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DISSERTATION

RAND

Military Compensation in the Age of Two-Income Households

Adding Spouses' Earnings to the Compensation Policy Mix

E. Casey Wardynski

RAND Graduate School

This document was prepared as a dissertation in May 2000 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of James Dertouzos (Chair), Bart Bennett, and Dean Dudley.

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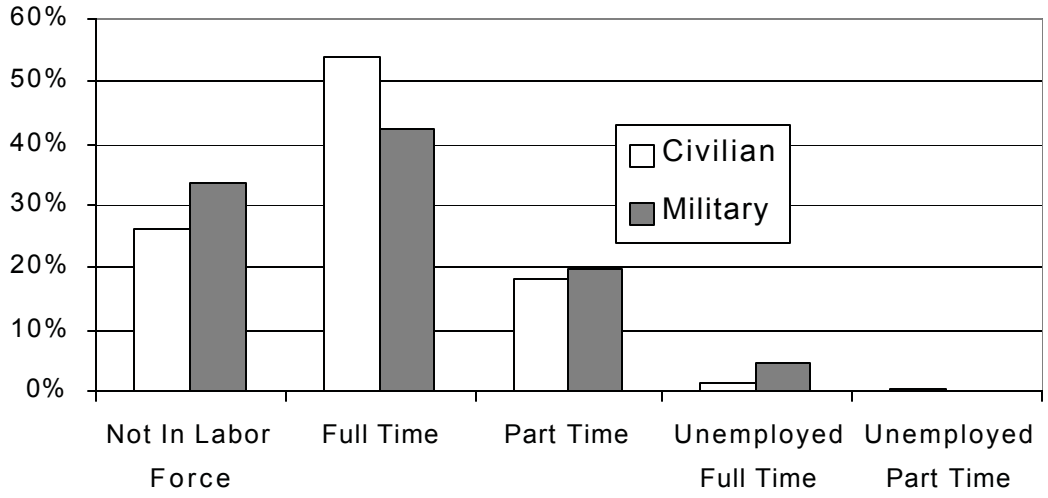
CHAPTER 1, RESEARCH OBJECTIVES AND BACKGROUND.

Objectives. This dissertation will explore the policy relevance and utility of moving beyond current metrics for evaluating soldier pay to consideration of spousal earnings in shaping military compensation and manpower policy. The thrust of this effort will be directed to providing policy makers with an updated analytic framework that accounts for the effects of military service on civilian spouses' earnings. Consequently, this dissertation will not seek to identify a nexus between spouse earnings and soldier retention. Rather, it will address civilian spouse earnings as a potential channel through which policy can act to enhance military household welfare by improving the employment and wage prospects of soldiers' spouses. In this way, this dissertation will identify and explore policy options for enhancing military household earnings that do not entail dramatic increases to soldier pay, potentially at the expense of other Army budget accounts, as has been the trend to date. To the degree that this effort bears fruit, it will provide national decision-makers with policy options that are more reflective of labor market conditions that are likely to prevail into the new millennium rather than those extant at the midpoint of the last century.

Among senior military leaders who entered the Army during an era when single income households were the norm, the distinction between soldier earnings and household earnings can pass without notice. Indeed, as high rates of labor participation and earnings are a fairly recent phenomenon, these leaders entered an Army in which most military wives labored within the home or as volunteers. Today, however, the era of single income households is quickly becoming a

luxury good. Indeed, as illustrated in Figure 1.1, military wives now exhibit high rates of labor force participation.

Figure 1.1, March 1999 Employment Status of Wives
During the Previous Year
Within Traditional Civilian & Military Households
Data Source: March 1999 Supplement to Current Population Survey



Within the military, this situation has engendered the attention of senior leaders as it relates to the wives' satisfaction with military life and thus bears upon the retention behavior of soldiers[1]. Beyond this context however, spouse employment and earnings remains an auxiliary consideration that, as of yet, remains beyond the scope of Army policy formulation. Indeed, heretofore, wives' labor market outcomes have fallen under the purview of the Department of Defense

[1] In an electronic communication dated 8 December 1999 the Principle Assistant Secretary of the Army for Manpower and Reserve Affairs indicated that policy action regarding spouse earnings and employment was far more likely if spouse employment conditions could be related to attrition or retention.

where they have been addressed within the context of family policy. Consequently, though military service is likely to entail unique implications for wives' labor market outcomes, and therefore military household earnings, soldier pay remains the locus of attention in shaping military compensation policy.

As a married career soldier, my interest in the topic of spouse employment and earnings is not wholly academic. Rather, its genesis can be found in twenty years of married life and military service during which the requirements of my career have visited upon my wife twelve moves between three continents and nine states. Without exception, this migratory behavior was for the "good of the service" and transpired without regard to its impact on my wife's career and employment situation. By extension, it therefore transpired without regard to its effect on my household earnings. Thus, this migration often ran against the currents of welfare maximizing behavior suggested in economic theory. Namely, households will relocate where the net present value of post-migration household earnings exceeds the net present value of pre-migration household earnings.[2] That is, migration undertaken in support of military objectives often took my wife to areas characterized by poor labor markets, net out-migration, and below average civilian wages. Indeed, in one location, trade and commerce were so moribund that the annual lizard races marked a zenith of economic activity for local enterprises.

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[2] Mincer, J. (1978). "Family Migration Decisions." Journal of Political Economy 86(51): 749-773.

Background. As a milestone in infusing market forces into military manpower programs, the conversion from the draft to an All-Volunteer Force (AVF) in 1972 was a seminal event. Specifically, the end of the draft imposed market discipline on the military with regard to recruiting and retaining manpower. To facilitate recruiting, national authorities dramatically increased soldier pay and benefits to effectively compete with civil sector labor demand. These increases were achieved within the framework of soldier pay. Since 1972, the military has addressed slack labor supply by adjusting soldier compensation levels. Interpreting recent recruiting short-falls as evidence of lagging soldier pay, national authorities have shifted resources within relatively fixed defense programs to provide military personnel wage increases of over 11% for some ranks during fiscal year 2000. Given evidence of worsening retention in key grades, further wage increases or increased use of retention bonuses may necessitate shifting additional budgetary resources to manpower programs. Within the framework of fixed defense budget caps, these increases may reduce resources for investment in Army capital stock and infrastructure. However, there is ample reason to suspect that a more broadly drawn perspective on military compensation could afford national leaders means to improve the material lot of military households without resorting to a continued regime of above inflation military pay increases. Indeed, this dissertation will demonstrate that there is substantial scope to improve the welfare of military households by moving beyond soldier centric analysis of compensation. Specifically, by addressing military household earnings as a relevant unit of analysis, the military will gain insights on the merits of wives'

labor market opportunities as a policy instrument and their earnings and employment outcomes as a policy target.

The basis for this more expansive approach to military compensation is twofold. First, it incorporates recognition of the unique demands imposed upon families by military service in the form of migration based upon the needs of the service rather than household utility maximization. Second, it accounts for the dramatic rise in the labor force participation exhibited by soldiers' wives. This second aspect, in fact, has a direct bearing on formulations of military household utility. By way of contrast, explanations of civilian migration among working age households typically include economic factors as important considerations. Indeed, research has found that destination characteristics do help determine the locality to which migrants will move.[3] Thus, while civilian household migration is typically evaluated within the framework of household utility maximization, decisions regarding military migration are made on the basis of military considerations. Consequently, military household earnings outcomes obtaining from such migration will be subject to the vagaries of assignment policies and local labor market conditions. Thus, such migration may become income-reducing propositions in proportion to the distribution of Army posts located in depressed labor markets.

Today, the Army has curtailed many activities that were likely to have depressed wives' labor market participation. For example, commanders may no longer make reference to wives' community support and volunteer

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[3] Greenwood, M. (1975). "Research on Internal Migration in the United States: A Survey." Journal of Economic Literature 13(June): 397-433.

activities in their husbands' efficiency reports. However, an appreciation of the military's appetite for furthering the employment and career aspirations of wives can be found in the old adage, "If the Army wanted you to have a family it would have issued you one". A particularly stark illustration of military ambivalence, if not outright aversion, to wives was rendered by the Commandant of the Marine Corps as recently as August 1993. Seeking to reduce the expense of benefits associated with married personnel, the Commandant sought to preclude married persons from entering the Corps. He also ordered that bachelor Marines already in the force participate in educational programs and command counseling designed to discourage marriage.[4] Though immediately reversed by civilian authorities, the Commandant's policy is illustrative of policies and leadership disposition that had made bachelor peacetime forces an American norm until commencement of the Cold War.[5]

Notwithstanding nostalgia for forces unencumbered by the expense of wives and families, soldiers continue to form households at high rates. This analysis will therefore move beyond the bounds of traditional thinking to explore policies that view benefits extended to soldiers' wives as an investment rather than a burden. Indeed, rather than seeking to adjust the rate of military household formation, this analysis will address married households as a potentially salutary construct for shaping compensation and ancillary manpower policies within the Department of the Army. Thus, I propose

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[4] Burns, R. (1993). About Face! Marines Ordered to Withdraw Singles-Only Policy. Associated Press. Washington, D.C., Associated Press.
[5] Carlson, A. (1993). "Your Honey Or Your Life." The Heritage Foundation Policy Review Fall(66): 45.

a break with thinking that sees civilian spouses as a burden. Rather, I will proceed by accepting the prevalence of married soldiers as an attribute of the modern volunteer force. On this basis, I will seek to update the framework within which compensation policy is shaped. This update will look beyond soldier pay as embodied in construct of regular military compensation to examine the incidence of military service on civilian wives' earnings within military households.

Due to the scale of its operations, Army level policy making typically proceeds from the distillation of detail into board aggregates and rules of thumb so as to facilitate analysis and Army wide policy implementation. This dissertation will follow the opposite tack. I will generate and evaluate alternatives with the objective of reaching feasible policy recommendations that are suitably tailored to match the disparate attributes of Army wives and the varied employment and earnings conditions presented in the vicinity of major Army installations.

As a point of departure, my analysis will consequently employ empirical techniques to establish the magnitude and locus of any military employment or earnings penalty within the population of military wives. I will then generate and explore policy options to reduce any such penalty as a vehicle for raising military household compensation without direct expenditure of budgetary resources as is required with soldier pay. As a part of this analysis, I will highlight options that will afford the Army the opportunity to garner a return for the substantial investment made in civilian spouses of soldiers. By way of example, this return may come in the form of

employing soldiers' wives in lieu of other civilians as a cost savings and workforce quality enhancing strategy.

Regular Military Compensation. So as to provide a context for the analysis that follows, it is instructive to review the genesis of the current policy focus on soldier pay. Regular military compensation, a long-standing formulation of military pay, was a creation of recommendations contained within the Gorham Report on military compensation. This report was prepared at the request of Secretary of Defense McNamara in 1962. In its review of military compensation, the Gorham Commission noted that all service members were entitled to basic pay, the basic allowance for quarters, and the basic allowance for subsistence. Taken as a whole, these pay and allowances and their attendant tax advantage[6] were combined by the Commission into the construct of "regular military compensation" (RMC) as a metric for comparing civil and military earnings. Since 1962, with minor adjustments, RMC has served as the conceptual framework within which military compensation policy has evolved. Based upon labor market conditions existent in 1962, RMC was a reasonable construct for assessing pay comparability and adjusting military compensation. However, as heretofore outlined, there is good reason to suspect that RMC is now an inappropriately limiting construct for addressing military compensation policy.

To understand the utility of a broader construct for considering military and civilian pay comparability, it is necessary to consider

how military service differs from employment in the civil sector. First, the military provides its members with pay and benefits based upon their family situation. For example, where quarters are not available, payments to soldiers for housing are substantially less for single soldiers than for married soldiers. Indeed, single soldiers through the grade of staff sergeant are often required to live in barracks and are thus denied payments for off-post quarters. Conversely, married soldiers are not required to live in barracks. Rather, they are either afforded on-post family quarters or an augmented housing allowance so that they can procure family housing on the local economy. This augmentation can represent a 10 percent increase over the total compensation afforded to single soldiers. Locality adjustments such as Overseas and Variable Housing Allowance are also substantially higher for married personnel.

This subsidization of married soldiers extends beyond allowances for quarters. During transfers between posts, soldiers with families are afforded higher weight allowances for their household goods, as well as dislocation payments substantially higher than those afforded to single personnel. Finally, soldiers with families are often afforded special consideration with regard to work schedules and assignment patterns. Given this situation, soldiers, unlike their civilian counterparts, can directly increase their level of remuneration through the institution of marriage. Moreover, they can attain higher levels of welfare without regard to their spouses' labor force

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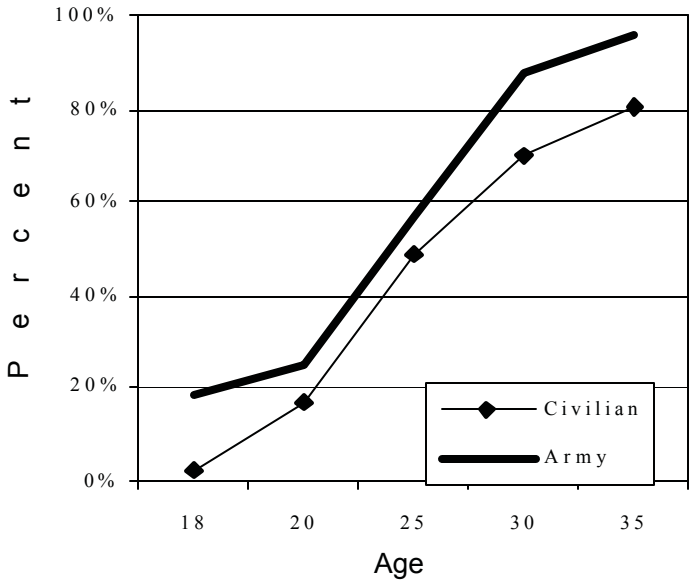
[6] The basic allowance for subsistence (BAS) and basic allowance for quarters (BAQ) are paid to soldiers as allowances rather than income. Thus, they are tax-free.

participation status. Therefore, it is not surprising that as illustrated in Figure 1.2, male soldiers marry at higher rates than do their civilian contemporaries[7].

Figure 1.2, Percent of Civilian and Military Males
Ages 18 to 35 Ever Married as of March 1999
Data Source: Current Population Survey, Army Enlisted Master File & Dependent Eligibility Entitlements System

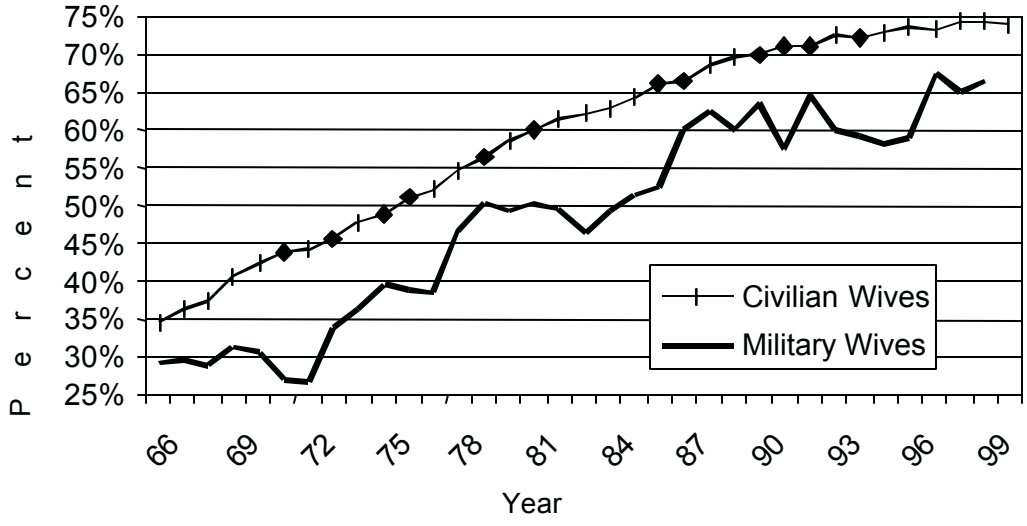


Returning to the construct of RMC, one can see that prior to the era in which wives' earnings comprised an important share of household income, marriage engendered substantial benefits to soldiers with few economic costs to military families. Today, however, there is substantial evidence to suspect that rising labor force participation among women has altered this benefit-cost calculus. Specifically, at the inception of the All-Volunteer Force in 1972, less than thirty percent of military wives worked outside the home[8]. As illustrated in

[7] 1998 Census and Army Enlisted Master File Data.
[8] Based upon the March 1972 Supplement of the Current Population Survey.

Figure 1.3 below, by March 1999, the percentage of military wives seeking employment outside the home had more than doubled so that 67 percent of these women are now in the labor force[9].

Figure 1.3, Labor Force Participation Among
Wives of Civilian and Military Personnel
Data Source: March Supplements to Current Population Survey



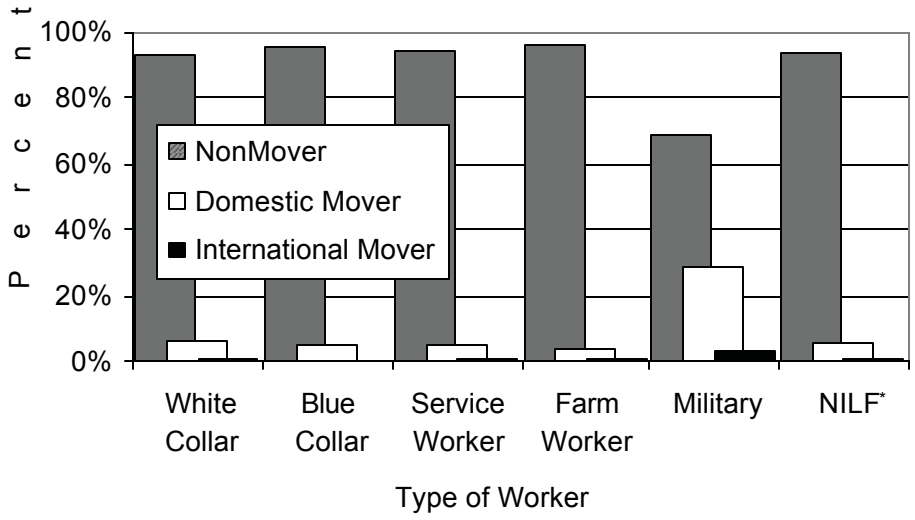
Though exhibiting lagging growth until the 1980s, military wives' labor participation now approaches the record high rates exhibited among wives of civilians. While this dramatic rise in military wives' labor outside the home is increasingly recognized among military leaders, it is, as of yet, an under-appreciated evolution.

The Impact of Migration. As reflected in Figure 1.4 below, military service entails frequent migration. For example, 32 percent of

[9] Based upon the March 1999 Supplement of the Current Population Survey. Membership in the labor force is defined as employed at work, on lay off or unemployed looking for work.

traditional military families moved across state or international boundaries between March 1998 and 1999.

Figure 1.4, Percent of Male Heads of Households
Ages 20 to 49
Who Moved Across County Lines Between March 1998 & 1999
Data Source: Current Population Survey



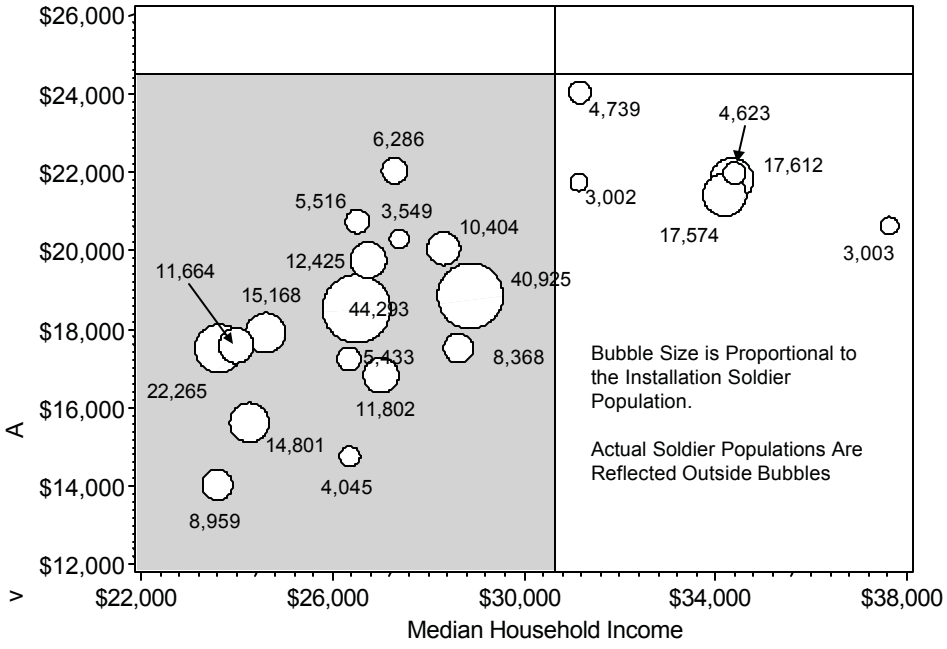
* Not In Labor Force (NILF)

This transient behavior proceeds from the military utility of shifting personnel between units to satisfy near term readiness demands, professional development requirements, and to accommodate shifting national priorities and heterogeneous personnel turnover and turbulence. Based on these considerations, during the recent past, the Army has moved 160,000 of its 480,000 soldiers annually. During FY2000, many of these reassignments will be structured to shift personnel from training, recruiting, and acquisition posts to combat forces with the objective of raising the readiness of operational

forces by filling vacancies in under-strength divisions.[10] In contrast, during March 1998 to March 1999, only six percent of civilian households moved across county lines[11].

Artifacts of Army real estate acquisitions since the founding of the nation potentially exacerbate the transient nature of Army life with regard to soldiers' wives' employment prospects. A review of the geographic distribution of Army duty assignments within the United States finds that most assignments are located in rural areas characterized by their relatively meager wages and household earnings. Through reference to Figure 1.5, we find that the average private sector wages in Army locales are well below the national average.

Figure 1.5, 1992 Average Wage (U.S.=$24,481) & Median Household Income (U.S.=$30,636) within the County Outside Post Main Gate
Data Souce: 1992 Personnel Authorization Manning Document and USA Counties 1998



[10] McHugh, J. and J. Tice (1999). Marching Orders / 8,000 Soldiers to Move Into Combat Divisions, Army Times. 1999.
[11] March 1999 Supplement of the Current Population Survey.

Similarly, the preponderance of soldiers stationed with the continental United States are located in areas with relatively low median household incomes as compared with the national median (lower left gray shaded area).[12]

While these characteristics need not rule out lucrative labor force participation among Army wives, they are not suggestive of conditions one would seek in selecting migration destinations. Nor are these the sort of conditions envisioned in traditional economic theory as first hypothesized by J. R. Hicks as early as 1932 "…differences in net economic advantages, chiefly differences in wages are the main causes of migration".[13] This situation suggests a set of remedial policies that are distinct from those likely to arise from a single-minded focus on the frequency of moves entailed in Army life.

As addressed above, there are manifold reasons to suspect that compensation policy based upon RMC alone fails to account for many of the vagaries of Army life that are likely to impart an unwanted downward bias to the earnings of soldiers' wives and military household income. As will be seen, the literature addressing migration and dual career households provides considerable scope to expect that military migration can impart an untoward influence on civilian spouses' labor market outcomes. Whereas at the time of the writing of the Gorham Report, soldiers' spouses were overwhelmingly female, and these spouses either worked in the home or as volunteers

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[12] Developed from USA Counties 1998, U.S. Census Bureau.
[13] Greenwood, M. (1975). "Research on Internal Migration in the United States: A Survey." Journal of Economic Literature 13(June): 397-433.

in support of the military community, failure to account for the household utility consequences of military migration in framing RMC was understandable. However, today, whereas employment for economic need (59%), or because they had always expected to work (36%), or to prepare for a future career (36%), rank prominently among military spouses' reasons for working, it is unlikely that these spouses are indifferent to the earnings consequences of migration[14]. Rather, it is clear that military spouses seek to make a substantive contribution to family earnings. Consequently, military assignment practices and compensation constructs inherited from the post World War II era may now preclude military families from realizing their full earnings potential. However, traditional analysis based upon RMC fails to account for this possibility and thereby limits the range of compensation policy options available to decision-makers.

Options & Analytic Emphasis. By way of providing a road map to the analysis contained within this dissertation, it is important to note that this work will not spring forth in a vacuum. Rather, a substantial body of literature has developed around the topics of married wives' earnings, household migration, married female labor supply and labor demand. A smaller body of work also provides insights on these topics within the narrower context of military households and the civilian spouses of military personnel. Thus, as a point of departure, I will proceed by first informing my analysis with a review of the existing literature and explore the policy efficacy of recommendations contained therein. Mindful of the applicable methods,

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[14] 1992 DoD Survey of Officers and Enlisted Personnel and Military Spouses.

insights, and voids in the existing body of knowledge, I will expand upon existing analysis by first gauging the scope and locus of any civilian spouse earnings penalty. Here, I will employ human capital theory and new data sources to analyze the earnings consequences of military service. As opposed to earlier work, I will allow for disparate earnings and employment outcomes across spouse educational strata and major army installations. In this way, I propose to generate policy alternatives that move beyond pat answers such as "slow the rate of migration" to tailored approaches that account for unique spouse attributes and employment conditions across the Army's set of installations.

CHAPTER 2, REVIEW OF PREVIOUS RESEARCH

The Conceptual Framework. Interest in the topic of military wives' earnings has its genesis within a broader body of literature concerned with household production and welfare. In the late 1970's, Jacob Mincer[15] took note of the dramatic increase in two-income households as a juncture to explore the economic basis for household migration within the context of family welfare maximization. Mincer noted that in an era of increasing female labor participation, a gulf was likely to emerge between individual and household incentives to relocate. Previous conceptions of migration drew upon labor market conditions similar to those found during the Gorham Commission's review of military compensation in 1962. Specifically, when labor within the home constituted wives' primary contribution to household welfare, family migration decisions were derivative of the husbands' employment and earnings prospects across alternative geographic locations. Consequently, the conceptual framework for such migration decisions focused upon the husbands' private present value of migration. However, Mincer noted that with the rising prevalence of two-income families, household welfare analysis becomes more complex. Under these circumstances, a decision to migrate that maximizes household income and welfare need not simultaneously maximize the earnings of both husbands and wives. Rather, Mincer theorized that decisions based upon analysis at the household level could result in outcomes adverse to one spouse. That is, household welfare would be maximized so long as the gains to one spouse were sufficiently large so as to

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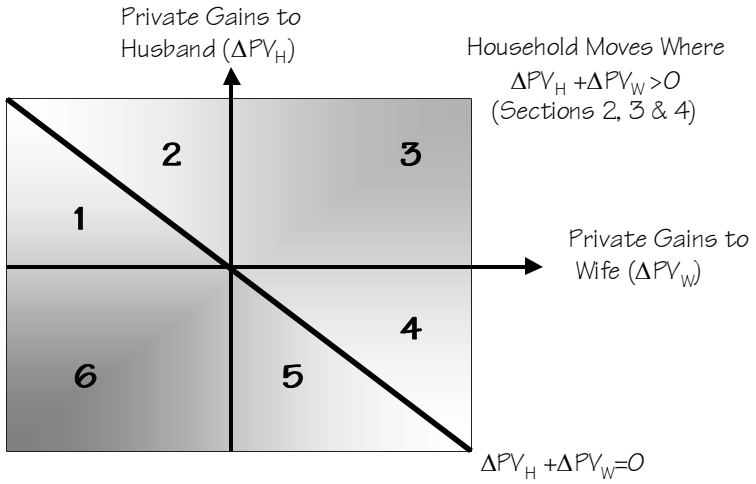
[15] Mincer, J. (1978). "Family Migration Decisions." Journal of Political Economy 86(51): 749-773.

more than offset any relocation-induced earnings losses incurred by the other spouse. Thus, within two-income households, a decision to relocate on this basis is pareto efficient in that the private gains to one spouse can be sufficient to compensate the losses of the other and thus yield higher household welfare.

The graphic[16] formulation provided below encapsulates the migration decision as posed by Mincer. Where both spouses gain from a decision to migrate, household welfare falls within area 3. Where the husbands' gains are larger than the wife's earnings loss, household welfare lies within area 2. Where the reverse is the case, and the wife's gains exceeded the husband's loss, the household will find itself in area 4. Thus, within the context of household welfare maximization, migration will occur where household earnings at the destination lie in the northeast region of the household decision space.

Figure 2.1, Household Framework for Reaching a Migration Decision



Adding to Mincer's theory, Becker[17] expanded the conceptual framework of household welfare-maximization by treating the family as an economic decision-making unit. In this context, household production can occur both within the home and in the marketplace. In order to maximize household utility, each spouse elects to either work within the home or to join the work force as the result of an economic decision process. In essences this calculus weighs the degree to which wage earnings will offset lost production in the home. Factors shaping this labor participation decision include the spouse's reservation wage, the market wage, and personal preferences. Factors affecting the reservation wage are likely to include the presence of children in the home and, in the case of the military, social responsibilities such as volunteer activities in support of the military spouse's career.

Empirical Findings within Civilian Households. Building upon his earlier conceptual work, Mincer explored the empirical implications of his theory within a human capital framework[18]. Specifically, he noted that migration often engenders discontinuous employment for the spouse of a migrant. Consequently, whereas migration typically increases the earnings[19] and employment prospects of males[20], wives are likely to bear the burden of private costs associate with family relocation. In

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[16] Borjas, G. J. (1996). Labor Economics, McGraw-Hill.
[17] Becker, G. (1976). The Economic Approach to Human Behavior. Chicago, University of Chicago Press.
[18] Mincer, J. and H. Ofek (1982). "Interrupted Work Careers: Depreciation and Restoration of Human Capital." Journal of Human Resources 17: 3-24.
[19] Lansing, J. B. and J. N. Morgan (1967). "The Effect of Geographic Mobility on Income." Ibid. 2(Fall): 449-60.
[20] DaVanzo, J. (1976). Why Families Move: A Model of the Geographic Mobility of Married Couples. Santa Monica, Rand.

part, this burden can accrue from migration induced employment discontinuities that result in a depreciation of wives' human capital. This depreciation can act through two channels. First, wives may forgo growth in their general or transferable human capital (skills) during migration induced unemployment. Second, and most importantly, they may earn lower wages upon reentering the labor market than at exit due to their inability to achieve a complete match between specific skills acquired in their last job and those required in their new position. In modeling the effects of migration, Mincer found that wives experienced a short-term earnings loss of up to 9%. His findings also comported with earlier work[21] that found that the earnings depreciation associated with employment interruptions varied positively with education level. Upon reexamination, Sandell[22] found that this depreciation effect was about one-third as large as reported by Mincer, though still significant.

Expanding upon Mincer's work, Lichter[23] couched his analysis within the context of family resource theory. This theory proceeds from an expectation that wives' resources, such as earnings and educational attainment, provide wives with a source of leverage in exercising power within a marriage. Employing data from the National Longitudinal Survey (NLS) of mature women, Lichter modeled the earnings (E_t) of married women in period *t+1* (1971 or 1976) as a reduced form function of labor supply and demand. Lichter's control variables included the

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[21] Mincer, J. and S. W. Polachek (1974). "Earnings of Women." Journal of Political Economy 82(March/April 1974): S76-108.
[22] Sandell, S. H. and D. Shapiro (1978). "The Theory of Human Capital and the Earnings of Women: A Reexaminiation of the Evidence." Journal of Human Resources 13(1): 103-117.

wife's earnings in period *t*, a dichotomous variable (M) to indicate migration between period *t* and *t+1*, a vector of socioeconomic (S_I) control variables (e.g. age, race and the presence of children under age 6) and a vector of resource (R_I) variables (e.g. years of education completed and Duncan Socioeconomic Index (SEI) scores for the wife's last occupation).

$$E_{t+1} = f(E_t, M, S_i, R_i)$$

Employing ordinary least-squares, Lichter estimated model parameters with primary interest on the earnings incidence of migration. As indicated in the table below, Lichter's formulation provided evidence that migration exerts an untoward effect on wives' earnings.

1966 Earnings	.79*	1996 Earnings	.79*	.79*	.79*	.79*
Migration	-382.88*		1177.58	-118.29	-452.56*	-456.16*
Education	69.73*		82.92*	70.76*	69.25*	70.94*
Relative Education	51.05*		50.01*	50.27*	58.46*	49.10*
SEI	17.82*		17.91*	18.38*	17.81*	17.77*
Relative SEI	.66		.69	.72	.58	1.95
		Migration Interactions with:				
		Education	-129.63*			
		Relative Education		-75.53		
		SEI			-6.81	
* p<.05		Relative SEI				-12.14

Moreover, notwithstanding the migration implications of resource theory, Lichter also found that the earnings penalty incurred by wives in migrant families did not vary inversely with their resource endowments. As such, Lichter concluded that family migration does not

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[23] Lichter, D. T. (1982). "The Migration of Dual-Worker Families: Does the Wife's Job Matter." Social Science Quarterly 63(1): 48-57.

enhance wives earnings[24] since the returns to migration do not differentially benefit wives with the greatest occupational and educational resources. Rather, he concluded that migration imposes its most harmful earnings effects as wives' resources increase. In subsequent analysis, Lichter did, however, find that wives' labor market participation inhibits household migration. Specifically, through limited dependent variable modeling, Lichter found that increasing job tenure among wives significantly reduces the probability of family migration and that families are likely to be more mobile if the wife is not employed.[25] In contrast to these results, Duncan[26] found that the prestige of a wife's occupation and her contribution to family income do not deter family migration. Moreover, migration reduces prospects for the wife's continued labor participation.

Empirical Findings within Military Households. At this juncture, it is important to note that research into the topic of military wives' earnings ensues from the forgoing work regarding civilian household migration. As such, this research has developed at the intersection of Mincer's theory and opportunities for empirical analysis presented by highly migratory military households.

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[24] Lichter, D. T. (1983). "Socioeconomic Returns to Migration Among Married Women." Social Forces 62(2): 487-503.
[25] Lichter, D. T. (1980). "Household Migration and the Labor Market Position of Married Women." Social Science Research 9: 83-97.
[26] Duncan, R. P. and C. C. Perrucci (1976). "Dual Occupation Families and Migration." American Sociological Review 41: 252-261.

Noting that the percent of married military personnel had risen from 38% to 61% over the period from 1953 to 1980, Segal[27] viewed migration as particularly burdensome for military wives. Addressing the topic from a social science perspective, Segal observed that the military operates as a greedy institution with regard to the unrecompensed costs it imposes on military wives. That is, based upon military requirements, service members' families relocate with great frequency. Segal argued that military wives consequently incur relatively high rates of unemployment and numerous career interruptions that lower their earnings. She saw this situation as source of conflict within military families that was likely to grow in importance apace with female labor force participation and wage growth.

Earnings Estimates Using the 1985 CPS. Under contract to the Department of Defense, Schwartz[28] extended Mincer's economic model of female labor force participation to military households using cross sectional analysis. Schwartz compared the labor market outcomes of military and civilian wives using a subset of the March 1985 Current Population Survey (CPS). Representing labor supply and demand within a semi-log reduced form structure, he modeled earnings as a function of control variables normally incorporated into such specifications. These variables included education, represented as a continuous effect, worker age and age squared as proxies for worker experience, race, dummies to control for full and part-time employment, and a set

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[27] Segal, M. W. (1988). The Military and the Family as Greedy Instititutions. The Military, More than Just a Job? C. C. Moskos and F. R. Woods. Washington, D.C., Pergamon-Brassey: 79-97.
[28] Schwartz, J. B. (1990). Labor Force Participation, Employment, and Earnings of Married Women: A Comparison of Military and Civilian Wives. Research Triangle Park, N.C., Research Triangle Institute.

of dummy variables to control for labor conditions across geographic regions. Of note, he also included control variables for wives' occupations. Based upon his wage analysis, Schwartz concluded that the earnings of wives of military personnel are not significantly different from civilian contemporaries when one controls for the variety of individual and household differences. An extract of Schwartz statistical findings is provided below.

Independent Variable	Log of Hourly Wages Parameter (t-statistic)	Log of Annual Wage Parameter (t-statistic)
Intercept	-.4503 (-2.265)	6.0669 (24.329)
Husband in Military	-.0395 (-.719)	-.1029 (-1.494)
Age	.0905 (7.343)	.1018 (6.591)
Age squared	-.0013 (-7.007)	-.0014 (-6.232)
Education	.0478 (10.020)	.0460 (7.687)
Black	.0546 (1.658)	.1009 (2.445)
Hispanic	-.0244 (-.811)	.0259 (.687)
Full Time	.1534 (9.470)	1.0623 (52.296)
Self-Employed	-.4631 (-6.435)	-.3921 (-4.345)
Part Time & Self Employed	-.1897 (-2.031)	-.2482 (-2.118)
Occupations		
Managerial	.3521 (7.090)	.4556 (7.314)
Professional	.3974 (7.479)	.4312 (6.471)
Health	.5788 (10.403)	.6972 (9.992)
Teaching	.2921 (5.548)	.3085 (4.674)
Technician	.4260 (7.583)	.5042 (7.158)
Sales	.0343 (.721)	.0313 (.524)
Clerical	.1845 (4.215)	.2268 (4.130)
Service	-.0766 (-1.639)	-.1732 (-2.957)
Manufacturing	.1523 (3.116)	.3061 (4.993)
Ages of Youngest Child		
0 to 2	-.0433 (-1.398)	-.1601 (-4.124)
3 to 5	-.0902 (-2.662)	-.2203 (-5.185)
6 to 11	-.1332 (-3.899)	-.2523 (-5.889)
12 to 17	-.104 (-2.637)	-.1609 (-3.337)
18 +	.0089 (.240)	-.0458 (-.991)
Moved in Past 5 Years	-.0288 (-1.488)	-.0529 (-2.177)
Region of the Country		
New England	-.0817 (-2.428)	-.1038 (-2.458)
Mid-Atlantic	-.1572 (-5.267)	-.1887 (-5.042)
East North Central	-.1306 (-4.513)	-.1486 (-4.095)
West North Central	-.2201 (-7.029)	-.1867 (-4.755)
South Atlantic	-.1517 (-5.355)	-.1293 (-3.641)
East South Central	-.2275 (-5.417)	-.2109 (-4.005)
West South Central	-.1732 (-5.318)	-.1444 (-3.534)
Mountain	-.1141 (-3.515)	-.0915 (-2.247)
Metropolitan	.1291 (7.271)	.1242 (5.579)
Central City	.0502 (2.467)	.0759 (2.977)

Noting that the frequency of career interruptions is a potentially important wage rate determinant, Schwartz included a variable to control for migration frequency. As the parameter for this control variable (moved in the last 5 years) was negative and significant at a 5% level, Schwartz suggested that policies to reduce the frequency of PCS moves would improve the economic lot of military wives.

With regard to these findings, it is first important to note that Schwartz not only did not, but more likely, could not, detect a significant relationship between military affiliation and wives' earnings due to the limited number of military households found in his CPS subset. Of the 17,560 households in his sample, only 550 had husbands in the military. Of these, only 207 had earnings and thus entered into his earnings equation. Consequently, given his relatively small parameter estimate, -.1097, Schwartz most likely lacked sufficient power to detect a significant relationship between a husband's military affiliation and his wife's earnings. Indeed, in the case of annual earnings, a population on the order of 371 military wives with earnings would have been required to establish significance at a 5% level for his 10% earnings penalty estimate.[29] Moreover, given the high rate of migration in the military, most of the 207 military

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[29] $t = \frac{b_j}{se_j} = \frac{-.1029}{s_j/\sqrt{n}} = -1.494$ and with $n = 207$ we find $s_j = .99095$

Thus, to achieve a significance, t=2.0, Schwartz would have required 371 observations on military wives with earnings.

$t = \frac{b_j}{se_j} = \frac{-.1029}{.99095/\sqrt{n}} = -2.0$ yields $n = \left[\frac{2 \times .99095}{-.1029}\right]^2 = 371$

households with earnings were likely to have moved during the five-year period for which Schwartz controlled. Thus, Schwartz most likely introduced a high level of collinearity between his migration and military dummy variables for military households. Such an untoward effect would have inflated the standard error for the 'husband in military' dummy variable and thus reduced the prospects for detecting a significant military-earnings relationship.

Finally, with regard to detecting a nexus between wives' earnings and husbands' military affiliation, Schwartz's model is over specified. That is, by including variables to control for wives' occupations, Schwartz excluded the possibility that military wives, by virtue of their transient nature, predominate in certain high turnover or easily transportable career fields. That is, rather than populating career fields commensurate with their education and experience, college educated military wives, who could only find employment in service or clerical occupations, are found within Schwartz's specification to earn no less than similarly under employed wives of civilian husbands. Indeed, Long[30] concluded that such a set of circumstances induces women to adopt such gender-typed occupations as a means to facilitate employment in the face of frequent employment interruptions.

Estimates of Employment Status, the 1985 DoD Survey. Building upon the previous analytic base, Schwartz[31] extended his research through the use of the 1985 Department of Defense Survey of Officer and

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[30] Long, L. H. (1974). "Women's Labor Force Participation and the Residential Mobility of Families." Social Forces 52: 342-348.

Enlisted Personnel and Military Spouses. Schwartz drew a merged sample of soldiers' and spouses' survey responses submitted by 7,912 Army officers, 34,601 enlisted personnel and 5,484 spouses of soldiers. Using this data, he found that the majority of wives, 53%, were in the labor force. Of these, 77% were employed and 67% were working full-time. Importantly, he noted that labor participation, employment, and full-time employment rose with education level. In keeping with Becker's inferences regarding wives' reservation wage, mothers with children less than five years old had the lowest labor participation.

Due to the lack of a civilian contrast group within the DoD survey data, Schwartz confined his analysis to the use of limited dependent variable models in which military households were constrained to two outcomes. These outcomes addressed labor force participation, employment or unemployment, full-time or part-time work employment, and underemployment. In terms of results, his findings with regard to labor force participation comported with those reported by Mincer[32] such that better educated wives, minority wives, and wives with older children were more likely to be in the labor force. Additionally, in keeping with the earlier discussion of reservation wages, wives with children under six were significantly less likely to be in the labor force.

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[31] Schwartz, J. B. and L. L. Wood (1991). "The Impact of Military Life on Spouse Labor Force Outcomes." Armed Forces and Society 17: 385-407.
[32] Mincer, J. (1962). Labor Force Participation of Married Women: A Study of Labor Supply. Aspects of Labor Economics. National Bureau of Economic Research. Princeton, N.J., Princeton University Press.

Importantly, Schwartz also found that military wives' were more likely to be in the labor force the more proximate their home was to population centers. From a practical perspective, this relationship stems from the role of wives within the household and the need for propinquity between their place of work and their children's schools and day care facilities. Indeed, Madden[33] has found that within civilian households, women select jobs close to their home due to the fact that their low wage rate and short work hours, relative to their husbands', reduce the returns to commuting, while familial responsibilities increase the costs of commuting. The salience of this phenomenon will become apparent when we take note of the distribution of Army installations across the economic landscape of America in Chapter 4.

In terms of working with non-military data, it is interesting to note that Schwartz also found that wives of officers were no more and no less likely to be in the labor force than wives of enlisted personnel. The lack of a relationship in this regard suggests that the absence of a rank indicator in the Current Population Survey is not an important limitation in this dimension with regard to modeling military wives' labor market outcomes.

With regard to labor force participation, Schwartz found that military wives located outside the United States were less likely than their stateside contemporaries to be in the labor force. This situation

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[33] Madden, J. (1981). "Why Women Work Closer to Home." Urban Studies 18(May 1981): 181-194.

provides an interesting counterpoise to the federal hiring preference afforded to military wives overseas.

In terms of wives' employment, Schwartz found that the husband's wage rate was not a significant factor while proximity to population centers and tenure on station were statistically significant and positive. In keeping with this latter finding, the likelihood of wives' longevity at their current location also bore a positive and statistically significant relationship to wives' full-time employment. Wives with higher levels of education and wives without young children also exhibited a higher likelihood of full-time employment.

Finally, Schwartz found that the likelihood that a wife was underemployed exhibited a significant inverse relationship with the length of time spent on the same post. In light of these results, Schwartz's policy prescriptions included lengthening the time on station and availing wives of opportunities to increase their educational attainment.

Findings Based Upon the 1985 CPS and DoD Survey. Drawing upon the 1985 Current Population Survey and the Couple File of the 1985 DoD Survey, Payne[34] sought to contrast labor market outcomes of military and civilian wives. Towards this end, Payne separately estimated civilian wives' earnings using 18,954 observations from the 1985 CPS and 18,244 observations on military families from the 1985 Couple File. Though military husbands exhibited, on average, one more year

of education than their civilian contemporaries, husbands' earnings were virtually equal across the civilian and military samples. Wives, however, exhibited significantly different wage outcomes. Estimating the percent change in weekly and annual wages as a function of a reduced form wage equation, Payne found that returns to education were substantially higher among civilian wives. A pooled analysis revealed that military wives' weekly wages were 5.4% lower than those of civilian contemporaries while annual wages were 18.4% lower among military wives.

Turning to military migration, Payne modeled military wive's earnings as a function of their longevity at their current station. She found that migration resulted in a ten-month break in employment. In keeping with Mincer's conceptions of human capital depreciation, Payne also found that following a relocation-induced break in employment, military wives' wages rose dramatically subsequent to reemployment, with weekly wages rising 7% and annual wages increasing 16% one year after securing new employment. Based upon these results, Payne concluded that frequent military migration impairs wives' earnings during lengthy spates of unemployment, lost seniority, and human capital depreciation akin to that suggested by Mincer.

Prospective Research. In closing this survey of research into the topic of military wives' earnings, Gill's[35] prospective analysis of

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[34] Payne, D. M., J. T. Warner, et al. (1992). "Tied Migration and Returns to Human Capital: The Case of Military Wives." Social Science Quarterly 73(2): 325-339.

[35] Gill, H. L. and D. R. Haurin (1998). "Wherever He May Go: How Wives Affect Their Husband's Career Decisions." Social Science Research(27 Sept 1998): 264-279.

military officers' career intentions based upon household earnings nicely closes the circle with regard to Mincers' original conceptual framework. Employing data from the 1992 DoD Survey of Military Officers and Spouses and the 1985 National Longitudinal Survey of Young and Mature Women (NLS), Gill modeled the lifetime earnings of military officers and their wives. Assuming that retired officers' post-military wage earnings could be modeled from those of comparable civilian males, Gill estimated an annuity value for officers' and wives' life-cycle earnings under alternative career patterns.

Gill developed alternative potential annuity values for officers and wives based upon a decision to continue in the military to retirement or leave the military in the following year. Modeling career intentions, revealed in the DoD survey, as a function of this annuity difference and attitudinal variables, Gill found within the framework of a logit process that officers give less weight to their wives' potential earnings differences when these wives are relatively unattached to the labor force. More importantly, he found that career intentions are shaped by economic factors. Specifically, where a wife's potential earnings suffered through continued military affiliation, the officer's military career intentions exhibited a significant decline.

Elsewhere, Bielby[36] lent weight to this conclusion with regard to the part changing gender role beliefs play in shaping family migration decisions. That is, with the rise of dual-income household, and

blurring of gender roles, husbands with less traditional role beliefs are likely to be increasingly sensitive to the impact of household migration on their wives' career and earnings progression.

Conclusions. Through a variety of methods and mixed results, several conclusions emerge. First, migration within both civilian and military households exhibits untoward effects on wives' employment status and earnings. Whereas migration among military personnel is an order of magnitude greater than that found among other classes of workers, wives of soldiers appear to incur substantial mobility engendered career interruptions. Second, research to date has achieved mixed results with regard to estimating the earnings difference between wives of military personnel and comparable wives of civilians. Moreover, as the existing body of research has sought to test and extend Mincer's original work, research along other policy relevant dimensions is lacking.

As we shall explore in Chapter 3, migration is a central attribute of military service. To the extent that it is an indispensable attribute, single-minded research into the effects of migration on military wives will lack policy salience from the outset. Moreover, by failing to entertain other factors likely to affect wives' labor market outcomes, existing research has potentially overlooked important alternative factors shaping military wives' career and earnings opportunities. We shall explore these factors in Chapter 4.

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[36] Bielby, W. T. and D. D. Bielby (1992). "I Will Follow Him: Family Ties, Gender-Role Beliefs, and Reluctance to Relocate for A Better Job." American Journal of Sociology 97: 1241-1267.

Whereas military rates of migration have not decreased apace with the flow of policy research highlighting its injurious effects, one is drawn to conclude that military leaders have research to date, at best, peripheral to policy making.

CHAPTER 3

THE FEASIBILITY AND EFFICACY OF REDUCING MILITARY MIGRATION

In the analysis that follows, I will first review the basis for military migration. This review will entail a survey of the Army's operating environment. Thereafter, I will explore the most readily available policy alternative to slow military migration. Specifically, I will assess the retention consequences of deploying soldiers from home stations in the U.S. to overseas locations in lieu of moving Army families between the U.S. and overseas operating areas.

Why Military Families Migrate. As noted in the previous chapter, the existing literature explains the relatively poor labor market outcomes of military wives in terms of family migration. This finding ensues from economic theory regarding the untoward effect migration exerts upon wives' earnings coupled with recognition of the high rates of migration found among military households. Whereas migration remains an enduring attribute of military service, it is appropriate at this juncture to survey the basis for the transient nature of military life. As a matter of practicality, such a survey will serve as a starting point in evaluating the feasibility and efficacy of policies directed towards stabilizing military families as a means to improve the employment situation of military wives.

First, it is important to note that mission requirements underlie the Army's personnel rotation and assignment policies. Under Title 10,

> *"It is the intent of Congress to provide an Army that is capable, in conjunction with the other Armed Forces, of preserving the peace and security… of the United States…,*

> *supporting the national objectives,… and overcoming any nations responsible for aggressive acts that imperil the peace and security of the United States. [The Army] shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations on land…[and] is responsible for the preparation of land forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated… mobilization plans, for the expansion of the peacetime components of the Army to meet the needs of war"*[37]

To implement the intent of Congress, the Army must position personnel and forces both overseas and within the United States to facilitate current and future operations. Deployable combat forces based in Europe, the Pacific, and Southwest Asia represent the implements of National Military Strategy positioned geographically to attain capabilities outlined in joint strategic planning documents. Within the United States, Army units and personnel are arrayed within the framework of systems tailored to Title 10 requirements. In their simplest form, these systems can be thought of as production, combat, and integration.[38]

The production system is concerned with transforming national resources into the constituent elements of the combat system: doctrine to guide training and organizational design, personnel acquisition and development, technology acquisition, and materiel development. The acquisitive functions are best accomplished where resources can be found. In terms of personnel acquisition, officers and soldiers located in communities throughout the United States accomplish recruiting functions necessary to infuse new labor into the Army.

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[37] Title 10, United States Code, Section 3062.
[38] U.S. Army War College (1997). "How the Army Runs, A Senior Leader Reference Handbook.": 3.1-3.11.

This includes manning ROTC detachments at the nations' institutions of higher learning and serving at the Military Academy. Similarly, members of the Army's Acquisition Corps work in proximity to the nation's industrial and technological centers. Typically, preparing soldiers to accomplish these functions entails assigning them to institutions of higher education where they can acquire the necessary technical skills.

Soldiers assigned within the combat system combine inputs from the production system to yield deployable forces. Activities within the production system occur on a global basis. Three of the Army's ten combat divisions, as well as two theater army support commands, are located overseas. The remaining combat forces are distributed on seven major installations in the United States. Additionally, training support for Army Reserve and National Guard units engenders a wide distribution of active component soldiers to communities throughout the United States.

Finally, soldiers assigned within the integrating system are located abroad and within the United States so as to synchronize and direct functions accomplished within the production and combat systems. To facilitate command and control functions, these entities were originally located in proximity to important command and communications nodes. Thus, the Pentagon is located in Washington, D.C., while Eighth Army Headquarters is located in Seoul, Korea. Alternatively, many subordinate headquarters are distributed according to the military requirements prevailing at the time of their inception or so as to satisfy the vagaries of American budgetary politics.

Specifically, the location of headquarters such as Armaments Command in the Illinois Quad-City region and Recruiting Command in southern Kentucky are exemplary cases.

Relatively few billets within the aforementioned systems are collocated within the same installation. Consequently, concerns for soldier development contribute to the frequency of migration within the Army. Reference to Figure 3.1 below provides graphic illustration of this situation.

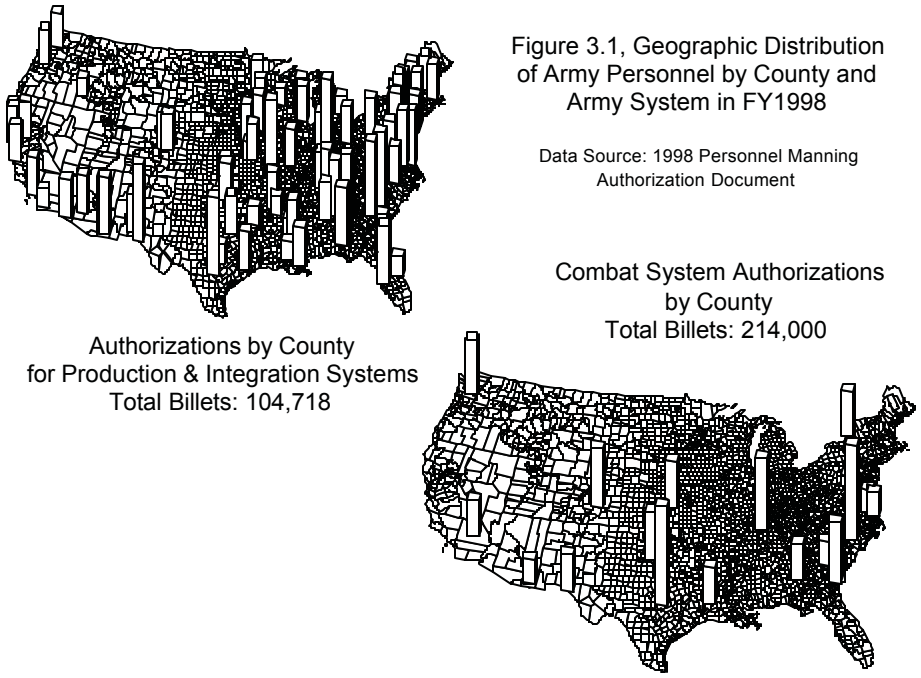

Figure 3.1, Geographic Distribution of Army Personnel by County and Army System in FY1998

Data Source: 1998 Personnel Manning Authorization Document

The county level map in the upper left corner of Figure 3.1 depicts the number of Army production and integration system billets (with more than 10 soldiers in a county) by county within the United States. The map in the lower right corner of Figure 3.1 depicts combat system billets not collocated with production and integration billets. In terms of personnel and migration management, the dispersion of

personnel and functions presented in Figure 3.1 will confound efforts to stabilize the residence of Army families.

Indeed, a cursory review of personnel development requirements is illustrative of the degree to which a transient lifestyle is embedded in Army structure. Army careers begin with entry level training in the production system. Initial developmental assignments designed to ground soldiers in the military arts ensue at posts located within the combat system. Thus, an initial term of service will entail at least one move, as these systems are, by and large, not collocated. While entry level personnel are seasoned within the combat system, more senior personnel carry out training, acquisition, and integration functions that are typically not collocated with elements of the combat system. So as to hone their combat skills as they advance in rank and longevity, these personnel must return to developmental assignments within the combat system. Thus, professional development contributes to migration throughout a career so as to engender moves every three to four years.

The role migration plays in distributing and developing Army personnel within its various systems is all the more apparent when we incorporate overseas forces into our analysis. Significant numbers of soldiers serve abroad. These assignments range from duty in Alaska and Hawaii to Europe. Whereas the Army has established sufficient infrastructure (hospitals, schools, family housing, and security) at these locations to support military families, the Army categorizes them as "long accompanied" tours. They are accompanied tours by virtue of the fact that soldiers may bring their families with them to

these assignments at government expense. Alternatively, locations such as Turkey, South Korea, and Southwest Asia lack adequate family support infrastructure and are designated as "short unaccompanied" tour areas. In the case of unaccompanied tours, families are not permitted to accompany soldiers to these assignments at government expense. Family members are therefore denied access to military housing and medical care should they join their military spouse at these locations at their own expense. In the case of short tour areas, families cannot be separated from soldiers indefinitely. Thus, these tours engender a rotational flow of personnel on an annual basis. In the case of long tours, personnel cannot be left overseas indefinitely. Soldiers and their families must be returned to the United States periodically for developmental assignments in the production and integration systems. In the case of accompanied tours, the overseas rotation interval is typically three years to correspond to the normal interval between developmental assignments paced to career advancement.

Putting aside professional development considerations, anyone having served in overseas long or short tour areas can provide anecdotal support for the need to repatriate soldiers on a periodic basis. Indeed, the ubiquitous ability of soldiers to recite the number of months, weeks, and days until their DEROS[39] attests to the impracticality of leaving personnel overseas indefinitely.

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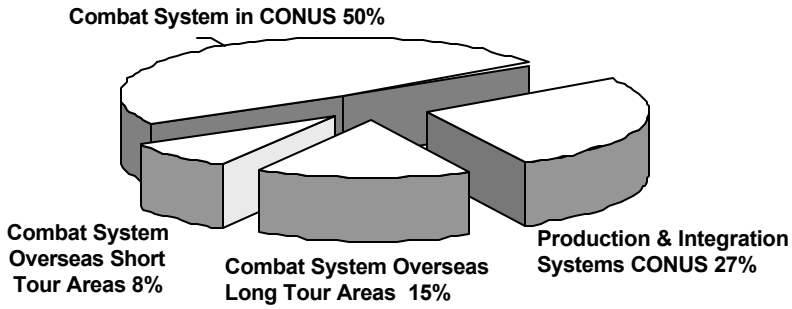
[39] DEROS is the military acronym for "Date of Expected Return from Overseas".

Reflecting upon Figure 3.2 below, we find that 23 percent of Army billets are located overseas while 27 percent are located in production and integration systems in the continental United States (CONUS). Thus, 50 percent of Army billets are not collocated with elements of the combat system in the continental United States. Consequently, the Army's rate migration ensues from the need to staff widely dispersed and dissimilar systems while developing soldiers with the technical and military skills necessary to accomplish the Army's Title 10 mission.

Figure 3.2, Distribution of Army Personnel Worldwide by Type of Tour Length and System in FY1998

Data Source: 1998 Personnel Manning Authorization Document



THE RETENTION CONSEQUENCES OF DEPLOYMENTS

Having reviewed the basis for migration in the Army, I now turn to the topic of migration reduction. Specifically, in the following section, I explore the retention consequences of substituting deployments from home stations in the United States for migration between posts in the United States and overseas installations.

Deployments Rather than Forward Basing as a Means to Reduce Migration. Heretofore, I have attributed soldier migration to the geographically diffuse disposition of Army forces and functions. Given this

situation, it is reasonable to weigh infrastructure consolidation as a means to reduce migration. Such consolidation could take two forms. First, the Army could consolidate its activities within the continental United States (CONUS) so as to collocate production, integration and combat systems within a much reduced set of installations. Alternatively, the Army could reduce overseas basing of soldiers and their families in favor of relatively short soldier deployments to Europe and Japan. By collocating production, integration and combat systems within a few large installations, migration due to professional development considerations could be reduced. Alternatively, by relying upon deployments in lieu of forward basing, migration due to the need to repatriate soldiers and their families could be reduced.

However, reflection upon the Base Realignment and Consolidation (BRAC) efforts of the early 1990s suggests that domestic political considerations will preclude the sort of large-scale consolidations required to implement the first alternative. Indeed, earlier attempts to rationalize Army infrastructure with contemporary military requirements were marked by bitter internecine political struggles. Hence, there is little political support for significant base consolidations within the United States.

Whereas domestic political considerations may militate against base consolidation in the United States, political support can be found for returning overseas forces to bases in the U.S. Indeed, the force reductions and base closures implemented in the early 1990s fell heavily upon forces stationed abroad. Therefore, as this alternative

enjoys a modicum of political feasibility, I will explore the increased use of deployments in place of forward basing as a means to reduce the rate of migration in the Army.

Since the end of the Cold War, the Department of Defense has considered deploying combat forces to, rather than permanently stationing military personnel and their families in, Europe and Japan.[40] A shift to such a deployment policy would entail home-basing soldiers and their families in the United States from whence soldiers would rotate to overseas locations. These deployments would occur with much higher frequency[41] than current overseas assignments but would entail a much shorter duration, approaching six months.[42]

Estimating the Spouse Earnings Benefit. While deploying forces in lieu of forward basing could achieve objectives beyond the scope of this work[43], such a strategy would have the salutary effect of eliminating a major impetus to migration among military households. Namely, eliminating three-year rotations to Europe would slow the rate of migration associated with these tours. With forward basing, the likelihood of serving one three-year overseas tour is estimated to be

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[40] Permanent overseas stationing of forces, as is the current practice, is known as forward basing.

[41] Since current tour lengths in Europe average 32 months in duration (U.S. Army Office of Economic and Manpower Analysis), adopting a six-month deployment regime would increase the frequency of tours in Europe by more than fivefold.

[42] Deployments for periods in excess of 180 days are categorized as a permanent change of station under DoD policy.

[43] Elements within the Army Staff have suggested that forces stationed in the United States garner greater political support in Congress due to the jobs and contracting dollars they provide to local economies.

80 percent in a twenty-year career.[44] Therefore, dropping forward basing in Europe, in favor of deployments from the United States, would yield an expected reduction in migration by eight-tenths of a move. Given the current three-year reassignment pattern with forward basing, a switch to deployments would yield a reduction of about one (eight-tenths) move from the current frequency of six moves in a twenty-year career. This would represent a 14 percent reduction in migration and increase average time-on-station from thirty-six months to forty-one months.

If we adopt Payne's results as addressed in Chapter 2 for the purpose of a brief thought experiment, we can evaluate the spousal earnings impact of increasing the time between migration episodes. Recall that with Payne's linear specification, an additional twelve months on the job raises military wives' annual wages by 16 percent.[45] For the purpose of this experiment, we will assume that the entire five month increase in time-on-station occasioned by a deployment, rather than forward basing strategy, is added to Army wives' employment longevity. Under this assumption, annual earnings for employed wives of soldiers would rise by five-twelfths of 16 percent, or, approximately 7 percent.

The PERSTEMPO Implications of a Deployment Strategy. Of course, for both the Army and Army families, deployments in lieu of forward basing are likely to entail unwelcome encumbrances. With the advent of the

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[44] Thie, H., A. Robbert, et al. (1998). Impact of Current Army TEMPO on Forward Basing and Deployments. Santa Monica, Rand Corporation.

post Cold War 'Engagement', Army personnel have witnessed a dramatic rise in the frequency of peacemaking, peacekeeping, and peace-enforcement operations. Rand Corporation has estimated that as a result of these operations, between 1985 and 1995, soldiers witnessed a 33 percent increase in the amount of time they could expect to be separated from their families.[46]

Between 1 October 1994 and 31 August 1999, married soldiers spent an average of 23 to 26 percent of their term of enlistment deployed[47]. If the Army had substituted a European deployment regime for the current forward basing strategy, the share of time deployed would have risen by 10 to 18 percent depending upon soldier longevity.[48] This increase in time away from home, or personnel tempo (PERSTEMPO) as it is known in the military, provides an avenue for exploring one of the important burdens alluded to above. Specifically, such deployments may engender lower reenlistment rates. As such, adopting deployments as a means to lengthen time-on-station, and thus increase wives' employment

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[45] Payne, D. M., J. T. Warner, et al. (1992). "Tied Migration and Returns to Human Capital: The Case of Military Wives." Social Science Quarterly 73(2): 325-339.

[46] Thie, H., A. Robbert, et al. (1998). Impact of Current Army TEMPO on Forward Basing and Deployments. Santa Monica, Rand Corporation.

[47] Descriptive statistics can be found in Tables C.1 through C.6 in Appendix C. For example, married soldiers with four to six years of service at ETS had an average term of service (TOS) of 40.33 months. Of this period, these soldiers spent 3.63 months in unaccompanied tour areas (short tours) and 5.56 months deployed. Thus, they experienced an average of 9.19 months or 23 percent of an average enlistment away from home. The figures reported above are for soldiers completing a term of service between 1 October 1994 and 31 August 1999 who had the option to reenlist at the end of their contracted term of service (ETS).

[48] If the Army had elected to deploy forces to, rather than station them in Germany after the end of the Cold War, the average married soldier facing a re-enlistment decision between 1995 and 1999 would have spent 32 to 42 percent of an enlistment deployed away from his or her home station.

longevity and earnings, would be a Faustian bargain for the Army. In this regard, concern about the untoward retention consequences of frequent deployments has led the military to sponsor research into the nexus between PERSTEMPO and retention. I will proceed from this foundation.

Findings from Earlier Research. In a 1973 exit survey of junior officers departing the Army, 96 percent of respondents reported that their wives were dissatisfied with family separations.[49] In subsequent work, separations among Navy enlisted personnel were found to increase in a linear fashion with deployments.[50] As the share of time deployed rose from virtually nil to 75 percent, the proportion of enlisted personnel leaving the service nearly doubled. Elsewhere, the Center for Naval Analysis found a modest negative relationship between the length of extended deployments and sailor re-enlistment outcomes.[51] Finally, a 1998 analysis of the reenlistment and PERSTEMPO nexus for enlisted personnel found that, to a point, PERSTEMPO increases reenlistment rates.[52]

METHODOLOGY FOR GAUGING THE PERSTEMPO AND RETENTION NEXUS

In the preceding section I addressed the potential spousal earnings benefit of reducing migration in the Army by substituting deployments

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[49] [U.S. Army Personnel Management Directorate, 1973 #135]
[50] Szoc, R. (1982). Family Factors Critical to the Retention of Navy Personnel: Final Report. Washington D.C., U.S. Navy Personnel Research and Development Center.
[51] Cooke, T. W., A. J. Marcus, et al. (1992). Personnel Tempo of Operations and Navy Enlisted Retention. Alexandria, VA, Center for Naval Analyses.
[52] Hosek, J. and M. Totten (1998). Does Perstempo Hurt Reenlistment? The Effect of Long or Hostile Perstempo on Reenlistment. Santa Monica, CA, Rand Corporation.

for forward basing. In the following analysis, I find that, with regard to retention, there is no free lunch. Specifically, I find that deployments that would increase PERSTEMPO would incur a marked reduction in retention among soldiers with less than ten years of service.

Measuring PERSTEMPO. The mixed findings discussed in the preceding section invite a detailed appraisal of the deployment and retention nexus. However, as a point of departure, this appraisal, and a reading of the foregoing literature, must be tempered by an appreciation of the dearth of suitable measures at hand to gauge PERSTEMPO.

Unfortunately, service personnel data suffers from missing incentives. On the one hand, service members have few means to, and garner no benefit from, ensuring deployment indicator data in Army personnel databases are correct. Similarly, personnel clerks, burdened with routine activities, have little to no incentive to solicit and enter such data. Thus, the Army Personnel Deployment File contains abundant instances of erroneous reporting.[53]

Given the lack of reliable direct measures, one is relegated to techniques reminiscent of hog weighing day in Momence, Illinois. Each year, the local populace gathered in the Momence to weigh their hogs before sending them to the Chicago stockyards. After placing a hog on

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[53]I reviewed entries for soldiers with known deployment histories. In a particularly emblematic case, The Personnel Deployment File indicated that a soldier, who had at that time been assigned to West

the town scale, the townspeople collected large stones and deposited them on the counterweight portion of the scale. Once the scale was in balance, they estimated the weight of the stones.[54] With regard to gauging the nexus between PERSTEMPO and retention, I employ a technique akin to that used in Momence. Specifically, I borrow from earlier work and employ Family Separation Allowance Type II (FSA II) and Hostile Fire Pay (HFP) as indirect measures of PERSTEMPO.

FSA II and HFP as Deployment Indicators. In recognition of the problems found with personnel deployment data, the Defense Manpower Data Center (DMDC) created a special PERSTEMPO File using FSA II and HFP pay elements in addition to unit location data to classify personnel deployment status. Theoretically, use of payments for Family FSA II and HFP provide good measures of deployments.[55] In the case of FSA II, payments are only made to soldiers while deployed away from their dependents. In contrast, HFP is only paid to soldiers while they are deployed to hostile fire areas. Since these payments involve monetary transfers, one can also expect that they accurately

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Point for some two years, was still on an extended deployment from Fort Bliss to Southwest Asia.

[54] Adapted from a similar story in Augustine, N. R. (1997). Augustine Laws. Reston, Va, American Institute of Aeronautics and Astronautics.

[55] Hostile Fire Pay (HFP) is paid during periods of nominal peace to personnel subject to hostile fire, mines, or explosions. The amount of this pay is $150 per month of deployment. Entitlement to this pay begins on the first day of a deployment to an area authorized HFP. These areas currently include Bosnia, Croatia, Macedonia, and Southwest Asia.

Family Separation Pay Type II (FSA II) is paid to personnel involuntarily separated from their dependents for more than 30 consecutive days. This pay was $75 per month prior to 1998 and $100 per month thereafter. FSA II payments are typically paid to personnel afloat or stationed in Bosnia, Croatia, Macedonia, Hungary, South Korea, Turkey, and Southwest Asia.

portray soldier status.[56] However, several complicating factors impair the reliability of these measures as currently employed by the Defense Department in imputing deployment status.

Limitations of the DMDC Deployment File. Soldiers without dependents are not entitled to FSA II. Therefore, such soldiers would be uncounted when deployed to areas where HFP is not authorized. In recognition of this situation, the Department of Defense imputes personnel deployment status so that all members of a unit are reported as deployed based upon unit location data when the following conditions are met:

1) The unit has ten or more personnel.
2) Thirty percent of these unit personnel have dependents.
3) Sixty percent of the personnel with dependents are drawing FSA.

Unfortunately, such rules do not comport well with available data and Army operating practices. First, administrative data files only reflect soldier assignment histories to the battalion or separate company level of resolution. This becomes problematic since deploying forces are often composed of subordinate elements of such organizations. Second, in many instances, soldiers participate in 'PERSTEMPO' generating events as individual replacements or 'fillers' rather than as members of deploying units. Therefore, tracking soldier exposure to such PERSTEMPO is not a straightforward matter of cross-matching soldiers to deployed units.

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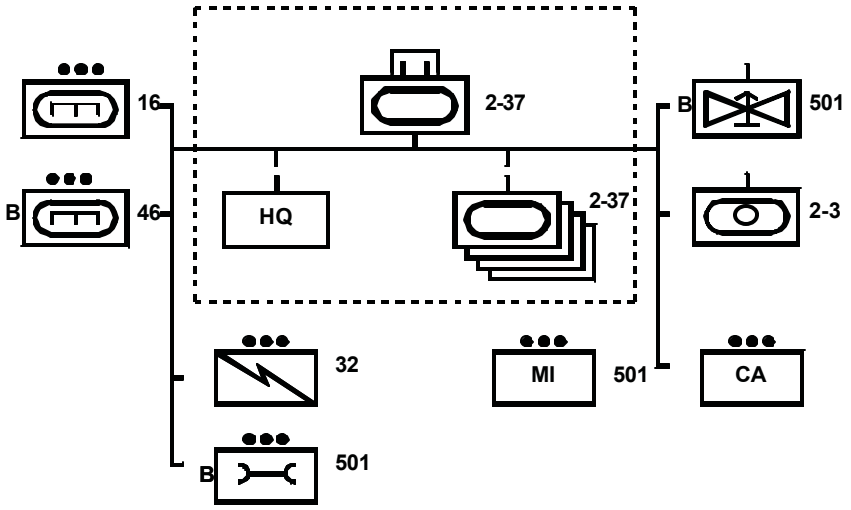
[56] Military paymasters face personnel liability for erroneous payment of these entitlements and service personnel have a strong personal incentive to ensure full payment for amounts due them. Therefore, incentives for accurate reporting of FSA II and HFP payments are well aligned.

By way of illustration, Task Force 2-37 Armor served as the United Nations Preventative Deployment Force in Macedonia from March 1997 to August 1997. Rather than deploying as a pure armor battalion (units within the dashed box of Figure 3.3 below), Task Force 2-37 consisted of an ad-hoc organization of aviation, engineer, artillery, and support elements (units outside the dashed box) built upon the structure of 2d Battalion, 37th Armor Regiment.

Figure 3.3, Task Force 2-37 Armor Organized for Peacekeeping Operations in Macedonia During Operation Able Sentry



Consequently, the attribution of personnel deployment status in these fractional unit attachments to 2-37 Armor, based upon unit location data, is problematic.[57] Since, existing data precludes accurate attribution of personnel deployment status in the case of fractional unit deployments, the utility of DMDC deployment data is suspect.

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[57] In the case of TF2-37 Armor, the misclassification of deployment status was likely to have approached 30 to 40 percent of the total force. The DMDC method would have credited all 600 personnel of 2-37 Armor with a deployment. However, it is likely that this battalion left a rear detachment of 20 to 30 personnel in Germany. At the same time, the DMDC methods would not have credited some 300 to 330 personnel in the attached engineer, maintenance, signal, intelligence, artillery, aviation, and civil affairs units with a deployment.

Given this situation, this analysis does not attempt to impute deployments of unmarried soldiers to areas where Hostile Fire Pay is not authorized.

Aside from unknown biases imparted through the previous imputation method, Department of Defense rules regarding transformation of FSA II and HFP pay data into deployment indicators systemically understates the duration of deployments.[58] This situation accrues due to decision rules imbedded in Department of Defense data management software. These rules attribute one month of deployment for each month with a positive FSA II or HFP payment amount. In the author's experience, pays triggered by changes in deployment status can substantially lag personnel deployment and redeployment. Consequently, a soldier deployed for three months to Bosnia may receive a single lump sum Hostile Fire payment at the end of the deployment. Additionally, FSA II and HFP payments may continue even after a soldier has redeployed from an area triggering his entitlement to such pays. This situation then results in negative payments that are, in fact, collections for overpayment of FSA II or HFP. These factors thus bias Defense Department data that has heretofore served as the basis for empirical analysis of operations tempo.[59]

Table 3.1 below illustrates the artifacts of FSA II payment streams with their potential impact on imputed measures of deployment duration and frequency. As indicated, Defense Department methods would

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[58] Defense Manpower Data Center (1998). Perstempo Project Active Duty Personnel Cohort File. Monterey, CA, DMDC.
[59] The Department of Defense furnished Hosek and Totten data from this file with which to complete their analysis or PERSTEMPO and retention.

categorize the lumpy FSA II payment stream in Table 3.1 as representing four noncontiguous deployments of one month each.

Table 3.1, Contrast Between Defense Department Method (DMDC) and Pay Amount Method for Attributing PERSTEMPO from FSA II Payments
(FSA II Entitlement: $75 per Month Separated From Family Members)

Exemplary FSA II Payments to SSN 001380xxx

Input Finance Data		DMDC Method	Pay Amount Method		
Payment Month	**Pay Amount**	**Derived Months Deployed**		**Derived Months Deployed**	
30MAY94	$258	1	Late Pay	3.44	
30APR94	.	.	.		
31MAR94	.	.	.		
28FEB94	.	.	.		
31JAN94	.	.	.		
31DEC93	$85	1	Late Pay	1.13	
30NOV93	.	.	.		
31OCT93	$188	1	Late Pay	2.51	
30SEP93	.	.	.		
31AUG93	$418	1	Late Pay	5.57	9.21 Months
31JUL93	.	.	.		
30JUN93	.	.	.		
31MAY93	.	.	.		
30APR93	.	.	.		
31MAR93	.	.	.		
Output Estimates		4 Deployments of 1 Month Duration		2 Deployment of 3.44 and 9.21 Months Duration	

However, by using the information imbedded in the payment amount, we can see that all of the payments were in excess of the monthly $75 entitlement amount. They thus represent late payments. By dividing the $75 monthly payment amount into the actual payments, and consolidating payment periods, we find that the soldier at hand was deployed twice for a total of 12.65 months. In the case of the analysis that follows, failure to account for such late payments would yield a 17 percent under-estimate of the mean duration of FSA II

deployments and an 18 percent under-estimate of the mean duration of HFP deployments.

In addition to the aforementioned issues, substantive differences in sample framing and model specification make comparisons of the findings that follow and with those of earlier work[60] problematic and led the author to create a PERSTEMPO history file using the pay method outlined above.

Methodology. With the aforementioned data, I employ logistic regression models to relate deployment frequency and duration to retention likelihoods. In the interest of brevity, details regarding my modeling methodology and results are provided in Appendix A. For the topic at hand, it suffices to refer the interested reader to Appendix A while hastening to the findings that motivate this analysis.

Retention Model Results. Having controlled for important covariates, I find that PERSTEMPO has a statistically significant and policy relevant impact on reenlistment rates. First, higher rates of PERSTEMPO engender lower retention. As expected, this adverse effect is strongest among first term soldiers who are least invested in the Army. Due to selection through attrition, and other factors, this

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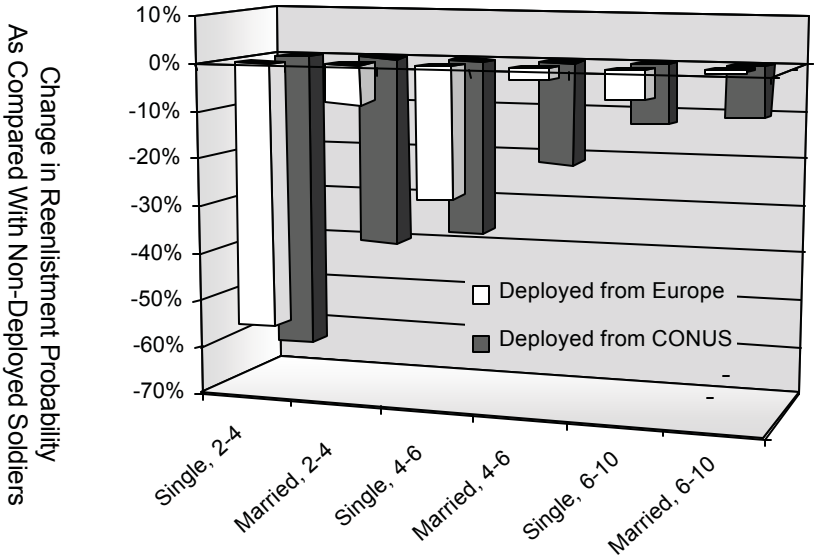
[60] Hosek, J. and M. Totten (1998). Does Perstempo Hurt Reenlistment? The Effect of Long or Hostile Perstempo on Reenlistment. Santa Monica, CA, Rand Corporation. This work modeled retention outcomes for personnel separating within three months of ETS. This approach should be compared with the approach detailed in Appendix A.

adverse effect attenuates with soldier longevity. Figure 3.4 below provides simulation results for a scenario of relevance to the issue at hand.

Figure 3.4, Change in Reenlistment Likelihood for Married Enlisted Personnel with Enlistments Ending in 1997 Who Deployed for Six Months During Their Current Term of Service



It illustrates the change in soldier reenlistment likelihoods associated with a six-month deployment from the United States to a non-hostile area. It also provides the change in reenlistment likelihoods for soldiers deploying from home stations in Europe to a non-hostile area. By way of example, a six-month deployment from CONUS to a non-hostile area induced a 39 percent reduction in the likelihood that a single soldier with dependents would reenlist at the end of a four to six year term of service.

Data underlying these results summarized in Figure 3.4 represents retention outcomes for single and married soldiers who were eligible to reenlist in FY1997 and who received FSA II payments during a term

of service ending in FY1997. Therefore, retention outcomes indicated by the second tier of dark bars represents a situation akin to deploying soldiers from the United States to Europe rather than forward basing soldiers and their families in Europe.

The first tier of light bars suggest that deploying soldiers from Europe to a non-hostile area entailed a lower retention cost than deploying soldiers from the United States. It is important to note that the underlying data was drawn from a period during which soldiers deployed from Europe and the U.S. to non-hostile areas of the Balkans and Eastern Europe in support of peacekeeping activities in former Yugoslavia. Therefore, Figure 3.4 suggests that, from a retention perspective, employment of forward based soldiers, rather than soldiers deployed from the United States was the preferred operating policy in the Balkans. More succinctly, the untoward retention consequences of PERSTEMPO were moderated when soldiers deployed from Europe. These results suggest that the Army's strategy of spreading deployments to the Balkans among CONUS based forces is relatively costly with regard to soldier retention.

Conclusions. With regard to the policy question motivating this analysis, substituting deployments from CONUS for forward basing soldiers in Europe could reduce migration within the Army. However, such a policy would entail substantial retention costs. Given the challenges presented in staffing the All Volunteer Force, such a tradeoff would jeopardize the Army's Title 10 responsibilities while yielding only a slight earnings gain among soldiers' spouses who work outside the home. Relying upon deployments rather than forward basing

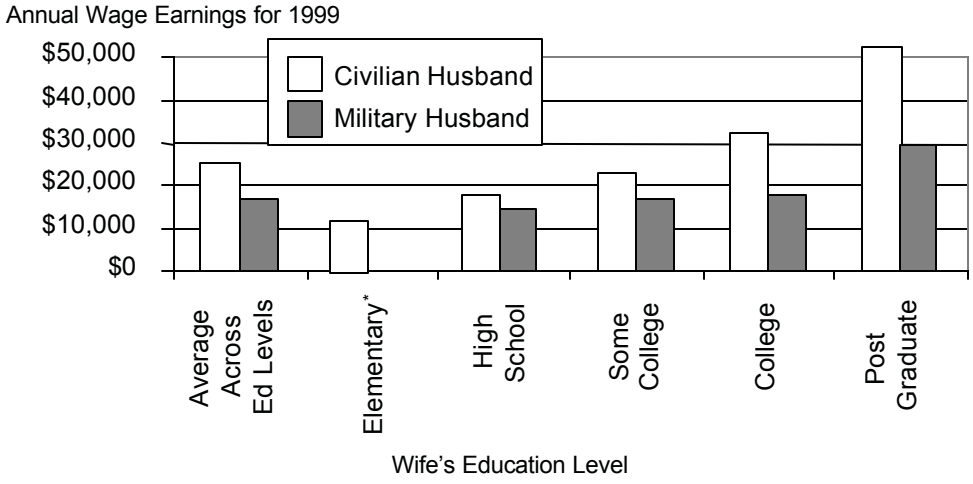
would also place a considerable burden of separation on the large population of Army families that would enjoy no benefits from such a change in stationing regimes. These families include households headed by a single parent soldier as well as traditional households in which the civilian spouse does not seek employment outside the home. Therefore, these considerations invite an exploration of spouse earnings that is unfettered by concerns for migration reduction and thus moves beyond the counsel of existing literature to identify policies that will enhance the labor market outcomes of soldiers' spouses without undue cost to the Army.

CHAPTER 4

THE WAGE EARNINGS OF MILITARY WIVES

Introduction. Reference to Figure 4.1 below suggests that wives of military personnel incur a substantial wage penalty. Moreover, in absolute dollar terms, this penalty appears to increase with educational attainment.[61]

Figure 4.1, 1999 Annual Earnings of Wives with Husbands Age 20 to 50
Data Source: 1999 March CPS Supplement



* Insufficient data to compute a mean for wives of military personnel

However, as we saw in Chapter 2, existing literature provides mixed findings with regard to the existence and scope of any such penalty. Schwartz's use of two stage estimation techniques coupled with inadequate sample size may have precluded his detection of a significant earnings difference between the wives of civilians and

[61] There are insufficient observations to compute the mean income for military wives who only completed elementary school.

military personnel.[62] Alternatively, Payne's work entailed questions of model specification. More generally, due to its genesis in Mincer's original work on migration, the bulk of the literature concerning the earnings of wives of military personnel arrives at a policy cul-de-sac. That is, in light of Chapter 3 analysis, recommendations to curtail migration as a means to enhance military wives' earnings assume the character of bromides of questionable practicality.

So as to improve upon the existing literature, my analysis will follow a different approach. First, setting aside migration theory, I will draw from the rich literature on human capital earnings functions to ascertain the magnitude and significance of any earnings penalty incurred by wives of military personnel. Thereafter, I will investigate the extent to which any such earnings penalty can be laid to factors beyond the transient nature of military life. Specifically, I will investigate the extent to which the destination, as well as the frequency, of military migration impacts wives' earnings.

CONCEPTUAL FRAMEWORK

Earnings Functions. Since this study is concerned with the wage earnings of military wives, I frame the analysis that follows within

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[62] Schwartz employed a two stage Heckmam procedure to correct for sample selection. The Heckman technique is known to be inefficient since estimation of second stage parameters employs a selection variable estimated in the first stage and yields heteroscedastic 2d stage residuals. Maddala, G. S. (1983). Limited-Dependent and Qualitative Variables In Econometrics. New York, Cambridge University Press. Maddala outlines the computations required to obtain

the context of human capital earnings functions. Specifically, I employ statistical earnings functions as an empirical means to explain wives' earnings. Within this framework, wives' earnings outcomes can be seen as a function of a vector of individual attributes and market factors. The basis for this approach is firmly rooted in earlier work by Becker[63] and Mincer[64] who first suggested the use of earnings functions to explain the influence of education and work experience on earnings. These earnings functions represent a practical approach to the issue of wage determinants. Specifically, they embody the central implications of human capital theory within models that are amenable to regression analysis using census and survey data that otherwise lack the requisite detail to enable structural equation modeling.

In their simplest incarnations, statistical earnings functions model earnings as a function of human capital

$$y = f(s,e) + u$$

where $f(s,e)$ is the functional form that best explains earnings in terms of education (s) and experience (e). Due to a deficit of data on actual work experience, potential experience is typically imputed as age (a), less years of education, plus six, to account for the age at which schooling typically begins.[65]

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consistent estimates for parameter standard errors for the second stage.

[63] Becker, G. S. (1964). Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. Chicago, University of Chicago Press.

[64] Mincer, J. (1958). "Investment in Human Capital and Personal Income Distribution." Journal of Political Economy: 281-302. and Mincer, J. and S. W. Polachek (1974). "Earnings of Women." Ibid. 82(March/April 1974): S76-108.

[65] Mincer, J. (1974). Schooling, Experience, and Earnings. New York, Columbia University Press.

$$e = a - (s + 6)$$

Potential experience thus accounts for the productivity enhancing human capital accumulation associated with learning-by-doing. As a matter of empirical regularity, the effect of potential experience is seen to be a diminishing function that assumes a concave form.[66] This earnings-experience form reflects a less than proportional increase in earnings with experience. Seen from the perspective of productivity, this implies a diminishing marginal product of experience.

Human Capital and Earnings. As alluded to above, statistical earnings functions derive from a body of theory that seeks to explain the nexus between human capital investment and earnings. As such, this theory contends that the pursuit of education delays worker entry into the labor force. Education thus entails foregone earnings. To induce workers to forego earnings while in school, education must raise worker productivity sufficiently so that more highly educated workers garner higher wages than less educated, and thus less productive, workers. Assuming homogeneous ability, educational choice thus becomes a function of the discount rate and the marginal return to education. Given this structure, and fairly constant discount rates, workers will select the level of education at which the discounted present value of future wages, associated with a given level of education, exceeds the present value of wages not earned during the period of education.

Accounting for Wives' Labor Supply. Given the non-trivial expenditure of married female labor in non-market household production,

traditional earnings functions must be augmented to account for labor supply. Specifically, wives' earnings functions must place wives' time allocation over work in the home, and in the labor market, within a framework that maximizes household earnings/production.[67] In this way, a wife's labor allocation decision can be seen to be a function of a variety of household factors that account for the value of household goods she produces as compared with the wage return she can garner outside the home.

Historically, differential wage returns to men and women contributed to labor specialization within households. Specifically, males garnered relatively high market wages per unit of labor. Thus, households elected to allocate husbands' time to work outside the home. Conversely, due to relatively low female market wages, wives found their greatest contribution to household production and utility through work within the home.[68]

Societal norms and technology also combined to shape households' labor allocation decisions. In the presence of few labor saving devices, and high fertility rates, the cost of foregone household production was high. Work outside the home for mothers of young children either entailed diversion of their husbands' non-leisure time to labor in the home, or diversion of household income to pay for the services of a

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[66] Ibid.
[67] Becker, G. (1976). The Economic Approach to Human Behavior. Chicago, University of Chicago Press.
[68] Some 60 percent of the increase in female labor participation since 1890 has been attributed to an increase in the real wage garnered by women. Smith, J. P. and M. P. Ward (1985). "Time-Series Growth in the Female Labor Force." Journal of Labor Economics 3(January Supplement): S59-S90.

nanny or housekeeper. Today, technological advances afford wives greater control over the labor demands within the home, as well as decisions regarding fertility. Nevertheless, allocation of time to work outside the home continues to entail substantial costs in terms of foregone household production.

Wives' Reservation Wage. The aforementioned costs of foregone household production and leisure represent a wife's reservation wage. When the market wage falls below a wife's reservation wage, devoting the wife's labor to production in the home increases household utility. Alternatively, when the market wage exceeds a wife's reservation wage, she will enter the labor market and garner earnings. Thus, the decision for a wife to seek employment outside the home can be seen as the output of a utility maximizing process. This process will depend upon the wife's market wage, her reservation wage, and her preferences. Thus, this process can be modeled within the framework of an augmented earnings function that seeks to account for the wife's reservation wage. Since reservation wages are not directly observable, the vector of individual and market factors normally included in earnings functions should be augmented to incorporate factors thought to affect a wife's reservation wage.

The presence of children in a household is likely to exert a strong influence on a wife's reservation wage. Within traditional households, wives take a leading role in caring for minor children. In the case of preschool age children, this role can be demanding in both time and energy, while offering the substantial emotional rewards associated with parenting. Therefore, labor market participation by a

wife with preschool age children is likely to entail considerable monetary and non-monetary costs. At a minimum, these costs can be valued at the fee afforded to child care providers outside the household. Viewed more expansively, they can also include reduced feelings of well-being due to separation from young children during the workday.

As children mature and enter school, child care costs incurred by a wife's labor market participation are likely to decline. Thus, the presence of children under age six is likely to be a leading determinant of a wife's reservation wage. Additionally, a distinction between teen and pre-teen children is also likely to be meaningful. Preteens are likely to require a higher level of after school supervision. As such, they may constrain a wife's employment to school hours. By way of example, analysis of workplace-residence separation finds that the presence of children significantly impacts the work trip behavior of mothers in two-earner families. Specifically, wives select jobs closer to their home because their household responsibilities increase the cost of longer commutes.[69] Thus, the presence of children may not only reduce a wife's labor supply. They may also preclude a wife from securing relatively high wage employment that is not proximate to her home and children.

MODELING WIVES' WAGE EARNINGS

Current Population Survey Data. Empirical comparisons of the earnings of wives of civilian and military personnel require data of sufficient

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[69] Madden, J. (1981). "Why Women Work Closer to Home." Urban Studies 18(May 1981): 181-194.

resolution and breadth to implement statistical earnings models. As is often the case, such data is in short supply. In the past fifteen years, the Department of Defense has only fielded one survey that systematically addressed the labor participation and earnings of wives of enlisted personnel and officers.[70] Of course, given the charter for such surveys, data reflected therein did not include responses from non-military households. Fortuitously, the March Supplement to the Current Population Survey (CPS) does include demographic, earnings, and employment information collected from a probability sample of American households on an annual basis. Of particular importance, the CPS includes observations on Americans residing in the United States and its territories to include military personnel not stationed overseas or residing in barracks. Since the Current Population Survey includes variables that allow individual observations to be matched into military and civilian households, it is particularly well-suited to a cross sectional analysis of military and civilian wives' earnings.

The CPS does, however, embody two idiosyncrasies worthy of special consideration. First, the prevalence of military households in any annual CPS rotation is low. Second, though normally thought of as only a cross sectional survey, the CPS includes a longitudinal component. In light of these considerations, I employ a pooled sample of survey responses for alternating years from 1993 through 1999.

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[70] Defense Manpower Data Center (1993). 1992 DoD Surveys of Officers and Enlisted Personnel and Military Spouses. Arlington, Virginia, Department of Defense.

With regard to sample size, an annual subset of the CPS selected for traditional households headed by a husband between the age of 20 and 50[71] will include approximately 12,000 matched observations on husbands and wives. Of these, the underlying population frequency of military households yields some 180 observations per annual CPS rotation. Thus, given the small size of the underlying population of military households, in relation to the total population of American households, a pooled sample is necessary to achieve sufficient power. In fact, of the 49,549 observations on households included in my sample, only 823 represent households headed by a male military service member married to a civilian wife.

My use of a pooled sample from annual CPS rotations brings us to consideration of the longitudinal aspect of the Current Population Survey. Specifically, fifty percent of a given annual CPS rotation is included in two consecutive years. As this structure does not lend itself to fixed effects modeling, use of responses from alternating years avoids a violation of the underlying classical regression assumption of independently distributed errors.

Modeling Approach. To identify the role military affiliation plays in wage determination; I model the earnings of all wives who had wage income during 1993, 1995, 1997 and 1999. To address the effects of military affiliation on wives most connected to labor markets, I also model the earnings of wives identifying themselves as full-time workers during the year for which their earnings were reported.

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[71] Sample restriction to these age groups is reflective of the age demographic of male military personnel.

Finally, to preclude untoward influence from fractional year earnings due to migration, I only estimate earnings functions for wives in households that did not move in the year for which wives' earnings are reported.

To minimize the influence of selection bias, the issue of market and reservation wages must be addressed. That is, only those wives whose market wage exceeds their reservation wage will be in the labor force. Thus, a sample of wives with wage earnings will exclude those wives whose reservation wage exceeds their market wage. Since we cannot observe the wage rate for such wives, the potential for selection bias ensues, and use of ordinary least squares will render inconsistent estimates. To address this situation, I employ a sample selection correction technique developed by James Heckman.[72] Specifically, I model wives' earnings functions using a two-stage approach. In the first stage, I employ a probit selection equation to model the probability that a wife will have earnings.

My first stage estimators include variables thought to influence a wife's market wage and reservation wage. These include her race, potential labor force experience, education level, the presence of children, and her husband's education and wage level. Rather than imposing a restriction that the probability of earnings rise as a constant rate, I employ dummy variables at key threshold education levels.

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[72] Heckman, J. J. (1980). Sample Selection Bias as a Specification Error with Application to the Estimation of Labor Supply Functions. Female Labor Supply: Theory and Estimation of Labor Supply Functions. J. P. Smith. Princeton, N.J., Princeton University Press.

To account for the effect of military affiliation, I model civilian and military wives' education levels with distinct sets of dummy variables. My inclusion of the wives' potential experience and education level derives from human capital theory that views such investments as a means to garner higher market wages. Since military wives exhibit lower potential experience, I include an interaction term for military wives' potential experience and potential experience squared. These interaction variables are the product of potential experience variables and a zero-one dummy variable where a level of one indicates a wife was married to a military husband.

So as to control for wives' labor supply, I include several variables thought to govern a wife's reservation wage. These include the presence of children, husbands' earnings, and husbands' education level. As noted earlier, the presence of children will raise the cost of a wife's employment outside the home and should thus increase a wife's reservation wage. Similarly, a husband's earnings, as reflected by his current weekly wage, and his earnings potential, as reflected by his education level, should further control for household preferences regarding the extent of a wife's labor force participation. For example, increased allocation of a wife's time to labor in the home or leisure may be seen as a luxury good, the production of which is likely to increase with the husband's earnings. Finally, I fix regional and year effects by including dummy variables for four regions of the United States as reflected in the CPS and the year of each of the CPS rotations included in my pooled sample.

The statistical earnings function that I model in the second stage OLS regression takes the following form.

$$\ln(w) = \beta_0 + \beta_1 x_1 + \cdots \beta_{21} x_{21} + \beta_{22} \lambda + u$$

The dependent variable, $\ln(w)$, is the percent change in wives' annual wage earnings observed for wives with earnings.[73] Salient wage determination factors, x, include the percent change in the wife's labor expenditure in the year for which her earnings were reported, $\ln(WeeksWorked)$. The vector of explanatory variables also includes variables drawn from human capital theory, as well as household factors traditionally employed as a proxy for wives' reservation wage. Of note, the second stage regressors do not include the husbands' earnings and education level. I omit these variables from the second stage since they are likely to shape the level of a wife's labor participation rather than her earnings once she enters the labor force.

Regressing the aforementioned variables, augmented with Heckman's selection variable or Mills Ratio, λ, on the natural log of wives' annual earnings yields consistent parameter estimates by accounting

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[73] I do not model average weekly wages. The use of this variable in company with weeks worked, as a RHS variable, could bias parameter estimates towards -1. In the CPS, average weekly wage is derived from two questions: 1) What were your annual wages last year? 2) How many weeks did you work last year? Thus, use of this variable would place a variable with suspected measurement error, 'How many weeks did you work last year?', on the left and right hand side of the regression equation. Borjas and others have demonstrated that, given this situation, use of CPS reported values for average weekly wages, as a dependent variable is inadvisable. Borjas, G. J. (1980). "The

for the correlation between first and second stage residuals.[74] Statistical insignificance of the Mills Ratio in the second stage regression would indicate random assignment of wives to the group of wage earners. In this case, a single stage OLS model would suffice for estimating statistical earnings functions.[75]

Finally, with regard to earnings function specification, I do not apply the restrictive assumption of constant proportional returns to education typically found in the literature.[76] Rather, I apply a less restrictive model through the use of dummy variables to account for the return on human capital. Specifically, I use dummy variables to indicate the attainment of theoretically important levels of education. In keeping with the underlying motivation for this analysis, I interact these education variables with military affiliation to model disparate wage outcomes for wives of civilian and

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Relationship Between Wages and Weekly Hours of Work: The Role of Division Bias." Journal of Human Resources 15(Summer): 409-423.

[74] The Heckman procedure has been shown to be sensitive to the assumption of normally distributed first stage errors. The basis for this can be seen in the form of the mills ratio. Kennedy, P. (1998). A Guide to Econometrics. Cambridge, MA, MIT Press.

[75] For a more complete exposition on correction for selection bias see: Davidson, R. and J. G. MacKinnon (1993). Estimation and Inference in Econometrics. New York, Oxford University Press., Heckman, J. J. (1980). Sample Selection Bias as a Specification Error with Application to the Estimation of Labor Supply Functions. Female Labor Supply: Theory and Estimation of Labor Supply Functions. J. P. Smith. Princeton, N.J., Princeton University Press., Maddala, G. S. (1983). Limited-Dependent and Qualitative Variables In Econometrics. New York, Cambridge University Press. and Eklof, J. A. and S. Karlsson (1999). Testing and Correcting for Sample Selection Bias in Discrete Choice Contingent Valuation Studies. Stockholm, Stockholm School of Economics.

[76] Mincer, J. (1974). Schooling, Experience, and Earnings. New York, Columbia University Press.

military personnel as evidence of a military wage penalty.[77] My ultimate set of first stage explanatory variables is provided in Tables 4.2 and 4.5. Second stage regressors are provided in Tables 4.3 and 4.6.

Descriptive Statistics. Table 4.1 provides summary statistics for the universe of women married to men between the age of 20 and 50 who did not move during the year for which wives' wages are reported.

Table 4.1, Population Means

Parameter		Means All	Civilian	Military
Wife Had Any Wage Earnings			.7303	.6659
Wife Had Some Full Time Wage Earnings			.4966	.3815
Ln(Wife Annual Earnings Last Year)		9.488	9.494	9.087
Ln(Weeks Worked Last Year by Wife)		3.722	3.724	3.562
Proportion Military Households		.0166	.	.
Imputed Years of Experience		16.89	16.96	13.04
Experience Squared		343.6	345.7	219.9
Percent Caucasian		.8972	.8989	.7934
Husband Weekly Wage		762.3	765.5	591.1
Children Under Age 6	(1=Yes, 0=No)	.3733	.3722	.4350
Children Under Age 12	(1=Yes, 0=No)	.4252	.4249	.4386
Children Under Age 18	(1=Yes, 0=No)	.3268	.3277	.2758
Education Level of Husband: High School Graduate		.3265	.3276	.2637
Education Level of Husband: Some College		.2751	.2720	.4593
Education Level of Husband: College Level		.2784	.2785	.2722
Education Level of Husband: Post Graduate		.0961	.0957	.1179
Civilian Wife, High School	(1=Yes, 0=No)	.	.3570	.
Civilian Wife, Some College	(1=Yes, 0=No)	.	.2853	.
Civilian Wife, College	(1=Yes, 0=No)	.	.1821	.
Civilian Wife, Post Graduate	(1=Yes, 0=No)	.	.0642	.
Military Wife, High School	(1=Yes, 0=No)	.	.	.3755
Military Wife, Some College	(1=Yes, 0=No)	.	.	.3524
Military Wife, College	(1=Yes, 0=No)	.	.	.1835
Military Wife, Post Graduate	(1=Yes, 0=No)	.	.	.0389
Proportion from the North East	(1=Yes, 0=No)	.2069	.2092	.0741
Proportion from the MidWest	(1=Yes, 0=No)	.2476	.2493	.1434
Proportion from the South	(1=Yes, 0=No)	.2992	.2981	.3633
1995 CPS March Supplement	(1=Yes, 0=No)	.2316	.2335	.1179
1997 CPS March Supplement	(1=Yes, 0=No)	.2300	.2291	.2831
1999 CPS March Supplement	(1=Yes, 0=No)	.2110	.2112	.1981

[77] As indicated in Tables 4.2 and 4.3, probit parameter estimates for military wives' potential experience were significant determinants of these wives' labor participation. However, I did not include these variables in results reported in Tables 4.4 through 4.7. I omitted these variables from my statistical earnings functions due to the fact

These statistics reveal that wives of military personnel exhibit comparatively lower labor participation. Specifically, 66.6 percent of military wives had some wage earnings. By way of comparison, 73 percent of wives of civilians had some wage earnings. Similarly, 38 percent of military wives garnered full time earnings during the year for which they reported wages as compared with 49.6 percent of wives of civilians.

In keeping with this pattern, military wives reported working fewer weeks and garnering lower annual earnings. Also, non-Caucasians comprised a larger proportion of military wives, 21%, than of civilian wives, 10%. Furthermore, military wives exhibited lower potential years of experience. Since military wives had only a bit more undergraduate education, this difference in potential experience can be attributed to the relative youth of military wives. With regard to factors thought to affect wives' reservation wage, higher proportions of wives of military personnel had young children. Military wives are also married to better-educated husbands who earned lower weekly wages. Finally, the population of military wives predominantly resided in the South and West while the regional distribution of wives of civilians was much less skewed.

REGRESSION RESULTS

Labor Force Participation. As indicated in Tables 4.2 and 4.3 below, the probit parameter estimates for wives of military personnel are

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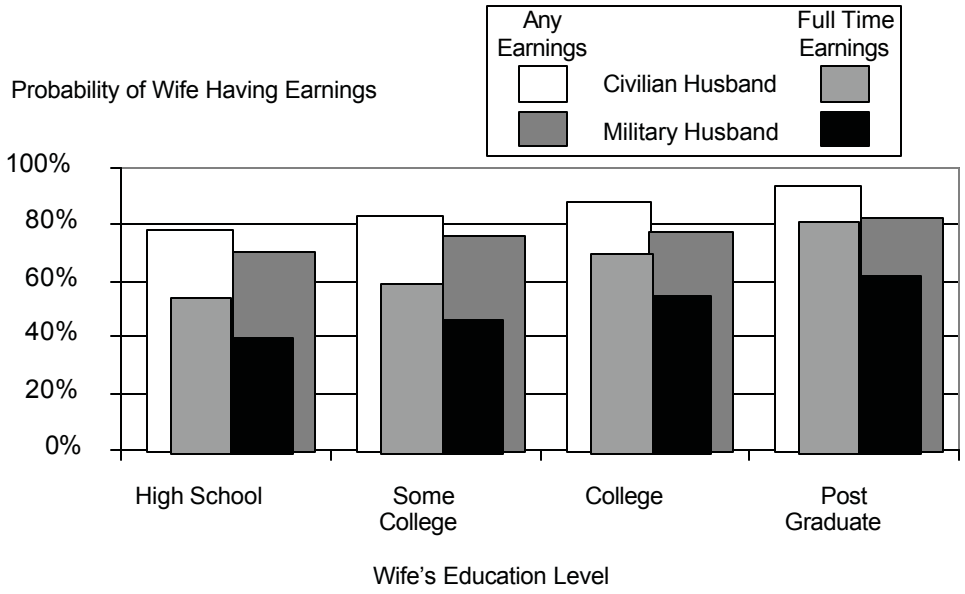
that F-Test values for these variables fell well below critical values required to establish statistical significance.

consistently negative and significant across all levels of educational attainment. At the same time, wives of military personnel exhibit higher labor participation for their potential experience than do wives of civilians. Direct interpretation of probit estimates requires resorting to simulation. Simulation results as presented in Figure 4.2 below elicit several observations.

Figure 4.2, Labor Participation Simulation Results
for Wives with Husbands Age 20 to 50
Data Source: 1993, 1995, 1997 and 1999 March CPS Supplement



First, holding the level of other explanatory variables constant[78], a substantial margin separates outcomes for wives of military personnel and wives of civilians. The wives of military personnel were seven to eleven percent less likely to have reported any earnings. Military wives were also twelve to eighteen percent less likely to have reported earning any wages from full time employment during the period

[78] In light of the difference in potential experience exhibited by wives of civilian and military personnel, I hold military and civilian wives' experience constant at the civilian wives' mean. Thus, simulation results presented in Figure 4.2 only reflect differential returns to education.

from 1993 through 1999. At the same time, the probability of having earnings increased with educational attainment among both classes of wives. However, labor participation, as evidenced by earnings, rose more rapidly with educational attainment among wives of civilians.

Table 4.2, Probit Model Results: Modeling the Probability that a Wife had Any Earnings
Omitted Variables: West, Elementary Education, 1993 Supplement

Number of Observations	43,989	
Log Likelihood	-41570605.28	
		(Weighted)
With Earnings, Response=1	32,678	59,438,979
No Earmomgs, Response=0	11,301	20,152,660

Level of Significance: **=.05, ***=.01

Parameter		Estimate	Std Err	Chi Square	Pr>Chi	Sig	Means for Wives with Earnings: All	Civilian	Military
Ln(Wife Annual Earnings Last Year)		.	.	.	.		9.488	9.494	9.087
Ln(Weeks Worked Last Year by Wife)		.	.	.	.		3.725	3.727	3.561
Proportion Military Households		.	.	.	.		.0152	.	.
Intercept		0.549	0.0011	261829	.000	***	.	.	.
Potential Years of Experience		0.001	0.0001	68.1	.000	***	16.70	16.76	.
Potential Experience Squared		-.000	0.0000	28729.9	.000	***	336.3	338.1	.
Potential Years of Experience, Military Wives		0.007	0.0004	265.7	.000	***	.	.	13.05
Potential Experience Squared, Military Wives		-.000	0.0000	202.8	.000	***	.	.	218.7
Percent Caucasian		-.057	0.0005	12454.2	.000	***	.8964	.8985	.7628
Husband Weekly Wage		-.000	0.0000	656846	.000	***	737.5	739.8	599.2
Children Under Age 6	(1=Yes, 0=No)	-.541	0.0004	2124511	.000	***	.3254	.3248	.3613
Children Under Age 12	(1=Yes, 0=No)	-.205	0.0003	362611	.000	***	.3999	.3995	.4234
Children Under Age 18	(1=Yes, 0=No)	0.032	0.0004	7049.6	.000	***	.3313	.3318	.2993
Education Level of Husband: High School Graduate		0.157	0.0006	68313.6	.000	***	.3313	.3327	.2464
Education Level of Husband: Some College		0.167	0.0006	67054.6	.000	***	.2932	.2902	.4891
Education Level of Husband: College Level		-.044	0.0007	3866.0	.000	***	.2798	.2801	.2609
Education Level of Husband: Post Graduate		-.201	0.0006	102641	.000	***	.0916	.0914	.1058
Civilian Wife, High School	(1=Yes, 0=No)	0.443	0.0006	533860	.000	***	.3533	.3529	.
Civilian Wife, Some College	(1=Yes, 0=No)	0.621	0.0007	880299	.000	***	.3008	.3000	.
Civilian Wife, College	(1=Yes, 0=No)	0.842	0.0008	1218260	.000	***	.1966	.1967	.
Civilian Wife, Post Graduate	(1=Yes, 0=No)	1.122	0.0010	1281417	.000	***	.0732	.0737	.
Military Wife, High School	(1=Yes, 0=No)	-.286	0.0035	6615.9	.000	***	.	.	.3777
Military Wife, Some College	(1=Yes, 0=No)	-.298	0.0035	7364.0	.000	***	.	.	.3558
Military Wife, College	(1=Yes, 0=No)	-.485	0.0039	15457.5	.000	***	.	.	.1880
Military Wife, Post Graduate	(1=Yes, 0=No)	-.583	0.0061	8998.5	.000	***	.	.	.0420
Proportion from the North East	(1=Yes, 0=No)	0.076	0.0005	22873.6	.000	***	.2089	.2110	.0675
Proportion from the MidWest	(1=Yes, 0=No)	0.170	0.0005	131786	.000	***	.2604	.2622	.1423
Proportion from the South	(1=Yes, 0=No)	0.086	0.0004	39961.6	.000	***	.2985	.2977	.3522
1995 CPS March Supplement	(1=Yes, 0=No)	0.039	0.0004	7558.9	.000	***	.2320	.2335	.1350
1997 CPS March Supplement	(1=Yes, 0=No)	0.063	0.0004	21127.2	.000	***	.2338	.2330	.2901
1999 CPS March Supplement	(1=Yes, 0=No)	0.052	0.0004	13892.8	.000	***	.2101	.2104	.1898

Reflecting upon parameter estimates contained in Tables 4.2 and 4.3, it is interesting to note that wives' labor participation varied inversely with their husbands' current, and in the case of post secondary education, potential earnings (where education is a proxy

for potential earnings). This would seem to reflect a situation in which husbands' rising current and potential earnings decrease the impetus for wives to enter the labor market. It may also reflect wives' consumption of leisure as a luxury good.

Table 4.3, Probit Model Results: Modeling the Probability that a Wife had Full Time Earnings
Omitted Variables: West, Elementary Education, 1993 Supplement

Number of Observations	43,978	
Log Likelihood	-51018865.84	
		(Weighted)
With Earnings, Response=1	22,180	40,685,216
No Earmomgs, Response=0	21,799	38,906,423

Level of Significance: **=.05, ***=.01

Parameter		Estimate	Std Err	Chi Square	Pr>Chi	Sig	Means for Wives with Earnings All	Civilian	Military
Ln(Wife Annual Earnings Last Year)		.	.	.	.		9.866	9.870	9.607
Ln(Weeks Worked Last Year by Wife)		.	.	.	.		3.850	3.851	3.796
Proportion Military Households		.	.	.	.		.0128	.	.
Intercept		0.083	0.0010	6971.6	.000	***	.	.	.
Potential Years of Experience		0.025	0.0001	111006	.000	***	16.84	16.88	.
Potential Experience Squared		-.001	0.0000	170905	.000	***	341.0	342.4	.
Potential Years of Experience, Military Wives		0.017	0.0005	1377.5	.000	***	.	.	13.54
Potential Experience Squared, Military Wives		-.001	0.0000	1182.5	.000	***	.	.	228.8
Percent Caucasian		-.230	0.0005	243253	.000	***	.8826	.8843	.7484
Husband Weekly Wage		-.000	0.0000	795002	.000	***	709.6	711.1	603.5
Children Under Age 6	(1=Yes, 0=No)	-.541	0.0003	2504899	.000	***	.2881	.2885	.2611
Children Under Age 12	(1=Yes, 0=No)	-.303	0.0003	915038	.000	***	.3658	.3652	.4172
Children Under Age 18	(1=Yes, 0=No)	-.040	0.0004	12847.5	.000	***	.3273	.3275	.3185
Education Level of Husband: High School Graduate		0.047	0.0006	6617.9	.000	***	.3337	.3350	.2325
Education Level of Husband: Some College		0.031	0.0006	2545.5	.000	***	.2975	.2948	.5064
Education Level of Husband: College Level		-.164	0.0007	58125.6	.000	***	.2728	.2730	.2580
Education Level of Husband: Post Graduate		-.234	0.0006	155245	.000	***	.0858	.0857	.0955
Civilian Wife, High School	(1=Yes, 0=No)	0.367	0.0006	370136	.000	***	.3477	.3474	.
Civilian Wife, Some College	(1=Yes, 0=No)	0.500	0.0006	596584	.000	***	.2948	.2941	.
Civilian Wife, College	(1=Yes, 0=No)	0.756	0.0007	1075182	.000	***	.2039	.2037	.
Civilian Wife, Post Graduate	(1=Yes, 0=No)	1.112	0.0009	1505067	.000	***	.0831	.0836	.
Military Wife, High School	(1=Yes, 0=No)	-.455	0.0035	16645.9	.000	***	.	.	.3726
Military Wife, Some College	(1=Yes, 0=No)	-.426	0.0034	15777.0	.000	***	.	.	.3471
Military Wife, College	(1=Yes, 0=No)	-.461	0.0038	14477.4	.000	***	.	.	.2166
Military Wife, Post Graduate	(1=Yes, 0=No)	-.647	0.0060	11696.3	.000	***	.	.	.0446
Proportion from the North East	(1=Yes, 0=No)	0.010	0.0005	427.0	.000	***	.1999	.2015	.0701
Proportion from the MidWest	(1=Yes, 0=No)	0.084	0.0004	37741.3	.000	***	.2539	.2556	.1242
Proportion from the South	(1=Yes, 0=No)	0.177	0.0004	191936	.000	***	.3226	.3218	.3854
1995 CPS March Supplement	(1=Yes, 0=No)	-.119	0.0004	83464.6	.000	***	.2121	.2133	.1242
1997 CPS March Supplement	(1=Yes, 0=No)	0.084	0.0004	45099.3	.000	***	.2424	.2415	.3089
1999 CPS March Supplement	(1=Yes, 0=No)	0.079	0.0004	37557.4	.000	***	.2189	.2193	.1911

Finally, as expected, wives' labor participation was also dampened by the presence of young children. This finding is in keeping with earlier observations regarding the impact of young children on wives' reservation wage and labor supply.

WIVES' WAGE EARNINGS

General Findings. Through reference to Tables 4.4 and 4.5 we find unambiguous evidence of a wage penalty among wives of military personnel. As opposed to the situation with probit models, interpretation of parameter estimates for my second stage earnings functions is straightforward. Given my log-log specification with regard to earnings and work expenditure, the parameter for '*weeks worked last year*', β_4, represents the percent change in annual wage earnings associated with a percent change in weeks worked. Similarly, β_1 and β_2 represent the percent change in annual earnings associated with a percent change in potential experience. Of note, F-Test results led me to conclude that wives of civilians and military personnel exhibit similar returns to potential experience. Therefore, I omitted interaction terms for military wives' potential experience from my second stage models.

With the exception of the Mills Ratio, my other regressors are zero-one dummies. Thus, with the appropriate transformation, the parameters associated with these variables yield the percent change in annual earnings due to the factor in question.[79] Moreover, education dummies for wives of military personnel reflect marginal effects. For example, as reported in Table 4.4, the change in earnings for military

[79] With dummy variables in a semilogarithmic specification the percent change in the dependent variable is equal to the antilog (base *e*) of dummy parameters minus 1 times 100. Halvorsen, R. and R. Palmquist (1980). "The Interpretation of Dummy Variables in Semilogarithmic Equations." American Economic Review 70(3): 474-475.

wives with a college education, as compared with the omitted group, is the transformed value of the sum of $\beta_{10}+\beta_{14}$.

Table 4.4, Annual Earnings Estimation Results for Wives with Any Earnings
Omitted Variables: West, Elementary Education, 1993 Supplement

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	22	40493839	1840629	1833.94	<.0001
Error	32654	32773072	1003.64648		
Corrected Total	32676	73266911			
Weighted	59,438,979				

Root MSE	31.68038	R-Square	0.5527
Dependent Mean	9.52985	Adj R-Sq	0.5524
Coeff Var	332.43297		

Level of Significance: **=.05, ***=.01

	Parameter		Estimate	Sig	StdErr	t Value	Prob t	Mean	Adjusted Estimates 1.2% Measurement Error	Adjusted Estimates 6% Measurement Error
β_0	Intercept		3.826	***	0.0463	82.7	.000	.	3.860	3.308
β_1	Imputed Years of Experience		0.040	***	0.0021	18.8	.000	16.45	0.039	0.036
β_2	Experience Squared		-0.001	***	0.0001	-16.	.000	328.5	-0.001	-0.001
β_3	Dummy Variable (1=White, 0=NonWhite)		-0.090	***	0.0132	-6.8	.000	0.886	-0.093	-0.151
β_4	Ln(Weeks Worked Last Year)		1.332	***	0.0076	175	.000	3.730	1.331	1.323
β_5	Children Under Age 6	(1=Yes, 0=No)	-0.108	***	0.0152	-7.1	.000	0.324	-0.133	-0.733
β_6	Children Under Age 12	(1=Yes, 0=No)	-0.178	***	0.0101	-18	.000	0.391	-0.183	-0.304
β_7	Children Under Age 18	(1=Yes, 0=No)	-0.100	***	0.0101	-10	.000	0.321	-0.101	-0.131
β_8	Civ Wife, High School	(1=Yes, 0=No)	0.259	***	0.0212	12.2	.000	0.351	0.272	0.595
β_9	Civ Wife, Some College	(1=Yes, 0=No)	0.443	***	0.0231	19.2	.000	0.304	0.459	0.851
β_{10}	Civ Wife, College	(1=Yes, 0=No)	0.755	***	0.0246	30.6	.000	0.202	0.772	1.200
β_{11}	Civ Wife, Post Grad	(1=Yes, 0=No)	1.075	***	0.0291	36.9	.000	0.075	1.095	1.599
β_{12}	Mil Wife, High School	(1=Yes, 0=No)	-0.172	***	0.0580	-3.0	.003	0.005	-0.178	-0.338
β_{13}	Mil Wife, Some College	(1=Yes, 0=No)	-0.150	***	0.0573	-2.6	.009	0.005	-0.157	-0.316
β_{14}	Mil Wife, College	(1=Yes, 0=No)	-0.248	***	0.0768	-3.2	.001	0.003	-0.260	-0.556
β_{15}	Mil Wife, Post Grad	(1=Yes, 0=No)	-0.124		0.1530	-.81	.418	0.001	-0.135	-0.416
β_{16}	North East	(1=Yes, 0=No)	0.033	**	0.0136	2.44	.014	0.184	0.035	0.077
β_{17}	MidWest	(1=Yes, 0=No)	-0.045	***	0.0129	-3.5	.000	0.271	-0.040	-0.072
β_{18}	South	(1=Yes, 0=No)	-0.021		0.0118	-1.8	.076	0.349	-0.019	-0.038
β_{19}	1995 March Supplement	(1=Yes, 0=No)	0.061	***	0.0117	5.18	.000	0.221	0.061	0.088
β_{20}	1997 March Supplement	(1=Yes, 0=No)	0.153	***	0.0112	13.7	.000	0.259	0.154	0.181
β_{21}	1999 March Supplement	(1=Yes, 0=No)	0.237	***	0.0115	20.6	.000	0.234	0.237	0.254
β_{22}	Mills Ratio		0.166	***	0.0477	3.49	.000	.	0.226	1.660

F-Test of Mil H.S., Mil Some College, Mil College, Mil Post Grad

Source	DF	Mean Square	F Value	Pr > F
Numerator	4	6530.07847	6.51	<.0001
Denominator	32654	1003.64648		

Thus, in this case, military wives with an undergraduate education garnered approximately 90 percent higher earnings than the omitted contrast group, civilian wives with an elementary education.

Wives with Any Earnings. Turning to the regression results provided in Table 4.4, we can see that my statistical earnings function explains some 55 percent of the variation in the percent change in wives' earnings. The p-value associated with the Mills Ratio also indicates that we cannot assume random assignment of wives to the group of wives with earnings. Thus, my use of Heckmans' two-stage method is appropriate given the implied presence of selection bias.[80]

With regard to parameter estimate values, it appears that my results comport well with human capital theory. First, potential experience exhibits the expected concave form. This is manifested by the positive parameter estimate for the linear effect and the negative parameter estimate for potential experience squared. This pattern parallels findings throughout the literature that report diminishing marginal returns to experience as an empirical regularity. Concomitantly, earnings also exhibit the expected rising return to education. Specifically, among wives of civilians, the percent change in earnings follows a consistently rising gradient with wives' educational attainment. Wives with a high school diploma earned some 29.6 percent more than wives who only completed elementary school.

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[80] I also performed a sub-sample regression for wives with earnings that did not incorporate a Mills Ratio to control for selection. Results from this regression for military wives are as follows:

Parameter		Estimate	Sig	StdErr	t-Value	Prob-t
Civilian Wife, High School	(1=Yes, 0=No)	0.219	***	0.0167	13.1	.000
Civilian Wife, Some College	(1=Yes, 0=No)	0.395	***	0.0171	23.1	.000
Civilian Wife, College	(1=Yes, 0=No)	0.703	***	0.0181	38.8	.000
Civilian Wife, Post Graduate	(1=Yes, 0=No)	1.031	***	0.0215	48.1	.000
Military Wife, High School	(1=Yes, 0=No)	-0.143	**	0.0579	-2.5	.014
Military Wife, Some College	(1=Yes, 0=No)	-0.125	**	0.0568	-2.2	.028
Military Wife, College	(1=Yes, 0=No)	-0.197	***	0.0758	-2.6	.009
Military Wife, Post Graduate	(1=Yes, 0=No)	-0.100		0.1541	-.65	.516

Similarly, for wives with postgraduate work, the return to education is almost twice that exhibited by wives with only an elementary education.

Minority status and the presence of young children also exhibit the expected dampening effect on wives' earnings. Specifically, Caucasian wives earn approximately nine percent more than minority wives holding other factors constant. Whereas parameters for the presence of children are modeled as additive effects, a wife in a family with children ages five, ten, and fifteen would earn 36 percent less than would a wife in a family without minor children. This pattern is repeated throughout the literature. Moreover, it fits well with Maddens' findings regarding the constraint children impose on wives' set of employment opportunities in terms of work-hours and home-work travel-time.[81] In light of the remote location of many military installations, such a constraint is particularly salient. Moreover, given the irregular work hours entailed by military service, any work-hour and travel-time constraint is likely to be all the more important for wives of military personnel.

With regard to regional wage effects, there would appear to be no statistically significant difference between wives' wages in the West and South. However, wives in the Northeast earn about 3 percent more than wives in the West. In contrast, wives in the Midwest appear to garner the lowest wages. As a penultimate observation, wives' wages follow a positive temporal gradient as evidenced by parameter

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[81] Madden, J. (1981). "Why Women Work Closer to Home." Urban Studies 18(May 1981): 181-194.

estimates for CPS rotation dummies. Moreover, these estimates appear to be in keeping with the robust economic activity that characterized the period from 1993 to 1999.

At this point, a digression on the topic error estimates is appropriate. As I mentioned earlier, the Heckman method yields heteroscedastic second stage residuals. Therefore, I computed consistent asymptotic standard error estimates for the parameters in my second stage earnings functions. These errors, as provided in Tables 4.5 and 4.7, should be used to preclude spurious conclusions regarding statistical significance.[82]

With the appropriate errors at hand, we turn to the parameter estimates that motivate this analysis. These are β_{12} through β_{15} that relate military wives' human capital investment to their wage earnings. As indicated in Table 4.5 on the following page, military wives with any wage earnings garner much lower returns to education than do their civilian contemporaries. Based upon estimate p-values, these effects are statistically significant with the exception of undergraduate education. Among wives who did not have full time earnings, these findings, in company with probit model results, lead to two conclusions. Fist, military wives are less likely to have wage earnings. Second, with the exception of college graduates, military wives garner earnings that are twelve to sixteen percent lower than their contemporaries in civilian households.

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[82] See pages 677-678 and 744-747 of Greene for estimation method. Greene, W. H. (1990). Econometric Analysis. New York, MacMillan.

Table 4.5, Annual Earnings Estimation Results for Wives with Any Earnings with Consistent Asymptotic Standard Errors of Estimates
Omitted Variables: West, Elementary Education, 1993 Supplement

Level of Significance: **=.05, ***=.01

	Parameter		Estimate	Sig	StdErr	t Value	Prob t
β_0	Intercept		3.826	***	0.0459	83.3	.000
β_1	Imputed Years of Experience		0.040	***	0.0022	18.2	.000
β_2	Experience Squared		-0.001	***	0.0001	-16.	.000
β_3	Dummy Variable (1=White, 0=NonWhite)		-0.090	***	0.0137	-6.6	.000
β_4	Ln(Weeks Worked Last Year)		1.332	***	0.0154	86.5	.000
β_5	Children Under Age 6	(1=Yes, 0=No)	-0.108	***	0.0102	-11	.000
β_6	Children Under Age 12	(1=Yes, 0=No)	-0.178	***	0.0101	-18	.000
β_7	Children Under Age 18	(1=Yes, 0=No)	-0.100	***	0.0209	-4.8	.000
β_8	Civ Wife, High School	(1=Yes, 0=No)	0.259	***	0.0228	11.3	.000
β_9	Civ Wife, Some College	(1=Yes, 0=No)	0.443	***	0.0246	18	.000
β_{10}	Civ Wife, College	(1=Yes, 0=No)	0.755	***	0.0292	25.8	.000
β_{11}	Civ Wife, Post Grad	(1=Yes, 0=No)	1.075	***	0.0531	20.2	.000
β_{12}	Mil Wife, High School	(1=Yes, 0=No)	-0.172	***	0.0549	-3.1	.002
β_{13}	Mil Wife, Some College	(1=Yes, 0=No)	-0.150	**	0.0762	-1.9	.049
β_{14}	Mil Wife, College	(1=Yes, 0=No)	-0.248		0.1568	-1.6	.114
β_{15}	Mil Wife, Post Grad	(1=Yes, 0=No)	-0.124	***	0.0127	-9.8	.000
β_{16}	North East	(1=Yes, 0=No)	0.033	***	0.0125	2.65	.008
β_{17}	MidWest	(1=Yes, 0=No)	-0.045	***	0.0117	-3.9	.000
β_{18}	South	(1=Yes, 0=No)	-0.021		0.0113	-1.9	.063
β_{19}	1995 March Supplement	(1=Yes, 0=No)	0.061	***	0.0112	5.38	.000
β_{20}	1997 March Supplement	(1=Yes, 0=No)	0.153	***	0.0116	13.2	.000
β_{21}	1999 March Supplement	(1=Yes, 0=No)	0.237	***	0.0075	31.7	.000
β_{22}	Mills Ratio		0.166	***	0.0482	3.45	.000

In terms of factors thought to affect labor participation and earnings, these findings point to the existence of a substantive difference in labor market outcomes that hinges upon military affiliation.

Wives with Full Time Earnings. As reported in Table 4.6, my earnings function for wives with full time earnings explains much of the variation in wives earnings (R^2=.468). In keeping with my earlier findings, this model also fits well with human capital theory and expectations regarding the influence of children on wives' earnings. As with the model for wives with any earnings, there was no statistical difference between military and civilian wives' returns to potential experience. Thus, base upon F-Test results, I did not

include these as a separate set of experience variables for military wives.

Table 4.6, Annual Earnings Estimation Results for Wives with Full Time Earnings
Omitted Variables: West, Elementary Education, 1993 Supplement

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	22	11436974	519862	889.38	<.0001
Error	22,157	12951325	584.52520		
Corrected Total	22,179	24388299			
Weighted	40,685,216				

Root MSE	24.17696	R-Square	0.4690
Dependent Mean	9.90195	Adj R-Sq	0.4684
Coeff Var	244.16358		

Level of Significance: **=.05, ***=.01

	Parameter		Estimate	Sig	StdErr	t Value	Prob t	Mean	Adjusted Estimates 1.2% Measurement Error	Adjusted Estimates 6% Measurement Error
β_0	Intercept		3.911	***	0.0561	69.7	.000	.	3.877	3.087
β_1	Imputed Years of Experience		0.048	***	0.0020	24.3	.000	16.56	0.049	0.063
β_2	Experience Squared		-0.001	***	0.0001	-20	.000	332.3	-0.001	-0.002
β_3	Dummy Variable (1=White, 0=NonWhite)		-0.067	***	0.0123	-5.4	.000	0.870	-0.076	-0.304
β_4	Ln(Weeks Worked Last Year)		1.197	***	0.0115	104	.000	3.854	1.196	1.181
β_5	Children Under Age 6	(1=Yes, 0=No)	-0.166	***	0.0140	-12	.000	0.285	-0.200	-1.037
β_6	Children Under Age 12	(1=Yes, 0=No)	-0.150	***	0.0103	-15	.000	0.357	-0.159	-0.394
β_7	Children Under Age 18	(1=Yes, 0=No)	-0.103	***	0.0092	-11	.000	0.317	-0.107	-0.199
β_8	Civ Wife, High School	(1=Yes, 0=No)	0.426	***	0.0181	23.5	.000	0.344	0.436	0.699
β_9	Civ Wife, Some College	(1=Yes, 0=No)	0.649	***	0.0191	34.0	.000	0.299	0.662	0.976
β_{10}	Civ Wife, College	(1=Yes, 0=No)	1.021	***	0.0208	49.2	.000	0.208	1.036	1.425
β_{11}	Civ Wife, Post Grad	(1=Yes, 0=No)	1.351	***	0.0251	53.9	.000	0.085	1.374	1.937
β_{12}	Mil Wife, High School	(1=Yes, 0=No)	-0.337	***	0.0584	-5.8	.000	0.004	-0.352	-0.699
β_{13}	Mil Wife, Some College	(1=Yes, 0=No)	-0.205	***	0.0568	-3.6	.000	0.005	-0.218	-0.527
β_{14}	Mil Wife, College	(1=Yes, 0=No)	-0.391	***	0.0712	-5.5	.000	0.003	-0.404	-0.730
β_{15}	Mil Wife, Post Grad	(1=Yes, 0=No)	-0.376	***	0.1438	-2.6	.009	0.001	-0.395	-0.834
β_{16}	North East	(1=Yes, 0=No)	0.038	***	0.0127	3.01	.003	0.175	0.038	0.037
β_{17}	MidWest	(1=Yes, 0=No)	-0.026	**	0.0118	-2.2	.026	0.261	-0.022	0.066
β_{18}	South	(1=Yes, 0=No)	-0.029	**	0.0114	-2.6	.010	0.376	-0.022	0.014
β_{19}	1995 March Supplement	(1=Yes, 0=No)	0.023	**	0.0113	2.03	.042	0.200	0.019	-0.081
β_{20}	1997 March Supplement	(1=Yes, 0=No)	0.141	***	0.0102	13.8	.000	0.268	0.143	0.201
β_{21}	1999 March Supplement	(1=Yes, 0=No)	0.222	***	0.0105	21.1	.000	0.243	0.223	0.266
β_{22}	Mills Ratio		0.556	***	0.0321	17.3	.000	.	0.615	2.056

F-Test of Mil H.S., Mil Some College, Mil College, Mil Post Grad

Source	DF	Mean Square	F Value	Pr > F
Numerator	4	11781	20.15	<.0001
Denominator	22157	584.52520		

With this model, the highly significant Mills Ratio allows me to reject any notion that wives exhibit random assignment to the group

with full time earnings. Of particular note, the wage penalty noted among wives with any earnings is all the more apparent among wives with full-time earnings. Specifically, as indicated in Table 4.7, military wives exhibit a statistically significant earnings decrement when compared with wives of civilians.[83]

Table 4.7, Annual Earnings Estimation Results for Wives with Full Time Earnings with Consistent Asymptotic Standard Errors of Estimates
Omitted Variables: West, Elementary Education, 1993 Supplement

Level of Significance: **=.05, ***=.01

	Parameter		Estimate	Sig	StdErr	t Value	Prob t
β_0	Intercept		3.911	***	0.0581	67.3	.000
β_1	Imputed Years of Experience		0.048	***	0.0023	20.9	.000
β_2	Experience Squared		-0.001	***	0.0001	-17	.000
β_3	Dummy Variable (1=White, 0=NonWhite)		-0.067	***	0.0146	-4.6	.000
β_4	Ln(Weeks Worked Last Year)		1.197	***	0.0159	75.5	.000
β_5	Children Under Age 6	(1=Yes, 0=No)	-0.166	***	0.0116	-14	.000
β_6	Children Under Age 12	(1=Yes, 0=No)	-0.150	***	0.0105	-14	.000
β_7	Children Under Age 18	(1=Yes, 0=No)	-0.103	***	0.0194	-5.3	.000
β_8	Civ Wife, High School	(1=Yes, 0=No)	0.426	***	0.0205	20.8	.000
β_9	Civ Wife, Some College	(1=Yes, 0=No)	0.649	***	0.0225	28.8	.000
β_{10}	Civ Wife, College	(1=Yes, 0=No)	1.021	***	0.0279	36.6	.000
β_{11}	Civ Wife, Post Grad	(1=Yes, 0=No)	1.351	***	0.0591	22.9	.000
β_{12}	Mil Wife, High School	(1=Yes, 0=No)	-0.337	***	0.0615	-5.5	.000
β_{13}	Mil Wife, Some College	(1=Yes, 0=No)	-0.205	***	0.0803	-2.6	.011
β_{14}	Mil Wife, College	(1=Yes, 0=No)	-0.391	***	0.1700	-2.3	.022
β_{15}	Mil Wife, Post Grad	(1=Yes, 0=No)	-0.376	***	0.0134	-28	.000
β_{16}	North East	(1=Yes, 0=No)	0.038	***	0.0128	2.98	.003
β_{17}	MidWest	(1=Yes, 0=No)	-0.026	**	0.0126	-2.1	.038
β_{18}	South	(1=Yes, 0=No)	-0.029	**	0.0124	-2.4	.018
β_{19}	1995 March Supplement	(1=Yes, 0=No)	0.023	**	0.0117	1.96	.050
β_{20}	1997 March Supplement	(1=Yes, 0=No)	0.141	***	0.0121	11.7	.000
β_{21}	1999 March Supplement	(1=Yes, 0=No)	0.222	***	0.0113	19.5	.000
β_{22}	Mills Ratio		0.556	***	0.0357	15.6	.000

Moreover, holding other relevant factors constant, this decrement leaves military wives with comparatively low returns to education.

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[83] I also performed a sub-sample regression for wives with earnings that did not incorporate a Mills Ratio to control for selection. Results from this regression for military wives are as follows:

Parameter		Estimate	Sig	StdErr	t-Value	Prob-t
Civilian Wife, High School	(1=Yes, 0=No)	0.293	***	0.0161	18.2	.000
Civilian Wife, Some College	(1=Yes, 0=No)	0.490	***	0.0165	29.6	.000
Civilian Wife, College	(1=Yes, 0=No)	0.831	***	0.0174	47.7	.000
Civilian Wife, Post Graduate	(1=Yes, 0=No)	1.104	***	0.0199	55.5	.000
Military Wife, High School	(1=Yes, 0=No)	-0.198	***	0.0586	-3.4	.001
Military Wife, Some College	(1=Yes, 0=No)	-0.105		0.0571	-1.8	.066
Military Wife, College	(1=Yes, 0=No)	-0.260	***	0.0709	-3.7	.000
Military Wife, Post Graduate	(1=Yes, 0=No)	-0.191		0.1465	-1.3	.192

The 19 to 32 percent annual earnings difference reported above was for wives who did not move during the year for which they reported their earnings. Additionally, my model controls for weeks of labor expenditure. Therefore, it would be unreasonable to attribute this earnings difference to migration induced unemployment.

Additionally, as the group at hand exhibits strong labor market attachment, it is unlikely that wives of military personnel select relatively low paying employment of their own volition. Rather, the wage penalty exhibited among military wives' full-time earnings appears to be attributable to factors exogenous to these wives and endogenous to the military. Before turning to an examination of these factors, my use of CPS survey data elicits the following brief examination of measurement error as it pertains to my second stage parameter estimates.

Adjustment for Measurement Error. Whereas the foregoing results were based upon survey data, the issue of measurement error intrudes. In the case of self-reported data, such as race and education level, there would seem to be little scope for errors in variables. Similarly, military affiliation, region of the nation, and CPS rotation year can be expected to comport with the assumption of non-stochastic explanatory variables. However, reference to the literature regarding measurement error in survey data does give pause with regard to wives' recollections of the number of weeks they worked in the previous year. Indeed, as opposed to other RHS variables, *'weeks worked last year'* is likely to embody a non-negligible

stochastic component.[84] Use of this variable in a univariate model would tend to bias the associated parameter estimate toward zero. However, in the present case of multivariate analysis, the potential bias induced by measurement error in this single variable may afflict all parameter estimates.[85] Fortuitously, as Greene has demonstrated, adjustment for any such bias is a tractable econometric problem.

Though the literature does not address the specific topic of measurement error in CPS data regarding *'weeks worked last year'*, errors associated with similar variables can be found in the literature.[86] Drawing upon the literature addressing error in economic

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[84] The literature does not address the specific topic of error in survey measures of *'weeks worked last year'*. However, based upon analysis of survey data and actual work records, Bound reports that the error associated with *'hours worked last year'* lies within the range of 1.2 to 6 percent. Bound, J., C. Bound, et al., Eds. (Forthcoming). Measurement Error in Survey Data. Handbook of Econometrics.

Since the CPS only reports work experience in terms of *'weeks worked last year'*, I will adopt 1.2 to 6 percent as a reasonable range of measurement error in the analysis that follows.

[85] 'The coefficient on the badly measured variable is still biased toward zero. The other coefficients are all biased as well though in unknown directions. Greene, W. H. (1990). Econometric Analysis. New York, MacMillan.

[86] As outlined in Greene, with stochastic variables, the regression equation becomes $y = \mathbf{X}^*\hat{\mathbf{a}} + \varepsilon$ where the regressors include the true value, X^*, plus a random error component, U. In this case the observed value is given by $\mathbf{X} = \mathbf{X}^* + \mathbf{U}$. At the probability limit the cross product becomes $\text{plim}\frac{\mathbf{X}'\mathbf{X}}{n} = \mathbf{Q}^* + \sum_{uu}$. With one stochastic variable $\sum_{uu}$ contains a single non-zero element. This element occupies the *i*th row and *k*th column where *i* is the index of the stochastic variable.

$$\sum_{uu} = \begin{bmatrix} 0 & 0 & \cdots & \cdots & 0 \\ 0 & \ddots & & & 0 \\ & & \sigma_u^2 & & \\ & & & \ddots & \\ 0 & 0 & \cdots & \cdots & 0 \end{bmatrix}$$

survey data, I have adopted a range of 1.2 to 6 percent as likely bounds of measurement error in *'weeks worked last year'*. On this basis, I provide adjusted parameter estimates in Tables 4.4 and 4.6. In light of the degree to which the aforementioned measurement error biases parameter estimates toward zero, it is clear that unadjusted parameters are likely to represent an under-statement of the wage penalty incurred by wives of military personnel. As reflected in Figure 4.3, this under-statement can become substantial as the level of measurement error approaches six percent, or an error of 2.4 weeks at the mean of *'weeks worked last year'*.

This element is the measurement error variance of the stochastic variable evaluated at the variable mean. In the case of my earnings functions, this would be the 5th regressor. Thus, the error variance would be the 5,5 element of the $\sum_{uu}$ matrix. Since my earnings functions are concerned with the percent change in annual earnings as they relate to the percent change in weeks worked, the measurement error becomes additive.

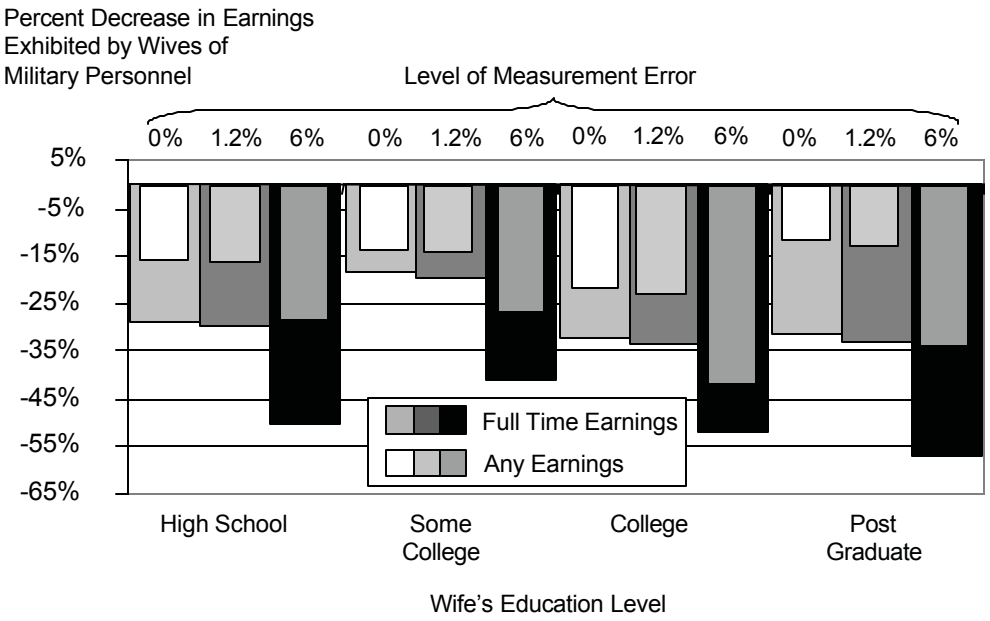
$$\mathrm{Ln}(Weeks\ Worked \times Error) = \mathrm{Ln}(Weeks\ Worked) + \mathrm{Ln}(Error)$$

Thus, I adjust for measurement error in '*weeks worked last year*' by subtracting the error variance evaluated at mean of the natural log of weeks worked, $\mathrm{plim}\frac{\mathbf{X}'\mathbf{X}}{n} - \sum_{uu} = \mathbf{Q}^*$. For example, in the case of all wives with earnings, and 6 percent measurement error (from Bound), I subtract $\sigma_u^2 = [Ln(41.6791) * .06]^2 = .05008644$ from the 5,5 element of the $\frac{\mathbf{X}'\mathbf{X}}{n}$ matrix to obtain $\mathbf{Q}^*$. Given that $\mathrm{plim}\frac{\mathbf{X}'\mathbf{y}}{n} = \mathbf{Q}^*\hat{\boldsymbol{\alpha}}$, Green obtains $\mathrm{plim}\mathbf{b} = \left[\mathbf{Q}^* + \sum_{uu}\right]^{-1}\mathbf{Q}^*\hat{\boldsymbol{\alpha}}$. From this, Greene arrives at the following formula for correcting the bias induced by a single stochastic variable

$$\mathrm{plim}\, b_j = \beta_j - \beta_5\left[\frac{\sigma_u^2 q^{*k,5}}{1+\sigma_u^2 q^{*5,5}}\right]$$

where $q^{*k,5}$ is the kth,5th element in the $\mathbf{Q}^{*-1}$ matrix. In this case, j is 1 through 22.

Figure 4.3, Earnings Penalty Exhibited by Wives of Military Personnel
by Wife's Education Level, Holding Other Factors Constant
Summary of Parameter Estimates from Tables 4.4 and 4.6



Therefore, one can safely adopt the foregoing insights regarding the existence and operation of a military wage penalty. Specifically, wives of military personnel incur a substantial loss in earnings as compared with their civilian contemporaries. This penalty is most pronounced among full-time workers, rising to yield a 32 percent gap between earnings of military and civilian wives with an undergraduate education.

THE GENESIS OF THE WAGE PENALTY

Labor Market Conditions and Wives' Earnings. As I have demonstrated, wives of military personnel are less likely to have any earnings, or full time earnings, than are their civilian contemporaries. Additionally, those military wives with earnings garner far lower returns than do comparable wives of civilians. My findings stand in

contrast with the literature that failed to establish such a statistically significant wage effect (Schwartz), or found a comparatively moderate wage penalty (Payne). Moreover, in the section that follows, I make a methodological break with the literature in terms of seeking a nexus for the relatively poor labor outcomes exhibited among wives of military personnel. I begin with an overview of Department of Defense survey data that allows for comparison of wives' earnings across and within military services. Thereafter, I employ this data to model the full time employment earnings and employment outcomes of the wives and husbands of military personnel.

The 1992 DoD Survey. As we have seen, the Current Population Survey (CPS) provides sufficient data to implement a cross-sectional comparison of the earnings of wives of civilian and military personnel. However, the CPS lacks the requisite geographic information to explore the basis for the earnings and employment penalty evidenced among wives of military personnel. Thus, to facilitate such an analysis, I employ proprietary Department of Defense data created for the purpose of this study. This data consists of survey responses from the Couples Module of the *1992 Department of Defense Survey of Officers, Enlisted Personnel and Their Spouses* (hereafter referred to as the 1992 DoD Survey) matched with Department of Defense location and administrative data.

This survey includes responses from 10,702 military couples for which only one spouse was on active duty. The 1992 DoD Survey was drawn as a probability sample from the entire population of active duty

military households and includes sample weights so as to present a representative sample of couples.

Whereas responses from husbands and wives are matched, this survey is similar to the CPS in that it allows for analysis of the employment and earnings outcomes of civilian spouses of military personnel while controlling for other household factors. Indeed, in considering the comparability of 1992 CPS and 1992 DoD Survey data, it is interesting to note the degree to which the two surveys yield similar descriptive measures of military wives' earnings and labor expenditure. With the 1992 DoD Survey, average annual earnings of CONUS based military wives in the labor force were $11,696. This compares with $11,370 for similar CPS respondents. At the same time, military wives in the labor force reported an average of 37.36 weeks worked in the 1992 DoD Survey. This labor expenditure is comparable to the average of 35.23 weeks for military wives surveyed in the 1992 CPS.

In contrast, however, the 1992 DoD Survey captures information that is uniquely suited to a study of military households. First, it includes not only respondents within the United States, as is the case with the CPS, but also respondents stationed abroad. Moreover, the 1992 DoD Survey includes administrative data from DoD pay, entitlements, and personnel files merged with survey responses. Thus, it provides data regarding the military spouses' rank, branch of service and frequency of relocation. Additionally, the 1992 DoD Survey captures attitudinal data regarding the civilian spouses' satisfaction with military life and reasons for working outside the home.

To facilitate this analysis of military wives' earnings, the Department of Defense merged 1992 DoD Survey response data with military personnel data so as to identify the zip code location of survey respondents in 1991.[87] So as to facilitate exploration of the extent to which local conditions influence spouses' labor market outcomes, I matched this zip code information to military installations. This allowed me to match survey respondents to the labor markets in which they were located in 1991. I also matched Bureau of Labor Statistics (BLS) county level economic data to the military installation to which survey respondents were assigned in 1991. Thus, my resultant data set includes far more breadth and depth of information than is available with the Current Population Survey or the nonproprietary set of 1992 DoD Survey data.

Interservice Earnings Differences. While CPS data does not desegregate military households by military service, the 1992 DoD Survey does identify respondents' service affiliation. This bit of information, coupled with respondent's frequency of migration, provides a logical point of departure for exploring the nexus between migration and wives' earnings. Specifically, after controlling for relevant human capital, labor supply, and migration factors, cross service differences in wives, earnings must be attributable to factors aside from frequency of relocation.

Building upon my earlier work using CPS data, I model the earnings of spouses of military personnel across military services using a

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[87] The 1992 DoD Survey was conducted in 1992 and thus embodies data for the previous year, 1991.

statistical earnings function. However, I leverage the information afforded by my use of the 1992 DoD Survey to incorporate the following data:

- The number of moves a couple made in the military.
- The pay grade of the military spouse in terms of officer or enlisted grades.
- The number of years the military spouse had been in the military.
- The military spouses' branch of service; Army, Navy, Air Force and Marines.
- The number of months the civilian spouse had been employed in the same job.

Of note, given the large sample size afforded by the 1992 DoD survey, I model not only labor market outcomes for wives of military personnel, but for husbands as well. In the interest of brevity, I refer to these hereafter simply as *civilian spouses*. Thus, my initial model assumes the following form:

$$\begin{aligned}\ln(Earnings) = {} & \beta_0 + \beta_1 \ln(WeeksWorked) + \beta_2(Caucasian) + \beta_3(Gender) + \beta_4(Grade) + \beta_5 \ln(YrsActiveFedSvc) + \\ & \beta_6(SpouseSomeCollege) + \beta_7 Ln(SpouseCollege) + \beta_8(SpousePostGrad) + \\ & \beta_9(YrsPotentialExperience) + \beta_{10}(YrsPotentialExperience^2) + \beta_{11}(MnthsJobTenure) + \beta_{12}(MissTenure) + \\ & \beta_{13}(KidsUnder6) + \beta_{14}(KidsUnder14) + \beta_{15} \ln(YrsMarried) + \\ & \beta_{16}(NumberMoves) + B_{17}(Army) + \beta_{18}(AirForce) + \beta_{19}(Marines)\end{aligned}$$

where *Caucasian, Gender, Grade, SpouseSomeCollege, SpouseCollege, SpousePostGrad, MissTenure, KidsUnder6 and KidsUnder14* are zero/one dummy variables.

The basis for my use of weeks worked, race, gender, civilian spouse education level, and variables to indicate the presence of children,

parallels my use of these variables in the foregoing section regarding CPS data. I augment these variables with grade, years of active federal service, months of job tenure, and number of permanent change of station moves so as to account for aspects of military service that exert an influence on spouse earnings.

I include the military spouses' grade, officer or enlisted, so as to control for differential access to employment information networks. Specifically, employment information is likely to be shared among wives of the same grade through social interactions with peers of the same grade. The natural log of active federal service controls for the length of time the military spouse has been in the military. This variable, in company with the natural log of length of marriage, controls for the period over which military service has exerted an influence on the civilian spouses' labor market experience. So as to control for the returns to job specific human capital, I include the number of months tenure a spouse had in the job for which they reported earnings. Since this variable suffered from a high number of missing values, I added an auxiliary dummy variable to account for missing observations. Thus, a missing value in the job tenure variable is coded zero while the missing tenure variable is coded one. Where tenure values were not missing, the missing tenure variable is coded zero. Finally, so as to capture the direct earnings incidence of migration, I include a variable to control for the number of permanent change of station moves a civilian spouse had made while married to his/her current military spouse. I model this variable in linear form since it can, and does, take on a value of zero, and since meaningful interpretations of a percent change in PCS moves is dubious

at best.[88] In terms of functional form, I model civilian spouses' earnings and work expenditure using a log-log form. Thus, a percentage change in spouse earnings correspond to percentage change in weeks worked.

Finally, so as to address the possiblity of reservation wage induced response bias, I explored a two stage Heckman modeling approach. However, since the second stage Mills Ratio coefficient was not significant, I ruled out such bias and thus report a single stage estimation approach.

Interservice Earnings Results. Table 4.8 provides the results of my first regression to include the mean values of dependent and independent variables. So as to gage the effect of interservice earnings differences on spouses most closely tied to labor markets; these results pertain to spouses working full time in the private sector. By virtue of its relatively high R^2 value, this model explains much of the variation in the earnings of civilian spouses. Of note, several findings mirror results obtained in my earlier work with CPS data. Earnings increase in virtual lock-step with labor expenditure. Human capital variables exhibit increasing returns to education and modest returns to experience. Caucasian spouses exhibit a 4.6 percent wage premium over non-Caucasians.

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[88] I explored both diminishing and increasing effects of the number of PCS moves on civilian spouses' earnings, through the addition of PCS moves squared, and the square root of PCS moves, neither of these embellishments proved statistically significant.

As opposed to my CPS findings, the presence of young children does not exhibit a dampening effect on earnings. Rather, spouses with young children tend to earn more than those without children under age six. This may be due to the relative availability of child care services in the military as opposed to the civil sector. Based upon the gender parameter estimate, wives of military personnel earn 20 percent less than husbands of female service members. At the same time, spouses of officers earn 21 percent more than spouses of enlisted personnel, holding other factors constant. This large wage effect tends to confirm the operation of information networks that systemically advantage officers' spouses. The relatively high proportion of full time workers who were married to officers may also indicate the operation of such networks. Specifically, officers comprise 32 percent of the underlying military population while their spouses represent 69 percent of workers earning full time wages in the civil sector.

With regard to migration, two parameter estimates are of interest. First, months of tenure will be affected by migration. In this case, each additional month of tenure increases earnings an average of .44 percent. Second, each instance of migration lowers the annual earnings of civilian spouses by an average of 2.1 percent. Given these parameters, as well as a mean tenure of 21.23 months, and an average of three moves, one can simulate the earnings effect of alternative migration regimes. For example, at a rate of migration of three moves over 5.5 years of marriage, military couples spend twenty-two months on station. Since spouses report an average of 21.27 months tenure, it would seem that only a month or so is lost to job

search. Thus, assuming one of the three moves was to the first duty station, subsequent migration reduced earnings of spouses working full time by an average of 5.88 percent. At this level, migration explains relatively little of the earnings penalty exhibited among spouses of military personnel.

Table 4.8, Percent Change in Annual Private Sector Earnings of Military Spouses
Employed Full Time in 1991, by Military Service (Omitted Service: Navy)

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	19	43274	2277.59529	173.80	<.0001
Error	2002	26236	13.10497		
Corrected Total	2021	69510			

Root MSE	3.62008	R-Square	0.6226
Dependent Mean	9.50246	Adj R-Sq	0.6190
Coeff Var	38.09622		

Level of Significance: **=.05, ***=.01

Parameter	Estimate	Std Err	t Value	Probt	Sig	Mean
Log of Civilian Spouses Annual Wage						9.762
Intercept	5.751	.0934	61.5	.000	***	
Log of Number of Weeks Worked Last Year	.9357	.0227	41.2	.000	***	3.730
Civ Spouse is Caucasian, 1=Yes, 0=No	.0450	.0209	2.16	.031	**	0.819
Mil Spouse Gender: 1=Male, 0=Female	-.226	.0334	-6.8	.000	***	0.741
Mil Spouse Grade: 1=Officer, 0=Enlisted	.1916	.0280	6.85	.000	***	0.690
Log of Years of Active Federal Service	.0959	.0164	5.85	.000	***	2.131
Some College, 1=Yes, 0=No	.1275	.0224	5.68	.000	***	0.290
Undergraduate Degree, 1=Yes, 0=No	.3583	.0299	12.0	.000	***	0.262
Post Graduate Work, 1=Yes, 0=No	.6560	.0342	19.2	.000	***	0.260
Imputed Years of Experience	.0018	.0047	.378	.705		13.04
Year of Experience Squared	.0001	.0002	.585	.559		228.6
Number of Months in Current Job	.0044	.0004	10.5	.000	***	21.27
Missing Months of Tenure, 1=Yes, 0=No	.4726	.6295	.751	.453		0.002
Log of Length of Marriage in Years	.0059	.0143	.413	.680		1.711
Children Under Age 6, 1=Yes, 0=No	.0778	.0233	3.33	.001	***	0.182
Children Under Age 14, 1=Yes, 0=No	-.075	.0230	-3.3	.001	***	0.276
Number of Permanent Changes of Station	-.025	.0053	-4.8	.000	***	3.028
Army	-.126	.0255	-4.9	.000	***	0.169
Air Force	-.080	.0239	-3.4	.001	***	0.314
Marines	-.010	.0352	-.29	.773		0.216

Turning now to the parameters motivating this model, we can see that spouses of Army and Air Force personnel incur a substantial wage decrement when compared with spouses of sailors. Indeed, soldiers' spouses earn about 12 percent less than do those of sailors. Spouses

of airmen exhibit a somewhat more moderate earnings decrement, garnering some 8 percent less than spouses of sailors. Whereas the parameter estimate for spouses of Marines is both very small and not significant, it would seem that the average earnings of Marines and sailors are virtually the same after controlling for other relevant factors. Finally, it is potentially important to note that spouses of soldiers comprise only 16.9 percent of this sample of full-time workers. This figure should be compared with an overall population proportion in excess of 30 percent for Army personnel with spouses.

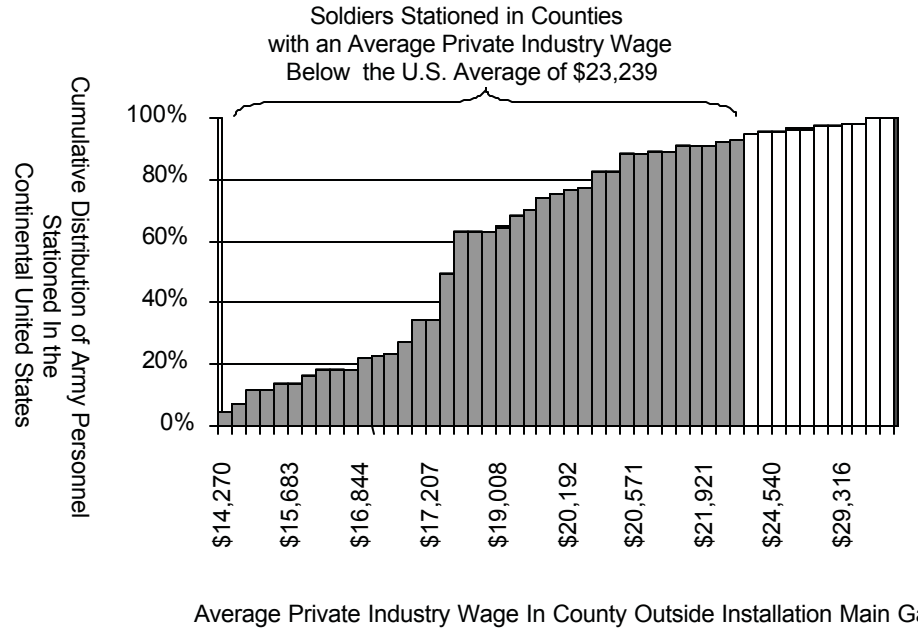
The widely disparate earnings of soldiers' and airmen's spouses as compared with those of Marines and sailors are all the more suggestive of important earnings impediments beyond migration. Whereas this exploration of spousal earnings across services controls for a wide array of factors that explain the variation in earnings, these impediments must be endogenous to service in the Army and Air Force. By way of exploring these impediments, we will now address the earnings of soldiers' spouses in greater detail.

Local Effects on Spousal Earnings. Recall that the literature seeks to explain differential wage outcomes, between wives of military personnel and wives of civilians, in terms of military migration. As we have seen, controlling for migration within the military does not explain the considerable degree of spousal wage variation across services. Since the literature does address the impact of local labor market conditions, it proceeds from an implicit assumption of random assignment of military households to labor markets. However, in my experience, such an assumption is wholly unwarranted when applied to

the military in general and the Army in specific. Indeed, casual empiricism suggests that military wives confront employment opportunities that are distinguishably less robust than those faced by the general population of wives.

One can readily gain an appreciation of the unique employment environment confronting military wives through reference to Figure 4.4 below. This graphic represents the cumulative distribution of active duty Army personnel by installation in 1991.

Figure 4.4, Distribution of Active Duty Army Personnel by the Average Private Industry Wage Within the County Outside the Post Main Gate in 1991
Source: 1992 Personnel Authorization Manning Document & USA Counties 1998



Each bar represents an Army installation. The incremental increase in the heights of bars represents the contribution of each installation to the cumulative population of soldiers on installations in the continental U.S. (CONUS). The horizontal axis provides the average private sector wage prevailing in the county outside each

installation. By arraying installations according to this private industry wage, one can see that the vast majority of soldiers are stationed in areas characterized by relatively low wages. While I selected 1991 data so as to conform to analysis that follows, the message conveyed by Figure 4.4 is relatively time invariant. That is, given the relative proportions of soldiers, and therefore soldiers' wives, residing in areas with below average wages, one can immediately abandon any assumption of random assignment of Army wives to labor markets. Moreover, the implied distribution of wages confronting Army wives entails important implications.

At this point, it is appropriate to take note of an important limitation entailed by the use of traditional statistical earnings functions. Specifically, these functions rely upon classical assumptions regarding market clearing. With such clearing, the real wage is equated with a worker's marginal product of labor. Thus, these functions cannot account for the persistent labor supply and demand imbalances. Indeed, of particular relevance to this analysis, classical theory anticipates that any local imbalance will be eliminated through the redirection of capital and labor to their most efficient use as signaled by the price mechanism. Thus, one would expect that any locality based earnings penalty would be self-correcting through induced migration from low wage areas to high wage areas. Indeed, with zero or low migration cost this would be the case for civilian households. However, military households are not free to engage in such welfare enhancing migration. Rather, soldiers are assigned to Army posts according to military requirements. By extension, soldiers' spouses are also tied to these installations

through the institution of marriage. Hence, the wage environment confronting these wives is not only a function of their stock of human capital and abilities, but also of successive evolutions of Army stationing requirements as shaped by the vagaries of history.[89]

Therefore, for the purpose of gauging the influence of local labor market conditions on military wives', I employ augmented earnings functions as an improvement to existing theory. In addition to specifying control variables for human capital and labor supply factors, I also include variables to account for local labor market conditions. Through this improvement, I assess variations in spousal earnings across installations and generate an entirely different set of policy alternatives as compared with analysis informed solely by migration theory. Indeed, in light of the pattern suggested in Figure 4.4, one can envision that policy ought to take the form of near term remedial strategies tailored to local market conditions and long term strategies designed to reconcile stationing practices with spouses' employment needs.

To motivate the work that follows, I present a simple model. First, assume random assignment of military couples to installations. Given this assumption, differences in civilian spouse earnings across installations must be due to local factors. In this case, I employ the local private sector wage for 1991 as my factor of interest. As

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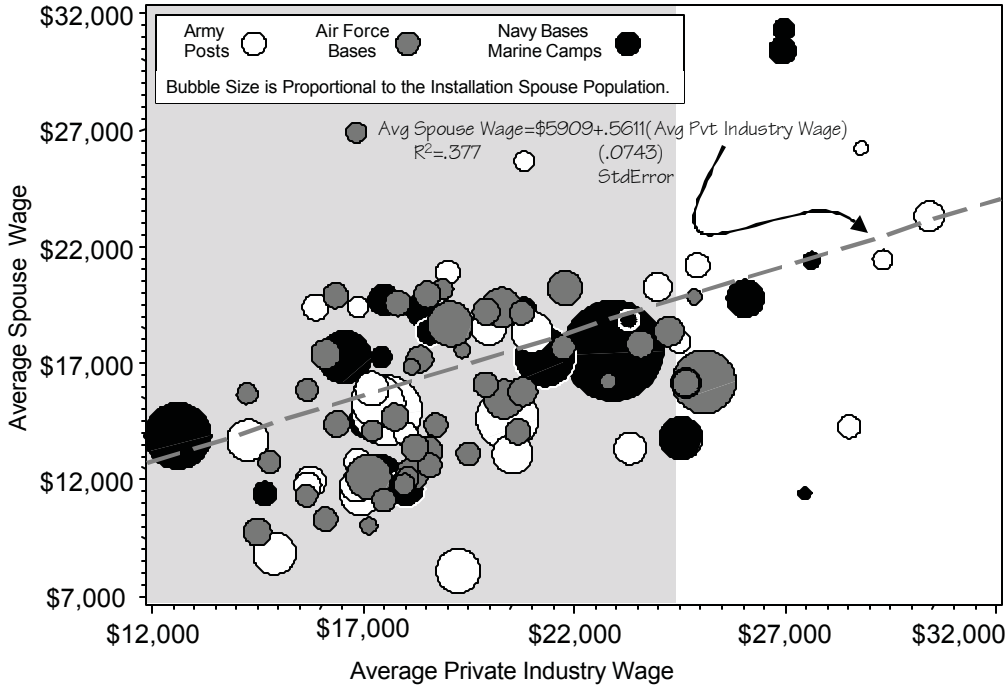
[89] Whereas many U.S. cities grew apace with trade and commerce, the Army's set of installations was accumulated to support military operations. Thus, posts such as Fort Huachuca and Fort Leavenworth were established during the Indian Wars. West Point was established during the Revolutionary War to bar British naval forces from the upper Hudson River Valley.

is presented in Figure 4.5 below, within the context of a simple linear regression, this proxy for local labor market conditions explains much of the variation in average spousal wages across installations. Here I have computed the average spousal wage, shown on the vertical axis, for major installations using the annual earnings reported in the 1992 DoD Survey. The local private sector wage is from Bureau of Labor Statistics county level data.[90]

As evidenced in Figure 4.5, most military installations are located in areas characterized by relatively poor wage conditions.

Figure 4.5, Average Spouse Wage by Installation & Average Private Industry Wage ($24,481) Within the County Outside the Installation Main Gate in 1991
Source: 1992 DoD Survey of Officers, Enlisted Personnel and Spouses & USA Counties 1998



This situation is evidenced by the horizontal location of the bubbles

[90] U.S. Department of Commerce (1998). USA Counties, U.S. Census Bureau. 1998.

in Figure 4.5 in relation to the gray shaded area. Specifically, the gray area connotes average private sector wages reported for U.S. counties that fell below the U.S. average private sector rate of $23,239. The superposition of the preponderance of military installations (bubbles) over the region of below average wages suggests a nexus to the relatively poor earnings of military wives established in my earlier analysis of CPS data. Indeed, Figure 4.5 suggests that the universe of migration destinations is a leading contributor to the relatively poor earnings outcomes exhibited by military spouses, as opposed to the frequency of migration alone. Exploration of this situation, however, requires multivariate analysis.

Earnings Across Army Installations. To gauge the degree to which civilian spouses' earnings are a function of local labor market conditions, I employ a modification to my interservice model. Specifically, in lieu of military service control variables, I substitute dummy variables for each of 120 major defense installations. I also include a control variable to indicate whether a household resided in on-post government furnished housing or in off-post quarters for which they had to pay rent. My use of this variable has the objective of controlling for that portion of the variation in civilian spouses' wages that is governed by variations in the cost of living across localities. Since households residing on post would be insulated from a major source of this variation, housing costs, my use of this variable should control for much of the influence of local

price levels on spousal earnings.[91] In this way, I explore the difference in average spouse earnings across military installations holding other relevant factors constant. With the following specification, installation dummy variable coefficients reflect the incidence of both wage and non-wage factors on spouse earnings.

$$\begin{aligned}\ln(Earnings)_s = {} & \beta_0 + \beta_1 \ln(WeeksWorked) + \beta_2(Caucasian) + \beta_3(Gender) + \beta_4(Grade) + \beta_5 \ln(YrsActiveFedSvc) + \\ & \beta_6(SpouseSomeCollege) + \beta_7 Ln(SpouseCollege) + \beta_8(SpousePostGrad) + \\ & \beta_9(YrsPotentialExperience) + \beta_{10}\left(YrsPotentialExperience^2\right) + \beta_{11}(MnthsJobTenure) + \beta_{12}(MissTenure) + \\ & \beta_{13}(KidsUnder6) + \beta_{14}(KidsUnder14) + \beta_{15} \ln(YrsMarried) + \\ & \beta_{16}(NumberMoves) + \beta_{17}(Govt Housing) + \beta_{18-137}(Installations)\end{aligned}$$

Local non-wage factors may include the degree to which military installations are physically isolated from local centers of economic activity. For example, Fort Irwin is located in San Bernadino County. However, that installation is over an hour away from Barstow, which is the nearest town. Wage factors may reflect relatively poor local wage conditions due to distress in local industry, lack of economic development, or a surplus of low cost labor. By way of reference to

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[91] Recall from Chapter 1 that the off-post housing allowance incorporates a variable component to account for fluctuations in housing costs by location. Therefore, to the extent that this variable component is set appropriately, military families should be compensated for the main source of locality based price level variations. However, by living off-post, they would be likely to spend a higher percent of their income outside the on-post commissary and military Post Exchange systems. The effect of high off-post price levels for food and other goods would thus be reflected in the off-post housing control variable parameter estimate and reduce the potential for bias in installation control variable parameter estimates. Finally, I also modeled spousal earnings by including the military cost-of-living index for 1999 into my model. This index is computed for each installation and reflects the extent to which non-housing costs vary across installations. Since the parameter estimate for this variable was quite small, and the standard error was very large, its effect was not statistically significant. Therefore, I do not incorporate this variable in my final model in Table 4.10.

these conditions, Fort Polk is located in Louisiana bayou country, which is bereft of industry and commerce. Fort Huachuca is bounded by Indian reservations. Finally, Fort Bliss is located adjacent to El Paso, Texas. That border town experiences a constant influx of low cost labor from Mexico and thus evidences some of the lowest wage rates in the nation.

Installation dummy variables are coded 'one' for observations in which a couple was stationed on an installation in 1991. Otherwise, these variables are coded 'zero'. Since I model the natural log of spouses' earnings as my dependent variable, installation parameter estimates are interpreted in terms of percentage change. Since this change must be in contrast to some benchmark installation, the issue of the omitted constrast installation is of central importance.

In the case at hand, I employ San Diego as my omitted contrast installation. Consequently, installation variable coefficients reflect the percent change in civilian spouses' earnings on any given installation as compared with the earnings of civilian spouses in San Diego, holding other variables constant. My selection of San Diego as my benchmark installation acrues from practical considerations. First, the average annual earnings of military wives in San Diego were virtually equal to those of wives of civilians. Specifically, based upon 1992 DoD Survey data, military wives working full time in San Diego garnered average annual earnings of $19,807. A matched group of wives of civilians drawn from the San Diego segment of the 1992 March

Supplement of the Current Population Survey earned $19,253.[92] Thus, in San Diego, military wives' earnings were virtually equivalent to those of their civilian contemporaries. Additionally, the average annual private sector wage reported for San Diego was $22,970. This figure is quite close to the national average of $23,239. Thus, by this measure, San Diego is not an outlier in terms of unusually high or low average wage rates. Finally, San Diego is a large enough city so as to present a familiar frame of reference for readers of this analysis and policy makers.

So as to provide a holistic picture of the employment situation confronting spouses of military personnel, I also model full time employment probabilities across installations. Here I build upon my earlier analysis of employment outcomes using CPS data. That is, I employ a probit model to estimate the full time employment probabilities of spouses.

This approach allows me to control for factors that are likely to shape spouse employment outcomes. Specifically, my model includes the military spouses' current earnings and longevity in the military. In this way, I control for his or her current contribution to household earnings. I also include the military spouses' education level and grade to control for his or her future earnings potential. These factors, in company with the civilian spouse's education level, potential experience, frequency of migration, and parental status

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[92] With a standard error of 1,607 for the wives of military personnel and 2,969 for wives of civilians, one can readily reject the proposition of unequal means.

control for factors likely to shape the civilian spouse's reservation wage and labor supply. I control for local labor demand conditions through the use of installation dummy variables.

Local Earnings and Employment Results. As reported in Table 10.9 at the end of this chapter, my spousal earnings function augmented to reflect the incidence of local conditions on spouses' earnings explains 66 percent of the variation in such earnings. Moreover, parameter estimates for local labor market conditions indicate that the wage earnings of spouses of military personnel exhibit considerable variability across installations. For example, the typical wife or husband of an airman would earn 78 percent less at Minot Air Force Base than at San Diego.

By reviewing the earnings of soldiers' spouses, one can readily gain an appreciation for the source of the wage penalty exhibited for Army spouses in the previous earnings regression. Referring to Table 4.10 (at the end of this chapter), the preponderance of Army installations, with statistically significant paramater estimates, impose a substantial wage penalty. Indeed, by summing across installations with appreciable soldier populations, one can see that 75 percent of Army spouses are located in areas characterized by relatively poor private sector earnings. This situation is indicated in Table 4.10 by the data provided in the two right most columns. The first of these columns, *Percent*, provides the percent of all Army spouses located on the named installation in 1991. Thus, one can see that 1.07 percent of Army spouses were located at Fort Rucker. Hence, controlling for other relevant factors, those wives with full time private sector

earnings at Fort Rucker garnered .48 percent lower earnings than they would have garnered if they had been stationed in San Diego.

Whereas statistically significant installation parameter estimates are arrayed in accending order, it is possible to sum the affected spouse population across those installations exhibiting a statistically significant wage penalty. Indeed, the right most column of Table 4.10, *Cum %*, reports the accumulated population of Army spouses located on installations. Reviewing this column, one can see that Fort Leonard Wood is the last installation with a sizeable population of Army spouses that exhibits a statistically significant wage penalty.

Applying the foregoing approach it is possible to compute the weighted average wage penalty or premimum for each military service. In the case of the Army, one finds that the average Army spouse incurs a 17.4 percent wage penalty as compared with his or her potential earnings in San Diego. Similarly, the average spouse of a sailor incurs a 6.1 percent penalty, the typical Marine spouse incurs an 10.7 percent penalty, while the average spouse of an airman incurs an 13.6 percent penalty. Thus, at their most moderate level of effect (those exhibited for spouses of sailors), local labor market conditions extract a wage penalty equivalent to the earnings lost due to two permanent change of station moves. Indeed, reference to Table 4.9 below suggests that location effects dominate migration effects across all services except the Navy. With 63 percent of the average spouses' wage penalty acruing from locality effects it is clear that policies that policies to reducing military migration should be only a part of

an overall program to address the labor market outcomes of spouses of military personnel. Indeed, the findings summarized in Table 4.9 below suggest that even a 50 percent reduction in migration would yield only a three or four percent reduction in the 20 percent aggregate wage penalty.

Table 4.9, Earnings Penalty Exhibited by Spouses of Military Personnel
by Military Service
Assuming Three Months Lost Work Tenure Per Move

Service	Locality Effect	Migration Effect per Move	Average Number of Moves	Total Effect	Percent of Wage Effect due to Locality
Army	-17.4%	-8.21%	2.8	-25.6%	68%
USAF	-13.6%	-7.33%	2.5	-20.9%	65%
Navy	- 6.1%	-7.04%	2.4	-13.2%	47%
USMC	-10.7%	-6.16%	2.1	-16.8%	63%
All Services				-20.1%	63%

Also, recall that I selected San Diego as a benchmark due to the fact that spouses of military personnel in that city earned virtually the same wages as their civilian contemporaries and because the average wage rate in San Diego was quite close to the U.S. average. Thus, to the extent that San Diego represents parity between the earnings of spouses of military and the average spouses of civilians, the 18.7 percent penalty found for Army posts provides a useful measure of the wage penalty incured by spouses of soldiers when compared with civilian contemporaries nationwide.

Turning now to the topic of employment outcomes, reference to Table 4.11 at the end of this chapter suggests that soldiers' spouses again face relatively poor local labor market conditions. That is, spouses on Army installations are far less likely to be employed full time

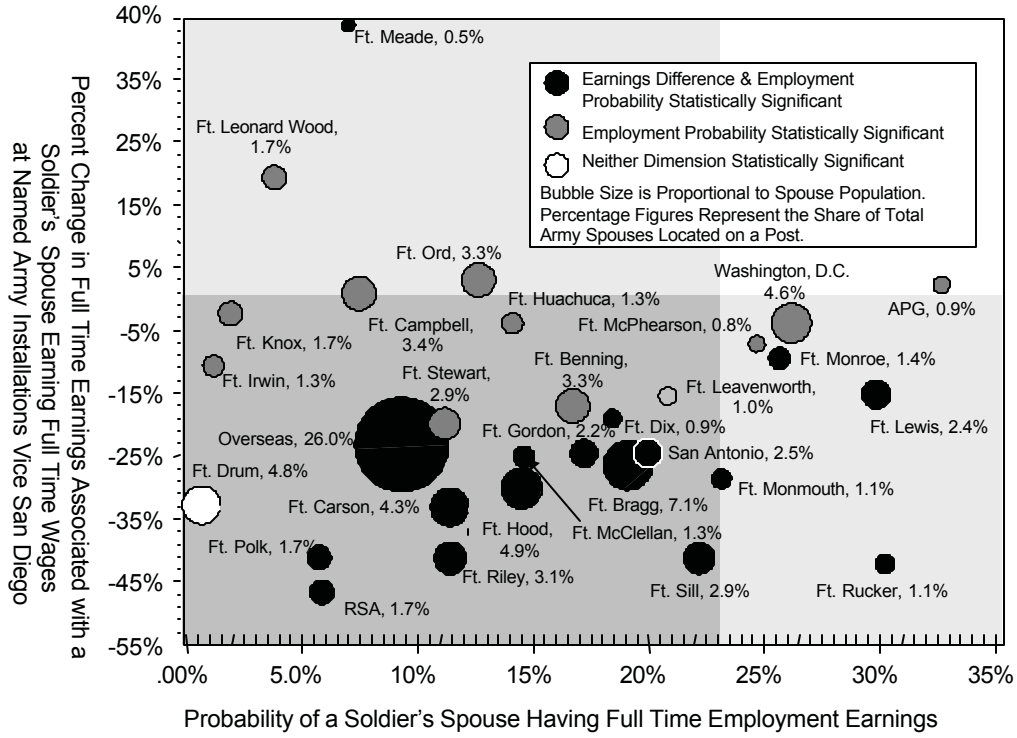
than are spouses at San Diego or many other locations. Table 4.11 reports the probability of full time employment by installation, holding other factors constant, in the the column labeled *FT Prob*. Thus, at Fort Irwin, the typical spouse of a soldier enjoys a 1.2 percent chance of being employed full time. In contrast, spouses of airmen at Los Angeles Air Force Base (Los Angeles) exhibit a 38.7 percent probability of being employed full time.

As with wage earnings, I report the percent of Army spouses located on major installations in the column labeled *Percent*. The *Cum %* column provides the cumulative percent of soldiers' spouses as one moves from the post with the worst likelihood of full time employment, Fort Irwin, to the best, Rocky Mountain Arsenal, in Denver.

Figure 4.6 summarizes the full time earnings and employment prospects confronting spouses of soldiers in 1991. The vertical axis provides the average percent change in earnings as compared with the typical earnings of civilian spouses of military personnel in San Diego. The horizontal axis provides the likelihood of full time employment by installation, holding other relevant factors constant. By way of annotating comparative reference points, I have broken Figure 4.6 into quadrants. The top half of the chart represents the region in which the typical spouse garnered average earnings above those he or she would have earned in San Diego. The right half of the chart represents levels of full time private sector employment in excess of the overall population proportion of 23 percent. Thus, the lower left quadrant encompasses posts characterized by relatively poor earnings

and employment prospects. The upper right quadrant includes posts with above average wage and employment prospects.

Figure 4.6, 1991 Full Time Earnings and Employment Outcomes
for the Average Soldier's Spouse
Earnings Are Relative to the Average Spouse's Earnings in San Diego
Source Data: 1992 Survey of Officers, Enlisted Personnel and Their Spouses



The relative proportion of Army spouses located on an installation is denoted by the size of each installation bubble. Black bubbles indicate installations for which both the earnings and employment parameters were statistically significant. Gray bubbles indicate installations for which the employment parameter was significant. Finally, the lone white bubble indicates that neither the earnings nor the employment parameters were significant for Fort Drum. The message conveyed by this figure is clear. Spouses of soldiers face extremely unfavorable wage and employment prospects on the majority of Army

posts. Indeed, apart from Aberdeen Proving Grounds (APG), Army posts uniformly confront spouses of soldiers with adverse labor market conditions. Indeed, these conditions, as aggravated by migration, are the basis for the substantial wage penalty incured by the wives and husbands of soldiers. To a lesser extent, this situation also impairs the earnings and employment prospects of spouses of airmen, Marines, and sailors.

Conclusion. My analysis of Current Population Survey data demonstrates that wives of military personnel incur a substantial wage penalty and enjoy markedly reduced employment prospects when compared with their contemporaries married to civilians. Whereas my analysis controlled for household and spouse human capital attributes, these untoward outcomes can be attributed to factors endogenous to military service. My exploration of these endogenous military conditions does indicate the operation of a moderate earnings penalty due to migration. However, my analysis of earnings and employment across military services found much worse outcomes for spouses of soldiers and airmen than those of sailors and Marines. Whereas this analysis controlled for the rate of migration, the substantially worse earnings and employment outcomes exhibited among spouses of soldiers and airmen cannot be attributed to migration alone. Rather, by framing my analysis within the context of local labor markets, as controlled for through my use of installation dummy variables, I demonstrate that much of the penalty born by spouses of military personnel actually falls upon the spouses of soldiers and airmen through the operation of adverse local labor markets. The practical basis for this finding was suggested by figure 4.5. That is, spouse wages are linked to local

labor market conditions. My analysis of these conditions across installations demonstrates that the military services occupy very different pieces of economic real estate. Specifically, the Army, and to a lesser extent the Air Force, operate in areas characterized by relatively poor labor market conditions. Moreover, the concentration of large numbers of spouses of soldiers and airmen in such markets makes the Army and Air Force the locus of the preponderance of the wage penalty exhibited among spouses of military personnel. Given these insights, our focus now changes to the identification and evaluation of remedial policy alternatives.

Table 4.10, Percent Change in Annual Private Sector Earnings of Military Spouses

Employed Full Time in 1991, by Military Installation (Omitted Installation: San Diego)

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	133	54419	409.16279	45.98	<.0001
Error	2530	22516	8.89961		
Corrected Total	2663	76935			

Root MSE	2.98322	R-Square	0.7073
Dependent Mean	9.57574	Adj R-Sq	0.6920
Coeff Var	31.15397		

Level of Significance: *=.1, **=.05, ***=.01

Parameter	Estimate	Std Err	t Value	Probt	sig	Mean	PERCENT	Cum%
Log of 1991 Wages for Civilian Spouse	.	.	.	.	***	9.818	.	.
Full Time Civ Employment, 1=Yes, 0=No	.	.	.	.	***	0.750	.	.
Log of Number of Weeks Worked Last Year	.9135	.0188	48.5	.000	***	3.748	.	.
Civ Spouse is Caucasian, 1=Yes, 0=No	.0621	.0165	3.76	.000	***	0.811	.	.
Mil Spouse Gender: 1=Male, 0=Female	-.182	.0239	-7.6	.000	***	0.718	.	.
Mil Spouse Grade: 1=Officer, 0=Enlisted	.1478	.0205	7.20	.000	***	0.703	.	.
Log of Years of Active Federal Service	.0860	.0156	5.51	.000	***	2.195	.	.
Married While in Mil Service, 1=Yes, 0=No	.0150	.0237	.632	.528		0.787	.	.
Married at Current Post, 1=Yes, 0=No	-.026	.0231	-1.1	.262		0.191	.	.
Some College, 1=Yes, 0=No	.1118	.0179	6.23	.000	***	0.307	.	.
Undergraduate Degree, 1=Yes, 0=No	.3636	.0241	15.1	.000	***	0.244	.	.
Post Graduate Work, 1=Yes, 0=No	.6209	.0256	24.2	.000	***	0.271	.	.
Imputed Years of Experience	.0019	.0039	.502	.616		13.77	.	.
Year of Experience Squared	.0001	.0001	.999	.318		250.5	.	.
Number of Months in Current Job	.0034	.0003	10.1	.000	***	22.10	.	.
Missing Months of Tenure, 1=Yes, 0=No	-.272	.1777	-1.5	.126		0.002	.	.
Log of Length of Marriage in Years	-.012	.0139	-.84	.401		1.767	.	.
Children Under Age 6, 1=Yes, 0=No	.0476	.0182	2.62	.009	***	0.183	.	.
Children Under Age 14, 1=Yes, 0=No	-.023	.0177	-1.3	.193		0.284	.	.
Army Spouse, Civ Spouse Fed Worker, 1=Yes	.1864	.0260	7.18	.000	***	0.075	.	.
Navy Spouse, Civ Spouse Fed Worker, 1=Yes	.0840	.0350	2.40	.016	**	0.061	.	.
USAF Spouse, Civ Spouse Fed Worker, 1=Yes	.1512	.0293	5.15	.000	***	0.081	.	.
USMC Spouse, Civ Spouse Fed Worker, 1=Yes	-.001	.0678	-.01	.992		0.033	.	.
Number of Permanent Changes of Station	-.019	.0040	-4.8	.000	***	3.137	.	.
Household in Government Housing, 1=Yes	-.049	.0165	-3.0	.003	***	0.284	.	.
Minot AFB, ND	-.784	.1488	-5.3	.000	***	.	.	.
Cannon AFB/Clovis, NM	-.651	.0966	-6.7	.000	***	.	.	.
Fort Rucker, AL	-.641	.2231	-2.9	.004	***	.	1.07	1.07
Ft Wainwright, AK	-.627	.1488	-4.2	.000	***	.	0.03	1.10
Maxwell AFB, Montgomery, AL	-.578	.1010	-5.7	.000	***	.	0.23	1.33
Wurstsmit AFB, MI	-.542	.2451	-2.2	.027	**	.	.	.
Fort Polk, LA	-.539	.1476	-3.7	.000	***	.	1.72	3.04
Sheppard AFB/Wichita Falls, TX	-.538	.1270	-4.2	.000	***	.	.	.
Fort Riley, KS	-.527	.0822	-6.4	.000	***	.	3.11	6.16
Fort Sill/Lawton, OK	-.499	.0663	-7.5	.000	***	.	2.87	9.03
Gulfport, MS	-.451	.0966	-4.7	.000	***	.	.	.
Fort Dix/McGuire AFB/Lakehurst, NJ	-.438	.0806	-5.4	.000	***	.	0.95	9.97

Table 4.10, Continued

Parameter	Estimate	Std Err	t Value	Probt	Sig	Mean	Percent	Cum %
Panama City, FL	-.431	.1103	-3.9	.000	***	.	.	.
Fort Bliss/El Paso, TX	-.430	.1094	-3.9	.000	***	.	1.67	11.65
Offutt AFB/Omaha, NE	-.392	.0898	-4.4	.000	***	.	0.05	11.70
Riverside, CA	-.389	.1394	-2.8	.005	***	.	.	.
Edwards AFB, CA	-.386	.0999	-3.9	.000	***	.	.	.
Groton/New London, CT	-.386	.0897	-4.3	.000	***	.	.	.
Fort Hood, TX	-.377	.0749	-5.0	.000	***	.	4.87	16.57
Whidbey Island, WA	-.371	.1416	-2.6	.009	***	.	.	.
Ft Carson/USAF Colorado Springs, CO	-.357	.0645	-5.5	.000	***	.	4.28	20.84
Malmstrom AFB, MT	-.356	.1128	-3.2	.002	***	.	.	.
Robins AFB, GA	-.351	.0845	-4.2	.000	***	.	0.02	20.86
Fort McClellan/Anniston, AL	-.351	.0929	-3.8	.000	***	.	1.32	22.18
Twenty Nine Palms MCB, CA	-.347	.1276	-2.7	.007	***	.	.	.
Grand Forks, ND	-.333	.1036	-3.2	.001	***	.	.	.
Dover AFB, DE	-.324	.1055	-3.1	.002	***	.	.	.
Eglin AFB, FL	-.320	.0740	-4.3	.000	***	.	0.03	22.20
Fort Bragg/Pope AFB, NC	-.296	.0595	-5.0	.000	***	.	7.12	29.32
Camp Lejeune, NC	-.293	.0651	-4.5	.000	***	.	.	.
Griffiss AFB/Rome, NY	-.285	.0971	-2.9	.003	***	.	.	.
Newport, RI	-.282	.1490	-1.9	.058	*	.	.	.
Phoenix, AZ	-.280	.0874	-3.2	.001	***	.	.	.
Spokane, WA	-.279	.1476	-1.9	.059	*	.	.	.
Cherry Point MCAS, NC	-.273	.1020	-2.7	.008	***	.	.	.
Lackland AFB/Kelly AFB/San Antonio, TX	-.268	.0541	-5.0	.000	***	.	2.52	31.84
Brunswick, ME	-.243	.1148	-2.1	.034	**	.	.	.
Ft Sheridan/Great Lakes NAVTRACEN, IL	-.241	.1096	-2.2	.028	**	.	0.29	32.14
Little Rock, AR	-.234	.0802	-2.9	.004	***	.	0.20	32.34
Fort Ord/Naval PostGrad Sch/Monterey, CA	-.223	.0643	-3.5	.001	***	.	3.34	35.68
Davis-Monthan AFB, AZ	-.219	.1045	-2.1	.036	**	.	.	.
Army Overseas	-.211	.0442	-4.8	.000	***	.	26.0	61.68
Denver, CO	-.207	.0959	-2.2	.031	**	.	0.36	62.04
Hampton/Newport News, VA	-.203	.0601	-3.4	.001	***	.	1.35	63.39
Jacksonville, FL	-.202	.0616	-3.3	.001	***	.	0.02	63.41
Patrick AFB, FL	-.197	.1055	-1.9	.062	*	.	0.01	63.42
Seymour Johnson AFB, NC	-.190	.0959	-2.0	.047	**	.	.	.
Fort Stewart, GA	-.184	.0903	-2.0	.042	**	.	2.91	66.32
Air Force Overseas	-.182	.0473	-3.8	.000	***	.	.	.
Fort Gordon, GA	-.172	.0728	-2.4	.018	**	.	2.17	68.50
Fort Lewis/McCord AFB/Tacoma, WA	-.171	.0603	-2.8	.005	***	.	2.42	70.91
Hawaii	-.106	.0557	-1.9	.057	*	.	0.21	71.12
Navy Overseas	-.106	.0437	-2.4	.016	**	.	.	.
Norfolk/Portsmouth, VA	-.100	.0560	-1.8	.073	*	.	0.28	71.40
Fort Leonard Wood, MO	.1962	.0983	2.00	.046	**	.	1.67	73.07
San Bernadino, CA	.2055	.1237	1.66	.097	*	.	.	.
Bremerton, WA	.2413	.1387	1.74	.082	*	.	.	.
Oakland, CA	.3719	.1497	2.48	.013	**	.	.	.
Fort Drum/Watertown, NY	-.437	.2964	-1.5	.140		.	4.18	77.25
Annapolis, MD	-.340	.2380	-1.4	.153		.	.	.
Vandenberg AFB, CA	-.314	.3075	-1.0	.307		.	.	.
New Orleans, LA	-.308	.2782	-1.1	.269		.	0.01	77.26
Shaw AFB/Sumter, SC	-.205	.1356	-1.5	.130		.	.	.
Barksdale AFB/Shreveport, LA	-.182	.1243	-1.5	.144		.	.	.
Fort Leavenworth, KS	-.179	.1099	-1.6	.103		.	0.96	78.22
Fort Monmouth/Earls NWS, NJ	-.166	.1078	-1.5	.125		.	1.10	79.32

Table 4.10, Continued

Parameter	Estimate	Std Err	t Value	Probt	Sig		
Scott AFB, IL	-.155	.1084	-1.4	.153	.	0.04	79.36
Santa Clara County, CA	-.147	.1696	-.87	.385	.	.	.
Sacramento, CA	-.138	.1136	-1.2	.224	.	0.31	79.67
Orlando, FL	-.135	.2439	-.55	.579	.	0.01	79.69
Carswell AFB/Fort Worth, TX	-.124	.0855	-1.4	.148	.	.	.
Fort G. G. Meade, MD	-.120	.0920	-1.3	.191	.	0.53	80.22
Nellis AFB/Las Vegas, NV	-.112	.0998	-1.1	.261	.	.	.
Fort Irwin/Barstow, CA	-.107	.1141	-.94	.347	.	1.28	81.50
Charleston, SC	-.107	.0742	-1.4	.150	.	.	.
Hill AFB/Ogden, UT	-.102	.0984	-1.0	.302	.	0.11	81.61
Fort McPherson/Atlanta, GA	-.098	.1210	-.81	.416	.	0.79	82.40
Pensacola, FL	-.095	.0816	-1.2	.243	.	0.04	82.45
Beaufort/Parris Island, SC	-.094	.1040	-.91	.365	.	.	.
Chanute AFB, IL	-.092	.1119	-.82	.413	.	.	.
Fort Knox, KY	-.087	.1294	-.67	.501	.	1.71	84.15
Wright-Patterson AFB, OH	-.085	.0812	-1.0	.298	.	0.18	84.33
Castle AFB, CA	-.076	.1116	-.69	.493	.	.	.
Marines Overseas	-.069	.0667	-1.0	.298	.	.	.
Quantico/Woodbridge, VA	-.064	.1049	-.61	.539	.	.	.
Camp Pendleton, CA	-.059	.0626	-.95	.343	.	.	.
Corpus Christi, TX	-.058	.2093	-.28	.783	.	0.01	84.34
Patuxent River, MD	-.053	.0719	-.74	.458	.	.	.
Travis AFB/Vallejo, CA	-.045	.0777	-.57	.565	.	.	.
Washington, DC Metro Area	-.030	.0447	-.66	.507	.	4.59	88.93
Fort Huachuca, AZ	-.027	.0892	-.30	.763	.	1.30	90.23
Aberdeen Proving Grounds, MD	-.022	.1018	-.21	.832	.	0.88	91.11
F.E. Warren AFB, Cheyenne, WY	-.011	.1055	-.10	.919	.	.	.
Kirtland AFB/Albuquerque, NM	-.010	.1006	-.10	.922	.	0.10	91.21
Fort Benning, GA	-.008	.0838	-.10	.921	.	3.35	94.55
Loring AFB, ME	.0009	.1677	.006	.996	.	.	.
Redstone Arsenal/Huntsville, AL	.0088	.1129	.078	.938	.	1.71	96.27
Fort Campbell, KY	.0167	.0812	.205	.837	.	3.36	99.63
Ft Greely/Elmendorf AFB, AK	.0334	.0658	.508	.611	.	.	.
Tinker AFB/Oklahoma CITY, OK	.0409	.0980	.417	.676	.	0.02	99.65
Ellsworth AFB/Rapid City, SD	.0569	.1329	.428	.668	.	.	.
Dyess AFB/Abilene, TX	.0921	.1299	.709	.479	.	.	.
Millington/Memphis, TN	.0929	.1070	.869	.385	.	0.03	99.67
Los Angeles, CA	.0956	.0652	1.47	.143	.	0.05	99.72
McConnell AFB/Wichita, KS	.0995	.1046	.951	.342	.	.	.
Tampa, FL	.1191	.1842	.646	.518	.	0.06	99.79
Alabany, GA	.1692	.2757	.614	.539	.	.	.
Hanscomb AFB, MA	.2024	.2050	.987	.324	.	.	.
Holloman AFB/Alamogordo, NM	.2052	.1464	1.40	.161	.	.	.
Carlisle Barracks, PA	.3654	.2312	1.58	.114	.	0.21	100.0

Table 4.11, Probit Model Results: Modeling the Probability that a Civilian Spouse of a Service Member Had Full Time Earnings in the Private Sector in 1991 by Military Installation

Model Information

Dependent Variable: Full Time Private Sector Earnings
Number of Observations: 9584
Name of Distribution: NORMAL
Log Likelihood: -368484.3749

Weighted Frequency Counts for the Ordered Response Categories

Level	Count	
0	164384.4	Employed Full Time In Private Sector
1	682478.1	

Level of Significance: *=.1, **=.05, ***=.01

Parameter	Estimate	Std Err	Prob Chi Square	Sig
Intercept	1.71056	.0574	.000	***
Log of Military Spouse's Annual Wage	-0.26889	.0060	.000	***
Mil Spouse Ed: High School 1=Yes, 0=No	-0.05839	.0078	.000	***
Mil Spouse Ed: Some College 1=Yes, 0=No	-0.08455	.0102	.000	***
Mil Spouse Ed: Undergraduate 1=Yes, 0=No	-0.07790	.0100	.000	***
Mil Spouse Ed: Post Graduate 1=Yes, 0=No	-0.19818	.0118	.000	***
Mil Spouse Grade: 1=Officer, 0=Enlisted	-0.03291	.0088	.000	***
Log of Years of Active Federal Service	0.17548	.0034	.000	***
Log of Length of Marriage in Years	0.00616	.0028	.025	**
Children Under Age 6, 1=Yes, 0=No	-0.58389	.0039	.000	***
Children Under Age 14, 1=Yes, 0=No	-0.21773	.0042	.000	***
Civ Spouse is Caucasian, 1=Yes, 0=No	-0.02088	.0038	.000	***
Mil Spouse Gender: 1=Male, 0=Female	-0.23926	.0066	.000	***
High School Diploma, 1=Yes, 0=No	-0.52303	.0130	.000	***
Some College, 1=Yes, 0=No	-0.25431	.0128	.000	***
Undergraduate Degree, 1=Yes, 0=No	-0.00769	.0132	.559	
Post Graduate Work, 1=Yes, 0=No	0.05913	.0135	.000	***
Imputed Years of Experience	0.05151	.0010	.000	***
Year of Experience Squared	-0.00149	.0000	.000	***
Number of Permanent Changes of Station	-0.04753	.0010	.000	***

Parameter	Estimate	Std Err	Prob Chi Square	Sig	FT Prob	PERCENT	Cum %
Vandenberg AFB, CA	-1.06041	.5320	.000	***	.009	.	.
Fort Irwin/Barstow, CA	-0.97654	.4315	.000	***	.012	1.2830	1.2830
Fort Knox, KY	-0.77931	.3016	.000	***	.019	1.7087	2.9917
Wurstsmit AFB, MI	-0.66388	.4108	.000	***	.025	.	.
Loring AFB, ME	-0.60640	.4059	.000	***	.029	.	.
Fort Leonard Wood, MO	-0.47840	.2512	.000	***	.038	1.6747	4.6664
Orlando, FL	-0.42244	.2816	.000	***	.043	0.0123	4.6787
Fort Polk, LA	-0.28140	.1756	.000	***	.057	1.7152	6.3939

Table 4.11, Continued

Parameter	Estimate	Err	Square	Sig	Prob	PERCENT	Cum %
Redstone Arsenal/Huntsville, AL	-0.27048	.1757	.000	***	.059	1.7127	8.1066
Fort G. G. Meade, MD	-0.18014	.1883	.000	***	.070	0.5328	8.6393
Fort Campbell, KY	-0.14567	.1157	.000	***	.075	3.3629	12.0022
Carlisle Barracks, PA	-0.05229	.3556	.374		.089	0.2129	12.2152
Army Overseas	-0.02511	.0557	.097	*	.093	26.0032	38.2184
Air Force Overseas	0.01193	.0575	.422		.099	.	.
Dyess AFB/Abilene, TX	0.03894	.1767	.225		.104	.	.
Fort Stewart, GA	0.07805	.1214	.001	***	.111	2.9055	41.1239
McConnell AFB/Wichita, KS	0.07807	.1877	.019	**	.112	.	.
Hanscomb AFB, MA	0.08143	.3250	.159		.112	.	.
Alabany, GA	0.08551	.3128	.134		.113	.	.
Ft Carson/USAF Colorado Springs, CO	0.09006	.0819	.000	***	.114	4.2759	45.3997
Fort Riley, KS	0.09160	.0995	.000	***	.114	3.1134	48.5131
Newport, RI	0.10204	.2446	.021	**	.116	.	.
Pensacola, FL	0.11260	.1197	.000	***	.118	0.0442	48.5574
Twenty Nine Palms MCB, CA	0.12720	.1669	.000	***	.121	.	.
Sacramento, CA	0.13626	.1366	.000	***	.123	0.3103	48.8677
Fort Benning, GA	0.15256	.0976	.000	***	.126	3.3480	52.2157
Spokane, WA	0.15277	.1677	.000	***	.126	.	.
Tampa, FL	0.15871	.2169	.000	***	.128	0.0643	52.2801
Kirtland AFB/Albuquerque, NM	0.17580	.1379	.000	***	.131	0.0957	52.3758
Scott AFB, IL	0.19706	.1499	.000	***	.136	0.0422	52.4180
Fort Huachuca, AZ	0.22077	.1372	.000	***	.141	1.3046	53.7226
Seymour Johnson AFB, NC	0.23655	.1260	.000	***	.145	.	.
Cherry Point MCAS, NC	0.23775	.1158	.000	***	.145	.	.
Fort Hood, TX	0.23823	.0815	.000	***	.145	4.8718	58.5945
Fort McClellan/Anniston, AL	0.24250	.1240	.000	***	.146	1.3161	59.9105
Camp Lejeune, NC	0.24661	.0751	.000	***	.147	.	.
Maxwell AFB, Montgomery, AL	0.24748	.1811	.000	***	.147	0.2271	60.1377
Hill AFB/Ogden, UT	0.25533	.1356	.000	***	.149	0.1113	60.2489
San Bernadino, CA	0.27313	.1860	.000	***	.153	.	.
Minot AFB, ND	0.28165	.1679	.000	***	.155	.	.
Oakland, CA	0.31351	.1699	.000	***	.163	.	.
Fort Ord/Naval PostGrad Sch/Monterey, CA	0.33104	.0818	.000	***	.167	3.3425	63.5914
Marines Overseas	0.33460	.0811	.000	***	.168	.	.
Tinker AFB/Oklahoma CITY, OK	0.34352	.1308	.000	***	.170	0.0165	63.6079
Fort Gordon, GA	0.35018	.0966	.000	***	.172	2.1723	65.7803
Travis AFB/Vallejo, CA	0.35647	.0896	.000	***	.174	.	.
Bremerton, WA	0.35821	.1569	.000	***	.174	.	.
Grand Forks, ND	0.36490	.1221	.000	***	.176	.	.
Dover AFB, DE	0.36741	.1263	.000	***	.176	.	.
Camp Pendleton, CA	0.37492	.0739	.000	***	.178	.	.
Fort Dix/McGuire AFB/Lakehurst, NJ	0.39742	.1050	.000	***	.184	0.9457	66.7260
Eglin AFB, FL	0.40482	.0892	.000	***	.186	0.0250	66.7510
Navy Overseas	0.40512	.0506	.000	***	.186	.	.
Fort Bragg/Pope AFB, NC	0.42239	.0637	.000	***	.191	7.1240	73.8750
Wright-Patterson AFB, OH	0.45043	.0990	.000	***	.199	0.1757	74.0507
Lackland AFB/Kelly AFB/San Antonio, TX	0.45370	.0661	.000	***	.200	2.5195	76.5702
Ellsworth AFB/Rapid City, SD	0.45809	.1132	.000	***	.201	.	.
Corpus Christi, TX	0.46346	.2665	.000	***	.202	0.0129	76.5831
Santa Clara County, CA	0.46886	.4697	.000	***	.204	.	.
Sheppard AFB/Wichita Falls, TX	0.47820	.1643	.000	***	.207	.	.
Beaufort/Parris Island, SC	0.48258	.1234	.000	***	.208	.	.
Fort Leavenworth, KS	0.48395	.1440	.000	***	.208	0.9568	77.5399

Table 4.11, Continued

Parameter	Estimate	Err	Square	Sig	Prob	PERCENT	Cum %
Norfolk/Portsmouth, VA	0.48445	.0621	.000	***	.208	0.2785	77.8184
Cannon AFB/Clovis, NM	0.49393	.1223	.000	***	.211	.	.
Millington/Memphis, TN	0.50788	.1218	.000	***	.215	0.0288	77.8472
Whidbey Island, WA	0.52063	.1607	.000	***	.219	.	.
Griffiss AFB/Rome, NY	0.52467	.1123	.000	***	.220	.	.
Hawaii	0.52623	.0665	.000	***	.221	0.2067	78.0539
Fort Sill/Lawton, OK	0.53064	.0847	.000	***	.222	2.8728	80.9267
Groton/New London, CT	0.53974	.1025	.000	***	.225	.	.
Charleston, SC	0.55173	.0931	.000	***	.228	.	.
Ft Wainwright, AK	0.55442	.2090	.000	***	.229	0.0291	80.9558
San Diego, CA	0.55805	.0175	.000	***	.230	.	.
Fort Monmouth/Earls NWS, NJ	0.56290	.1413	.000	***	.232	1.1012	82.0569
Nellis AFB/Las Vegas, NV	0.57055	.1241	.000	***	.234	.	.
Shaw AFB/Sumter, SC	0.58704	.1554	.000	***	.239	.	.
Brunswick, ME	0.60902	.1596	.000	***	.246	.	.
Fort McPherson/Atlanta, GA	0.61212	.1388	.000	***	.247	0.7880	82.8450
Hampton/Newport News, VA	0.64260	.0737	.000	***	.257	1.3518	84.1967
Panama City, FL	0.65413	.1309	.000	***	.260	.	.
Ft Greely/Elmendorf AFB, AK	0.65592	.0800	.000	***	.261	.	.
Washington, DC Metro Area	0.65887	.0540	.000	***	.262	4.5858	88.7825
Great Lakes NAVTRACEN, IL	0.66217	.1284	.000	***	.263	0.2935	89.0761
Annapolis, MD	0.68022	.3016	.000	***	.269	.	.
Quantico /Woodbridge, VA	0.71137	.1210	.000	***	.279	.	.
Offutt AFB/Omaha, NE	0.73153	.1038	.000	***	.286	0.0463	89.1224
Edwards AFB, CA	0.74549	.1171	.000	***	.291	.	.
Chanute AFB, IL	0.76396	.1357	.000	***	.297	.	.
Davis-Monthan AFB, AZ	0.76745	.1183	.000	***	.298	.	.
Castle AFB, CA	0.76777	.1265	.000	***	.298	.	.
Fort Lewis/McCord AFB/Tacoma, WA	0.76783	.0714	.000	***	.298	2.4168	91.5392
Gulfport, MS	0.77111	.1110	.000	***	.300	.	.
Fort Rucker, AL	0.77901	.3368	.000	***	.302	1.0714	92.6106
Barksdale AFB/Shreveport, LA	0.79470	.1452	.000	***	.308	.	.
Malmstrom AFB, MT	0.81746	.1269	.000	***	.316	.	.
F.E. Warren AFB, Cheyenne, WY	0.82867	.1369	.000	***	.320	.	.
Aberdeen Proving Grounds, MD	0.84805	.1260	.000	***	.327	0.8768	93.4874
Jacksonville, FL	0.87196	.0720	.000	***	.336	0.0165	93.5039
Carswell AFB/Fort Worth, TX	0.94489	.0975	.000	***	.363	.	.
Little Rock, AR	0.94690	.0938	.000	***	.363	0.1993	93.7032
Robins AFB, GA	0.98640	.0998	.000	***	.378	0.0165	93.7197
Los Angeles, CA	0.99419	.0739	.000	***	.381	0.0479	93.7676
Patrick AFB, FL	1.00290	.1479	.000	***	.384	0.0129	93.7805
Riverside, CA	1.01019	.1583	.000	***	.387	.	.
Phoenix, AZ	1.03793	.0992	.000	***	.398	.	.
Denver, CO	1.26674	.1305	.000	***	.488	0.3552	94.1357
Patuxent River, MD	1.30444	.0835	.000	***	.503	.	.

CHAPTER 5

IMPROVING THE LABOR MARKET OPPORTUNITIES AND OUTCOMES OF MILITARY WIVES

Policy Overview. As demonstrated in Chapter 4, spouses of military personnel incur a substantial wage penalty as compared with their contemporaries married to civilians. Moreover, this penalty increases with the civilian spouses' education level. Given the important contribution of spouse earnings to household income, these conditions impose a substantial burden on military households. Indeed, to make dual income military households whole through an increase in soldier pay, it would be necessary to increase regular military compensation by a substantial margin. In the case of soldiers with a college-educated spouse, this margin accounts for 12 percent of RMC.[93]

Of course, increasing soldier pay so as to offset lost civilian spouse earnings would be a poor substitute for solutions that drive more directly to the basis for spouses' poor labor market outcomes. First, many civilian spouses of military personnel do not enter the labor market through personal choice. In this case, raising the pay of the military spouse would be inefficient and inequitable. Alternatively, such a policy would fail to account for intangible aspects of civilian spouse employment. Specifically, 88 percent of civilian spouses with

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[93] During 1993 through 1999, the full time wage earnings of college educated wives comprised 43 percent of civilian household income. As demonstrated in Chapter 4, college educated military wives working full time incur a 23 percent earnings penalty. At the same time, civilian male head of household earnings for such wives exceeded military head of household earnings by only 6 percent. Thus, full time earnings for these wives of military personnel comprised 33 percent of military household earnings. The aforementioned 23 percent earnings penalty thus represents 12 percent of the military spouses' earnings.

full time earnings in the 1992 DoD Survey reported that these earnings contributed to their self-esteem. Similarly, 93 percent reported that full time employment contributed to their career aspirations. Finally, with regard to national output, policies should be directed toward providing an outlet for spouse labor commensurate with their stock of human capital. Simply put, soldier output and earnings are relatively invariant across military stations. However, such is not the case with the civilian spouses of military personnel. As we have seen, the relatively low earnings, and thus output, of these spouses can be attributed in large measure to local conditions. Thus, by virtue of military stationing practices these spouses create less national output, pay fewer taxes, and generate less wealth than would otherwise be the case. Therefore, policy should seek to address the conditions that engender this loss in national output and welfare. From these perspectives, a compensatory increase in RMC should not be the starting point in addressing the earnings and employment penalty incurred by spouses of military personnel.

With regard to the transient nature of military service, Chapter 4 analysis does indicate that migration impairs the labor market outcomes of spouses of military personnel. However, the effect of such migration is relatively moderate when compared with locality based effects. Moreover, as we saw in Chapter 3, in the case of the Army, stabilization policies are not the panacea suggested in the literature. Moreover, in light of Chapter 4 analysis, it would be difficult to argue that migration is the principal labor market challenge facing spouses of military personnel stationed at Fort Polk. Based upon the findings provided in Table 4.9, one could draw the same

conclusion with regard to assignments confronting 67 percent of Army households.

Given the relatively robust earnings and employment outcomes exhibited by spouses of sailors, it is apparent that the earnings and employment penalty confronting civilian spouses does not fall uniformly across services. Rather, Chapter 4 findings indicate that the locus of this penalty can be attributed to an identifiable set of Army and Air Force installations. This situation consequently suggests that policy remedies be developed so as to address local conditions that disproportionately impair the employment and earnings outcomes of spouses of soldiers and airmen.

Local Labor Conditions and Military Service Operating Considerations. Given the considerable variance of spouse labor market outcomes exhibited across installations, one is immediately drawn to the topic of local labor market conditions. As touched upon in Chapter 4, the military has accumulated and retained its current stock of installations based upon a variety of non-economic criteria. The following cursory survey of installations provides a sense of the considerations that gave birth to but a few of the Army's installations.[94] This survey also highlights local employment opportunities identified by local employment referral services.

> **Fort Polk**, in west central Louisiana, was established as a training center in the 1940s. This post is home to approximately 8,000 soldiers. Spouse job opportunities are so

[94] Office of the Secretary of Defense (2000). Standard Installation Topic Exchange Service, Defense Manpower Data Center. 2000.

limited that local employment services highlight the availability of commissary bagger positions.

Fort Leonard Wood, in the Missouri Ozarks was established shortly before World War II as a mobilization center. This post is home to approximately 4,000 soldiers and 7600 family members. Local private sector employment is extremely limited and consists of 270 positions in manufacturing, 650 in textile production, 850 in local education, 375 in retailing, 190 in local government, and 95 in services. Federal civil service employment includes 4,200 appropriated fund employees.

- **Fort Sill** was selected as a military encampment in 1869. Soldiers operating from this base defended settlers in Texas and Kansas from Indian raids. Fort Sill is home to the 10,000 soldiers and 36,000 family members of the Artillery Center and III Corps Artillery. Local employment referral services rate employment opportunities as good for food service workers, nurses and substitute teachers to poor for secretaries, administrative assistants, and state and federal employment. Fort Sill also employs over 5,800 federal civil servants in appropriated fund positions.

I leave it to the reader to contrast the employment opportunities presented above with those available on installations such as Naval Station San Diego and Naval Station Norfolk in urban and suburban areas.

Of course, it is important to note that the operating environment found within the Army serves to skew that service to remote locations. Training for land warfare requires vast expanses of land for maneuver areas and ranges. For example Fort Leonard Wood encompasses 98 square miles of the Ozarks while Fort Bliss encompasses approximately 1,700 square miles, a land area larger than the state of Rhode Island. In contrast, considerations such as good ship overhaul and repair facilities dominate Navy stationing practices. Indeed, with naval forces, operational training is accomplished at sea and well-developed port facilities are required to support fleet operations. Thus, it is not surprising to find major naval installations in centers of trade,

commerce, and industry such as Seattle, San Diego, and Newport News, Virginia.

The Federal Employment Earnings Premium. Heretofore, the literature has addressed low earnings among spouses of military personnel as a problem of migration. Given this approach, and the fairly uniform rates of migration exhibited across services[95], the issue of low spouse earnings has been addressed rather generically as a problem endemic to military service. However, it is now clear that the spouse earnings penalty entailed in military service falls disproportionately on the spouses of soldiers and airmen located on a set of readily identifiable installations. Thus, the problem at hand becomes one of devising policies that increase the employment and earnings opportunities available to these civilian spouses. In this regard, federal civil service employment policies are a logical point of departure. Therefore, I will explore increased Department of the Army employment of spouses as a model for crafting compensatory employment policies within the Department of Defense.

Department of the Army Civil Service Employment. Department of the Army civil service employment consists of appropriated and non-appropriated fund positions. As suggested by its title, appropriated fund positions are paid for with funds appropriated by Congress for

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[95] Defense Manpower Data Center (1993). 1992 DoD Surveys of Officers and Enlisted Personnel and Military Spouses. Arlington, Virginia, Department of Defense.

Service	Mean Number of Moves	Standard Error
Army	2.829	.055
Air Force	2.490	.040
Navy	2.407	.043
Marines	2.140	.050

operation of the Army. In contrast, non-appropriated fund positions draw their resources from entities such as the Armed Forces Exchange System or morale support activities that charge military families for their services. For a variety of considerations, the analysis that follows will focus on appropriated fund positions. These jobs entail substantially higher wages and career opportunities. They are also far more numerous at major troop installations than are non-appropriated positions.[96]

As of 20 September 1999, the Army employed 203,095 civilian personnel in appropriated fund positions. Of these employees, 139,330 were collocated on major installations with substantial populations of active component soldiers. Of this considerable population of civilian employees, only 8,800, or 6 percent, were spouses of soldiers. Therefore, the potential exists to considerably expand Army employment of soldiers' spouses.

By way of assessing the efficacy of such a policy, I build upon my Chapter 4 analysis of 1992 DoD Survey data. Specifically, I now incorporate a federal employment control variable into my spouse earnings function. This variable, *Full Time Federal Employment*, is coded 'one' for spouses who reported in the 1992 DoD Survey that they were full time federal employees. For spouses with full time employment outside the federal sector, this variable is coded 'zero'. In this way, I control for the earnings benefit accruing from employment in the federal civil service.

As indicated in Table 5.1 at the end of this chapter, spouses with full time federal civil service employment garner a substantial wage premium over other wives with full time earnings. Moreover, by controlling for installation specific effects, and military service affiliation (Army, Navy, Air Force, and Marines), the benefit of such federal employment to spouses of soldiers and airmen is striking. Specifically, soldiers' spouses who are employed full time in the federal civil service earn 18 percent more than other Army spouses with full time wage earnings. Whereas my regression controls for other relevant variables, this suggests that, on average, wages garnered by soldiers' spouses in federal employment are substantially higher than those earned by non-federal workers. Hence, by this measure, affording soldiers' spouses greater entrée to federal employment would close much of the wage penalty exhibited among these spouses.

Figures 5.1 and 5.2 below illustrate the benefits of federal employment from a local perspective. By way of orientation, the horizontal axis indicates the ratio of the average private sector wage in the local county at selected installations to the average federal wage in that county. The vertical axis indicates the ratio of local average private sector wages to the average private sector wage for the United States as a whole. Bubbles on Figure 5.1 indicate posts under the control of the Army Training and Doctrine Command (the production system), while those on Figure 5.2 indicate posts under the

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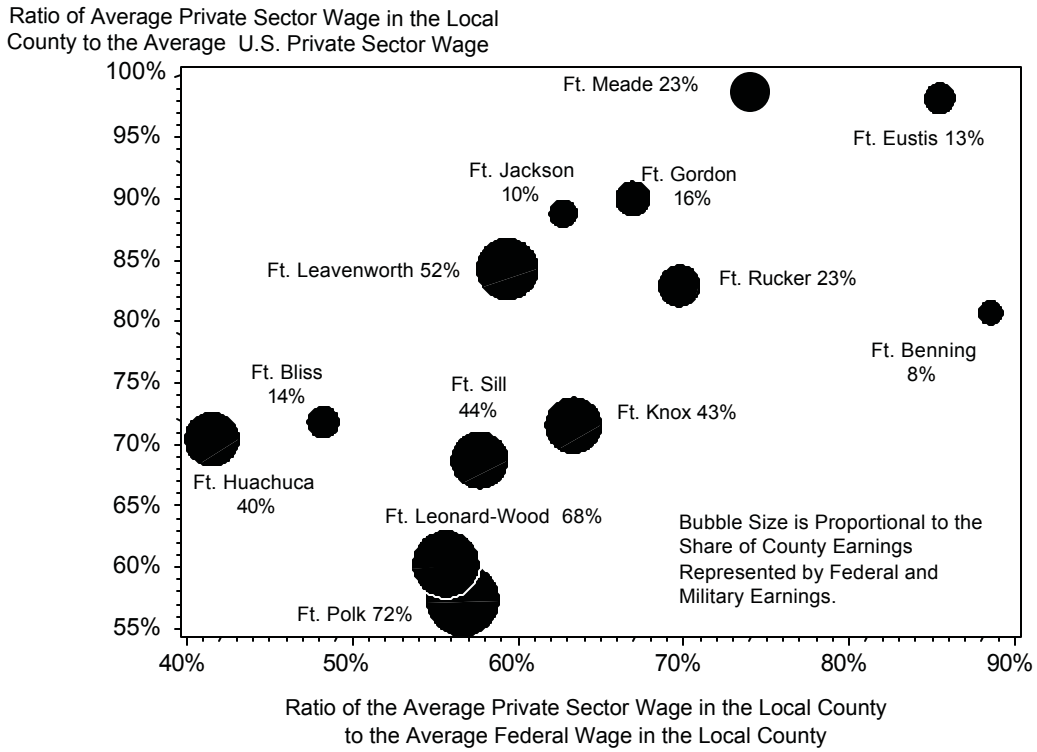
[96] For example, at the Army's most highly populated post, Fort Bragg, there are 8,700 appropriated and 932 non-appropriated fund positions.

command of Army Forces Command (the combat system). The size of installation bubbles indicates the proportion of earnings in the local county that are derived from federal civilian and military wages. Thus, in the case of Fort Huachuca (Figure 5.1), the average private sector wage is 40 percent of the average federal wage and the average private sector wage is 70 percent of the national average. Additionally, federal civilian and military wages account for 40 percent of all wages in the local county.

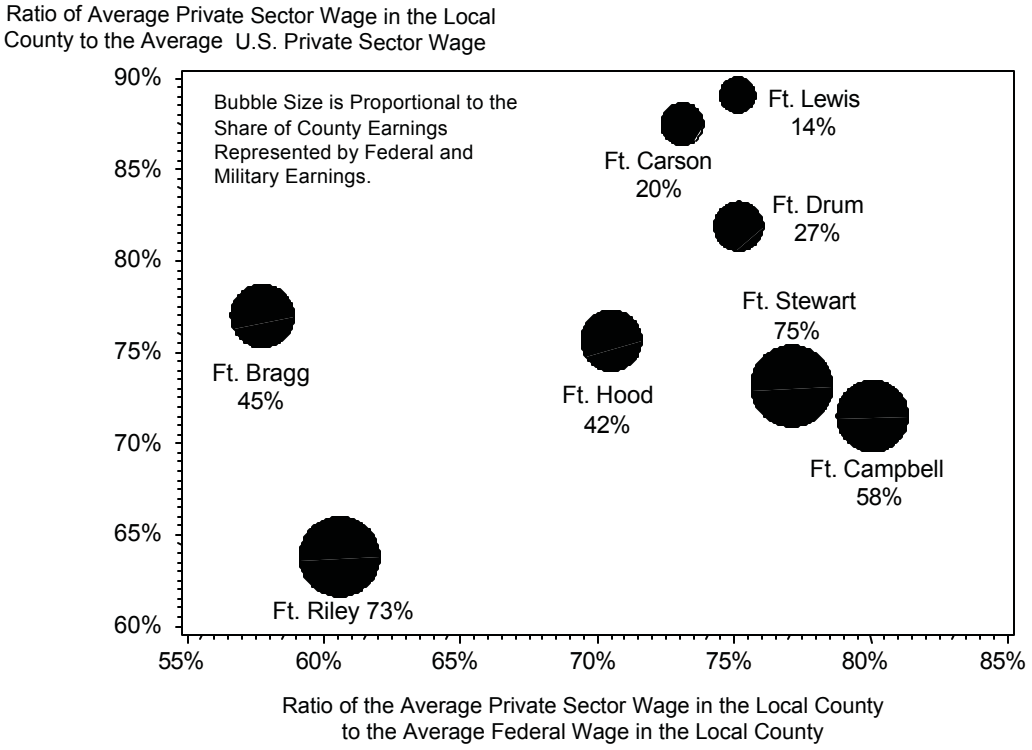
Figure 5.1, Ratio of the Average Local Private Sector Wage to the U.S. Average Wage and the Ratio of the Average Local Private Sector Wage to the Average Local Federal Wage in the Vicinity of Major Army TRADOC Posts
USA Counties 1992



Thus, on average, by moving from private sector employment, to federal employment, spouses of soldiers at Fort Huachuca could anticipate a substantial increase in earnings. Moreover, reflection on Figures 5.1 and 5.2 suggests that spouses in areas characterized by relatively low average private sector wages (vertical axis) would benefit most from

federal employment. The basis for this situation lies within the vagaries of federal wage determination. Aside from locality adjustments, federal wages are set forth in pay scales that apply uniformly across federal service regardless of location. Thus, in areas of relatively poor wage conditions, federal civil service is likely to offer the most lucrative compensation. Also, federal employment provides members of Congress a means to bring relatively high wage jobs into their home districts.

Figure 5.2, Ratio of the Average Local Private Sector Wage to the U.S. Average Wage and the Ratio of the Average Local Private Sector Wage to the Average Local Federal Wage in the Vicinity of Major Army FORSCOM Posts
USA Counties 1992



This situation, of course, suggests that policies that have the effect of reducing federal employment opportunities among local residents will entail sensitive political considerations. Finally, by way of closing the analytic loop, many of those posts exhibiting the largest

earnings penalty in Table 5.1 comport with the pattern illustrated in Figures 5.1 and 5.2 in terms of relative earnings privation.

Before moving to the topic of policy feasibility, it is important to address the potential that the poor earnings outcomes exhibited among spouses of military personnel accrue from unmeasured factors endogenous to these spouses. The first of these factors ensues from the potential that spouses of military personnel are somehow different and self select into the military lifestyle and its attendant labor market conditions due to their unique nature. The second hypothesis is a variant of the first and proceeds upon the assumption that most military personnel marry at their current installation and thus, their civilian spouses' work ethic and earnings expectations reflect local labor market norms.

By way of addressing the first factor, my augmented earnings function (Table 5.1) incorporates a control variable, *Married While in Mil Service*, to indicate whether a couple married before military service or after the military spouse was already on active duty. Since the parameter estimate for this control variable is quite small, and the standard error is quite large, one can rule out practical or statistical significance. This suggests that spouses who marry civilians who subsequently enter a military service exhibit earnings that are indistinguishable from those who marry personnel already serving on active duty. This would tend to rule out the potential that spouses of military personnel earn less due to some unseen attribute that draws them to uniformed mates.

To address the second concern, my augmented earnings function includes a control variable, *Married at the Current Post*. As indicated in Figure 5.1, this parameter estimate is also insignificant from a policy and statistical perspective. Thus, spouses who married their military mate before arriving at their installation of assignment in 1991 exhibited earnings that were indistinguishable from those who married their military mate at the duty installation from whence they reported their earnings in 1992. Thus, by these measures, we can reject the foregoing hypotheses.

Increasing Federal Employment of Soldiers' Spouses. Unlike private sector employment, federal employment is governed by regulations and procedures that present substantial barriers to entry. These procedures are set forth in Title 5 of the Code of Federal Regulations (5 CFR). Federal civil service consists of the competitive service that includes 80 percent of federal employees and the excepted service that includes the remainder of federal employees. Whereas the excepted service includes employees with highly specialized skills or who occupy policy-making positions, most spouses would only be eligible for appointment to competitive service positions. Moreover, the vast majority of the 139,000 appropriated positions collocated with large troop populations fall within the competitive service.

In order to secure federal employment, applicants must be referred to appointing authorities on a referral list. In order to appear on a referral list, an applicant must receive at least 70 points on a 100-point scale that equates applicant qualifications with job requirements. Additionally, certain candidates obtain employment

preferences such that they must be hired from a referral list. These candidates include noncompetitive applicants, Veterans Readjustment Appointments, appointments of 30% or more disabled veterans, noncompetitive transfers, placements to correct equal employment opportunity deficiencies, handicapped placements, and placements of persons returning from overseas tours of duty.

Given this situation, spouses face considerable difficulty in garnering sufficient points to appear at the top of a referral list. Consequently, since appointing officials are required to fill vacancies from the top candidates on a referral list, spouses face considerable difficulty in securing appointments. Moreover, lists are compiled for specific employment openings. Consequently, one cannot rise to the top of a referral list through longevity in an applicant queue. Rather, to circumvent this situation, a spouse must have a noncompetitive appointment status. Such status is available to a spouse who has been employed for 52 weeks[97] as a federal civil servant within the previous three years. Of course, this suggests a bit of a catch-22 in that one must have had federal employment to overcome the barriers to entry into federal civil service.

Partial relief for the foregoing situation is afforded by Executive Order 12721. Specifically, E.O. 12721 requires the Army (and other services) to provide priority employment to civilian spouses who are authorized to accompany their military spouse during overseas

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[97] This can be waived to 26 weeks for spouses of military personnel who secured federal employment overseas and who are returned to the United States on military orders before completing 52 weeks service (5 CFR 315.608c)

assignments. This exception to 5 CFR yields substantially higher spouse employment overseas than in the United States. For example, spouses of soldiers occupy 23 percent of the approximately 13,000 appropriated fund positions in Europe. In contrast, spouses of soldiers comprise only 4 percent of appropriated fund positions on major Army installations in the United States.

Unfortunately, as suggested by the low rate of federal spouse employment in the U.S., the operation of E.O. 12721 in terms of enhancing spouse entrée to federal employment upon return to the United States is far from complete. Though overseas employment under E.O. 12721 does afford spouses returning to the U.S. non-competitive appointment status, such status still leaves spouses well down the list for reappointment due to the operation of other employment preferences. This is due to the fact that noncompetitive referral lists are issued simultaneously with the competitive referral lists,

> and selection may be made of noncompetitive Army candidates, VRA appointments, appointments of 30% or more disabled veterans, noncompetitive transfers, placements to correct equal employment opportunity deficiencies, placement of the handicapped, and placements of persons returning from overseas tours of duty, without regard to spouse preference.[98]

Where local labor markets are quite thin, these caveats tend to be less important in terms of barring spouse accession to appropriated fund employment. For example, at Fort Irwin in the Mojave Desert, spouses comprise 16 percent of appropriated fund employees. In contrast they are only 1 percent of such employees at Redstone Arsenal

in Huntsville, Alabama. Moreover, the limited efficacy of military family member hiring preference can be seen when one reflects upon the fact that only 1,980 spouses of active duty soldiers now employed by the Army were selected while using this preference program.

A New Spouse Hiring Authority. In light of the foregoing, it is clear that a new hiring authority will be required if the Army desires to improve the earnings prospects of soldiers' spouses through appropriated fund employment. So as to ensure adequate positions are available for spouses of active duty personnel, this authority should provide employment only so long as the military spouse remains on active duty. Such a policy would also raise exit costs for soldiers contemplating separation from the Army and thereby contribute to soldier retention. So as to avoid creating perverse incentives for family separation, this authority should also apply where a spouse is collocated with his or her military mate. In terms of implementation, this authority could be employed on a test basis at those installations exhibiting the greatest earnings and employment penalty as highlighted in Figures 4.6 and 5.3 (installations within dark gray shaded areas).

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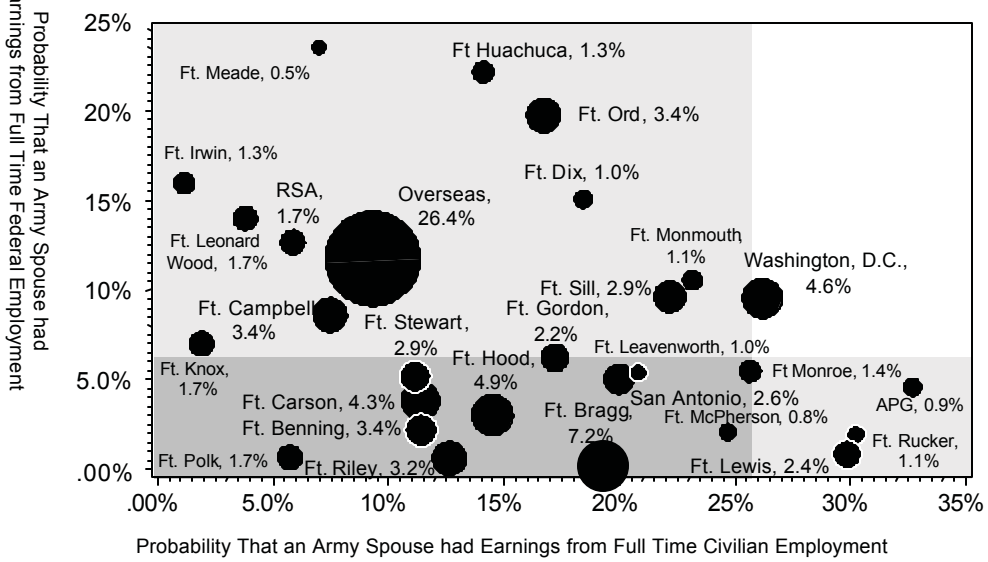
[98] Office of Personnel Management (1999). Title 5 Code of Federal Regulations, Administrative Personnel. Washington, D.C., U.S. Government Printing Office.

Figure 5.3, 1991 Probability that the Average Army Spouse had Full Time Federal or Private Sector Employment by Post in 1991
Source: 1992 DoD Survey of Officers, Enlisted Personnel and Spouses & USA Counties 1998



Army Benefits from Spouse Employment. Aside from the obvious benefits to Army households, appropriated fund employment of soldiers' spouses would also accrue substantial benefits to the Army and the Treasury. The benefits arise through savings in health benefits afforded to federal employees and through the collection of income taxes on the incremental earnings of spouses employed in federal civil service. With regard to the first point, the Army offers subsidized health benefits to non-temporary employees under the Federal Employees Health Benefit Plan (FEHBP). Currently, the Army cost share of this benefit is $2,529 per enrolled employee.[99] Among employees who are not married to an active duty soldier, the take rate for this benefit is 89 percent. In contrast, only 19 percent of soldiers' spouses working as

[99] Office of Personnel Management (1999). OPM Financial Management Letter F-99-03, dated February 5, 1999, Health Benefit Cost Factor. Washington, D.C.

Army civil servants avail themselves of this benefit.[100] At these rates of usage, the expected FEHBP cost for the spouse of a soldier would be $557, while the expected cost for the spouse of a civilian would be $2610. Assuming stable FEHBP take rates, employment of soldiers' spouses would net the Army at least $2,053 in expected benefits savings per spouse employed. Additionally, since under 5 CFR employment is only offered to fully qualified applicants, there would be no incremental training cost associated with such a strategy. Moreover, there is substantive reason to expect that spouses of soldiers embody skills that are fully amenable to Army requirements. Recall that soldiers' spouses occupy 23 percent of Army civilian positions in Europe.[101] As installations in Europe engage in many of the same activities entailed in operating posts in the United States, there is reason to believe that the rates of Army spouse employment in the U.S. can rise to such levels from their current average of 4 percent.

Army employment of soldiers' spouses would also benefit the United States Treasury through increased tax receipts. If one assumes a 15 percent tax rate and 18 percent increase in spouse earnings, income tax payments from spouses gaining employment in an appropriated fund positions would rise by approximately 3 percent, or $360 on a base of

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[100] The basis for this low take-rate can be found in the fact that federal employees bear about 30 percent of the cost of the FEHBP while all spouses of soldiers enjoy health coverage under various military health care programs by virtue of their marriage to a soldier. Also, in the vicinity of many installations, military health services are more convenient than care available from civilian providers under FEHBP.

[101] Department of the Army (1999). Civilian Personnel Master File, Headquarters Army Civilian Personnel System,. 1999.

$12,000. Thus, the net change in the federal cost associated with hiring the average soldiers' spouse would be a $2,413 saving.

Of course, from the perspective of other federal employment aspirants, policies directed toward increasing federal employment of soldiers' spouses assume the character of zero-sum games. That is, the number of positions available in Army civil service is relatively fixed. Therefore, each spouse of a soldier who joins the federal payroll must come at the expense of federal employment opportunities available to civilians residing in the vicinity of Army posts. Thus, spouse employment policies may lead to civilian unemployment or underemployment in the vicinity of some posts during a period of labor market adjustment. Nevertheless, such a circumstance would merely shift the burden of such unemployment or underemployment from military households to civilian households. Importantly, since civilian households are free to relocate to more lucrative job markets, this burden should be transitory. In contrast, spouses of soldiers cannot relocate to better job markets while maintaining an intact military household. Thus, their forgone employment and earnings are not transitory and will persist as long as they are stationed in areas characterized by poor labor markets. Thus, affording spouses of soldiers enhanced labor market opportunities through enhanced access to federal employment is welfare enhancing from a national perspective.

Implementing a Spouse Hiring Authority. It is possible to craft federal employment practices so as to minimize the cost of a spouse hiring authority on the existing Army civilian workforce. That is,

rather than separating existing workers, the Army could employ a policy of replacement through attrition. Thus, soldiers' spouses could be added to the Army payroll as existing workers retire or leave federal employment. Reference to Figure 5.4 suggests that the Army is approaching an ideal time to implement such a policy. As evidenced by the skewed age distribution of Army civil servants presented in Figure 5.4, 15 percent of Army civilian employees will become retirement eligible over the next five years. This represents a potential demand for 19,000 spouses of soldiers. Of course, in addition to retirements, Army civil service experiences turnover among the non-retirement eligible population.

Figure 5.4, Age Distribution of Department of the Army Appropriated Fund Civilian Employees Employed at Army Installations with Large Soldier Populations
Source: Army Civilian Master File

During the period from September 1998 to September 1999, this turnover amounted to approximately 6 percent of the Army appropriated fund workforce. At this rate, the potential exists to fill some 7,000 such vacancies with soldiers' spouses each year.

AREAS FOR FURTHER POLICY RESEARCH

Contracting Policy. In addition to employing large numbers of civilians as civil servants, the Army contracts with a wide variety of firms for services ranging from communications support to dry cleaning. For example, during 1999, the Army let more than $60 million in service contracts at Fort Polk. The preponderance of these contracts were awarded under competitive bidding procedures. Borrowing a page from 1970's era employment programs such as the New Jobs Tax Credit[102] and Targeted Jobs Tax Credit[103], there is scope to expand contractor employment of soldiers' spouses in such competitive bidding situations.

As a matter of policy, the Army could afford service contractors an employment subsidy for each wife or husband of a soldier they employ after winning a competitive bid. Such a policy should have the effect of increasing the private sector employment of soldiers' spouses at little or no cost to the Army. To the extent that spouses of soldiers are as productive as local civilian labor, there should be little to no incremental cost to contractors associated with employing soldiers' spouses rather than local civilian labor. Thus, a spouse employment subsidy would pass directly to a firm's bottom line as profit. In a competitive bidding setting, contractors would have scope to lower their bids by the amount of the subsidy that passed to profits. Therefore, the entire subsidy cost would return to the Army in the

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[102] Perloff, J. and M. Wachter (1979). "The New Jobs Tax Credit -An Evaluation of the 1977-78 Wage Subsidy Program." American Economic Review 69(May): 173-179.

[103] Bishop, J. H. and M. Montgomery (1993). "Does the Targeted Tax Credit Create Jobs at Subsidized Firms?" Industrial Relations 32(Fall): 289-306.

form of lower contractor bids. At the same time, of necessity, contractors would take maximum advantage of such a subsidy so as to gain the competitive bidding advantages entailed therein. By way of exploring the efficacy of such a policy, the Army should implement a test project at posts such as Fort Polk that are characterized by poor spouse earnings and employment outcomes.

Technology Innovations. As addressed in Chapter 4 analysis, the earnings and employment penalty confronting spouses of soldiers and airmen is largely derivative of local labor market conditions. Thus, the forgoing policy alternatives are designed to provide these spouses greater entrée to local federal and private sector employment. However, due to developments presented by new economy business relationships and technology, the tools are now at hand to greatly expand spouse access to regional and national labor demand.

Drawing upon the model of firms such as Commerce One and Ariba Inc., the Army could launch a pilot project to leverage the Internet as a vehicle to broker the labor of soldiers' spouses using reverse auctions. Given the shortage of skilled labor now evidenced in the economy, excess labor demand could be matched to excess soldier spouse labor supply through reverse auctions in the Web-based marketplace. Target industries could include publishing, telemarketing, and computer software development where transportation and communications constitute minuscule components of production costs.

Stationing Practices. As opposed to expanding federal and private sector labor demand in local labor markets or broadening spouses'

access to external markets, the Army should explore the basis for retaining installations in remote areas. Heretofore, vast expanses of land to support maneuver and weapons training have governed Army installation policy. However, reference to the dramatic increase in weapons range and speed exhibited since World War II suggests that relatively few posts will support training with the next generation of weapons. Indeed, analysis recently completed at the Rand Corporation has concluded that only two Army posts will be able to support training for a maneuver battalion by 2025.[104] Additionally, the prohibitive cost of maneuver and weapons training has led to a marked substitution of virtual training environments for traditional training methods. Again, this trend is likely to persist, and perhaps accelerate, as new weapon systems enter the inventory.

Given this situation, there is ample basis to envision an alternate-operating environment. In this environment, the Army would garrison forces in the vicinity of urban and suburban areas that afford strong labor demand for soldiers' spouses, robust housing markets, and a wide array of recreational and cultural activities. Thus, by imbedding its garrisons in well-developed markets and local communities, the Army could divest itself of nonmilitary functions entailed in stationing forces in remote locations. These functions range from operating movie theaters and bowling alleys to building and maintaining housing stocks. In such urban and suburban garrisons, soldiers could master individual and team training using simulators and virtual environments. In the case of unit training, soldiers could deploy

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[104] Hix, M. (2000). Installations for 2025. Santa Monica, CA, Rand Corporation.

periodically to large training areas located at installations such as Fort Bliss and White Sands Missile Range.

Summing Up. In this dissertation, I have shown that the civilian spouses of military personnel make an important contribution to household income. However, the earnings of these spouses are systemically lower than the earnings of their contemporaries in civilian households. I have demonstrated that this situation is only partially due to military migration. Rather, in the Army and Air Force, local conditions play the predominant role in shaping the employment and earnings outcomes of civilian spouses of soldiers and airmen. In light of this situation, I have developed several options to redress the employment and earnings penalty exhibited among these spouses. More importantly, by moving beyond the construct of Regular Military Compensation to a holistic view of military household earnings, I have provided a framework for bringing civilian spouse earnings into the policy mix. In light of today's competitive labor market and the rise of dual income households, this framework should shape analysis and policies directed toward attracting and retaining high quality soldiers, sailors, airmen, and Marines.

Table 5.1, Percent Change in the 1991 Annual Earnings of Military Spouses Employed Full Time, by Military Installation, (Omitted Installation: San Diego)

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	132	54317	411.48911	46.00	<.0001
Error	2531	22639	8.94462		
Corrected Total	2663	76955			

Root MSE	2.99076	R-Square	0.7058
Dependent Mean	9.57569	Adj R-Sq	0.6905
Coeff Var	31.23280		

Level of Significance: *=.10, **=.05, ***=.01

Parameter	Estimate	Std Err	t Value	Probt	Sig	Mean	Percent	Cum %
Log of Spouses' 1991 Annual	.	.	.	.		9.818	.	.
Full Time Civ Employment, 1=Yes, 0=No	.	.	.	.		0.750	.	.
Log of Number of Weeks Worked Last Year	.9116	.0189	48.2	.000	***	3.748	.	.
Civ Spouse is Caucasian, 1=Yes, 0=No	.0674	.0164	4.10	.000	***	0.811	.	.
Mil Spouse Gender: 1=Male, 0=Female	-.182	.0240	-7.6	.000	***	0.718	.	.
Mil Spouse Grade: 1=Officer, 0=Enlisted	.1518	.0206	7.38	.000	***	0.703	.	.
Log of Years of Active Federal Service	.0912	.0156	5.83	.000	***	2.195	.	.
Married While in Mil Service,1=Yes, 0=No	.0109	.0238	.460	.646		0.787	.	.
Married at Current Post, 1=Yes, 0=No	-.022	.0231	-.94	.346		0.191	.	.
Some College, 1=Yes, 0=No	.1103	.0180	6.13	.000	***	0.307	.	.
Undergraduate Degree, 1=Yes, 0=No	.3661	.0241	15.2	.000	***	0.244	.	.
Post Graduate Work, 1=Yes, 0=No	.6250	.0256	24.4	.000	***	0.271	.	.
Imputed Years of Experience	.0023	.0039	.592	.554		13.78	.	.
Year of Experience Squared	.0001	.0001	.959	.337		250.6	.	.
Number of Months in Current Job	.0034	.0003	10.2	.000	***	22.11	.	.
Missing Months of Tenure, 1=Yes, 0=No	-.296	.1779	-1.7	.096	*	0.002	.	.
Log of Length of Marriage in Years	-.013	.0139	-.90	.366		1.768	.	.
Children Under Age 6, 1=Yes, 0=No	.0415	.0181	2.29	.022	**	0.183	.	.
Children Under Age 14, 1=Yes, 0=No	-.024	.0177	-1.4	.176		0.284	.	.
Army Spouse, Civ Spouse Fed Worker, 1=Yes	.1838	.0260	7.06	.000	***	0.075	.	.
Navy Spouse, Civ Spouse Fed Worker, 1=Yes	.0914	.0351	2.61	.009	***	0.061	.	.
USAF Spouse, Civ Spouse Fed Worker, 1=Yes	.1434	.0293	4.89	.000	***	0.081	.	.
USMC Spouse, Civ Spouse Fed Worker, 1=Yes	-.001	.0680	-.01	.993		0.033	.	.
Number of Permanent Changes of Station	-.021	.0040	-5.2	.000	***	3.135	.	.
Minot AFB, ND	-.775	.1492	-5.2	.000	***	.	.	.
Ft Wainwright , AK	-.656	.1488	-4.4	.000	***	.	0.03	0.03
Cannon AFB/Clovis, NM	-.635	.0967	-6.6	.000	***	.	.	.
Fort Rucker, AL	-.631	.2236	-2.8	.005	***	.	1.07	1.10
Maxwell AFB, Montgomery, AL	-.560	.1011	-5.5	.000	***	.	0.23	1.33
Fort Polk, LA	-.541	.1480	-3.7	.000	***	.	1.72	3.04
Sheppard AFB/Wichita Falls, TX	-.538	.1273	-4.2	.000	***	.	.	.
Wurstsmit AFB, MI	-.531	.2457	-2.2	.031	**	.	.	.
Fort Riley, KS	-.516	.0824	-6.3	.000	***	.	3.11	6.16
Fort Sill/Lawton, OK	-.500	.0664	-7.5	.000	***	.	2.87	9.03
Fort Dix/McGuire AFB/Lakehurst, NJ	-.461	.0804	-5.7	.000	***	.	0.95	9.97
Gulfport, MS	-.440	.0969	-4.5	.000	***	.	.	.
Panama City, FL	-.430	.1106	-3.9	.000	***	.	.	.
Fort Bliss/El Paso, TX	-.416	.1095	-3.8	.000	***	.	1.67	11.65

Table 5.1, Continued

Parameter	Estimate	Err	Value	Probt	Sig	Mean	Percent	Cum %
Offutt AFB/Omaha, NE	-.400	.0900	-4.4	.000	***	.	0.05	11.70
Riverside, CA	-.394	.1397	-2.8	.005	***	.	.	.
Groton/New London, CT	-.386	.0900	-4.3	.000	***	.	.	.
Whidbey Island, WA	-.385	.1419	-2.7	.007	***	.	.	.
Fort Hood, TX	-.370	.0751	-4.9	.000	***	.	4.87	16.57
Twenty Nine Palms MCB, CA	-.369	.1277	-2.9	.004	***	.	.	.
Fort McClellan/Anniston, AL	-.365	.0930	-3.9	.000	***	.	1.32	17.88
Robins AFB, GA	-.365	.0846	-4.3	.000	***	.	0.02	17.90
Malmstrom AFB, MT	-.351	.1131	-3.1	.002	***	.	.	.
Grand Forks, ND	-.348	.1037	-3.4	.001	***	.	.	.
Ft Carson/USAF Colorado Springs, CO	-.343	.0645	-5.3	.000	***	.	4.28	22.18
Eglin AFB, FL	-.321	.0742	-4.3	.000	***	.	0.03	22.20
Dover AFB, DE	-.315	.1057	-3.0	.003	***	.	.	.
Newport, RI	-.304	.1492	-2.0	.042	**	.	.	.
Fort Bragg/Pope AFB, NC	-.289	.0595	-4.9	.000	***	.	7.12	29.32
Camp Lejeune, NC	-.285	.0652	-4.4	.000	***	.	.	.
Spokane, WA	-.282	.1480	-1.9	.057	*	.	.	.
Griffiss AFB/Rome, NY	-.282	.0973	-2.9	.004	***	.	.	.
Phoenix, AZ	-.274	.0876	-3.1	.002	***	.	.	.
Cherry Point MCAS, NC	-.262	.1022	-2.6	.010	**	.	.	.
Edwards AFB, CA	-.260	.0935	-2.8	.005	***	.	.	.
Great Lakes NAVTRACEN, IL	-.260	.1097	-2.4	.018	**	.	0.29	29.62
Lackland AFB/Kelly AFB/San Antonio, TX	-.260	.0542	-4.8	.000	***	.	2.52	32.14
Fort Ord/Naval PostGrad Sch/Monterey, CA	-.240	.0642	-3.7	.000	***	.	3.34	35.48
Little Rock, AR	-.235	.0804	-2.9	.003	***	.	0.20	35.68
Davis-Monthan AFB, AZ	-.229	.1047	-2.2	.029	**	.	.	.
Brunswick, ME	-.229	.1150	-2.0	.047	**	.	.	.
Army Overseas	-.222	.0441	-5.0	.000	***	.	26.0	61.68
Hampton/Newport News, VA	-.204	.0603	-3.4	.001	***	.	1.35	63.03
Patrick AFB, FL	-.202	.1058	-1.9	.057	*	.	0.01	63.05
Denver, CO	-.200	.0961	-2.1	.037	**	.	0.36	63.40
Jacksonville, FL	-.187	.0615	-3.0	.002	***	.	0.02	63.42
Air Force Overseas	-.186	.0474	-3.9	.000	***	.	.	.
Fort Lewis/ McCord AFB/Tacoma, WA	-.182	.0604	-3.0	.003	***	.	2.42	65.84
Seymour Johnson AFB, NC	-.181	.0961	-1.9	.060	*	.	.	.
Fort Stewart, GA	-.165	.0903	-1.8	.067	*	.	2.91	68.74
Fort Gordon, GA	-.162	.0729	-2.2	.027	**	.	2.17	70.91
Hawaii	-.122	.0556	-2.2	.028	**	.	0.21	71.12
Navy Overseas	-.112	.0437	-2.6	.010	**	.	.	.
Fort Leonard Wood, MO	.1767	.0983	1.80	.072	*	.	1.67	72.80
San Bernadino, CA	.2052	.1240	1.65	.098	*	.	.	.
Bremerton, WA	.2569	.1389	1.85	.065	*	.	.	.
Oakland, CA	.3586	.1500	2.39	.017	**	.	.	.
Carlisle Barracks, PA	.3822	.2317	1.65	.099	*	.	0.21	73.01
Fort Drum/Watertown, NY	-.418	.2971	-1.4	.159		.	4.18	77.19
Annapolis, MD	-.336	.2386	-1.4	.159		.	.	.
Vandenberg AFB, CA	-.324	.3082	-1.1	.293		.	.	.
New Orleans, LA	-.303	.2789	-1.1	.277		.	0.01	77.20
Shaw AFB/Sumter, SC	-.207	.1359	-1.5	.128		.	.	.
Barksdale AFB/Shreveport, LA	-.186	.1246	-1.5	.136		.	.	.
Fort Leavenworth, KS	-.167	.1101	-1.5	.129		.	0.96	78.15
Fort Monmouth/Earls NWS, NJ	-.164	.1081	-1.5	.128		.	1.10	79.26
Orlando, FL	-.149	.2445	-.61	.542		.	0.01	79.27
Scott AFB, IL	-.148	.1087	-1.4	.172		.	0.04	79.31
Fort Irwin/Barstow, CA	-.138	.1140	-1.2	.227		.	1.28	80.59
Santa Clara County, CA	-.131	.1699	-.77	.440		.	.	.
Sacramento, CA	-.131	.1138	-1.2	.250		.	0.31	80.90
Nellis AFB/Las Vegas, NV	-.119	.1000	-1.2	.235		.	.	.

Table 5.1, Continued

Parameter	Estimate	Err	Value	Probt	Sig	Mean	Percent	Cum %
Patuxent River, MD	-.116	.0755	-1.5	.124		.	.	.
Charleston, SC	-.113	.0744	-1.5	.130		.	.	.
Fort McPherson/Atlanta, GA	-.107	.1213	-.88	.376		.	0.79	81.69
Carswell AFB/Fort Worth, TX	-.106	.0855	-1.2	.214		.	.	.
Fort G. G. Meade, MD	-.103	.0921	-1.1	.263		.	0.53	82.22
Pensacola, FL	-.098	.0818	-1.2	.232		.	0.04	82.27
Beaufort/Parris Island, SC	-.096	.1043	-.92	.357		.	.	.
Norfolk/Portsmouth, VA	-.090	.0560	-1.6	.109		.	0.28	82.55
Chanute AFB, IL	-.088	.1122	-.78	.433		.	.	.
Hill AFB/Ogden, UT	-.084	.0985	-.86	.392		.	0.11	82.66
Marines Overseas	-.082	.0668	-1.2	.222		.	.	.
Fort Knox, KY	-.079	.1296	-.61	.544		.	1.71	84.37
Wright- Patterson AFB, OH	-.077	.0813	-.95	.343		.	0.18	84.54
Quantico/Woodbridge, VA	-.066	.1052	-.63	.529		.	.	.
Castle AFB, CA	-.064	.1117	-.57	.566		.	.	.
Camp Pendleton, CA	-.057	.0627	-.91	.362		.	.	.
Corpus Christi, TX	-.055	.2098	-.26	.792		.	0.01	84.56
Travis AFB/Vallejo, CA	-.038	.0778	-.49	.621		.	.	.
Loring AFB, ME	-.028	.1677	-.16	.869		.	.	.
Washington, DC Metro Area	-.025	.0447	-.56	.578		.	4.59	89.14
Fort Huachuca, AZ	-.025	.0894	-.28	.781		.	1.30	90.45
Aberdeen Proving Grounds, MD	-.023	.1021	-.23	.818		.	0.88	91.32
Fort Benning, GA	-.014	.0840	-.17	.864		.	3.35	94.67
Kirtland AFB/Albuquerque, NM	-.010	.1009	-.10	.921		.	0.10	94.77
F.E. Warren AFB, Cheyenne, WY	-.009	.1058	-.09	.929		.	.	.
Redstone Arsenal/Huntsville, AL	-.002	.1131	-.02	.985		.	1.71	96.48
Fort Campbell, KY	.0085	.0814	.104	.917		.	3.36	99.84
Tinker AFB/Oklahoma CITY, OK	.0406	.0982	.413	.680		.	0.02	99.86
Ft Greely/Elmendorf AFB, AK	.0445	.0658	.676	.499		.	.	.
Ellsworth AFB/Rapid City, SD	.0497	.1332	.373	.709		.	.	.
Millington/Memphis, TN	.0773	.1071	.722	.471		.	0.03	99.89
Los Angeles, CA	.0853	.0653	1.31	.192		.	0.05	99.94
Tampa, FL	.1020	.1846	.552	.581		.	0.06	100.0
Dyess AFB/Abilene, TX	.1114	.1301	.856	.392		.	.	.
McConnell AFB/Wichita, KS	.1212	.1046	1.16	.247		.	.	.
Alabany , GA	.1304	.2761	.472	.637		.	.	.
Hanscomb AFB, MA	.2018	.2056	.982	.326		.	.	.

APPENDIX A, PERSTEMPO & RETENTION MODELING METHODOLOGY

Modeling the PERSTEMPO and Retention Nexus. The dichotomous nature of reenlistment outcomes, stay or go, invites analysis within the framework of a random utility model in which a soldier's reenlistment decision is viewed as the outcome of a marginal benefit-marginal cost calculation. In this framework, a soldier's PERSTEMPO experience during the current enlistment is seen to influence retention in a variety of ways. With regard to cost, the frequency and duration of PERSTEMPO will serve to update married soldiers', and their spouses', expectations regarding the likely burdens of future deployments. Alternatively, in the case of entry-level soldiers, completion of a deployment may diminish the benefits arising from continued military service as a means to accomplish a personal right-of-passage or "Vision Quest".[105] Moreover, after passing through the crucible of hostile and separated deployments, such soldiers may find the routine of normal peacetime operations less satisfying.[106] Whereas marginal benefit and cost are not observed, the difference between benefit and cost will be represented by the 'reenlistment index', r^*, which is a linear function of explanatory variables plus an error term.

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[105] Whereas PERSTEMPO has typically been seen as a burden upon military families, it may also have unexpected, though predictable implications for single soldiers. Specifically, in the case of young men, a right-of-passage or 'Vision Quest' has historically been associated with the transition to manhood. Indeed, the military services have capitalized on this phenomenon to draw new enlistees. However, once the 'Quest' is complete it need not be repeated. Thus, while young soldiers may find deployments to exotic or hostile regions 'fulfilling', their participation in these life course events will have satisfied a major reason for their joining the military and thus reduce their reenlistment likelihood. Indeed, the author's experience in leading young Americans is replete with instances of such behavior.

$$r^* = X\beta + \varepsilon$$

If the reenlistment index exceeds a critical value, then $r^* = 1$ and a soldier will remain in the Army. Otherwise $r^* = 0$ indicating that a soldier did not reenlist. Thus, we do not need to observe the internal workings of a soldier's reenlistment calculus, only whether a soldier elected to reenlist.

$$r = 1 \text{ when } r^* > 0$$
$$r = 0 \text{ when } r^* \leq 0$$

and a retention likelihood is modeled as

$$Prob\left(r^* > 0\right) = Prob\left(X\beta + \varepsilon > 0\right)$$

Assuming that the error term is symmetrically distributed, as with the logistic distribution, the retention probability can be estimated using logistic regression,

$$Prob\left(r^* > 0\right) = \frac{e^{X\beta}}{1 + e^{X\beta}}$$

Response Variable. Since this analysis is concerned with the nexus between soldiers' retention behavior and their PERSTEMPO experience, my outcome measure is a dichotomous zero, one response variable. Methodologically, this approach stands in contrast to a duration approach in which soldier longevity would be modeled as the outcome of a survival function. I have adopted this dichotomous approach since it most closely approximates reality. Use of a duration approach would more properly address behavior among officer personnel who serve

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[106] Stewart, N. K. (1991). Mates & Muchachos. New York, Brassey's.

at will and depart the Army over the continuum of their service rather than at fixed reenlistment points. Additional support for the use of a dichotomous response variable can also be found within Army retention policy. Specifically, reenlistment bonuses and assignment policies are triggered by a soldier's decision to reenlist immediately prior to the end of a contracted term of service. Since normal terms of contracted service range from one to six years of service, soldiers face these decision points infrequently.

Finally, my methodology assumes that soldiers are exposed to deployments at random and thus, do not self select their frequency and duration of deployments. Among entry level personnel, assignments are primarily based upon the needs of the Army and knowledge of the machinations through which one could self select out of, or into, a deployment are likely to be very limited. Additionally, during the period from 1991 to 1999, deployments occurred with relatively little early warning, thus further reducing opportunities for selection.

With regard to response levels, soldiers documented with voluntary discharges or transfers to the reserve component are coded as "zero (n=50,698), did not reenlist." Only soldiers reflecting a Separation Program Designator code[107] indicating immediate reenlistment are coded as "one (n=124,236), reenlisted."[108]

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[107] For a list of separation programs (SPD codes) see Army Regulation 635-5-1.

[108] This methodology marks a departure from previous work (Hosek and Totten) that identified separations as soldiers who did not reenlist upon completion of their term of service and who separated within three months of ETS. Use of this method, as opposed to SPD codes, does not exclude soldiers who were barred from reenlisting, or who were medically discharged at ETS due to physical limitations. Such

EXPLANATORY VARIABLES

Longevity. Since Army bonus and retention policy differentiate between entry level and mid-career soldiers, I model retention outcomes for these groups separately using sub-samples of my reference population. Support for this approach also derives from the potential for selection through attrition. Specifically, soldiers who have slaked their thirst for, or endured their fill of PERSTEMPO are likely to depart the Army at relatively high rates at reenlistment points. Thus, the relative preferences of residual enlisted cohorts for PERSTEMPO will vary positively with longevity.

PERSTEMPO Variables. So as to capture the cumulative impact PERSTEMPO events, I employ variables to gauge the retention consequences of both attributes of deployments. Frequent deployments may disrupt family life, preclude attendance at schools required for career advancement, and impose an untoward degree of uncertainty in soldiers' personal lives. Alternatively, in the case of junior personnel, one deployment, regardless of length may satisfy the aforementioned life course goals that precipitated their enlistment.

I model deployments that entailed a separation from family members, exposure to hostile action, or both separated and hostile duty as dichotomous incidence variables (dummy variables) with marginal effects. These effects are wedded to reenlistment outcomes in a

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soldiers lacked reenlistment volition and were separated without regard to their PERSTEMPO experience. Therefore, their presence could entail untoward biases. Including such soldiers from my frame would have increased my study population by approximately 12 percent.

particular fiscal year so as to control for the different deployment environments in which soldiers found themselves over the 1991 through 1999 period.

I address PERSTEMPO duration through home-station specific continuous variables. That is, a six-month deployment from CONUS to Bosnia would be coded as a '6' under the CONUS hostile deployment variable so as to differentiate its retention effect from deployments from Europe or other locations. The basis for this approach arises from several considerations. First, a deployment to Bosnia may be more onerous from the United States than from Germany. Soldiers randomly join units in the United States upon their return from overseas assignments. They are thus more subject to separations from home and family. Additionally, deployments from the United States come as additions to other operations ranging from training to support for counter drug efforts on the Mexican border. Finally, soldiers deployed from Germany to Bosnia were only a relatively short driving distance from their home station. They could thus bring with them a great deal more in the way of creature comforts, and retain far better liaison with loved ones in Germany than could soldiers deployed from the United States.

I distilled PERTEMPO data underlying the aforementioned explanatory variables from the universe of 32.4 million monthly observations on soldier pay using the aforementioned pay method addressed in Chapter 3 (Table 3.1). This data covers deployments from 1 October 1991 through 31 August 1999 for enlisted personnel who faced reenlistment decisions between 1 October 1994 and 31 August 1999.

Marital Status and the Presence of Children. Research within the Navy has shown that spouses are more likely to encourage their mate to leave the service as the tension between work demands and home increase.[109] In turn, this spouse pressure has been found to adversely affect military member's reenlistment intentions.[110] Thus, family factors and marital status are potentially important explanatory variables. Deployments may induce stress through separation or by precluding the military member from sharing parental responsibilities. By way of accounting for these factors, and the predominant role spouses have been shown to play in shaping reenlistment intentions, I model retention outcomes for single and married soldiers separately while controlling for the presence of young children and any children in each regression.

With regard to parental status, I include polychotomous variables to indicate the number of children under age six and the number of minor dependents soldiers had during each term of enlistment. Inclusion of these variables accrues from an expectation that deployments may impose greater demands upon families with small children since child rearing will fall to the non-deployed parent. Alternatively, soldiers with children may be more tolerant of PERSTEMPO than peers without children due to the housing and medical benefits Army policy affords soldiers with children. The high frequency of single parents within

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[109] Farkas, A. J. and K. P. Durning (1982). Characteristics and Needs of Navy Families: Policy Implications. Washington, D.C., U.S. Navy Personnel Research and Development Center.
[110] Jones, A. P. and M. C. Butler (1980). "A Role Transistion Approach to the Stresses of Organizationally Induced Family Role Disruption." Marriage and the Family May: 367-376.

the military also presents a potentially important source of deployment induced stress. That is, upwards of 32 percent of single female soldiers and 11 percent of single male soldiers who were eligible to reenlist in the period from 1 October 1994 to 31 August 1999 had one or more minor children. For this group, managing the demands of deployments undoubtedly presented special challenges that certainly figured in their subsequent reenlistment decisions.

Special Event Indicator Variables. Soldiers may be deployed away from home during important life and family events such as a child's birth or Christmas holidays. For example, during the period of interest, soldiers in the 10th Mountain Division were deployed on short notice during three consecutive Christmas holiday seasons to participate in Hurricane Andrew relief operations, Provide Comfort operations in Somalia, and Restore Democracy operations in Haiti. Similarly, members of the 1st Cavalry Division and 3rd Infantry Divisions participated in short notice deployments to Kuwait during several Christmas holidays. Each of these deployments were initiated on short notice and thus were likely to have induced considerable uncertainty into the lives of affected soldiers and families. Controlling for Christmas time deployments thus provides a proxy for the retention consequences of such uncertainty. To control for these effects, I included polychotomous variables to indicate the number of births and Christmases soldiers missed while deployed.

Selective Reenlistment Bonuses. In investigating the nexus between PERSTEMPO and retention, it is important to reflect upon the overall personnel dynamics within which retention outcomes occur.

Specifically, the Army has made long-standing use of reenlistment bonuses to attain reenlistment goals. These bonuses, of up to $20,000, are paid to soldiers reenlisting in under strength occupations. Therefore, with the proper application of bonus payments, the Army can theoretically buy its way out of virtually any PERSTEMPO-induced retention crisis. Thus, omission of this variable could bias operations tempo parameters while failing to account for the utility of this potentially important policy lever. Importantly, soldiers can secure their entire stream of bonus payments free from federal taxes by reenlisting in areas in which hostile fire pay is authorized. In this case, soldiers anticipating a deployment may have deferred reenlistment until reaching Southwest Asia or Bosnia. This would have had the effect of depressing reenlistment rates at their home station and elevating reenlistment rates during deployments.

To address the retention impact of reenlistment bonuses, my model includes dummy variables to reflect the marginal impact of different bonus levels on soldier retention. Rather than employing dollar amounts, I make use of the multiplier levels confronting soldiers at the time in which they were eligible to reenlist.[111] By way of background, a soldier's reenlistment bonus is an exogenous product of these multipliers, .5, 1.0, 1.5, 2.0, 3.0 and 4.0, the soldier's monthly pay amount, and the number of years for which a soldier reenlists.[112] Additional dichotomous indicator variables distinguish

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[111] Until FY1999 soldiers could reenlist during a three-month window that opened six months prior to ETS. Since the end of FY1998 reenlistment can take place up through ETS.

[112] The reenlistment multiplier is established and announced in response to Army wide personnel shortages by occupation. Thus, the

soldiers who were deployed to a hostile fire area during their reenlistment window. These variables provide control for any retention premium associated with tax-free bonus payments.

Soldier Attributes. My set of explanatory factors include dummy variables to account for soldier attributes such as race and gender since these factors are known to be associated with disparate reenlistment rates. I also include continuous variables for soldiers' service longevity in months and the length of their terms of enlistment. The longevity variable controls for the increase in reenlistment rates that are likely to accrue as soldiers with an affinity for military service remain on active duty. By including a term of service variable, I control for the fact that within, and across cohorts, soldiers choose a variety of enlistment terms. By way of illustration, compare the PERSTEMPO exposure of a soldier completing a two-year enlistment with one completing a six-year term of service. Since my methodology models reenlistment outcomes as a function of PERSTEMPO during the current enlistment, controlling for term of service length ensures that this factor does not impart a confounding bias to other parameter estimates. Also, holding all other factors constant, a soldier enlisting for six years may signal a stronger commitment to, or affinity for, military service than a soldier enlisting for two years.

Soldier quality as measured by education level and Armed Forces Qualification Test (AFQT) scores are also important indicators of

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amount of the multiplier is not endogenous to a soldier's reenlistment decision for models specified in this analysis.

retention outcomes.[113] While high quality soldiers exhibit low attrition during a term of service, lower quality soldiers have historically exhibited higher reenlistment rates. More importantly, soldiers of dissimilar quality levels may exhibit differential retention behavior in the presence of high operations tempo. To control for this situation, I include dummy variables that parallel soldier quality categorizations as used by the Army. Specifically, I include dummy variables for high school diploma graduates with AFQT scores two and three standard deviations above the mean (listed *as HSDG & AFQT Groups I & II* in Tables C.1 through C.6 in Appendix C) and for those without diplomas or with scores below the mean (listed as *GED and/or AFQT Group IIIB & IV* in tables C.1 through C.6 in Appendix C).

Occupation and Year of Reenlistment Fixed Effects Variables. During the period of interest, there was considerable variance in the incidence of and duration of deployments across Army occupations.[114] As is indicated in Figure A.1 below, less than 30 percent of Unit Supply Specialists, MOS 92Y, who were eligible to reenlist between October 1994 and August 1999 participated in a deployment to a hostile fire area. At the same time some 76 percent of these soldiers elected to reenlist. Conversely, only some 50 percent of Fighting Vehicle Infantrymen, MOS 11M, participated in such deployments. Of these soldiers only 54 percent opted to reenlist.

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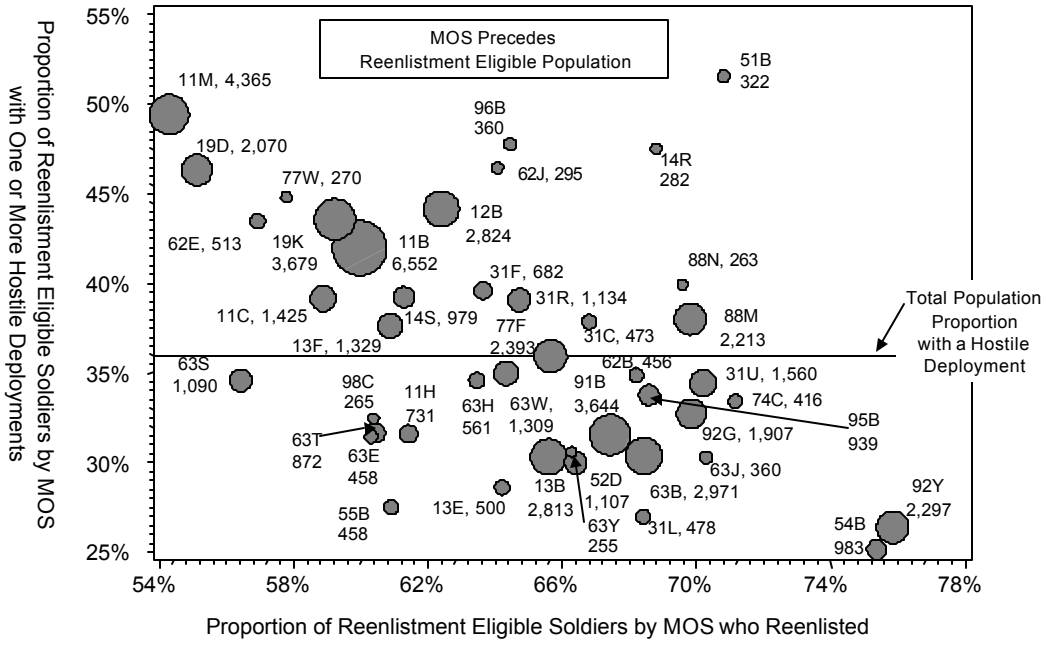
[113] Eitelberg, M. J. (1984). Screening for Service: Aptitude and Education Criteria for Military Entry. Washington D.C., Human Resources Research Organization.

[114] The Army classifies its Military Occupational Specialties (MOS) using a three-position code. Appendix B provides a comprehensive list of the codes and associate occupation titles.

Figure A.1, Proportion of Soldiers by MOS with Any Hostile Deployments
Between Oct 1991 and Aug 1999, Soldiers with 3 Thru 4 Year AFS
Reenlistment Eligible Soldiers with a Complete Term of Service between Oct 95 and Aug 99



Reflection upon Figure A.1 suggests an inverse relationship between occupational exposure to deployments and occupational retention rates. However, occupations such as Ammunition Specialists, MOS 55B, exhibited both low exposure to deployments and a low reenlistment rate. This situation suggests that, in addition to PERSTEMPO, occupational selection effects play an important role in reenlistment rates. Therefore, since the incidence of PERSTEMPO across occupations has been highly variable, it is appropriate to control for potentially confounding occupational affects in gauging the nexus between PERSTEMPO and retention. Toward this end, I have included 358 dummy variables in my models to fix such occupational effects. In the interest of brevity and as their levels do not bear on the substance

of this analysis, statistical results for these occupations are not shown in my regression results.[115]

The interval between October 1994 and August 1999 witnessed several evolutions with regard to Army retention policy and reenlistment options. Through 1997, the Army experienced significant force reductions as part of the Post Cold War drawdown of forces. To facilitate these reductions, reenlistment eligibility standards fluctuated widely from year to year. To control for these disparate reenlistment policy regimes I have also included dummy variables to indicate the fiscal year in which soldiers were eligible to reenlist.[116]

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[115] There were 359 occupations in my study population. Due to its large population size and predominant role in Army doctrine, I selected Infantryman, MOS 11B, as my contrast omitted variable.
[116] The omitted year is FY95.

APPENDIX B, MILITARY OCCUPATIONAL SPECIALTIES

MOS Description

11B INFANTRYMAN
11C INDIRECT FIRE INFANTRYMAN
11H HEAVY ANTIARMOR WEAPONS INFANTRYMAN
11M FIGHTING VEHICLE INFANTRYMAN
11Z INFANTRY SENIOR SERGEANT
12B COMBAT ENGINEER
12C BRIDGE CREWMEMBER
12Z COMBAT ENGINEERING SENIOR SERGEANT
13B CANNON CREWMEMBER
13C AUTOMATED FIRE SUPPORT SYSTEMS SPECIALIST
13D FIELD ARTILLERY TACTICAL DATA
13E CANNON FIRE DIRECTION SPECIALIST (SFC IN RC ONLY)
13F FIRE SUPPORT SPECIALIST
13M MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) CREWMEMBER
13P MULTIPLE LAUNCH ROCKET SYSTEM OPERATIONS/FIRE DIRECTION SPECIALIST
13R FIELD ARTILLERY FIREFINDER RADAR OPERATOR
13Z FIELD ARTILLERY SENIOR SERGEANT
82C FIELD ARTILLERY SURVEYOR
93F FIELD ARTILLERY METEOROLOGICAL CREWMEMBER
14D HAWK MISSILE SYSTEM CREWMEMBER (RC)
14E PATRIOT FIRE CONTROL ENHANCED OPERATOR/MAINTAINER
14J AIR DEFENSE COMMAND,CONTROL,COMMUNICATIONS,COMPUTERS AND INTELLIGENCE TACTICAL OPERATIONS CENTER ENHANCED OPERATOR/MAINTAINER
14L AN/TSQ-73 AIR DEFENSE ARTILLERY COMMAND AND CONTROL SYSTEM OPERATOR/MAINTAINER (RC)
14M MAN PORTABLE AIR DEFENSE SYSTEM CREWMEMBER (RC)
14R BRADLEY LINEBACKER CREWMEMBER
14S AVENGER CREWMEMBER
14T PATRIOT LAUNCHING STATION ENHANCED OPERATOR/MAINTAINER
14Z AIR DEFENSE ARTILLERY SENIOR SERGEANT
23R HAWK MISSILE SYSTEM MECHANIC (RC)
18B SPECIAL FORCES WEAPONS SERGEANT
18C SPECIAL FORCES ENGINEER SERGEANT
18D SPECIAL FORCES MEDICAL SERGEANT
18E SPECIAL FORCES COMMUNICATIONS SERGEANT
18F SPECIAL FORCES ASSISTANT OPERATIONS AND INTELLIGENCE SERGEANT
18Z SPECIAL FORCES SENIOR SERGEANT
19D CAVALRY SCOUT
19E M48-M60 ARMOR CREWMAN (RC)
19K M1 ARMOR CREWMAN
19Z ARMOR SENIOR SERGEANT
23R HAWK MISSILE SYSTEM MECHANIC (RC)
25M MULTIMEDIA ILLUSTRATOR
25R VISUAL INFORMATION EQUIPMENT OPERATOR-MAINTAINER
25V COMBAT DOCUMENTATION/PRODUCTION SPECIALIST
25Z VISUAL INFORMATION OPERATIONS CHIEF
31C RADIO OPERATOR-MAINTAINER
31F NETWORK SWITCHING SYSTEMS OPERATOR-MAINTAINER
31L CABLE SYSTEMS INSTALLER-MAINTAINER
31P MICROWAVE SYSTEMS OPERATOR-MAINTAINER
31R MULTICHANNEL TRANSMISSION SYSTEMS OPERATOR-MAINTAINER

31S SATELLITE COMMUNICATION SYSTEMS OPERATOR-MAINTAINER
31T SATELLITE/MICROWAVE SYSTEMS CHIEF
31U SIGNAL SUPPORT SYSTEMS SPECIALIST
31W TELECOMMUNICATIONS OPERATIONS CHIEF
31Z SENIOR SIGNAL SERGEANT
33W ELECTRONIC WARFARE/INTERCEPT SYSTEMS REPAIRER
24H HAWK FIRE CONTROL REPAIRER (RC)
24K HAWK CONTINUOUS WAVE RADAR REPAIRER (RC)
27E LAND COMBAT ELECTRONIC MISSILE SYSTEM REPAIRER
27G CHAPARRAL AND REDEYE REPAIRER
27H HAWK FIELD MAINTENANCE EQUIPMENT AND FIRING SECTION REPAIRER
27K HAWK FIRE CONTROL AND CONTINOUS WAVE RADAR REPAIRER
27M MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) REPAIRER
27T AVENGER SYSTEM REPAIRER
27X PATRIOT SYSTEM REPAIRER
27Z MISSILE SYSTEMS MAINTENANCE CHIEF
35C SURVEILLANCE RADAR REPAIRER
35D AIR TRAFFIC CONTROL EQUIPMENT REPAIRER
35E RADIO AND COMMUNICATIONS SECURITY (COMSEC) REPAIRER
35F SPECIAL ELECTRONIC DEVICES REPAIRER
35H TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE) MAINTENANCE SUPPORT SPECIALIST
35L AVIONIC COMMUNICATIONS EQUIPMENT REPAIRER
35M RADAR REPAIRER
35N WIRE SYSTEMS EQUIPMENT REPAIRER
35Q AVIONIC FLIGHT SYSTEMS REPAIRER
35R AVIONIC RADAR REPAIRER
35W ELECTRONIC MAINTENANCE CHIEF
35Y INTEGRATED FAMILY OF TEST EQUIPMENT (IFTE) OPERATOR AND MAINTAINER
35Z SENIOR ELECTRONICS MAINTENANCE CHIEF
39B AUTOMATIC TEST EQUIPMENT OPERATOR AND MAINTAINER
37F PSYCHOLOGICAL OPERATIONS SPECIALIST
38A CIVIL AFFAIRS SPECIALIST
46Q JOURNALIST
46R BROADCAST JOURNALIST
46Z PUBLIC AFFAIRS CHIEF
00B DIVER
51B CARPENTRY AND MASONRY SPECIALIST
51H CONSTRUCTION ENGINEERING SUPERVISOR
51K PLUMBER
51M FIREFIGHTER
51R INTERIOR ELECTRICIAN
51T TECHNICAL ENGINEERING SPECIALIST
51Z GENERAL ENGINEERING SUPERVISOR
52E PRIME POWER PRODUCTION SPECIALIST
52G TRANSMISSION AND DISTRIBUTION SPECIALIST (RC)
62E HEAVY CONSTRUCTION EQUIPMENT OPERATOR
62F CRANE OPERATOR
62G QUARRYING SPECIALIST
62H CONCRETE AND ASPHALT EQUIPMENT OPERATOR
62J GENERAL CONSTRUCTION EQUIPMENT OPERATOR
62N CONSTRUCTION EQUIPMENT SUPERVISOR
54B CHEMICAL OPERATIONS SPECIALIST
55B AMMUNITION SPECIALIST
55D EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST
44B METAL WORKER

44E MACHINIST
45B SMALL ARMS/ARTILLERY REPAIRER
45D SELF-PROPELLED FIELD ARTILLERY TURRET MECHANIC
45E M1 ABRAMS TANK TURRET MECHANIC
45G FIRE CONTROL REPAIRER
45K ARMAMENT REPAIRER
45N M60A1/A3 TANK TURRET MECHANIC (RC)
45T BRADLEY FIGHTING VEHICLE SYSTEM TURRET MECHANIC
52C UTILITIES EQUIPMENT REPAIRER
52D POWER-GENERATION EQUIPMENT REPAIRER
52X SPECIAL PURPOSE EQUIPMENT REPAIRER
62B CONSTRUCTION EQUIPMENT REPAIRER
63A M1 ABRAMS TANK SYSTEM MAINTAINER
63B LIGHT-WHEEL VEHICLE MECHANIC
63D SELF-PROPELLED FIELD ARTILLERY SYSTEM MECHANIC
63E M1 ABRAMS TANK SYSTEM MECHANIC
63G FUEL AND ELECTRICAL SYSTEMS REPAIRER
63H TRACK VEHICLE REPAIRER
63J QUARTERMASTER AND CHEMICAL EQUIPMENT REPAIRER
63N M60A1/A3 TANK SYSTEM MECHANIC (RC)
63S HEAVY-WHEEL VEHICLE MECHANIC
63T BRADLEY FIGHTING VEHICLE SYSTEM MECHANIC
63W WHEEL VEHICLE REPAIRER
63Y TRACK VEHICLE MECHANIC
63Z MECHANICAL MAINTENANCE SUPERVISOR
67G UTILITY AIRPLANE REPAIRER (RC)
67N UH-1 HELICOPTER REPAIRER
67R AH-64 ATTACK HELICOPTER REPAIRER
67S OH-58D HELICOPTER REPAIRER
67T UH-60 HELICOPTER REPAIRER
67U CH-47 HELICOPTER REPAIRER
67V OBSERVATION/SCOUT HELICOPTER REPAIRER
67Y AH-1 ATTACK HELICOPTER REPAIRER
67Z AIRCRAFT MAINTENANCE SENIOR SERGEANT
68B AIRCRAFT POWERPLANT REPAIRER
68D AIRCRAFT POWERTRAIN REPAIRER
68F AIRCRAFT ELECTRICIAN
68G AIRCRAFT STRUCTURAL REPAIRER
68H AIRCRAFT PNEUDRAULICS REPAIRER
68J AIRCRAFT ARMAMENT/MISSILE SYSTEMS REPAIRER
68K AIRCRAFT COMPONENTS REPAIR SUPERVISOR
68N AVIONIC MECHANIC
68X AH-64 ARMAMENT/ELECTRICAL SYSTEMS REPAIRER
71D LEGAL SPECIALIST
71L ADMINISTRATIVE SPECIALIST
71M CHAPLAIN ASSISTANT
73C FINANCE SPECIALIST
73D ACCOUNTING SPECIALIST
73Z FINANCE SENIOR SERGEANT
75B PERSONNEL ADMINISTRATION SPECIALIST
75F PERSONNEL INFORMATION SYSTEM MANAGEMENT SPECIALIST
75H PERSONNEL SERVICES SPECIALIST
74B INFORMATION SYSTEMS OPERATOR-ANALYST
74C TELECOMMUNICATIONS OPERATOR-MAINTAINER
74G TELECOMMUNICATIONS COMPUTER OPERATOR-MAINTAINER
74Z INFORMATION SYSTEMS CHIEF

77F PETROLEUM SUPPLY SPECIALIST
77L PETROLEUM LABORATORY SPECIALIST
77W WATER TREATMENT SPECIALIST
79R RECRUITER
79S CAREER COUNSELOR
79T RECRUITING AND RETENTION NCO(ARMY NATIONAL GUARD OF THE UNITED STATES)
81L LITHOGRAPHER
81T TOPOGRAPHIC ANALYST
81Z TOPOGRAPHIC ENGINEERING SUPERVISOR
82D TOPOGRAPHIC SURVEYOR
88H CARGO SPECIALIST
88K WATERCRAFT OPERATOR
88L WATERCRAFT ENGINEER
88M MOTOR TRANSPORT OPERATOR
88N TRANSPORTATION MANAGEMENT COORDINATOR
88P RAILWAY EQUIPMENT REPAIRER (RC)
88T RAILWAY SECTION REPAIRER (RC)
88U RAILWAY OPERATIONS (RC)CREWMEMBER
88X RAILWAY SENIOR SERGEANT (RC)
88Z TRANSPORTATION SENIOR SERGEANT
71G PATIENT ADMINISTRATION SPECIALIST
76J MEDICAL SUPPLY SPECIALIST
91A MEDICAL EQUIPMENT REPAIRER
91B MEDICAL SPECIALIST
91C PRACTICAL NURSE
91D OPERATING ROOM SPECIALIST
91E DENTAL SPECIALIST
91K MEDICAL LABORATORY SPECIALIST
91M HOSPITAL FOOD SERVICE SPECIALIST
91P RADIOLOGY SPECIALIST
91Q PHARMACY SPECIALIST
91R VETERINARY FOOD INSPECTION SPECIALIST
91S PREVENTIVE MEDICINE SPECIALIST
91T ANIMAL CARE SPECIALIST
91V RESPIRATORY SPECIALIST
91X MENTAL HEALTH SPECIALIST
43M FABRIC REPAIR SPECIALIST
57E LAUNDRY AND SHOWER SPECIALIST
92A AUTOMATED LOGISTICAL SPECIALIST
92G FOOD SERVICE SPECIALIST
92M MORTUARY AFFAIRS SPECIALIST
92R PARACHUTE RIGGER
92Y UNIT SUPPLY SPECIALIST
92Z SENIOR NONCOMMISSIONED LOGISTICIAN
93C AIR TRAFFIC CONTROL (ATC)OPERATOR
93P AVIATION OPERATIONS SPECIALIST
95B MILITARY POLICE
95C CORRECTIONS SPECIALIST
95D CID SPECIAL AGENT
96B INTELLIGENCE ANALYST
96D IMAGERY ANALYST
96H IMAGERY GROUND STATION (IGS) OPERATOR
96R GROUND SURVEILLANCE SYSTEMS OPERATOR
96U UNMANNED AERIAL VEHICLE OPERATOR
96Z INTELLIGENCE SENIOR SERGEANT

97B COUNTERINTELLIGENCE AGENT
97E INTERROGATOR
97L TRANSLATOR/INTERPRETER
97Z COUNTERINTELLIGENCE/HUMAN INTELLIGENCE SENIOR SERGEANT
02B CORNET OR TRUMPET PLAYER
02C EUPHONIUM PLAYER
02D FRENCH HORN PLAYER
02E TROMBONE PLAYER
02F TUBA PLAYER
02G FLUTE/PICCOLO PLAYER
02H OBOE PLAYER
02J CLARINET PLAYER
02K BASSOON PLAYER
02L SAXOPHONE PLAYER
02M PERCUSSION PLAYER
02N KEYBOARD PLAYER
02S SPECIAL BAND MEMBER
02T GUITAR PLAYER
02U ELECTRIC BASS PLAYER
02Z BANDS SENIOR SERGEANT
98C SIGNALS INTELLIGENCE ANALYST
98G VOICE INTERCEPTOR
98H MORSE INTERCEPTOR
98J NONCOMMUNICATIONS INTERCEPTOR/ANALYST
98K NON-MORSE INTERCEPTOR/ANALYST
98Z SIGNALS INTELLIGENCE (SIGINT)SENIOR SERGEANT

APPENDIX C, PERSTEMPO REGRESSION RESULTS

Table C.1 Logisitic Regression Results for Entry Level Single Soldiers with 36 to 48 Months Active Federal Service (AFS) PERSTEMPO Incidence and Bonus Increments Modeled as Marginal Effects Level of Significance: **=.05, ***=.01

Response Profile:	Value	Total Frequency
Reenlisted	1	18527
Separated	0	13456
Total Observations		31983

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	43532.427	29956.503
SC	43540.800	32351.170
-2 Log L	43530.427	29384.503

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	14145.9239	285	<.0001
Score	11337.6200	285	<.0001
Wald	7352.3642	285	<.0001

Association of Predicted Probabilities and Observed Responses

Percent Concordant	86.1	Somers' D	0.722
Percent Discordant	13.8	Gamma	0.723
Percent Tied	0.1	Tau-a	0.352
Pairs	249299312	c	0.861

Variable	Estimate	Sig	Prob ChiSq	WaldChi Sq	Mean
Intercept	6.5763	***	.0000	1886.842	.
Continuous Variables (Months)					
Current Term of Service (Months)	-0.0713	***	.0000	182.4697	36.37
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: HSDG & AFQT Group IIIA					
HSDG & AFQT Group I	-0.3164	***	.0001	16.3861	.0414
HSDG & AFQT Group II	-0.0721		.0557	3.6600	.3288
GED and/or AFQT Group IIIB & IV	0.2077	***	.0000	29.0980	.3393
Unknown Education of AFQT Group	-0.0776		.5278	0.3987	.0158
Continuous Variables (Months)					
Longevity at ETS (Months)	-0.0580	***	.0000	111.5602	36.74
Omitted Variable: CONUS Tour Length this Term of Service (TOS) in Months					
European Tour Length this TOS (Months)	0.0118	***	.0000	27.0915	5.690
Short Tour Length this TOS (Months)	0.0176	***	.0000	31.5226	2.469
Other Long Tour Length this TOS (Months)	0.0189	***	.0000	16.7012	.9443
Unknown Location Tour Length this TOS (Months)	0.1036	***	.0000	157.4370	.8476
Dummy PERSTEMPO Incidence Variables (1=Yes, 0=No)					
One or More Hostile Deployments w/1995 ETS	-2.5486	***	.0000	561.8476	.0693
One or More Hostile Deployments w/1996 ETS	-2.2610	***	.0000	701.5940	.1358
One or More Hostile Deployments w/1997 ETS	-2.3389	***	.0000	491.9743	.1544
One or More Hostile Deployments w/1998 ETS	-2.3511	***	.0000	303.2625	.1571
One or More Hostile Deployments w/1999 ETS	-1.6205	***	.0000	103.2387	.1605
Two or More Hostile Deployments w/1995 ETS	0.0770		.4735	0.5138	.0220
Two or More Hostile Deployments w/1996 ETS	-0.2643	***	.0016	9.9341	.0378
Two or More Hostile Deployments w/1997 ETS	-0.3855	***	.0000	23.0108	.0418
Two or More Hostile Deployments w/1998 ETS	-0.4681	***	.0000	36.9194	.0486
Two or More Hostile Deployments w/1999 ETS	-0.2832	***	.0001	15.1428	.0523
One or More Hostile & Separated Deployments w/1995 ETS	-1.0726	***	.0003	13.3633	.0033
One or More Hostile & Separated Deployments w/1996 ETS	-1.0317	***	.0001	15.1947	.0048
One or More Hostile & Separated Deployments w/1997 ETS	-1.2012	***	.0000	18.0508	.0050

One or More Hostile & Separated Deployments w/1998 ETS	-1.3536	***	.0000	25.3617	.0059
One or More Hostile & Separated Deployments w/1999 ETS	-0.8754	***	.0012	10.4719	.0075
Two or More Hostile & Separated Deployments w/1995 ETS	0.0017		.9985	0.0000	.0003
Two or More Hostile & Separated Deployments w/1996 ETS	-0.9047		.1522	2.0496	.0006
Two or More Hostile & Separated Deployments w/1997 ETS	-0.8186		.1120	2.5256	.0010
Two or More Hostile & Separated Deployments w/1998 ETS	-1.5764	***	.0037	8.4012	.0008
Two or More Hostile & Separated Deployments w/1999 ETS	0.1077		.8050	0.0609	.0013
One or More Separated Deployments w/1995 ETS	-1.7486	***	.0000	62.2101	.0103
One or More Separated Deployments w/1996 ETS	-1.3533	***	.0000	58.2095	.0194
One or More Separated Deployments w/1997 ETS	-1.6447	***	.0000	84.4477	.0192
One or More Separated Deployments w/1998 ETS	-1.8791	***	.0000	73.3487	.0124
One or More Separated Deployments w/1999 ETS	-0.6813	***	.0022	9.4026	.0120
Two or More Separated Deployments w/1995 ETS	0.4835		.1288	2.3063	.0048
Two or More Separated Deployments w/1996 ETS	0.0035		.9882	0.0002	.0105
Two or More Separated Deployments w/1997 ETS	0.2080		.3961	0.7202	.0094
Two or More Separated Deployments w/1998 ETS	-0.1498		.5956	0.2816	.0064
Two or More Separated Deployments w/1999 ETS	-0.5603	**	.0463	3.9689	.0058
Continuous PERSTEMPO Duration Variables (Months, Events)					
Hostile Deployments					
Months Deployed from CONUS	-0.0708	***	.0000	97.1340	2.764
Months Deployed from Europe	0.0765	***	.0000	75.4985	1.051
Months Deployed from Other OCONUS Areas	0.0159		.6202	0.2456	.0633
Months Deployed from Short Tour Areas	-0.0763	***	.0000	19.5490	.1369
Months Deployed from Unknown Areas	-0.4171	***	.0000	39.7964	.0123
Number of Christmases Away due to Deployments	0.1078	***	.0007	11.3615	.3132
Number of Births During Deployments	1.0256	***	.0000	34.4895	.0089
Hostile Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0265		.5632	0.3342	.0721
Months Deployed from Europe	0.0689		.1973	1.6623	.0222
Months Deployed from Other OCONUS Areas	-0.2934		.2151	1.5371	.0012
Months Deployed from Short Tour Areas	0.0200		.7718	0.0841	.0073
Months Deployed from Unknown Areas	-1.0577		.3017	1.0667	.0002
Number of Christmases Away due to Deployments	-0.0892		.6943	0.1545	.0066
Number of Births During Deployments	0.9844		.0942	2.8006	.0012
Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0565	**	.0109	6.4742	.2087
Months Deployed from Europe	0.0665		.0844	2.9782	.0291
Months Deployed from Other OCONUS Areas	0.0187		.7986	0.0651	.0061
Months Stationed in Short Tour Areas	0.0058		.7745	0.0821	.2244
Months Deployed from Unknown Areas	-0.2979	***	.0000	20.2481	.0227
Number of Christmases Away due to Deployments	0.1187		.3730	0.7935	.0384
Number of Births During Deployments	0.5173	***	.0010	10.8458	.0102
Dummy Selective Reenlistment Bonus Variables (1=Yes, 0=No)					
Multiplier = .05 and Above (1=Yes, 0=No)	-0.2059	***	.0002	13.8495	.3816
Multiplier = 1.0 and Above (1=Yes, 0=No)	0.1096		.0729	3.2174	.2434
Multiplier = 2.0 and Above (1=Yes, 0=No)	0.4299	***	.0000	18.3080	.0449
Reenlistment in Cmbt Zone, Multiplier = .05 and Above	4.4941	***	.0000	94.3004	.0356
Reenlistment in Cmbt Zone, Multiplier = 1.0 and Above	-0.1990		.7228	0.1258	.0232
Reenlistment in Cmbt Zone, Multiplier = 2.0 and Above	-0.3961		.6158	0.2518	.0043
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: Soldier Reenlisted/Separated in FY95					
Soldier Reenlisted/Separated in FY96 (1=Yes, 0=No)	-0.0035		.9752	0.0010	.2289
Soldier Reenlisted/Separated in FY97 (1=Yes, 0=No)	0.4415	***	.0007	11.5445	.2337
Soldier Reenlisted/Separated in FY98 (1=Yes, 0=No)	0.3632	**	.0189	5.5142	.2066
Soldier Reenlisted/Separated in FY99 (1=Yes, 0=No)	-0.4933	***	.0053	7.7740	.1892
Race (1=Caucasian, 0=Other)	-0.5343	***	.0000	253.2681	.6468
Gender (1=Male, 0=Female)	0.1279	***	.0082	6.9794	.8530
Polychotomous Variables					
Children under age 6 in household (Number)	0.0932		.2767	1.1831	.1597
Children in household (Number)	0.5569	***	.0000	62.2391	.2120

Table C.2 Logisitic Regression Results for Entry Level Married Soldiers with 36 to 48 Months Active Federal Service (AFS) PERSTEMPO Incidence and Bonus Increments Modeled as Marginal Effects Level of Significance: **=.05, ***=.01

Response Profile	Value	Total Frequency
Reenlisted	1	28142
Separated	0	12412
Total Observations		40554

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	49957.446	40095.514
SC	49966.056	42738.904
-2 Log L	49955.446	39481.514

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	10473.9316	306	<.0001
Score	9130.7613	306	<.0001
Wald	6901.7010	306	<.0001

Association of Predicted Probabilities and Observed Responses

Percent Concordant	80.2	Somers' D	0.606
Percent Discordant	19.6	Gamma	0.607
Percent Tied	0.2	Tau-a	0.257
Pairs	349298504	c	0.803

Variable	Estimate	Sig	Prob ChiSq	WaldChi Sq	Mean
Intercept	7.1000	***	.0000	2740.394	.
Continuous Variables (Months)					
Current Term of Service (Months)	-0.0568	***	.0000	285.9316	36.82
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: HSDG & AFQT Group IIIA					
HSDG & AFQT Group I	-0.1149		.0765	3.1372	.0445
HSDG & AFQT Group II	-0.0209		.5250	0.4041	.3260
GED and/or AFQT Group IIIB & IV	-0.2421	***	.0000	52.1704	.3430
Unknown Education of AFQT Group	-0.0647		.5834	0.3007	.0140
Longevity at ETS (Months)	-0.0985	***	.0000	700.2030	37.22
Omitted Variable: CONUS Tour Length this Term of Service (TOS) in Months					
European Tour Length this TOS (Months)	0.0282	***	.0000	193.8073	3.882
Short Tour Length this TOS (Months)	-0.0083	***	.0032	8.6791	3.072
Other Long Tour Length this TOS (Months)	0.0286	***	.0000	119.7028	1.407
Unknown Location Tour Length this TOS (Months)	0.0798	***	.0000	231.0462	1.213
Dummy PERSTEMPO Incidence Variables (1=Yes, 0=No)					
One or More Hostile Deployments w/1995 ETS	-0.2550	**	.0433	4.0818	.0160
One or More Hostile Deployments w/1996 ETS	-0.3580	***	.0001	15.5074	.0337
One or More Hostile Deployments w/1997 ETS	-0.4362	***	.0000	21.6869	.0356
One or More Hostile Deployments w/1998 ETS	-0.3508	***	.0014	10.2263	.0268
One or More Hostile Deployments w/1999 ETS	0.1928		.0807	3.0512	.0273
Two or More Hostile Deployments w/1995 ETS	-0.0175		.9459	0.0046	.0027
Two or More Hostile Deployments w/1996 ETS	-0.3992	**	.0142	6.0191	.0067
Two or More Hostile Deployments w/1997 ETS	0.1545		.3644	0.8226	.0068
Two or More Hostile Deployments w/1998 ETS	-0.2551		.1707	1.8770	.0056
Two or More Hostile Deployments w/1999 ETS	-0.2384		.1880	1.7332	.0054
One or More Hostile & Separated Deployments w/1995 ETS	-0.5116	***	.0000	20.6316	.0215
One or More Hostile & Separated Deployments w/1996 ETS	-0.5133	***	.0000	39.4962	.0409
One or More Hostile & Separated Deployments w/1997 ETS	-0.4780	***	.0000	30.8240	.0489
One or More Hostile & Separated Deployments w/1998 ETS	-0.0847		.3839	0.7582	.0436
One or More Hostile & Separated Deployments w/1999 ETS	0.0617		.5194	0.4152	.0488
Two or More Hostile & Separated Deployments w/1995 ETS	-0.3178		.0921	2.8370	.0054

Two or More Hostile & Separated Deployments w/1996 ETS	-0.2650		.1018	2.6776	.0069
Two or More Hostile & Separated Deployments w/1997 ETS	-0.6200	***	.0001	16.3630	.0086
Two or More Hostile & Separated Deployments w/1998 ETS	-0.6603	***	.0000	18.8905	.0089
Two or More Hostile & Separated Deployments w/1999 ETS	-0.3176	**	.0202	5.3941	.0105
One or More Separated Deployments w/1995 ETS	-1.3640	***	.0000	222.0142	.0873
One or More Separated Deployments w/1996 ETS	-1.1837	***	.0000	291.7507	.1612
One or More Separated Deployments w/1997 ETS	-1.0352	***	.0000	208.9725	.1581
One or More Separated Deployments w/1998 ETS	-0.7555	***	.0000	85.0554	.1307
One or More Separated Deployments w/1999 ETS	-0.1733	**	.0480	3.9105	.1316
Two or More Separated Deployments w/1995 ETS	0.3866	***	.0000	21.2208	.0429
Two or More Separated Deployments w/1996 ETS	0.2548	***	.0000	16.5746	.0903
Two or More Separated Deployments w/1997 ETS	0.3577	***	.0000	30.6735	.0866
Two or More Separated Deployments w/1998 ETS	0.3295	***	.0000	21.9810	.0696
Two or More Separated Deployments w/1999 ETS	0.2847	***	.0000	16.6914	.0679
Continuous PERSTEMPO Duration Variables (Months, Events)					
Hostile Deployments					
Months Deployed from CONUS	-0.0281	**	.0312	4.6428	.5934
Months Deployed from Europe	0.0380	**	.0106	6.5254	.2267
Months Deployed from Other OCONUS Areas	-0.0300		.5063	0.4416	.0265
Months Deployed from Short Tour Areas	0.0342		.4106	0.6771	.0196
Months Deployed from Unknown Areas	-0.1665	**	.0172	5.6799	.0062
Number of Christmases Away due to Deployments	-0.1552	***	.0025	9.1334	.0886
Number of Births During Deployments	0.3608	***	.0003	13.3392	.0165
Hostile Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0171		.2124	1.5549	.6154
Months Deployed from Europe	0.1369	***	.0000	61.2008	.2251
Months Deployed from Other OCONUS Areas	0.1282		.1191	2.4287	.0121
Months Deployed from Short Tour Areas	0.0772	***	.0086	6.9015	.0348
Months Deployed from Unknown Areas	0.1936		.3792	0.7731	.0016
Number of Christmases Away due to Deployments	-0.0363		.5818	0.3034	.0558
Number of Births During Deployments	0.2928	***	.0001	16.0451	.0326
Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0559	***	.0000	89.8420	2.423
Months Deployed from Europe	0.0346	**	.0115	6.3925	.2298
Months Deployed from Other OCONUS Areas	0.0550	**	.0257	4.9792	.0534
Months Stationed in Short Tour Areas	0.0357	***	.0000	32.5614	1.639
Months Deployed from Unknown Areas	-0.1026	***	.0000	32.4272	.2875
Number of Christmases Away due to Deployments	-0.0320		.3171	1.0008	.3523
Number of Births During Deployments	0.1367	***	.0000	22.8216	.1750
Dummy Selective Reenlistment Bonus Variables (1=Yes, 0=No)					
Multiplier = .05 and Above (1=Yes, 0=No)	-0.1562	***	.0008	11.1378	.3639
Multiplier = 1.0 and Above (1=Yes, 0=No)	0.0891		.0901	2.8723	.2281
Multiplier = 2.0 and Above (1=Yes, 0=No)	0.6236	***	.0000	50.0017	.0405
Reenlistment in Cmbt Zone, Multiplier = .05 and Above	5.2233	***	.0000	26.9360	.0229
Reenlistment in Cmbt Zone, Multiplier = 1.0 and Above	-0.1884		.8786	0.0233	.0148
Reenlistment in Cmbt Zone, Multiplier = 2.0 and Above	8.5125		.9389	0.0059	.0028
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: Soldier Reenlisted/Separated in FY95					
Soldier Reenlisted/Separated in FY96 (1=Yes, 0=No)	-0.0399		.6781	0.1723	.2491
Soldier Reenlisted/Separated in FY97 (1=Yes, 0=No)	-0.1171		.2377	1.3940	.2398
Soldier Reenlisted/Separated in FY98 (1=Yes, 0=No)	-0.5272	***	.0000	24.2693	.1886
Soldier Reenlisted/Separated in FY99 (1=Yes, 0=No)	-1.2029	***	.0000	111.6664	.1778
Race (1=Caucasian, 0=Other)	-0.4936	***	.0000	273.1927	.6792
Gender (1=Male, 0=Female)	0.5103	***	.0000	118.4724	.9112
Polychotomous Variables					
Children under age 6 in household (Number)	-0.0784	***	.0066	7.3843	.8096
Any Children in household (Number)	0.3322	***	.0000	189.7925	1.033

Table C.3 Logisitic Regression Results for Single Soldiers
with 48 to 72 Months Active Federal Service (AFS)
PERSTEMPO Incidence and Bonus Increments Modeled as Marginal Effects
Level of Significance: **=.05, ***=.01

Response Profile	Value	Total Frequency
Reenlisted	1	7302
Separated	0	3090
Total Observations		10392

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	12651.083	9787.845
SC	12658.332	11940.736
-2 Log L	12649.083	9193.845

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	3455.2378	296	<.0001
Score	2929.8961	296	<.0001
Wald	2020.6320	296	<.0001

Association of Predicted Probabilities and Observed Responses

Percent Concordant	83.8	Somers' D	0.677
Percent Discordant	16.1	Gamma	0.678
Percent Tied	0.2	Tau-a	0.283
Pairs	22563180	c	0.839

Variable	Estimate	Sig	Prob ChiSq	WaldChi Sq	Mean
Intercept	3.6721	***	.0000	109.7580	.
Continuous Variables (Months)					
Current Term of Service (Months)	-0.0525	***	.0000	449.4437	40.21
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: HSDG & AFQT Group IIIA					
HSDG & AFQT Group I	-0.1734		.1725	1.8612	.0481
HSDG & AFQT Group II	-0.2370	***	.0003	13.0564	.3635
GED and/or AFQT Group IIIB & IV	0.1221		.1083	2.5785	.2696
Unknown Education of AFQT Group	0.2513		.2365	1.4015	.0206
Continuous Variables (Months)					
Longevity at ETS (Months)	-0.0035		.3972	0.7169	60.58
Omitted Variable: CONUS Tour Length this Term of Service (TOS) in Months					
European Tour Length this TOS (Months)	0.0175	***	.0000	30.9315	7.521
Short Tour Length this TOS (Months)	0.0120	***	.0031	8.7438	3.798
Other Long Tour Length this TOS (Months)	0.0259	***	.0000	30.7968	2.048
Unknown Location Tour Length this TOS (Months)	0.0388	***	.0000	41.3956	.9777
Dummy PERSTEMPO Incidence Variables (1=Yes, 0=No)					
One or More Hostile Deployments w/1995 ETS	-1.2166	***	.0000	28.8506	.0298
One or More Hostile Deployments w/1996 ETS	-1.2730	***	.0000	57.1190	.0684
One or More Hostile Deployments w/1997 ETS	-1.3457	***	.0000	83.5377	.1454
One or More Hostile Deployments w/1998 ETS	-0.9262	***	.0000	42.5921	.1538
One or More Hostile Deployments w/1999 ETS	-0.6177	***	.0000	16.6660	.1299
Two or More Hostile Deployments w/1995 ETS	-0.2671		.3938	0.7271	.0072
Two or More Hostile Deployments w/1996 ETS	0.2382		.2337	1.4180	.0175
Two or More Hostile Deployments w/1997 ETS	-0.2594	**	.0488	3.8839	.0458
Two or More Hostile Deployments w/1998 ETS	-0.3619	***	.0045	8.0696	.0550
Two or More Hostile Deployments w/1999 ETS	0.0041		.9760	0.0009	.0462
One or More Hostile & Separated Deployments w/1995 ETS	-0.9437	**	.0254	4.9964	.0055
One or More Hostile & Separated Deployments w/1996 ETS	0.0365		.9360	0.0064	.0059
One or More Hostile & Separated Deployments w/1997 ETS	-0.7923	**	.0231	5.1622	.0125
One or More Hostile & Separated Deployments w/1998 ETS	-0.0475		.8799	0.0228	.0171
One or More Hostile & Separated Deployments w/1999 ETS	0.3166		.3614	0.8330	.0154

Two or More Hostile & Separated Deployments w/1995 ETS	0.8213		.5409	0.3739	.0007
Two or More Hostile & Separated Deployments w/1996 ETS	1.2476		.3411	0.9064	.0009
Two or More Hostile & Separated Deployments w/1997 ETS	-0.3529		.6110	0.2587	.0024
Two or More Hostile & Separated Deployments w/1998 ETS	-0.4244		.4039	0.6966	.0038
Two or More Hostile & Separated Deployments w/1999 ETS	-0.7675		.1465	2.1079	.0038
One or More Separated Deployments w/1995 ETS	-1.2586	***	.0002	14.2495	.0164
One or More Separated Deployments w/1996 ETS	-1.0787	***	.0007	11.5115	.0226
One or More Separated Deployments w/1997 ETS	-0.5878	**	.0265	4.9253	.0344
One or More Separated Deployments w/1998 ETS	-0.5444	**	.0192	5.4811	.0335
One or More Separated Deployments w/1999 ETS	0.0166		.9465	0.0045	.0286
Two or More Separated Deployments w/1995 ETS	1.0108		.0571	3.6204	.0075
Two or More Separated Deployments w/1996 ETS	-0.0621		.8751	0.0247	.0138
Two or More Separated Deployments w/1997 ETS	-0.2722		.4434	0.5875	.0184
Two or More Separated Deployments w/1998 ETS	0.4304		.2140	1.5443	.0168
Two or More Separated Deployments w/1999 ETS	-0.1494		.6725	0.1787	.0135
Continuous PERSTEMPO Duration Variables (Months, Events)					
Hostile Deployments					
Months Deployed from CONUS	-0.0305	**	.0123	6.2622	1.791
Months Deployed from Europe	0.0154		.2321	1.4282	1.149
Months Deployed from Other OCONUS Areas	-0.0508		.1853	1.7542	.1040
Months Deployed from Short Tour Areas	-0.0622	***	.0096	6.7040	.1931
Months Deployed from Unknown Areas	-0.0657		.1658	1.9201	.0235
Number of Christmases Away due to Deployments	-0.0368		.5503	0.3567	.2534
Number of Births During Deployments	0.3538		.1887	1.7280	.0092
Hostile Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0541		.3369	0.9221	.1313
Months Deployed from Europe	0.1169		.0851	2.9656	.0888
Months Deployed from Other OCONUS Areas	0.0248		.9185	0.0105	.0045
Months Deployed from Short Tour Areas	-0.0075		.9357	0.0065	.0182
Months Deployed from Unknown Areas	-1.2849		.1954	1.6766	.0003
Number of Christmases Away due to Deployments	-0.2251		.4271	0.6307	.0154
Number of Births During Deployments	1.4665		.1441	2.1331	.0035
Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0651	**	.0355	4.4197	.2814
Months Deployed from Europe	0.0978		.1735	1.8523	.0740
Months Deployed from Other OCONUS Areas	0.1033		.3455	0.8900	.0173
Months Stationed in Short Tour Areas	0.0074		.7926	0.0691	.4428
Months Deployed from Unknown Areas	-0.0909		.5664	0.3288	.0102
Number of Christmases Away due to Deployments	0.1764		.3865	0.7499	.0675
Number of Births During Deployments	0.1925		.4925	0.4710	.0127
Dummy Selective Reenlistment Bonus Variables (1=Yes, 0=No)					
Multiplier = .05 and Above (1=Yes, 0=No)	-0.3050	***	.0037	8.4204	.2933
Multiplier = 1.0 and Above (1=Yes, 0=No)	0.2587	**	.0467	3.9552	.1679
Multiplier = 2.0 and Above (1=Yes, 0=No)	-0.1726		.2916	1.1123	.0419
Reenlistment in Cmbt Zone, Multiplier = .05 and Above	16.0009		.9637	0.0021	.0242
Reenlistment in Cmbt Zone, Multiplier = 1.0 and Above	-0.0490		.9999	0.0000	.0156
Reenlistment in Cmbt Zone, Multiplier = 2.0 and Above	-12.253		.9674	0.0017	.0040
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: Soldier Reenlisted/Separated in FY95					
Soldier Reenlisted/Separated in FY96 (1=Yes, 0=No)	-0.0487		.8171	0.0535	.1558
Soldier Reenlisted/Separated in FY97 (1=Yes, 0=No)	0.3442		.0950	2.7877	.2644
Soldier Reenlisted/Separated in FY98 (1=Yes, 0=No)	-0.1837		.3599	0.8382	.2597
Soldier Reenlisted/Separated in FY99 (1=Yes, 0=No)	-0.8068	***	.0001	15.4959	.2103
Race (1=Caucasian, 0=Other)	-0.6380	***	.0000	105.0960	.5829
Gender (1=Male, 0=Female)	0.1835	**	.0140	6.0396	.7682
Polychotomous Variables					
Children under age 6 in household (Number)	-0.0130		.9180	0.0106	.2836
Any Children in household (Number)	0.6534	***	.0000	39.3083	.3907

Table C.4 Logisitic Regression Results for Married Soldiers
with 48 to 72 Months Active Federal Service (AFS)
PERSTEMPO Incidence and Bonus Increments Modeled as Marginal Effects
Level of Significance: **=.05, ***=.01

Response Profile	Value	Total Frequency
Reenlisted	1	20154
Separated	0	6054
Total Observations		26208

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	28331.780	24922.406
SC	28339.954	27472.638
-2 Log L	28329.780	24298.406

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	4031.3739	311	<.0001
Score	3772.1734	311	<.0001
Wald	3035.5558	311	<.0001

Association of Predicted Probabilities and Observed Responses

Percent Concordant	75.0	Somers' D	0.504
Percent Discordant	24.7	Gamma	0.505
Percent Tied	0.3	Tau-a	0.179
Pairs	122012316	c	0.752

Variable	Estimate	Sig	Prob ChiSq	WaldChi Sq	Mean
Intercept	3.2736	***	.0000	218.5334	.
Continuous Variables (Months)					
Current Term of Service (Months)	-0.0422	***	.0000	865.3560	40.33
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: HSDG & AFQT Group IIIA					
HSDG & AFQT Group I	-0.0854		.2699	1.2170	.0465
HSDG & AFQT Group II	0.0149		.7083	0.1400	.3675
GED and/or AFQT Group IIIB & IV	0.2310	***	.0000	25.1820	.2862
Unknown Education of AFQT Group	0.1074		.4028	0.7001	.0197
Continuous Variables (Months)					
Longevity at ETS (Months)	-0.0019		.4739	0.5128	61.87
Omitted Variable: CONUS Tour Length this Term of Service (TOS) in Months					
European Tour Length this TOS (Months)	0.0047	***	.0068	7.3312	7.094
Short Tour Length this TOS (Months)	-0.0046		.0770	3.1263	3.630
Other Long Tour Length this TOS (Months)	0.0181	***	.0000	54.3346	2.577
Unknown Location Tour Length this TOS (Months)	0.0319	***	.0000	103.5851	1.207
Dummy PERSTEMPO Incidence Variables (1=Yes, 0=No)					
One or More Hostile Deployments w/1995 ETS	-0.1602		.5062	0.4419	.0080
One or More Hostile Deployments w/1996 ETS	-0.2881	**	.0415	4.1568	.0171
One or More Hostile Deployments w/1997 ETS	-0.4122	***	.0000	17.3338	.0413
One or More Hostile Deployments w/1998 ETS	-0.1820		.0744	3.1825	.0420
One or More Hostile Deployments w/1999 ETS	-0.1317		.2394	1.3843	.0336
Two or More Hostile Deployments w/1995 ETS	-0.0472		.9395	0.0058	.0012
Two or More Hostile Deployments w/1996 ETS	0.1052		.7107	0.1376	.0034
Two or More Hostile Deployments w/1997 ETS	0.2000		.2587	1.2756	.0094
Two or More Hostile Deployments w/1998 ETS	0.1323		.4324	0.6163	.0111
Two or More Hostile Deployments w/1999 ETS	-0.3196		.0763	3.1421	.0090
One or More Hostile & Separated Deployments w/1995 ETS	-0.3080		.1211	2.4024	.0119
One or More Hostile & Separated Deployments w/1996 ETS	-0.2910	**	.0168	5.7195	.0260
One or More Hostile & Separated Deployments w/1997 ETS	-0.1592		.1008	2.6934	.0575
One or More Hostile & Separated Deployments w/1998 ETS	0.0230		.8102	0.0577	.0730

One or More Hostile & Separated Deployments w/1999 ETS	0.1777		.0832	3.0022	.0606
Two or More Hostile & Separated Deployments w/1995 ETS	-0.4813		.2697	1.2181	.0015
Two or More Hostile & Separated Deployments w/1996 ETS	0.1542		.5397	0.3761	.0046
Two or More Hostile & Separated Deployments w/1997 ETS	-0.1609		.2978	1.0841	.0124
Two or More Hostile & Separated Deployments w/1998 ETS	-0.1155		.3795	0.7723	.0198
Two or More Hostile & Separated Deployments w/1999 ETS	-0.3331	**	.0165	5.7472	.0165
One or More Separated Deployments w/1995 ETS	-0.9002	***	.0000	34.5555	.0462
One or More Separated Deployments w/1996 ETS	-0.2484	**	.0249	5.0311	.0821
One or More Separated Deployments w/1997 ETS	-0.4747	***	.0000	33.7881	.1498
One or More Separated Deployments w/1998 ETS	-0.2920	***	.0003	13.1678	.1525
One or More Separated Deployments w/1999 ETS	0.0910		.2913	1.1138	.1263
Two or More Separated Deployments w/1995 ETS	0.4931	***	.0032	8.7033	.0248
Two or More Separated Deployments w/1996 ETS	0.1465		.1942	1.6853	.0483
Two or More Separated Deployments w/1997 ETS	0.2617	***	.0016	9.9428	.0862
Two or More Separated Deployments w/1998 ETS	0.2149	***	.0083	6.9757	.0868
Two or More Separated Deployments w/1999 ETS	0.1426		.1143	2.4937	.0688
Continuous PERSTEMPO Duration Variables (Months, Events)					
Hostile Deployments					
Months Deployed from CONUS	-0.0282		.0634	3.4462	.4654
Months Deployed from Europe	0.0471	***	.0015	10.0514	.3378
Months Deployed from Other OCONUS Areas	-0.0815	**	.0386	4.2784	.0441
Months Deployed from Short Tour Areas	-0.0163		.6804	0.1697	.0325
Months Deployed from Unknown Areas	-0.0317		.4837	0.4906	.0072
Number of Christmases Away due to Deployments	-0.0567		.3828	0.7616	.0791
Number of Births During Deployments	0.1756		.1331	2.2559	.0170
Hostile Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0462	***	.0015	10.0451	.5294
Months Deployed from Europe	0.0571	***	.0001	15.5610	.4589
Months Deployed from Other OCONUS Areas	0.0628		.2759	1.1872	.0297
Months Deployed from Short Tour Areas	-0.0300		.2677	1.2283	.0521
Months Deployed from Unknown Areas	-0.2370		.0558	3.6570	.0027
Number of Christmases Away due to Deployments	0.0282		.6993	0.1492	.0671
Number of Births During Deployments	0.1245		.1337	2.2494	.0353
Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0523	***	.0000	44.0841	1.497
Months Deployed from Europe	0.0087		.5030	0.4487	.3492
Months Deployed from Other OCONUS Areas	-0.0209		.3001	1.0738	.1112
Months Stationed in Short Tour Areas	0.0010		.8909	0.0188	1.551
Months Deployed from Unknown Areas	-0.0817	**	.0115	6.3832	.0878
Number of Christmases Away due to Deployments	0.0102		.8178	0.0531	.2915
Number of Births During Deployments	0.0419		.3005	1.0719	.1247
Dummy Selective Reenlistment Bonus Variables (1=Yes, 0=No)					
Multiplier = .05 and Above (1=Yes, 0=No)	-0.0616		.3449	0.8921	.2820
Multiplier = 1.0 and Above (1=Yes, 0=No)	0.1368		.0847	2.9715	.1658
Multiplier = 2.0 and Above (1=Yes, 0=No)	0.1434		.2050	1.6063	.0323
Reenlistment in Cmbt Zone, Multiplier = .05 and Above	3.6895	***	.0000	26.5809	.0183
Reenlistment in Cmbt Zone, Multiplier = 1.0 and Above	0.1945		.8477	0.0369	.0110
Reenlistment in Cmbt Zone, Multiplier = 2.0 and Above	9.4802		.9662	0.0018	.0013
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: Soldier Reenlisted/Separated in FY95					
Soldier Reenlisted/Separated in FY96 (1=Yes, 0=No)	-0.4558	***	.0008	11.1442	.1491
Soldier Reenlisted/Separated in FY97 (1=Yes, 0=No)	-0.2871	**	.0251	5.0190	.2709
Soldier Reenlisted/Separated in FY98 (1=Yes, 0=No)	-0.6753	***	.0000	27.6932	.2630
Soldier Reenlisted/Separated in FY99 (1=Yes, 0=No)	-0.9718	***	.0000	55.8799	.2168
Race (1=Caucasian, 0=Other)	-0.5781	***	.0000	215.1175	.6618
Gender (1=Male, 0=Female)	0.1915	***	.0022	9.3983	.9198
Polychotomous Variables					
Children under age 6 in household (Number)	-0.0539		.1008	2.6930	.9009
Any Children in household (Number)	0.2573	***	.0000	97.7368	1.249

Table C.5 Logisitic Regression Results for Single Soldiers
with 72 to 120 Months Active Federal Service (AFS)
PERSTEMPO Incidence and Bonus Increments Modeled as Marginal Effects
Level of Significance: **=.05, ***=.01

Response Profile	Value	Total Frequency
Reenlisted	1	10718
Separated	0	2003
Total Observations		12721

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	11080.145	9660.367
SC	11087.596	11940.376
-2 Log L	11078.145	9048.367

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	2029.7782	305	<.0001
Score	1994.0463	305	<.0001
Wald	1448.4858	305	<.0001

Association of Predicted Probabilities and Observed Responses

Percent Concordant	79.6	Somers' D	0.595
Percent Discordant	20.1	Gamma	0.597
Percent Tied	0.3	Tau-a	0.158
Pairs	21468154	c	0.798

Variable	Estimate	Sig	Prob ChiSq	WaldChi Sq	Mean
Intercept	3.1659	***	.0000	97.6376	.
Continuous Variables (Months)					
Current Term of Service (Months)	-0.0369	***	.0000	220.3394	34.23
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: HSDG & AFQT Group IIIA					
HSDG & AFQT Group I	0.0342		.8213	0.0510	.0323
HSDG & AFQT Group II	-0.0822		.2533	1.3048	.2868
GED and/or AFQT Group IIIB & IV	0.1240		.0915	2.8484	.3639
Unknown Education of AFQT Group	-0.1664		.3389	0.9144	.0240
Continuous Variables (Months)					
Longevity at ETS (Months)	0.0076	***	.0006	11.9305	92.64
Omitted Variable: CONUS Tour Length this Term of Service (TOS) in Months					
European Tour Length this TOS (Months)	0.0201	***	.0000	37.3373	7.205
Short Tour Length this TOS (Months)	0.0121	***	.0056	7.6662	4.195
Other Long Tour Length this TOS (Months)	0.0262	***	.0000	23.7466	2.011
Unknown Location Tour Length this TOS (Months)	0.0219	***	.0025	9.1293	.4311
Dummy PERSTEMPO Incidence Variables (1=Yes, 0=No)					
One or More Hostile Deployments w/1995 ETS	-1.2338	***	.0000	25.0664	.0282
One or More Hostile Deployments w/1996 ETS	-1.3050	***	.0000	54.6648	.0488
One or More Hostile Deployments w/1997 ETS	-0.7706	***	.0000	27.1054	.0847
One or More Hostile Deployments w/1998 ETS	-0.5260	***	.0002	13.6470	.0820
One or More Hostile Deployments w/1999 ETS	-0.1972		.1674	1.9059	.0798
Two or More Hostile Deployments w/1995 ETS	0.0618		.8591	0.0315	.0071
Two or More Hostile Deployments w/1996 ETS	0.4134		.0907	2.8610	.0130
Two or More Hostile Deployments w/1997 ETS	-0.3102		.0670	3.3561	.0274
Two or More Hostile Deployments w/1998 ETS	-0.0078		.9599	0.0025	.0307
Two or More Hostile Deployments w/1999 ETS	-0.4476	***	.0045	8.0721	.0311
One or More Hostile & Separated Deployments w/1995 ETS	0.1412		.7445	0.1062	.0086
One or More Hostile & Separated Deployments w/1996 ETS	0.5454		.1775	1.8184	.0124
One or More Hostile & Separated Deployments w/1997 ETS	0.4390		.1548	2.0241	.0187
One or More Hostile & Separated Deployments w/1998 ETS	0.2988		.2740	1.1965	.0176
One or More Hostile & Separated Deployments w/1999 ETS	0.5250		.0685	3.3186	.0189

Two or More Hostile & Separated Deployments w/1995 ETS	-0.2692		.7345	0.1150	.0018
Two or More Hostile & Separated Deployments w/1996 ETS	-1.2654		.0820	3.0240	.0021
Two or More Hostile & Separated Deployments w/1997 ETS	0.9917		.1905	1.7136	.0040
Two or More Hostile & Separated Deployments w/1998 ETS	0.0836		.8681	0.0276	.0037
Two or More Hostile & Separated Deployments w/1999 ETS	0.4537		.3461	0.8879	.0045
One or More Separated Deployments w/1995 ETS	-1.1478	***	.0000	16.8449	.0451
One or More Separated Deployments w/1996 ETS	-0.6788	***	.0037	8.4433	.0570
One or More Separated Deployments w/1997 ETS	-0.7069	***	.0004	12.4854	.0647
One or More Separated Deployments w/1998 ETS	0.2991		.1595	1.9793	.0449
One or More Separated Deployments w/1999 ETS	0.3081		.1415	2.1613	.0440
Two or More Separated Deployments w/1995 ETS	0.0886		.7755	0.0813	.0234
Two or More Separated Deployments w/1996 ETS	0.2880		.2993	1.0774	.0323
Two or More Separated Deployments w/1997 ETS	0.7388	***	.0036	8.4638	.0394
Two or More Separated Deployments w/1998 ETS	0.2823		.3161	1.0049	.0230
Two or More Separated Deployments w/1999 ETS	0.2066		.4489	0.5734	.0235
Continuous PERSTEMPO Duration Variables (Months, Events)					
Hostile Deployments					
Months Deployed from CONUS	-0.0429	***	.0038	8.3680	.9472
Months Deployed from Europe	0.0206		.1687	1.8944	.7792
Months Deployed from Other OCONUS Areas	-0.0528		.2357	1.4063	.0781
Months Deployed from Short Tour Areas	0.0108		.6550	0.1996	.1495
Months Deployed from Unknown Areas	-0.1531	**	.0457	3.9908	.0129
Number of Christmases Away due to Deployments	-0.0892		.2225	1.4880	.1571
Number of Births During Deployments	0.9316	***	.0060	7.5559	.0070
Hostile Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0932		.0559	3.6546	.1555
Months Deployed from Europe	-0.0343		.4761	0.5078	.1130
Months Deployed from Other OCONUS Areas	-0.1532		.2256	1.4682	.0124
Months Deployed from Short Tour Areas	-0.1330	**	.0287	4.7846	.0364
Months Deployed from Unknown Areas	38.8114		.3066	1.0453	.0010
Number of Christmases Away due to Deployments	-0.2111		.3828	0.7618	.0215
Number of Births During Deployments	0.7652		.2859	1.1390	.0046
Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0803	***	.0027	8.9722	.4326
Months Deployed from Europe	-0.0427		.1661	1.9180	.1688
Months Deployed from Other OCONUS Areas	0.0756		.4963	0.4628	.0388
Months Stationed in Short Tour Areas	-0.0253		.1982	1.6558	.9363
Months Deployed from Unknown Areas	0.4470		.2971	1.0873	.0102
Number of Christmases Away due to Deployments	0.0018		.9894	0.0002	.1376
Number of Births During Deployments	0.4243		.1159	2.4719	.0189
Dummy Selective Reenlistment Bonus Variables (1=Yes, 0=No)					
Multiplier = .05 and Above (1=Yes, 0=No)	0.6726	***	.0017	9.8515	.0433
Multiplier = 2.0 and Above (1=Yes, 0=No)	0.0270		.9344	0.0068	.0151
Reenlistment in Cmbt Zone, Multiplier = .05 and Above	3.0071	***	.0054	7.7540	.0042
Reenlistment in Cmbt Zone, Multiplier = 2.0 and Above	11.5054		.9836	0.0004	.0014
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: Soldier Reenlisted/Separated in FY95					
Soldier Reenlisted/Separated in FY96 (1=Yes, 0=No)	-0.4178		.0632	3.4514	.1891
Soldier Reenlisted/Separated in FY97 (1=Yes, 0=No)	-0.7982	***	.0001	14.7662	.2585
Soldier Reenlisted/Separated in FY98 (1=Yes, 0=No)	-1.6551	***	.0000	64.6544	.2025
Soldier Reenlisted/Separated in FY99 (1=Yes, 0=No)	-1.8397	***	.0000	80.7396	.2015
Race (1=Caucasian, 0=Other)	-0.4890	***	.0000	60.6028	.4276
Gender (1=Male, 0=Female)	0.3029	***	.0000	16.9133	.6882
Polychotomous Variables					
Children under age 6 in household (Number)	-0.2407	***	.0054	7.7367	.4614
Any Children in household (Number)	0.5945	***	.0000	74.3720	.7434

Table C.6 Logisitic Regression Results for Married Soldiers
with 72 to 120 Months Active Federal Service AFS
PERSTEMPO Incidence and Bonus Increments Modeled as Marginal Effects
Level of Significance: **=.05, ***=.01

Response Profile	Value	Total Frequency
Reenlisted	1	44464
Separated	0	8612
Total Observations		53076

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	47069.275	42494.049
SC	47078.155	45406.518
-2 Log L	47067.275	41838.049

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	5229.2266	327	<.0001
Score	5165.2874	327	<.0001
Wald	4304.9991	327	<.0001

Association of Predicted Probabilities and Observed Responses

Percent Concordant	73.2	Somers' D	0.469
Percent Discordant	26.3	Gamma	0.471
Percent Tied	0.5	Tau-a	0.128
Pairs	382923968	c	0.734

Variable	Estimate	Sig	Prob ChiSq	WaldChi Sq	Mean
Intercept	3.1752	***	.0000	433.9519	.
Continuous Variables (Months)					
Current Term of Service (Months)	-0.0396	***	.0000	1229.774	34.78
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: HSDG & AFQT Group IIIA					
HSDG & AFQT Group I	-0.1163		.0883	2.9044	.0344
HSDG & AFQT Group II	-0.0159		.6281	0.2346	.3233
GED and/or AFQT Group IIIB & IV	0.0406		.2362	1.4033	.3594
Unknown Education of AFQT Group	-0.2070	**	.0173	5.6661	.0209
Continuous Variables (Months)					
Longevity at ETS (Months)	0.0092	***	.0000	92.3693	94.58
Omitted Variable: CONUS Tour Length this Term of Service (TOS) in Months					
European Tour Length this TOS (Months)	0.0115	***	.0000	59.6614	6.826
Short Tour Length this TOS (Months)	0.0040		.0553	3.6744	3.967
Other Long Tour Length this TOS (Months)	0.0203	***	.0000	93.2643	2.402
Unknown Location Tour Length this TOS (Months)	0.0311	***	.0000	103.5212	.4475
Dummy PERSTEMPO Incidence Variables (1=Yes, 0=No)					
One or More Hostile Deployments w/1995 ETS	-0.5905	***	.0001	14.4789	.0086
One or More Hostile Deployments w/1996 ETS	-0.2431	**	.0411	4.1718	.0155
One or More Hostile Deployments w/1997 ETS	-0.1358		.1362	2.2202	.0278
One or More Hostile Deployments w/1998 ETS	0.0880		.3324	0.9395	.0257
One or More Hostile Deployments w/1999 ETS	0.2164	**	.0194	5.4665	.0262
Two or More Hostile Deployments w/1995 ETS	-0.1001		.7818	0.0767	.0014
Two or More Hostile Deployments w/1996 ETS	0.5139		.0559	3.6563	.0031
Two or More Hostile Deployments w/1997 ETS	-0.0902		.5890	0.2919	.0061
Two or More Hostile Deployments w/1998 ETS	0.0086		.9557	0.0031	.0069
Two or More Hostile Deployments w/1999 ETS	-0.1266		.4143	0.6664	.0066
One or More Hostile & Separated Deployments w/1995 ETS	-0.5811	***	.0000	22.6420	.0175
One or More Hostile & Separated Deployments w/1996 ETS	-0.1245		.1971	1.6640	.0308
One or More Hostile & Separated Deployments w/1997 ETS	0.0125		.8763	0.0242	.0561
One or More Hostile & Separated Deployments w/1998 ETS	0.2084	***	.0090	6.8280	.0530
One or More Hostile & Separated Deployments w/1999 ETS	0.1986	**	.0119	6.3199	.0541

Two or More Hostile & Separated Deployments w/1995 ETS	0.8670	***	.0051	7.8508	.0032
Two or More Hostile & Separated Deployments w/1996 ETS	-0.1934		.2677	1.2285	.0066
Two or More Hostile & Separated Deployments w/1997 ETS	-0.1755		.1555	2.0171	.0139
Two or More Hostile & Separated Deployments w/1998 ETS	-0.2543	**	.0195	5.4543	.0153
Two or More Hostile & Separated Deployments w/1999 ETS	-0.0898		.4280	0.6282	.0148
One or More Separated Deployments w/1995 ETS	-0.7502	***	.0000	50.3746	.0736
One or More Separated Deployments w/1996 ETS	-0.4778	***	.0000	33.0646	.1149
One or More Separated Deployments w/1997 ETS	-0.3275	***	.0000	24.9585	.1429
One or More Separated Deployments w/1998 ETS	-0.0241		.6962	0.1525	.1079
One or More Separated Deployments w/1999 ETS	0.3073	***	.0000	22.4992	.1055
Two or More Separated Deployments w/1995 ETS	0.4354	***	.0000	16.9131	.0385
Two or More Separated Deployments w/1996 ETS	0.3992	***	.0000	24.3535	.0678
Two or More Separated Deployments w/1997 ETS	0.3012	***	.0000	19.0957	.0814
Two or More Separated Deployments w/1998 ETS	0.3495	***	.0000	24.4251	.0570
Two or More Separated Deployments w/1999 ETS	0.2427	***	.0016	9.9635	.0552
Continuous PERSTEMPO Duration Variables (Months, Events)					
Hostile Deployments					
Months Deployed from CONUS	-0.0679	***	.0000	29.4084	.3257
Months Deployed from Europe	-0.0082		.5236	0.4067	.2522
Months Deployed from Other OCONUS Areas	-0.0262		.4228	0.6426	.0351
Months Deployed from Short Tour Areas	-0.0494		.0862	2.9433	.0341
Months Deployed from Unknown Areas	0.0557		.3765	0.7821	.0058
Number of Christmases Away due to Deployments	0.0052		.9245	0.0090	.0627
Number of Births During Deployments	0.2092		.0702	3.2774	.0112
Hostile Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0471	***	.0000	16.7386	.4546
Months Deployed from Europe	0.0615	***	.0000	26.0173	.4253
Months Deployed from Other OCONUS Areas	0.0013		.9760	0.0009	.0309
Months Deployed from Short Tour Areas	0.0454	**	.0364	4.3766	.0658
Months Deployed from Unknown Areas	-0.1834	***	.0091	6.7997	.0032
Number of Christmases Away due to Deployments	0.1158		.0539	3.7160	.0620
Number of Births During Deployments	0.1383		.0623	3.4762	.0268
Deployments while Separated from Dependents					
Months Deployed from CONUS	-0.0267	***	.0004	12.7664	1.019
Months Deployed from Europe	0.0168		.1422	2.1541	.3644
Months Deployed from Other OCONUS Areas	-0.0196		.2537	1.3027	.1204
Months Stationed in Short Tour Areas	-0.0225	***	.0002	14.2695	1.725
Months Deployed from Unknown Areas	-0.1675	***	.0000	17.6596	.0179
Number of Christmases Away due to Deployments	0.0028		.9404	0.0056	.2833
Number of Births During Deployments	0.1498	***	.0002	13.7513	.0824
Dummy Selective Reenlistment Bonus Variables (1=Yes, 0=No)					
Multiplier = .05 and Above (1=Yes, 0=No)	0.3047	***	.0017	9.8777	.0452
Multiplier = 2.0 and Above (1=Yes, 0=No)	0.3491	**	.0210	5.3237	.0169
Reenlistment in Cmbt Zone, Multiplier = .05 and Above	13.2925		.9212	0.0098	.0036
Reenlistment in Cmbt Zone, Multiplier = 2.0 and Above	-0.2100		.9993	0.0000	.0013
Dummy Variables (1=Yes, 0=No)					
Omitted Variable: Soldier Reenlisted/Separated in FY95					
Soldier Reenlisted/Separated in FY96 (1=Yes, 0=No)	-0.3505	***	.0008	11.1445	.1890
Soldier Reenlisted/Separated in FY97 (1=Yes, 0=No)	-0.6467	***	.0000	44.9022	.2575
Soldier Reenlisted/Separated in FY98 (1=Yes, 0=No)	-1.4863	***	.0000	247.8490	.2079
Soldier Reenlisted/Separated in FY99 (1=Yes, 0=No)	-1.5326	***	.0000	265.5199	.2132
Race (1=Caucasian, 0=Other)	-0.5122	***	.0000	297.1574	.5837
.					
Gender (1=Male, 0=Female)	-0.0388		.5001	0.4547	.9354
Polychotomous Variables					
Children under age 6 in household (Number)	-0.0084		.6857	0.1638	.9403
Any Children in household (Number)	0.1649	***	.0000	118.7733	1.581

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