participation rates (except for college-educated women married to men without college degrees). The earnings gaps are slightly larger for couples who migrated within the past 5 years, but there are also sizeable and significant for

⁶ Costa and Kahn (QJE, 2000) provide additional support by documenting the trend that “power-couples” (in which both partners are college educated) are increasingly locating in major metropolitan areas. The paper argues that a large share of that trend is driven by the increasing colocation needs of dual earning households (mainly college educated, but also couples with less schooling), though Compton and Pollak (2007) argue that the source of the concentration is that highly educated individuals increasingly value the non-work amenities of large cities and are more likely find mates and marry in cities.

couples with no recent moves. The potential presence of anticipatory effects means that our estimates will only capture a lower-bound on the total impact of PCS moves on spousal earnings.

Because our primary outcome variable is annual earnings, and our main estimation sample includes spouses with positive or zero earnings, the local effects of PCS moves that we measure include both price (wage) and quantity (hours worked per week or weeks worked per year). Tied migration can have direct negative effects on each of these dimensions separately. Migration can lead to lower wage rates by causing spouses to match with new employers and lose the value of their firm-specific skills. Migration can separately reduce hours worked by requiring additional time for home production to manage the relocation or if it takes time for the spouse to find a job at the new location. These two channels can also affect one another, for example, if spouses exit the labor market when they are offered lower wages or if spouses are offered lower wages when they return to paid work after an interruption. Without information on work weeks or hours (the major limitation of SSA data relative to surveys), we are unable to estimate separate effects on these two dimensions. We do, however, consider the role of labor force participation, defined based on earnings (we are unable to distinguish periods of unemployment from periods outside of the labor market). We estimate models using employment (positive earnings) as an outcome and separately estimate our earnings models on the subsample of spouses with positive earnings.

In addition to studying the effects of migration on the earnings of spouses, researchers have also considered the impacts of moves on marital stability. Mincer's original (1977) work documented a strong positive correlation between migration and marriage dissolution (separation or divorce), but noted that causality likely run in both directions, with moves increasing family disruptions and family disruptions increases the chances of moves. In Mincer's discussion, family dissolution occurs before the move, when one spouse suffers private cost from moving (in terms of own earnings) for which the other spouse (whose earnings increase) is not able to compensate. It is also possible for moves to increase divorce rates among couples who move together, if the full impact of the move is not perfectly anticipated in advance.

Military Migration

The military setting provides several advantages to researchers interested in studying family migration in general (high quality data, exogenous timing and location of moves, clear identification of lead and tied migrants),⁷ but it is also of particular interest in its own right. One motivation for studying military moves in particular is the body of work comparing the earnings and employment of military and civilian spouses. Using the Status of Forces Survey and the

⁷ For example, Booth (2003) argued that within the literature on tied migration, military wives are an ideal "quasi-experimental group, because such women represent perhaps the ideal typical tied migrant" (p. 27).

Current Population Survey, Lim et al. (2007) find military spouses earn less, on average, and are less likely to be employed than civilian spouses, even after controlling for age and other demographics, educational attainment, family size and geographic location. Lim and Schulker (2010) similarly find that military spouses are more likely to be under-employed. Other work finds that employed military spouses earn approximately 25% less than their civilian counterparts (Kinskern and Segal, 2011), despite the fact that 84% of military spouses have some college and 35% have a bachelor's or more advanced degree. These measured earnings gaps between military and civilian spouses provide some of the motivation for the policy attention currently directed at military spouses and aimed at improving their career and educational outcomes.

It is natural to suppose that PCS moves contribute to the pay gap between military and civilian spouses. As reported in Hosek et al. (2002), military families are 3 times as likely as civilians to move out-of-county within a year. Prior studies of PCS moves have associated previous moves with lower wages for military spouses, using comparisons to military or civilian populations. For example, Cooney et al. (2011) use data from the 1992 DoD Surveys of Officers and Enlisted Personnel and their Spouses, finding negative effects of geographic mobility on employment outcomes. Hosek et al. (2002) use data from 1988-2000 Current Population Survey March Supplement files and re-weighted the samples to be representative of the active-duty male population. They find military couples are more likely to move and a negative association between past moves and the probability of the wife working or working full-time for both military and civilians. They find no significant association between recent moves and weekly wages (part-time or full-time) for military spouses, conditional on their working. Harrell et al. (2004) use mixed-methods to paint a picture of spousal careers and barriers to labor market participation, analyzing cross-sectional data from the 1990 Census and interviews with over 1,100 military spouses. They report that 1/3 of spouses perceive that frequent moves are harming them in the labor market. Cooke and Spiers (2005) also use the 1990 Census and find strong negative associations between recent migration and employment for both male and female military spouses. More recently, Friedman et al. (2015) analyze data from the 2012 Active Duty Spouse Survey and find that PCS moves are commonly listed by non-working spouses as a reason they are not looking for work.

However, because previous studies of PCS moves have relied entirely on self-reported career outcomes from survey data and employed cross-sectional comparisons relating current earnings to past moves, it is unclear exactly how much PCS moves depress military spousal wages. In particular, there is a concern that military spouses may differ from their civilian counterparts in ways that affect earnings irrespective of moves. Without data on earnings in the years before a move, it is impossible to separate this fixed unobservable heterogeneity from the impact of the

recent moves. Our data allow us to address this limitation and also to study a larger and more comprehensive set of military spouses than have been used previously.

3. Data Description

The data for this study are drawn from administrative military records that are linked with administrative earnings records from the Social Security Administration (SSA). These files have rarely been linked for previous research, and their combination represents a unique opportunity to use administrative sources to study a key segment of the US population. A particular value of the linkage is the unusual ability to match spousal earning records, which enables exploration of the kinds of intra-household labor spillovers central to this analysis.⁸

The military data are from several databases managed by the Defense Manpower Data Center's (DMDC's) Data Analysis and Programs Division including the Defense Enrollment Eligibility Reporting System (DEERS), Work Experience File (WEX), and Active-Duty Pay Files. Starting with the universe of active duty service members, we first restrict our sample to those who are married with a spousal record in the DEERS system.

In addition to identifying military spouses, these data also enable us to identify changes in duty location. We define our key measure of military PCS moves as any change in the duty location of the servicemember that entails a change in the first 3 digits of the zip code and lasts more than 3 months.⁹ We can also identify some basic demographic information about spouses, their age and sex, and more detailed information about the servicemember, including military rank, military compensation, number of children, sex, race, ethnicity, active duty status (which we use for sample inclusion), and score on the Armed Forces Qualification Test (AFQT), which measures reasoning, math, verbal, and reading comprehension abilities. These elements are used to create the main covariates in our estimation models.

Although the military records are extensive, they do not contain information about spousal labor market outcomes or non-military sources of income for servicemembers. Linking the military records to SSA files is what provides a view of labor market outcomes for military

⁸ A pair of recent studies published by RAND in support of the 11th Quadrennial Review of Military Compensation (QRMC) (Heaton et al. 2012, Miller et al. 2012) also used linked military and SSA records to study the effects of combat injuries and fatalities on family and spousal earning and income (including disability or death benefits from SSA, the Department of Defense and the Department of Veterans' Affairs).

⁹ The first 3 digits of a zip code are commonly referred to as the "zip code prefix" and contain information about the state and postal service facility that serves a location. There are fewer than 1000 codes in use (less than a third the number of counties), but they are more concentrated in population centers. Larger cities contain multiple zip code prefix areas. To the extent some of the PCS moves we identify are within labor market commuting areas, and therefore entail lower adjustment costs for households and spousal careers, our estimates will understate the impact of longer moves that span labor market commuting areas.

spouses. In particular, we use annual earnings data from SSA’s Master Earnings File (MEF) for both servicemembers and spouses. The MEF information on annual earnings reported to Social Security includes all sources subject to social security taxes, which includes self-employment earnings. It does exclude some components of military pay that are observable in the military data.

To more cleanly examine impacts of PCS moves on civilian spouse careers, we remove joint active duty military couples from our sample. We also limit our sample to servicemembers located within the United States and exclude periods of deployment or other stationing out of the country. This is another way in which we may understate the total costs of military moves. The benefits of this restriction are the greater comparability of locations before and after moves and reliability of SSA data for measuring total income.

Table 3.1 describes the evolution of our sample. In any given year we observe labor market outcomes and demographic characteristics for over 300,000 civilian spouses. We retain 85 to 87 percent of our sample on a year-over-year basis, with approximately 80 percent of attrition coming from servicemembers’ leaving active duty and the remaining 20 percent from marital dissolution. Yearly sample reductions are roughly offset by new entrants into our data. In total, our dataset contains over 900,000 civilian spouses, whom we observe for just under 5 years on average, yielding over 4.6 million spouse-year observations.

Table 3.1 Sample Evolution

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
New Entrants	335,323	37,104	43,358	42,755	51,344	52,829	58,604	61,706	65,384	54,449	63,652	65,168	9,785	941,461
Exits (From Last Year)	-	50,046	44,623	41,104	44,471	46,260	47,423	48,085	49,030	47,152	49,612	51,784	57,965	577,555
Fraction Exits:														
Transition to Guard/Reserve	-	0.28	0.27	0.24	0.22	0.25	0.26	0.27	0.28	0.25	0.26	0.27	0.29	0.26
Separated from Military		0.53	0.57	0.58	0.55	0.58	0.59	0.58	0.56	0.55	0.54	0.51	0.51	0.56
No longer married or marital status unavailable	-	0.19	0.16	0.18	0.23	0.17	0.15	0.15	0.16	0.2	0.2	0.22	0.2	0.18
Obs	335,323	322,381	321,116	322,767	329,640	336,209	347,390	361,011	377,365	384,662	398,702	412,086	363,906	4,612,558

Table 3.2 summarizes the demographic characteristics of our sample. While our data have high quality information regarding spousal labor market outcomes, we have limited spousal

demographic information; we are only able to observe age and gender. Average spousal age in our sample is 30 years old and our sample is predominately female (93 percent). Based on our data on dependents, we observe that roughly two-thirds of households in our sample have children under the age of 18 and over 40 percent have children under the age of 6.

Our data are more complete about servicemembers and we control for several of their characteristics in the analysis. The average age of servicemembers in our sample is approximately 31 years old. More than a third of servicemembers in our sample serve in the Army (37 percent), while a quarter of our sample serves in the Air Force (26 percent) and another quarter serves in the Navy (25 percent). Nearly 80 percent of servicemembers in our sample are enlisted service personnel, while the balance of our sample is commissioned officers. Average AFQT percentile in our sample (62nd percentile) is near the universal median, though we are missing AFQT score for a quarter of our sample (including all individuals who entered the military prior to 1987, the earliest date at which we can observe servicemember characteristics). A little less than three-quarters of servicemembers are white, and approximately one-third has attended at least some college.¹⁰

In addition to data from military administrative records and SSA, we also merged in location information to account for local employment market characteristics. In particular, we used United States Department of Agricultural (USDA) data to classify census tracts as metropolitan areas and Bureau of Labor Statistics (BLS) data to incorporate state level unemployment characteristics.¹¹ Over 80 percent of our sample observations reside in a metropolitan location and average state level unemployment is approximately 6 percent.

Table 3.2 Sample Demographic Characteristics

Variable	MEAN	STD
Spouse Characteristics:		
Age Spouse	30.31	8.195
% Spouse Female	0.93	0.247
Family Characteristics:		
% Children under 6	0.42	0.493

¹⁰ Our regression analyses use more detailed information on race and educational characteristics as described in the appendix. We did not include information on military occupation in the regression analysis because of limits on the analysis at SSA to protect confidentiality and avoid small cell sizes. Our main models do control for spouse fixed effects, which will absorb the variation in occupation across servicemembers.

¹¹ Metropolitan core areas have total population of 50,000 or higher and we include surrounding areas with significant commuting flows (over 10% or higher) into the core as part of the metropolitan area. We control for city size as a proxy for the variety of labor market opportunities in the area, including military and civilian options (Booth, 2003; Hosek et al., 2002).

# Children under 6	0.57	0.772
% Children 6 - 18	0.41	0.492
# Children 6 - 18	0.74	1.058
% Children 0 - 18	0.67	0.472
# Children 0 - 18	1.31	1.230
Servicemember Characteristics:		
Age	30.75	7.766
Service: Army	0.37	0.483
Service: Navy	0.25	0.431
Service: Air Force	0.26	0.438
Service: Marines	0.12	0.331
Pay Grade: Enlisted	0.78	0.415
Pay Grade: Officer	0.21	0.405
AFQT Percentile	0.62	0.204
AFQT Missing	0.25	0.435
Race White	0.72	0.448
Some college or more	0.33	0.470
Location Characteristics:		
Metropolitan	0.84	0.363
Unemployment	0.06	0.023
N	4,612,558	

Table 3.3 describes the earning characteristics of our sample. Approximately two-thirds of spouses in our sample are employed (measured by positive earnings in the year) and average annual spousal earnings is approximately \$15,300. Among actively employed spouses, average annual earnings are slightly less than \$23,000. Servicemembers in our sample earn considerably more, with average SSA earnings of \$43,000. Social Security earnings, however, do not measure the total compensation servicemembers in our sample receive. On average, total servicemember pay exceeds \$55,000.¹²

This gap in earnings favoring servicemembers suggest that the spouses are more likely to be tied migrants, if families are maximizing total income when they make migration decisions. For the moves that we study, the spouse will, by definition, be a tied migrant if they follow the servicemember to the new duty location. It is also possible for spouses to live separately from the servicemember and possibly join them to the new location at a later date. Although data on spousal location are available, we focus our analysis on PCS moves, irrespective of spousal moves. The main reason is that the decision to follow (and when) is endogenous and may be

¹² All earnings data have been adjusted for inflation and indexed to 2013 dollars.

related to career outcomes for the spouse. The secondary reason is that PCS moves are the policy-relevant variable: PCS moves are set by the military, but the military does not control spousal location decisions. Therefore, our estimates should be interpreted as the effect of a PCS move for the member, allowing spouses to make the best accommodation in terms of timing and location, which may lead to smaller estimated effects of moves compared to an approach that focused on moves in which the spouse followed immediately.

Table 3.3 Sample Earnings Characteristics

Variable	MEAN	STD
Spouse Earnings	\$15,301.19	23,678.08
% Spouse Earnings > 0	0.67	0.47
Spouse Earnings if > 0	\$22,811.52	25,778.20
% Spouse Earnings > \$1,000	0.63	0.48
Servicemember SSA Earnings	\$43,452.69	24,446.20
Servicemember Total Pay	\$55,366.62	31,867.83
N	4,612,558	

Note: Earnings data have been adjusted for inflation and indexed to 2013 dollars.

Table 3.4 documents the incidence of PCS moves in our sample, the source of variation we leverage to estimate causal impacts on spouse careers and earnings. Approximately a quarter of servicemembers (and by extension spouses) experience a PCS move in each year of our data. On average, servicemembers move about once every 2 years, consistent with findings from previous literature (Cooney et al., 2011, report an average move about once every two to three years). The majority of those who experience a PCS move in a calendar year move only once, though a sizeable fraction (approximately one-third) of PCS moves occur within 12 months of a previous move in our data. Similarly, the majority of PCS moves experienced by our sample are interstate moves.

Table 3.4 PCS Moves Incidence

Variable	MEAN	STD
% PCS Moves in Year	0.26	0.438
# PCS Moves in Year	0.29	0.520
% Interstate Moves in Year	0.23	0.421
# Interstate Moves in Year	0.25	0.484
N	4,612,558	

4. Estimation Approach

Unlike much of the literature on military moves, our interest is not in comparing military spouses to civilian spouses, but in comparing outcomes among military spouses. Our estimation sample is limited to spouses of active duty servicemembers whose duty locations are in the US.

We measure the effect of PCS moves on civilian spouse labor market outcomes by estimating the following model using ordinary least squares (OLS):

$$Y_{it} = \beta_0 + \beta_1 PCS_{it} + X_{it} \beta_2 + \theta_i + \gamma_t + \varepsilon_{it} \quad (1)$$

where Y_{it} represents spouse i 's annual Medicare earnings in year t . Our key variable of interest PCS_{it} is an indicator variable taking on a value of 1 if spouse i is exposed to a PCS move in year t . The vector X_{it} contains spouse, servicemember, household, and location characteristics such as ages, number of children in the household, and state unemployment rates.

In our main models, we also control for unobserved time-invariant spouse characteristics using spouse fixed effects, θ_i , and year fixed effects through γ_t . The inclusion of these fixed effects mean that our regression coefficients can be interpreted as difference-in-differences estimates that compare the changes in spousal labor market outcomes in the years surrounding a PCS move to the counterfactual changes that would have been expected if the household had not had a PCS move. Spouses of servicemembers, with similar values of the control variables, who did not themselves experience a PCS move in that same time period, are used to compute the counterfactuals.¹³ Our extended models also allow some of the observable variables to affect earnings growth over time as well as levels, which we accomplish by interacting the variables for spouse gender and servicemember AFQT score, education, and ethnicity with the linear age variable. To the extent that these factors are related to rates of ongoing human capital and labor market investments, they will predict different slopes for the spouse's age-earnings profile. We also examine if the estimates are sensitive to including or excluding key control variables. We cluster our standard errors at the spouse level to account for serial correlation, which can arise

¹³ This basic specification draws on spouses with recent PCS moves (one or two years prior to the current year) as part of the control group. Table 5.3 reports results from an extended model that also controls for effects of moves one or two years earlier, removing those spouse-year observations from the control group. Among spouses who ever appear in our data, 35.75% are never observed in a year with a PCS move.

from persistent but not permanent earnings shocks (that are correlated over time but not absorbed in the individual fixed effects).

As described above, we use yearly variation in spouses' exposure to PCS moves to estimate within-year impacts on earnings and employment. In additional specifications, we also examine how exposure to PCS moves in the recent past influences current labor market outcomes. In particular, we are interested in measuring if the earnings effect of a PCS moves is limited to the immediate period following the move or if it persists for longer. The disruption associated with a PCS move could easily lead to a temporary decline in earnings from a disruption in labor force participation, but the duration of the earnings effect will depend on the extent to which the spouse is able to recover from the disruption and to make up for any loss of human capital or wage growth related to the disruption. Spouses with employers who can transfer them to a job at another geographic location or to virtual employment status may have shorter disruptions, but even they may suffer from lower earnings or slower earnings growth because of the lost value of firm-location specific human capital or because virtual work is not a perfect substitute for on-site status. We therefore estimate models that include separate effects of PCS moves in the year of the move and in each of the subsequent two years. These results allow us to distinguish immediate effects of moves from longer-term effects, and to test for a recovery in earnings after an initial transition period. We also estimate models that incorporate potential anticipatory effects in the two years preceding PCS moves.

In addition to estimating the overall effects, we also explore heterogeneous impacts. These are motivated in part by the literature on family migration that finds varying effects on wives' income based on family situation (e.g., Cooke, 2001, found only very brief reductions in employment from migration for non-mothers but large and enduring effects for women with children). In particular, we examine whether younger spouses, those with young children, spouses of enlisted servicemembers, and female spouses are differentially impacted by PCS moves. We also investigate whether there are heterogeneous impacts based on the branch of service to which a spouse is tied. Examining heterogeneous impacts provides important insights into who is most affected by PCS moves. This may provide policymakers with insights into how scarce resources can be most effectively distributed to mitigate any adverse impacts on spousal careers.

5. Empirical Results

Table 5.1 presents our full sample results, including spouses with positive or zero earnings. Estimates from the sample of spouses with positive earnings are in Table 5.2. Earnings variables have been adjusted for inflation and indexed to 2013 dollars. Standard errors, clustered at the spouse level, are reported in parentheses below the coefficient estimates. All estimates are statistically significant at the 1 percent level.

Column 1 shows that, without controlling for any other covariates, experiencing a PCS move is associated with an approximately \$3,700 reduction in same year earnings, equivalent to 24 percent reduction of the sample mean. Column 2 adds year fixed effects, which has only a minor impact on our coefficient of interest. Column 3 examines the impacts of interstate moves, finding that spouses exposed to a PCS move across state lines experience larger losses in earnings – interstate PCS moves are associated with a \$4,200 reduction in wages, approximately 27 percent of the sample mean. This finding is consistent with results from prior work suggesting that longer distance moves have higher job transition costs, particularly for tied movers (Mincer 1978).

Column 4 adds spouse fixed effects to the model estimated in Column 2. The addition of spouse fixed effects reduces the point estimate on our PCS moves variable by approximately 40%, indicating that PCS moves are not randomly assigned across individuals. Instead, a substantial decline in the magnitude of the estimated effect of PCS moves implies that unobserved time-invariant spouse characteristics, such as natural ability or preferences for paid work, are important factors influencing spouse labor market outcomes that are also correlated with the incidence of PCS moves. Our preferred approach is therefore to control for spouse fixed effects, which allows for the possibility that individuals vary in their frequency of PCS moves in way that are correlated with pre-move spousal earnings. The model instead requires the weaker assumption that, for a given servicemember, the precise timing of PCS moves is unrelated to changes in their spousal labor market outcomes. After controlling for spouse fixed effects, PCS moves are associated with a \$2,100 reduction in same year earnings, equivalent to a 14 percent reduction of the sample mean.

Column 5 adds time-varying control variables to the model estimated in column 4. Older spouses (and those married to older servicemembers) tend to have higher earnings, with each year of own age being associated with a \$338 increase in annual income. Interestingly, spousal income tends to decline as servicemember income increases, holding everything else constant, and spouses of enlisted personnel earn more than spouses of commissioned officers on average.

This finding indicates that military marriages are not an area with significant assortative mating, at least not in terms of realized labor market earnings. However, there may still be matching based on potential earnings, but that effect may be overwhelmed by the negative effect of higher servicemember earnings on spousal labor force participation. Indeed, Hosek et al. (2002) find that labor force participation declines faster (with more years of military experience) for spouses with a college education “most of whom are officers’ wives.” They write that “the decline may reflect the selective departure of families with wives who have a stronger interest in the labor market. It may also reflect the withdrawal of military wives from the labor market in order to take on service-related volunteer activities or personal nonwork activities” (pp. xiii-xiv).

Similar to the pattern in the general female population, military spouses in households with children earn considerably less than their peers without children.¹⁴ Each child under the age of 6 is associated with a \$3,200 reduction in annual income, while children between the ages of 6 and 18 are associated with a \$1,200 income drop. Local labor market conditions also play an important role – a one percentage point increase in the unemployment rate is associated with a small, but statistically significant, decrease in annual income of approximately \$50 dollars. Further, spouses residing in non-metropolitan areas earn approximately \$700 less than their peers located in larger labor markets. This stands in contrast to Hosek et al. (2002), who also look at location of residence, but find little difference in earnings of military wives between urban, suburban and rural areas, and may reflect an increasing importance of location over time.

Column 6 introduces time-invariant covariates through interactions with the spouse age variable. Interestingly, female spouse earnings grow more slowly than their male counterparts by approximately \$300 per year. Spouses earnings decrease with increases in servicemember AFQT score, though the effect is quite small – a one percentile increase in AFQT score ranking is only associated with a \$2 reduction in income. Spouses of service members with missing AFQT scores, predominately those who entered the service prior to 1987, earn slightly less than spouses of servicemembers who entered the service later.

¹⁴ This “family gap” in pay between mothers and non-mothers has been documented extensively in the literature (e.g., Miller, 2011). For men, the evidence points to a fatherhood premium or no effect (Kunze, 2014). Our sample is 93% female.

Table 5.1 Impact of PCS Moves on Earnings

VARIABLES	Spousal Earnings	Spousal Earnings	Spousal Earnings	Spousal Earnings	Spousal Earnings	Spousal Earnings
PCS Move in Yr	-3,716.21 (25.10)	-3,685.62 (24.24)		-2,129.23 (14.70)	-2,057.90 (14.59)	-2,068.50 (14.59)
PCS Moves in Yr (Interstate)			-4,226.35 (25.01)			
Spouse Age					338.19 (12.63)	772.46 (16.66)
Member Age					679.68 (14.26)	778.26 (14.46)
Member Total Pay					-0.03 (0.00)	-0.02 (0.00)
Member SSA Pay					-0.04 (0.00)	-0.04 (0.00)
Paygrade Enlisted					1,713.1 (73.89)	1,692.6 (76.44)
# Child < 6 yrs					-3,175.19 (13.25)	-3,238.97 (13.34)
# Child 6 - 18 yrs					-1,190.35 (14.87)	-1,288.74 (15.09)
Unemployment End Location					-51.70 (6.85)	-55.39 (6.85)
End Location Not Metropolitan					-676.57 (26.39)	-686.46 (26.37)
Spouse Female X Age						-334.60 (9.13)
AFQT Percentile X Age						-1.66 (0.10)
AFQT Missing X Age						-286.22 (8.47)
Constant	16,264 (12.77)	18,313 (38.94)	18,281 (38.81)			
Includes Year Fixed Effects?	No	Yes	Yes	Yes	Yes	Yes
Includes Spouse Fixed Effects?	No	No	No	Yes	Yes	Yes
Observations	4,612,558	4,612,558	4,612,558	4,612,558	4,612,558	4,612,558

Note: All point estimates are significant at the 1% level. Standard errors, clustered at the spouse level, are in parentheses. Earnings data have been adjusted for inflation and indexed to 2013 dollars. Spouses with zero earnings are included in the sample.

In addition to examining how PCS moves affect spousal earnings, we also examine their impact on spousal labor market participation. Table 5.2 presents results on employment, where we define a spouse to be participating in the labor market if she or he has positive earnings for the year. Column 1 indicates that spouses who are exposed to a PCS move are approximately four percentage points less likely to be employed in the year of the move, a relatively large contemporaneous effect. Defining employment slightly differently, as earning at least \$1,000 in the year, yields relatively similar results as PCS moves are associated with a 5 percent reduction in labor market participation under this specification.

Table 5.2 also examines earnings impacts when limiting the sample to spouses who are actively employed (have positive earnings for the year). Column 3, which examines how log of spouse earnings is affected by a PCS move, indicates that among those actively in the labor force, PCS moves are associated with a 28 percent reduction in earnings. Column 4 uses the same sample of spouses to examine impacts in a linear specification and finds that PCS moves are associated with a \$4,200 reduction in earnings, approximately 18 percent of the sample mean. Column 5 adds covariates and spouse fixed effects to the model estimated in Column 4 and finds that, after controlling for unobserved time-invariant spouse characteristics, PCS moves are associated with a \$3,100 reduction in same year earnings for employed spouses, roughly 14 percent of the sample mean.

Table 5.2 Impact of PCS Moves on Employment and Earnings for Workers

VARIABLES	Spouse Earnings > \$0	Spouse Earnings > \$1000	Log Spousal Earnings	Spouse Earnings (if > \$0)	Spouse Earnings (if > \$0)
PCS Move in Yr	-0.04 (0.00)	-0.05 (0.00)	-0.28 (0.00)	-4,200.87 (33.32)	-3,127.75 (20.69)
Spouse Age	-	-	-		294.63 (15.14)
Member Age					732.12 (18.80)
Member Total Pay					-0.02 (0.00)
Member SSA Pay					-0.02 (0.00)
Paygrade Enlisted					1,684.82 (112.99)
# Child < 6 yrs					-2,158.51 (21.18)
# Child 6 - 18 yrs					-844.12 (21.79)
Unemployment End Location					37.13 (10.03)
End Location Not Metropolitan					-917.23 (39.12)
Constant	0.75 (0.00)	0.71 (0.00)	9.56 (0.00)	24,500 (46.23)	
Includes Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Includes Spouse Fixed Effects?	No	No	No	No	Yes
Includes Member Education?	No	No	No	No	No
Includes Member Race?	No	No	No	No	No
Observations	4,612,558	4,612,558	3,093,947	3,093,947	3,093,947

Note: All point estimates are significant at the 1% level. Standard errors, clustered at the spouse level, are in parentheses. Earnings data have been adjusted for inflation and indexed to 2013 dollars. Spouses with zero earnings are included in the sample in the first two columns.

Previous research covering the general population has found negative effects of migration on wives' employment that dissipate within a few years (Clark and Withers 2002; Spitze 1984). Table 5.3 examines whether the adverse earnings impacts associated with PCS moves in our sample persist over time. Without controlling for other covariates or spouse fixed effects, we find that spouses exposed to a move continue to have significantly lower earnings several years

after the event. Column 1 indicates that even two calendar years afterwards, spouses exposed to a PCS move earn \$1,700 less than their peers who are not exposed to a move. Column 2 shows (as in Table 5.1, Column 4) the estimated effects of PCS moves are considerably mitigated after controlling for spouse fixed effects, but they do not disappear. Spouses experiencing a PCS move earn approximately \$2,550 less (17 percent of the sample mean) in the year of the move, \$1,250 (8 percent of the sample mean) less one year afterwards and approximately \$450 (3 percent of the sample mean) less two years afterwards. The sum of the earnings losses over the three year period including the year of the move and the 2 following years amounts to \$4,242.34 (ignoring any discounting over time or interest).

Table 5.3 Persistent Effects of PCS Moves

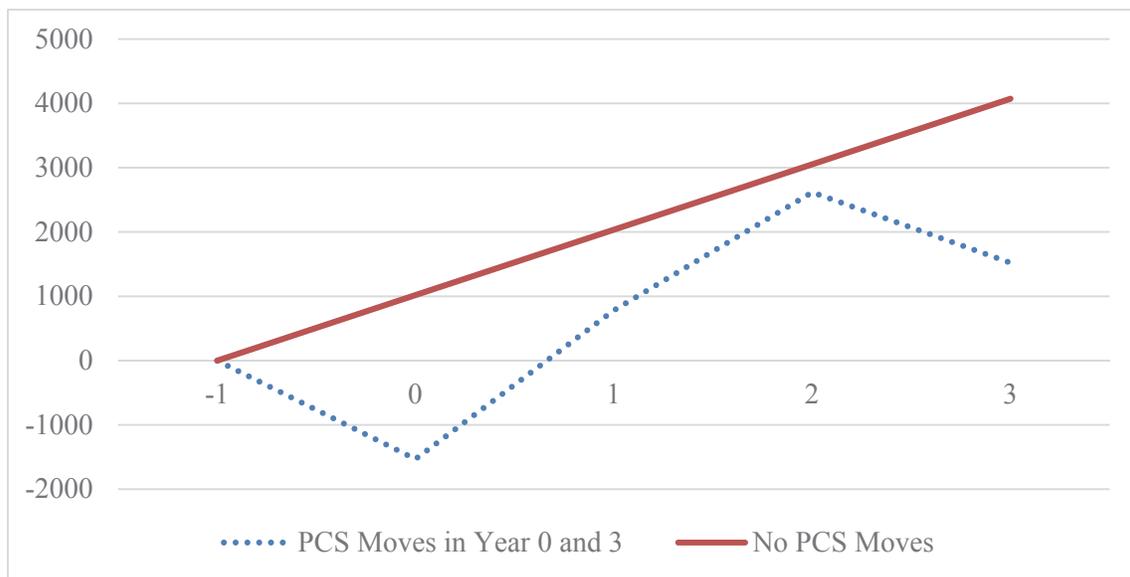
VARIABLES	Spousal Earnings	Spousal Earnings	Spousal Earnings	Spousal Earnings
PCS Move in Yr	-3,892.52 (33.82)	-2,550.86 (19.41)	-3,308.20 (28.70)	-1,944.57 (17.55)
PCS Move 1 Yr Prior	-2,388.84 (34.52)	-1,253.38 (18.96)		
PCS Move 2 Yr Prior	-1,720.62 (32.49)	-437.64 (18.21)		
PCS Move 1 Yr Forward			-729.95 (30.74)	376.46 (18.32)
PCS Move 2 Yr Forward			-907.88 (31.39)	89.54 (18.44)
Constant	19,942 (58.60)		17,961 (48.57)	
Includes Year Fixed Effects?	Yes	Yes	Yes	Yes
Includes Spouse Fixed Effects?	No	Yes	No	Yes
Includes Member Education?	No	No	No	No
Includes Member Race?	No	No	No	No
Observations	2,917,695	2,917,695	3,362,148	3,362,148

Note: All point estimates are significant at the 1% level. Standard errors, clustered at the spouse level, are in parentheses. Earnings data have been adjusted for inflation and indexed to 2013 dollars. Sample sizes are smaller than in Table 5.1 because the inclusion of moves in prior or future years reduces the number of years of observations. Spouses with zero earnings are included in the sample.

Although the effects of a move are consistently negative over the three year period, it is important to recall that these effects apply against a backdrop of substantial predicted earnings

growth over time. In particular, the estimates in Table 5.1 for spousal age (338.19) and servicemember age (679.68) imply annual income growth of \$1,017.87 for years without PCS moves (holding all other control variables constant). Figure 5.1 shows how these two forces interact to generate a saw-tooth pattern in the predicted earnings profile over time. The figure shows earnings growth profiles relative to a fixed year without a PCS move (year = -1). The dotted blue line represents individuals who experience PCS moves in years zero and 3 and the solid red line is for individuals with no PCS moves over the 5 year period. Movers experience a drop in earnings in the year of their move, both relative to their own pre-move earnings and relative to individuals without PCS moves. Over the next two calendar years, earnings for those with a PCS move in year zero slowly recover relative to the earnings of individuals without such moves. The figure then shows the impact of the second PCS move, in year 3, which further lowers earnings below the levels of non-movers (and below own earnings in year 2, but above own earnings in year -1).

Figure 5.1 Effects of Repeated PCS Moves on Earnings Growth over Time



Note: Each line depicts the growth in earnings relative to year -1 based on the coefficients on spouse age and servicemember age from Column 5 of Table 5.1 and the coefficients on PCS moves in the current and past 2 calendar years from Column 2 of Table 5.3. The dotted blue line shows the case for an individual with PCS moves in years zero and 3; the solid red line shows the case with no PCS moves over the 5 year period.

Columns 3 and 4 of Table 5.3 examine whether there are any near-term anticipatory effects on spouse earnings associated with future PCS moves. Without controlling for spouse fixed effects (Column 3), our regression results indicate that spouses who will experience a PCS move

in the coming years earn less than their peers who will not be exposed to a move. Although they may in theory capture anticipatory effects of future moves, the large magnitude of the effect 2 calendar years in advance is more likely an indication that PCS moves are not exogenous across individuals in the sample, and that spouses with more frequent PCS moves also tend to have lower average earnings. This is confirmed in Column 4. When spouse fixed effects are added to the model, there is no evidence of negative impacts prior to PCS moves: the point estimates are both positive and small. This suggests that the negative impacts identified in Column 3 are due to omitted variable bias, coming from unobserved heterogeneity within our sample between spouses who move more or less frequently. The comparison between Columns 3 and 4 of Table 5.3 therefore shows that spouses who move more often have lower earnings in all years they are observed, while the estimates in Column 2 show that they also experience significant drops in earnings following each move.

The earnings impact of a PCS move likely varies across spouses based on their personal characteristics and family composition. Table 5.4 explores whether spouses younger than 30 years old (the average age in our sample), wives, spouses with children under 6 years of age, and spouses of enlisted servicemembers experience larger or smaller drops in earnings following PCS moves than their respective counterparts. Column 1 shows that younger spouses experience a roughly 50 percent smaller decline in earnings following a PCS move than older spouses (\$1,500 reduction vs. \$2,800 reduction), suggesting older spouses have more difficulty (or less interest) in replacing wages following a PCS move.¹⁵

While females in our sample earn less than their male counterparts (about \$13,070 less; in an unreported regression) and experience slower earnings growth (see Table 5.1), interestingly they are not as adversely impacted by PCS moves as male spouses in terms of total earnings losses. Specifically, Column 2 indicates that following a PCS move, earnings decrease by approximately \$2,000 for military wives while earnings decrease by approximately \$3,200 on average for military husbands. Although the dollar value of the earnings loss is larger for husbands, the loss as a proportion of average earnings is actually higher for wives: female spouses in our sample earn on average 56% of male spousal earnings, but their average PCS-related earnings losses represent 64% of the average PCS-related earnings loss for male spouses. This difference implies that female spouses spend more time out of the labor force or suffer larger declines in wage rates following PCS moves or both.

Unsurprisingly, spouses in households with young children see larger drops in income following PCS moves than spouses without young children. On average, wages drop nearly

¹⁵ Spouses over the age of 30 in our sample are less likely than spouses under the age of 30 to have young children (under the age of 6), but are more likely to have children under the age of 18.

twice as much for spouses with children under 6 compared with spouses without young children (\$2,600 reduction vs. \$1,350 reduction), consistent with job transition costs being larger for households in need of childcare. Spouses of enlisted personnel experience smaller drops in total earnings than spouses of officers following a PCS move, with spouses of enlisted servicemembers experiencing a roughly \$1,900 reduction in earnings and spouses of officers experiencing an approximate \$2,700 earnings decrease.

Table 5.4 also explores whether there are heterogeneous impacts on spouse earnings based on the branch of service to which a servicemember belongs. Relative to spouses married to servicemembers in the Army (the omitted category in Table 5.4) who experience approximately \$1,900 reductions in earnings on average, spouses of servicemembers in the Air Force and Navy experience larger drops in wages by approximately \$1,000 and \$200 respectively. Spouses of servicemembers in the Marines are relatively less impacted by PCS moves than spouses of servicemembers in the Army as their wages decrease approximately \$150 less on average.

Table 5.4 Heterogeneous Effects of PCS Moves

VARIABLES	Spousal Earnings	Spousal Earnings	Spousal Earnings	Spousal Earnings	Spousal Earnings
PCS Move in Yr	-2,780.77 (20.43)	-3,207.52 (59.93)	-1,351.58 (18.03)	-2,708.55 (27.94)	-1,861.92
PCS Move X Spouse Age < 30	1,287.42 (28.04)				
PCS Move X Spouse Female		1,146.48 (61.77)			
PCS Move X Have Child under 6			-1,256.28 (16.88)		
PCS Move X Enlisted				793.63 (32.54)	
PCS Move X Marines					133.29 (46.81)
PCS Move X Air Force					-980.20 (38.21)
PCS Move X Navy					-220.21 (37.74)
Includes Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes

Includes Spouse Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Includes Member Education?	No	No	No	No	No
Includes Member Race?	No	No	No	No	No
Observations	4,612,558	4,612,558	4,612,558	4,612,558	4,612,558

Note: All point estimates are significant at the 1% level. Standard errors, clustered at the spouse level, are in parentheses. Earnings data have been adjusted for inflation and indexed to 2013 dollars. Spouses with zero earnings are included in the sample.

6. Conclusions

Using administrative records on the universe of active duty service members and their spouses for the years 2001 to 2012, we estimate the effects of military change-of-station moves on spousal earnings. Across a range of regression models, including ones with individual spouse fixed effects, we find economically and statistically significant effects: spousal earnings are about \$2,100 lower for all spouses, corresponding to 14% of the sample mean, and \$3,100 lower for working spouses, corresponding to 14% of the mean for those spouses. These effects decline over time, but are still detectable (at about 3% of earnings) two calendar years after the move. The finding of a lasting impact on current wages more than 2 year after the move is especially concerning for the potential of military spouses to accumulate human capital in light of the fact that military members move every two to three years on average. PCS moves reduce current spousal earnings and may pose a significant threat to retirement security through persistent impacts and repeated exposure.

These results reveal the quantitative importance of tied migration on spousal earnings around the time of a move and illustrate a particular challenge to families from work-related mobility. Because tied migrants are more likely to be female in the general population (and our sample of spouses is 93% female), the results also support the idea that women's greater likelihood of being tied migrants contributes to the overall gender pay gap.

By documenting the substantial negative impact of PCS moves on spousal earnings, this study also suggests a potential role for military policy in addressing the career costs to military spouses stemming from frequent PCS moves. The results support the empirical importance of the special career challenges faced by military spouses and in that sense support a role for programs and policies aimed at alleviating the transition costs associated with PCS moves for spouses. To the extent that these interventions are successful, they can have a meaningful impact on the financial wellbeing of military families. This study does not address the cost-effectiveness of any particular elements of family support policy, which is an important topic for future work.

The transition costs associated with PCS moves include both direct job transition costs stemming from challenges in finding appropriate employment at the new location as well as other location transition costs associated with setting up a new household and developing a new social network that can require additional time outside of paid employment. Older spouses and those with young children may be the greatest beneficiaries of such efforts as they experience the largest declines in earnings following a PCS move. Moreover, while female spouses in our sample earn less on average than male spouses and experience slower earnings growth, adverse

labor market impacts associated with PCS moves are not confined solely to women. Husbands experience larger reductions in earnings following PCS moves than wives, though the losses to wives are larger in proportion to their average earnings.

Because PCS moves are found to hinder the career progress of military spouses, they may be weakening the financial stability of military families. Though spousal earnings are lower than servicemember earnings, on average, they can still be an important part of total household earnings (approximately 22% of household earnings in our sample). Spousal earnings may also become more important to the household after the servicemember separates from the military if earnings in the civilian sector are lower. Furthermore, if spouses who are dissatisfied with their career outcomes resulting from frequent PCS moves discourage their partners from remaining in the military, PCS moves may contribute to lower military retention rates or to raising the level of compensation and bonuses required to maintain the force. In that way, the findings of this study contribute to our understanding of the reasons for a compensating differential paid to military servicemembers (beyond the physical hazards and difficult working conditions).

Our analysis is limited to active duty members of the military, so we are not able to provide direct evidence on the importance of PCS moves on initial recruitment or retention. Similarly, because we only study married couples, we are not able to estimate how PCS moves affect marriage or divorce rates, marriage match quality for military servicemembers. Finally, it is important to note that our outcome measure of spousal earnings is limited to the financial impact of a move, and we are not able to capture other (social, psychological, leisure time) effects of moves on spousal utility or effects of moves on the wellbeing of children in military households. Analyses of these effects are outside of the scope of the present study and remain important areas for future work.

7. Appendix

Table A.1 Detailed Servicemember Race Characteristics

Variable	MEAN	STD
White (not Hispanic)	0.72	0.448
American Indian or Alaskan Native	0.01	0.117
Asian	0.05	0.208
Black (not Hispanic)	0.15	0.360
Hispanic	0.07	0.248
N	4,612,558	

Table A.2 Detailed Servicemember Education Characteristics

Variable	MEAN	STD
Less than High School	0.01	0.094
GED	0.05	0.213
High School	0.58	0.494
Some College	0.1	0.300
Bachelors	0.13	0.341
Graduate School	0.1	0.299
Missing	0.03	0.171
N	4,612,558	

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