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EFFECTS OF WORK-RELATED ABSENCES ON FAMILIES: EVIDENCE FROM THE GULF WAR

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ABSTRACT

Labor economists and policy makers have long been interested in work-family interactions. Work generates income but also reduces the time families have to spend together. Many soldiers who were mobilized for Gulf War service were away from home for an extended period of time, so Gulf War mobilization makes for an interesting case study of work-related absences by both husbands and wives. We estimate the effect of Gulf War deployment on employment rates for soldiers' spouses, divorce rates, and disability rates among soldiers' children. Data from the 1992 Survey of Officers and Enlisted Personnel show that personnel deployed to the Gulf spent 3-6 more months away from home than non-deployed personnel. The estimates suggest that deployments of a male soldier reduced wives' employment rates, probably because of added child care responsibilities. Deployment of a female soldier left husbands' employment rates unchanged, but female deployment is associated with significantly higher post-deployment divorce rates. Finally, estimates for the pooled sample of men and women show no significant increase in the incidence of temporary disabilities among the children of deployed personnel. This may be because for most military families, deployment was not associated with a change in living standards.

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Concern about the effect of work schedules on workers' families helped mobilize support for the Family and Medical Leave Act of 1993 (FMLA) and has been a factor in the development of human resource policies such as employer-provided day care and flextime. Work schedules that involve unusual hours or extended business-related travel seem especially likely to put stress on family relationships and to create disagreements between spouses over child care and housework (see, e.g., Hochschild, 1989; Parcel and Menaghan, 1994). These factors may ultimately increase the rate of marital dissolution and have other negative consequences for children. It also seems plausible that parental absences are bad for children even in the absence of an effect on marital stability. On the other hand, research on single parenting suggests that the negative consequences of single-parenting for children may derive in large part from a loss of income (McLanahan and Sandefur, 1994). If income loss is the main problem created by a parent's absence, then demanding work schedules, at least those associated with high earnings, may not hurt children after all.

The families that experience parental absences differ from other families along many dimensions, so simple cross-family comparisons are unlikely to be good indicators of the impact of a parent's time away from home. Work-related absences due to sudden reassignments may be exogenous, however, at least after conditioning on industry and occupation. This paper presents a case study of one plausibly exogenous work-related absence that affected many soldiers and their families: deployment for military service in the Persian Gulf in 1990 and 1991. This episode probably comes closer than other comparisons to providing evidence on the causal effects of a parent's absence on spouses and children.

The deployment episode is especially useful for studying the impact of parental absences on children because, as we show below using military pay records, the earnings of deployed personnel actually increased slightly as a consequence of deployment. So any effects of parental absence in this case do not reflect a change in income. Another unusual feature of Gulf War deployment is that the resulting absences involved mothers as well as fathers. The question of how mothers' time at work affects children has long been of interest to labor economists (see, e.g., Blau and Grossberg, 1992). Of course, the military is an unusual

employer in many other respects, so lessons from our study need not generalize. On the other hand, the military is not entirely unique since other jobs involve extended parental absences. In fact, Hiew (1992) draws an analogy between time spent away from home by Canadian military personnel and Japanese workers that are routinely relocated and expected to live apart from their families. Other industries and occupations with jobs involving extended absences include fishing and work on offshore oil rigs (Vormbrock, 1993).[1]

The empirical analysis begins with reduced-form estimates of the effect of Persian Gulf deployment on time away from home, spouse's employment status, and divorce rates. We then use two-stage least squares (2SLS) to interpret the reduced-form effects of deployment as the impact of time spent away from home. Following the analysis of effects on couples, we turn to an analysis of effects on disabilities among the children of deployed personnel. The estimation for all outcome variables uses data from the Department of Defense 1992 Survey of Officers and Enlisted Personnel (SOEP), linked with administrative data on the income of service personnel from 1990-92 and on marital status before deployment. The SOEP contains information on soldiers and family members for a large sample of military personnel with at least four months of service in 1991. The link to administrative data allows us to document the effect of deployment on military pay and to control for key pre-deployment characteristics, making it more likely that the estimated deployment effects have a causal interpretation.

The results suggest that deployment of male soldiers led their wives to work less, probably because of added child care responsibilities while their husbands were away. Another interesting finding is that deployment of female soldiers led to an increase in divorce rates. This supports the notion that deployment was difficult for married couples. On the other hand, deployment of male soldiers did not lead to an increase in divorce and deployment of female soldiers did not affect husbands' labor supply. Finally, the results show

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[1]Repeated short-term separations are common for night-shift workers and airline pilots, a fact used by Landy, Rosenberg, and Sutton-Smith (1969) and Rigg and Cosgrove (1994) in studies of the effects of intermittent work-related absences on workers' families.

no significant increase in child disability rates, at least as measured by the reported incidence of temporary or permanent handicaps among the children of deployed personnel. On balance, therefore, the results suggest that the consequences of parental absences for couples differ for men and women, and that any negative consequences for children were minimal. This may be because of the extensive family support services provided by the military and because deployment typically did not lead to a reduction in living standards.

Background

The military is the largest employer in the United States besides the federal government, with 1.58 million active duty service members and 984,000 reservists in 1995. In a dramatic change from the bachelor military of conscription days, the majority of soldiers today are married -- this includes about 57 percent of enlisted personnel and 73 percent of active duty officers. Moreover, about half of soldiers have children.[2] On the other hand, while soldiers in the volunteer armed forces are very likely to marry and have children, military careers clearly place special demands on families. For example, military families move frequently, and soldiers are often separated from their families for extended periods of time. The nature of duty assignments vary considerably, and families have little control over the timing of moves or the location of their next job. On the plus side, many families live on military bases that provide a range of free services, such as child care, counseling and medical care.[3]

An important and perhaps unusual feature of military careers is the military's system for determining pay. In addition to a soldier's rank, experience, training, and duty assignment, family structure and living circumstances are also taken into account. All soldiers receive base pay, basic allowance for quarters, and

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[2]These statistics are from Office of the Assistant Secretary of Defense (1995:2-1,4-12).

[3]The recent literature on the consequences of deployment and changing duty assignments for military families includes Jensen, Martin, and Watanabe (1996), Kelley (1994), Kelley, *et al* (1994), Payne, Warner, and Little (1992), and Segal (1986).

basic allowance for subsistence (Department of Defense, 1996). Base pay is determined by length of service and rank. Basic allowance for quarters compensates people who do not live in government housing, and a variable housing allowance supplements these payments for cost of living differences in different regions. The basic allowance for subsistence is supposed to pay for food. Allowances also exist for special duty and work situations. For example, someone deployed to a combat area might be eligible for hazardous duty pay. On the other hand, personnel deployed to the Gulf stop receiving a basic allowance for subsistence because they receive rations. For most Gulf War veterans, however, this was offset by special pay allowances for soldiers who were separated from their families.[4]

The 1992 Survey of Officers and Enlisted Personnel

The Department of Defense conducted the 1992 SOEP to gather information on military life and experiences. The SOEP was a mail survey with approximately 140 questions. Data were collected between May and October 1992 using a sampling frame that included service personnel with at least four months of service in 1991. The samples were stratified by sex, officer status, and branch of service. Sample weights allow the calculation of population statistics, and partially correct for non-response. The overall response rate was 62 percent. The sample size including all strata is 59,930, which corresponds to a population of 1,952,793 active-duty soldiers and mobilized reservists.[5]

The SOEP collects extensive information about military job experiences, including branch of service,

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[4]Information on military compensation is drawn from Department of Defense (1996). Thanks also to Major Tracy Urman at the Military Compensation Office for explaining some details.

[5]In addition to the stratification variables mentioned in the text, the survey involved four subsamples: active duty personnel, a longitudinal follow-up of personnel interviewed in a 1985 survey who were still in the military in 1991, a reservist sample, and an enlisted recruiter sample. The same branch-of-service, officer, and sex stratification variables were used in all cases. The sample design is documented in Westat, Inc. (1993).

rank, years of service, and income from military and nonmilitary jobs. Of particular interest is the information on the number of months a service person spent away from his family due to military assignments. Time away is reported for calendar year 1991 and as a total over the course of soldiers' military career. In addition, information on deployment and months of service in the Persian Gulf as part of Operation Desert Storm/Desert Shield is collected.

Other parts of the survey elicit information on family background and family characteristics. Each respondent reports on his or her family, including dependents and spouse. Variables include age, marital status, educational background, and the primary activity of the spouse (e.g., employment status). Spouses' employment status and the respondent's marital status are the first two outcomes variables studied here. A survey module on dependents asks about the number and ages of dependents, child care arrangements, and dependents' disability status. Respondents are asked to distinguish between conditions that are temporary and permanent. We use the response to this question to measure the impact of deployment on children. Negative effects of parental separation might appear as temporary disabilities, since these include emotional and behavioral problems. Permanent disabilities seem less likely to be affected by parent absence.[6]

Table 1 shows descriptive statistics for the full sample and for sub-samples of men, women, male parents, and female parents (defined as those with at least one dependent between the ages of one and 22). The statistics in Table 1 and elsewhere were weighted by the survey sampling weights. Most of the people in the military are male (89 percent) and, as noted earlier, married (61 percent). The average age is twenty-nine in the full sample, and about half the full sample has one or more legal dependents aged 1-22 (excluding spouses, but possibly including stepchildren). In what follows, we refer to dependents aged 1-22 as children

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[6]Angrist and Lavy (1996) used Current Population Survey data to study the effect of teen and out-of-wedlock parenting on the incidence of childhood disabilities. They find that children of single mothers are more likely to have disabilities even after controlling for family background and family income. The effects are largest for learning disabilities and emotional problems, which in some cases would fall into the temporary handicap category in the SOEP.

and to soldiers with dependents aged 1-22 as parents.[7] The education variables in the tables refer to schooling at the time of entry into the military.

Statistics tabulated separately by sex show that female soldiers are less likely to be married than male soldiers (49 percent married in comparison to 63 percent for men) and that women are more likely to be divorced or separated (about 17 percent, compared to only 8 percent of men). About 41 percent of military women have children, compared with about 53 percent of the men. The table also shows that 3.6 percent of parents report they have a dependent with some kind of permanent disability while 5-6 percent of parents report they have a dependent with some kind of temporary disability.

After the demographic and outcome variables, the table describes military jobs. The Army is the largest service (36 percent of the full sample) and the Marines is the smallest (9.5 percent). About 15 percent of service personnel are officers, and the overall average length of service is about eight years, though female soldiers served for less than seven years on average. About 28 percent of the men were deployed to the Gulf War, while about 15 percent of women were deployed. On average, soldiers spent about 18 months away from home for job-related reasons while serving in the military.

Related to the military variables are the variables measuring type of service. As noted earlier, the SOEP draws stratified samples from the populations of regular active duty personnel (including a longitudinal follow-up sample), reservists, and recruiters. Because sample weights are used to calculate means, the table correctly shows that the vast majority of soldiers are in the regular active-duty forces. Unweighted statistics, reported in the appendix, have higher proportions in the reserves and recruiter categories. Finally, the table reports the proportion married and divorced for survey respondents who were in the military as of March 1990. These data come from our match to administrative records. We also have administrative data on

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[7]The age 22 cutoff for the definition of children reflects the brackets in the relevant survey question. Children under one are excluded from the definition of parents because we are interested in identifying soldiers who were parents before they were deployed.

monthly pay for January 1989 through December 1992. Both administrative sources are described in the appendix.

Gulf War Deployment

The Persian Gulf crisis began on August 2, 1990 when Iraq invaded Kuwait. By the end of Operation Desert Storm in June 1991, 697,000 United States troops had participated in the Gulf War. The war itself lasted only 43 days but many of the soldiers spent considerably longer in the Gulf region or were deployed somewhere else (e.g., at sea or in Europe).[8] Table 2 reports mean characteristics by deployment status. The table reflects the fact that deployment primarily affected somewhat more junior enlisted personnel in the ground-combat arms of the service and the Navy. Deployed servicemen are therefore younger and less educated than their non-deployed counterparts, though the age and schooling gaps by deployment status are smaller for women. Deployed men and women are less likely to be white. These differences suggest that it may be important to control for the demographic and military characteristics of soldiers when comparisons by deployment status are made.

A descriptive question of particular interest in this context is whether deployment is associated with a change in income since the possibility of negative effects from lost income have been a major theme in the literature on single-parenting. Loss of income while deployed was also an issue raised by some Gulf War veterans. We addressed this issue by linking longitudinal data on military pay to survey responses and then comparing the time series of earnings by deployment status. The pay data came from the military's administrative records described in the data appendix. Of course, a deployed soldier's earnings do not necessarily accrue to family members back home. Still, families that were intact on the eve of deployment must, for all practical purposes, have remained so at least until the soldier returns. Also, soldiers on

[8]For an overview of Gulf War events, see Department of Defense (1992:xiii-xxx).

deployment have little need for cash, and reports on family issues prepared for the Marines and Air Force (Caliber Associates, 1992 and 1993) suggest that soldiers' spouses were expected to manage finances during the deployment. For example, spouses were asked to obtain power of attorney and to open joint checking accounts with service members before deployment (if they hadn't already done so).

In addition to the differences documented in Table 2, deployed personnel had lower pay than the non-deployed before deployment. On the other hand, almost all of the difference in pay can be accounted for by differences in branch of service, length of service, age, race, and marital status in 1990. This can be seen in Figure 1, which plots the time series of military pay by deployment status, after regression-adjusting for these characteristics.[9] The figure shows pay from the first quarter 1990 through the last quarter of 1992. In addition to the small difference in levels, the evolution of soldiers pay through the deployment period is of interest. The two series generally move together, but between the last quarter of 1990 and the first quarter of 1991 (the Gulf War quarter), the pay of deployed personnel increased more steeply than the pay of non-deployed personnel.

Figure 1 suggests that deployment was actually associated with a small increase in average earnings. A potential problem with this interpretation is that family income has components besides military pay. The report on family issues prepared for the Air Force (Caliber Associates, 1992) notes that deployed families may have lost income from civilian jobs while deployed. Also, spouses may have given up jobs or reduced work hours to look after children. The question of lost spouse earnings is a point we return to below. On the other hand, the loss of civilian earnings was probably not important for the vast majority of deployed soldiers. Only 10 percent of our sample had some income from a civilian job, and the amounts were generally

[9]The covariates in the regression are age, age-squared, 3 marital status dummies for 1990, a dummy for officer status, a sex dummy, a race dummy, 3 dummies for subsamples, dummies for branch of service, and length of service in months. The figure plots average earnings each quarter and the average plus the coefficient on a deployment dummy. Regressions were run separately for each quarter.

small. The bulk of compensation received by all soldiers, except for reservists, was from military sources. And while reservists' may have experienced a decline in civilian earnings, this lost income is supposed to have been replaced by military pay while on active duty. In fact, almost half of the Marine Corp. reservists who were deployed reported that their income actually went up while deployed (Caliber Associates, 1993, P. III-29). Of course, it is still possible that the loss of civilian labor market experience caused by Gulf War mobilization generated a later earnings penalty.

Effects on Spouse Employment and Divorce Rates

Reduced-form estimates of the relationship between deployment and time away from home are reported in Table 3. The results from models with covariates were computed by ordinary least squares (OLS) estimation of

$$T_i = X_i'\beta_0 + \beta_1 D_i + \eta_i, \qquad (1)$$

where T_i is career time away, D_i is a dummy variable indicating Gulf War deployment, and X_i is the vector of covariates. The covariates are age, age-squared, three dummies for branch of service, nine dummies for level of schooling completed at time of entry into the service, dummies for race and officer status, the total number of (non-spouse) dependents aged 1-22, service time, and three dummies for sub samples. The number of dependents is limited to those over one year old to make this a "pre-treatment measure" of family size. The coefficient β_1 is the effect of the parent's time away from home. All regression estimates are weighted by survey sample weights.

Samples of currently married soldiers were used to estimate effects on spouse's employment and samples of ever-married soldiers were used to estimate effects on divorce. In addition, we report estimates for the subsample of soldiers who began serving before 1990. This strategy allows us to control for additional prewar variables. In particular, the regressions for soldiers whose military service began before 1990 also

include a dummy for receipt of hazardous duty pay in the first two quarters of 1990, 3 dummies for marital status in 1990, and total pay received in the first two quarters of 1990. The 1990 variables are included to better control for military occupation and family-structure before deployment.[10]

Average career time away is about 19 months for men and 10 months for women in both the currently-married and ever-married samples. Deployment for military service in the Gulf is associated with about 5 months additional time away for men and 3-4 months additional time away for women. Controlling for covariates has little effect on these estimates. The results are also similar when the samples are restricted to soldiers who entered the military before 1990.

We use the following model to describe the effect of deployment on spouse employment and divorce:[11]

$$Y_i = X_i'\pi_0 + \pi_1 D_i + \nu_i, \tag{2}$$

where Y_i is the dependent variable for soldier i and X_i is the same vector of covariates used in (1). Estimates of π_1 in (2) can be interpreted as reduced-form effects of deployment in a 2SLS procedure where the first-stage is equation (1) and the second stage is

$$Y_i = X_i'\gamma + \delta T_i + \varepsilon_i. \tag{3}$$

Here, δ is the causal effect of time away and the instrument is D_i.

Estimates of the reduced-form effect of deployment on spouses' employment and on soldiers' divorce status are also reported in Table 3. Simple differences in spouses' employment rates by deployment status suggest that deployment reduced employment by 4-5 percent, but this falls to around 3 percent in models with

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[10]Heteroscedasticity-consistent standard errors are reported for all regressions. The 1990 pay variable is our calculation from administrative records showing pay by individual categories. The hazardous-duty variable also comes from the administrative data.

[11]Information on the labor force status of the spouse is reported by the service person and is available for currently married personnel only. Employment is defined as working full or part-time in the military or in a civilian job.

covariates. The negative effect on employment seems likely to be due to the increased child care responsibilities borne by wives while their husbands were deployed. Negative employment effects may have persisted into 1992 since some deployments were still in progress and because employment status is serially correlated.[12] The causal interpretation of deployment effects on wives' labor supply is supported by the fact that 74 percent of deployed men report that their spouse or ex-spouse took care of their dependents while they were away. On the other hand, among married women, deployment had no (lasting) effect on the employment status of a male spouse. And, in fact, only 32 percent of deployed women identified their husband as the primary dependent-care provider in their absence.

As noted earlier, reduced-form estimates of effects on divorce were computed using samples of ever-married men and women, which includes the currently married sample used to estimate spouse employment effects. Although deployment is associated with higher divorce rates for ever-married men, this effect disappears in models with covariates. For women, however, the effects of deployment are positive and significantly different from zero in models with or without covariates. Estimates from a model with covariates show a 4.2 percentage point higher divorce rate among deployed women. Restricting the sample to women in the military before 1990 and including controls for marital status and military pay in 1990 actually makes the estimates a little larger. Robustness to the inclusion of pre-deployment marital status variables is important because it supports the notion that the higher divorce rates for deployed women were in fact caused by deployment. On the other hand, it should be noted that the administrative data on marital status are not always accurate since changes are reported with a lag.

Tables 4a and 4b report OLS and 2SLS estimates of the effect of time away in equation (3). The 2SLS estimates simply rescale the reduced-form estimates in Table 3, but they also offer opportunity for

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[12]The median deployment time was between 6-8 months. About 6 percent of deployed soldiers report deployments of 9 months or more. Deployments that began in 1991 could therefore have extended into 1992.

interesting comparisons with OLS estimates of equation (3). The OLS estimates of the effect of time away on spouse employment, reported in table 4a, are very small and not significantly different from zero. In contrast, the corresponding 2SLS estimates in columns (2) and (6) suggest that each month away from home reduced the employment rate of spouses by 6/10 of a percentage point. This estimate is significantly different from zero. The OLS estimate of the effect on spouse's employment status for women are positive but only marginally significant. As indicated by the reduced-form estimates, however, the corresponding 2SLS estimate of effects on female soldiers' spouses are negative but not significantly different from zero.

OLS estimates of the effects of time away on divorce are positive and significant for both men and women, though very small. This can be seen in columns (1) and (3) of Table 4b. The 2SLS estimates for men are insignificant, however, as are the OLS estimates for men with 1990 controls. In contrast with the results for men, the 2SLS estimates for women are positive, significant, and much larger than the corresponding OLS estimates. The 2SLS estimates for women in column (4) imply that each month away from home raises divorce probabilities by about 1.4 percentage points.

Overall, the results in Table 4 suggest that time away due to deployment did have an impact on soldiers' families, though the nature of this impact differs by sex. Negative employment effects appear only for the spouses of deployed male soldiers while divorce rates increased only for female soldiers who were deployed. This suggests that managing the additional child care and household responsibilities caused by deployment may have been easier for male soldiers' wives than for female soldiers' husbands. The idea that a military lifestyle can be hard on marriages is also supported by the fact that about 71 percent of SOEP respondents who got divorced while on active duty reported that military service contributed at least in part to the breakup of their marriage.

Child Disabilities

Previous research suggests that the children of Gulf War veterans were affected by the deployment of a parent. For example, Jensen, Martin, and Watanabe (1996) report higher levels of depression and stress among the children of deployed service personnel. We study the effect of deployment and time away from home using measures of children's disability status. The dependent variables in this case are indicators of the incidence of permanent and temporary disabilities among soldiers' children. These are coded from responses to the question: "Are any of your dependents physically, emotionally, or intellectually handicapped requiring specialized treatment or care?" Respondents reply either "yes, permanently," "yes, temporarily," or "no." One reason this question was included in the survey is that military dependents with disabilities, whether chronic or temporary, are eligible for a variety of special programs and benefits (see, e.g., Department of the Navy, 1993). Estimates of effects on children are computed using a sample of parents, which we define as military personnel with dependents aged 1-22.[13]

Reduced-form estimates of the effect of deployment on time away in the parents sample, reported in Table 5, show a slightly bigger effect than in the full and ever-married samples. The table also shows that the effect of deployment on temporary disabilities is positive but not significantly different from zero, whereas the effects on permanent disabilities is negative but not significantly different from zero.[14] These findings appear in models with or without covariates, and in models that control for 1990 variables. Similar results are obtained when the effects are estimated separately for men and women.

Parental absence is usually associated with worse outcomes for children. What might explain the

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[13]Here we interpret dependent's disabilities as referring to children. But since dependents can also be over 65 in the SOEP, a small number of dependents with handicaps in the parent sample could be elderly instead of children. Discarding parents with elderly dependents leaves the results unchanged.

[14]In an earlier draft of this paper we reported statistically significant estimates of effects on temporary handicaps, however, those estimates did not use the survey sampling weights.

absence of an association in this case? Above we argued that deployment did not lead to a decline in income for most families. In fact, the military earnings of deployed soldiers appear to have gone up slightly. This claim should be qualified, however, with the observation that reduced employment by the spouses of deployed soldiers may have led to reduced family income. But since the effect of deployment on employment rates is small, reduced spouse earnings seem unlikely to have been a major concern for most families. In addition to maintaining income levels while soldiers are away, the military also offers a wide range of support service for families, including child care, counseling, and help managing household finances. The findings here suggest that the combination of support services and a stable economic situation provided effective insulation against the negative effects of single-parenting for the children of deployed personnel.

Caveats

The results in Tables 3-5 have been interpreted as capturing the causal effect of time away from home due to deployment in the Persian Gulf. An alternative interpretation is that differences by deployment status are not caused by deployment, but rather they reflect the characteristics of deployed soldiers. Of course, deployed personnel clearly differ from non-deployed personnel along some dimensions. But since the basic pattern of results reported here is not very sensitive to the list of included covariates, unobserved confounding variables may not be important either. In future work, we hope to improve on this control strategy by using better longitudinal data on soldiers and their families.

Another caveat is that even if the deployment effects reported here are causal, they need not be due to time spent away from families. For example, possible alternative explanations are related to Gulf War Syndrome. If military service in the Gulf created health problems for service people, than the instrumental variables strategy confounds effects due to illness with effects due to time away from family. The leading explanations for Gulf War Syndrome are stress and potential exposure of some units to chemical weapons.

Clearly stress and anxiety were experienced by families as well as soldiers. On the other hand, there is no evidence that service-related illnesses or Gulf-syndrome symptoms spilled over to families (Presidential Advisory Committee on Gulf War Veterans' Illnesses, 1996).

Summary and Conclusions

The notion that work affects family life has a long history in economics. For example, many labor economists have considered the possibility that improved labor market opportunities for women contributed to the increase in divorce, although the evidence on this point is mixed (see, e.g., Becker, Landes, and Michael, 1977 and Hoffman and Duncan, 1994). And, as noted in the introduction, economists have looked at the effects of mother's labor supply on children's cognitive achievement. But the task of estimating the direct effect of different types of work schedules on families has largely been left to sociologists and psychologists.

This paper presents new evidence on the causal effect of work-related parental absences on families using Gulf War deployment as a natural experiment. The most striking result is that deployment of female soldiers appears to have increased the likelihood of divorce, although the deployment of men did not have a similar effect. This is consistent with notion that deployment of female soldiers put stress on their marriages, while the wives of deployed men were able to adapt to their husbands' absences. The divorce results for the Gulf War provide an interesting contrast with the World War II experience since the World War II demobilization was accompanied by an unprecedented spike in divorce rates (see, e.g., Davanzo and Rahman, 1993). The post-World War II increase in divorce is presumably attributable to the large-scale deployment of men since few women served in World War II .[15]

A second and related result is that time away from home reduced the employment rates of soldiers'

[15]See Michael (1988) for a discussion of World War II and divorce.

wives. The employment effects are probably due to increased child care responsibilities since deployed husbands report that their wives bore most of the responsibility for child care in their absence. On the other hand, wives' deployment does not lead to a change in husbands' labor market behavior, a finding consistent with Angrist and Evans' (1988) results that show no interaction between wives' fertility and husbands' labor supply. Finally, we found no evidence of an increase in disabilities in the children of service personnel, at least as measured by the reported incidence of disabilities. Because Gulf War deployments are not associated with significant declines in earnings, this result offers some support for the view that loss of income is largely responsible for negative effects of parental absences, though the extensive support network for military families may also have been a factor. Of course, the Gulf War experience is not necessarily representative of the impact of other sorts of separations on families. A natural avenue for further research is the analysis of additional episodes involving exogenous work-related separations.

Table 1
Descriptive Statistics
1992 D.O.D. Survey of Officers and Enlisted Personnel

Variable	Full Sample (1)	Men (2)	Women (3)	Male Parents (4)	Female Parents (5)
		Demographic Variables			
Sex	.888 (.315)	–	–	–	–
Age	28.8 (7.35)	28.9 (7.44)	28.2 (6.53)	32.5 (6.88)	30.7 (5.93)
High School Graduate	.577 (.494)	.585 (.493)	.512 (.500)	.554 (.497)	.531 (.499)
Some College	.191 (.393)	.183 (.387)	.255 (.436)	.180 (.384)	.260 (.439)
College Degree (2 or 4 year)	.156 (.363)	.151 (.358)	.197 (.398)	.161 (.368)	.161 (.367)
Married in 1992	.613 (.487)	.629 (.483)	.487 (.500)	.877 (.329)	.633 (.482)
Any Dependents Between Age 1 and 22	.518 (.499)	.532 (.499)	.405 (.491)	–	–
Non-White	.279 (.448)	.267 (.442)	.377 (.485)	.296 (.457)	.438 (.496)
		Outcomes			
Spouse's Employment Status	.618 (.486)	.592 (.492)	.885 (.319)	.559 (.496)	.876 (.329)
Divorced or Separated in 1992	.090 (.286)	.079 (.270)	.173 (.378)	.099 (.299)	.254 (.435)
Temporary Handicap	–	–	–	.052 (.221)	.059 (.236)
Permanent Handicap	–	–	–	.036 (.187)	.036 (.187)
		Service Variables			
Army	.361 (.480)	.360 (.480)	.372 (.483)	.384 (.486)	.396 (.489)
Navy	.289 (.453)	.292 (.455)	.261 (.439)	.267 (.442)	.239 (.426)
Air Force	.255 (.436)	.246 (.431)	.326 (.469)	.271 (.445)	.331 (.471)
Marines	.095 (.293)	.102 (.302)	.040 (.196)	.077 (.267)	.034 (.182)
Officer	.152 (.359)	.152 (.359)	.159 (.366)	.179 (.383)	.131 (.337)

Table 1(CONTINUED)
Descriptive Statistics
1992 D.O.D. Survey of Officers and Enlisted Personnel

Variable	Full Sample (1)	Men (2)	Women (3)	Male Parents (4)	Female Parents (5)
Deployments	.278	.295	.147	.286	.118
	(.448)	(.456)	(.354)	(.452)	(.323)
Time Away	18.1	19.0	10.7	21.6	11.7
	(16.8)	(17.1)	(12.3)	(17.6)	(12.4)
Service Time	96.6	98.7	80.2	136	107
	(77.1)	(78.6)	(62.2)	(76.0)	(60.4)
		Sub-samples			
Enlisted Recruiter	.008	.009	.003	.014	.004
	(.090)	(.094)	(.058)	(.117)	(.064)
Regular Member Sample	.926	.933	.869	.899	.803
	(.262)	(.250)	(.337)	(.302)	(.398)
Full Time Reserve Component	.037	.035	.049	.051	.071
	(.188)	(.184)	(.217)	(.219)	(.257)
Longitudinal Sample	.029	.023	.078	.037	.122
	(.169)	(.151)	(.268)	(.188)	(.328)
Sample Size	59896	35473	24423	21693	8919
		1990 Service Sample			
Married in 1990	.638	.654	.508	.892	.719
	(.481)	(.476)	(.500)	(.310)	(.449)
Divorced or Separated in 1990	.027	.022	.067	.027	.090
	(.161)	(.146)	(.253)	(.161)	(.287)
Sample Size	52064	31865	20199	20964	8310

Table 1 Notes: Standard deviations are in parenthesis. Statistics are weighted by survey final sampling weights. Education variables refer to schooling at the time of entry into military service.

Table 2
Comparison of Means by Deployment Status
1992 D.O.D. Survey of Officers and Enlisted Personnel

Variable	Men			Women		
	Deployed	Non-Deployed	Difference	Deployed	Non-Deployed	Difference
	(1)	(2)	(3)	(4)	(5)	(6)
			Demographic Variables			
Age	28.0	29.4	-1.35	27.7	28.3	-.568
	(.071)	(.048)	(.087)	(.110)	(.046)	(.119)
High School Graduate	.626	.569	.057	.550	.505	.044
	(.005)	(.003)	(.006)	(.009)	(.003)	(.009)
Some College	.160	.193	-.034	.243	.258	-.015
	(.004)	(.002)	(.005)	(.008)	(.003)	(.008)
College Degree	.125	.162	-.037	.177	.200	-.024
(2 or 4 year)	(.004)	(.002)	(.004)	(.007)	(003)	(.007)
Any Dependents	.519	.537	.018	.329	.419	.088
Between Age 1 and 22	(.005)	(.003)	(.006)	(.008)	(.003)	(.009)
Non-White	.293	.256	.037	.437	.366	.071
	(.005)	(.003)	(.005)	(.009)	(.003)	(.009)
			Service Variables			
Army	.369	.352	.018	.530	.340	.190
	(.005)	(.003)	(.006)	(.009)	(.003)	(.009)
Navy	.319	.285	.034	.208	.274	-.066
	(.005)	(.003)	(.005)	(.007)	(.003)	(.008)
Air Force	.174	.278	-.104	.227	.346	-.119
	(.004)	(.003)	(.005)	(.008)	(.003)	(.009)
Marines	.137	.085	.052	.035	.041	-.006
	(.004)	(.002)	(.004)	(.003)	(.001)	(.004)
Officer	.123	.166	-.044	.139	.164	-.025
	(.003)	(.002)	(.004)	(.006)	(.003)	(.007)
Time Away	22.7	17.5	5.17	13.9	10.2	3.65
	(.204)	(.115)	(.221)	(.282)	(.102)	(.278)
Service Time	91.0	103	-12.1	74.8	81.6	-6.77
	(.738)	(.520)	(.936)	(1.01)	(.442)	(1.14)
Sample Size	8915	25893		3118	20856	

Table 2 Notes: Standard errors are in parenthesis. Statistics are weighted by survey final sampling weights. Education variables refer to schooling at the time of entry into military service.

Table 3
Reduced Form Estimates of the Effect of Deployment

		Currently Married			Currently Married, First Year of Service Before 1990		
Sex	Dependent Variable	Mean (1)	Reduced Form (2)	R.F. with Covariates (3)	Mean (4)	Reduced Form (5)	R.F. with Covariates (6)
Men	Time Away	18.9	5.10 (.404)	5.30 (.339)	19.9	4.52 (.419)	5.36 (.353)
	Spouse's Employment Status	.583	-.041 (.013)	-.031 (.013)	.587	-.046 (.013)	-.033 (.013)
Women	Time Away	10.1	3.55 (.436)	3.18 (.389)	10.7	3.36 (.460)	3.44 (.415)
	Spouse's Employment Status	.881	-.013 (.014)	-.008 (.014)	.882	-.018 (.014)	-.015 (.014)
		Ever Married			Ever Married, First Year of Service Before 1990		
Men	Time Away	19.1	5.17 (.387)	5.40 (.330)	20.0	4.66 (.402)	5.53 (.345)
	Divorce	.105	.018 (.008)	.014 (.008)	.106	.015 (.008)	.012 (.008)
Women	Time Away	10.6	3.60 (.377)	3.10 (.347)	11.2	3.39 (.396)	3.33 (.366)
	Divorce	.239	.056 (.015)	.042 (.015)	.243	.060 (.016)	.054 (.016)

Table 3 Notes: Regressions with covariates include age, age-squared, 3 service dummies, 9 dummies for education level at the time of entry into military service, dummies for race and officer status, service time, number of dependents between age 1 and 22, and 3 dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in first 2 quarters of 1990, 3 dummies for marital status in 1990, and military compensation in the first and the second quarter of 1990. The standard errors reported in parentheses are heteroscedasticity consistent.

Table 4a
OLS and 2SLS Estimates
of Effects on Spouse's Employment Status

	Currently Married Men		Currently Married Women		Currently Married Men, First Year of Service Before 1990		Currently Married Women, First Year of Service Before 1990	
Covariates	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Time Away	.0003	-.006	.0005	-.002	.0004	-.006	.0007	-.004
	(.0004)	(.002)	(.0003)	(.004)	(.0004)	(.002)	(.0004)	(.004)
Age	.019	.026	.008	.010	.027	.031	.017	.020
	(.006)	(.007)	(.006)	(.007)	(.007)	(.007)	(.007)	(.007)
Number of Dependents	-.061	-.053	-.008	-.008	-.053	-.046	-.003	-.005
Between Age 1 and 22	(.005)	(.006)	(.005)	(.005)	(.005)	(.006)	(.005)	(.005)
Army	.018	.008	-.050	-.048	.031	.019	-.037	-.034
	(.016)	(.017)	(.013)	(.014)	(.017)	(.018)	(.014)	(.015)
Navy	.014	.034	-.031	-.036	.009	.027	-.024	-.032
	(.016)	(.017)	(.012)	(.014)	(.017)	(.018)	(.013)	(.015)
Air Force	.044	-.012	-.011	-.021	.055	-.009	.002	-.018
	(.015)	(.026)	(.011)	(.019)	(.016)	(.028)	(.012)	(.020)
Officer	-.089	-.083	-.027	-.017	-.146	-.155	-.030	-.017
	(.014)	(.015)	(.016)	(.022)	(.019)	(.019)	(.023)	(.026)
Non-White	.058	.049	.001	.002	.068	.060	.003	.004
	(.013)	(.014)	(.010)	(.010)	(.014)	(.014)	(.010)	(.011)
Sample Size	24136	24136	11411	11411	22882	22882	10164	10164

Table 4a Notes: Regressions with covariates include age, age-squared, 3 service dummies, 9 dummies for education level at time of entry into military service, dummies for race and officer status, service time, number of dependents between age 1and 22, and 3 dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in first 2 quarters of 1990, 3 dummies for marital status in 1990, and military compensation in the first and the second quarter of 1990. The standard errors reported in parentheses are heteroscedasticity consistent.

Table 4b
OLS and 2SLS Estimates
of Effects on Divorce

	Ever Married Men		Ever Married Women		Ever Married Men, First Year of Service Before 1990		Ever Married Women, First Year of Service Before 1990	
Covariates	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Time Away	.0008	.003	.0016	.014	.0005	.0021	.0012	.016
	(.0003)	(.002)	(.0004)	(.005)	(.0003)	(.0014)	(.0004)	(.005)
Age	.022	.020	.040	.027	.009	.008	.014	.002
	(.003)	(.004)	(.006)	(.009)	(.004)	(.004)	(.007)	(.009)
Number of Dependents	-.024	-.027	-.004	-.001	-.025	-.028	-.014	-.007
Between Age 1and 22	(.003)	(.004)	(.005)	(.005)	(.003)	(.004)	(.005)	(.006)
Army	-.007	-.005	-.009	-.020	-.008	-.006	-.015	-.027
	(.010)	(.010)	(.015)	(.016)	(.011)	(.011)	(.016)	(.018)
Navy	-.008	-.013	-.054	-.031	-.009	-.013	-.033	-.002
	(.010)	(.010)	(.015)	(.018)	(.010)	(.011)	(.015)	(.020)
Air Force	-.008	.008	-.049	-.002	-.017	-.001	-.064	-.001
	(.009)	(.016)	(.014)	(.025)	(.010)	(.017)	(.015)	(.026)
Officer	-.045	-.047	-.055	-.088	-.043	-.041	-.067	-.097
	(.008)	(.008)	(.016)	(.022)	(.010)	(.010)	(.023)	(.027)
Non-White	.004	.006	.048	.042	.010	.012	.050	.044
	(.008)	(.008)	(.011)	(.012)	(.009)	(.008)	(.011)	(.012)
Sample Size	26589	26589	14760	14760	25226	25226	13216	13216

Table 4b Notes: Regressions with covariates include age, age-squared, 3 service dummies, 9 dummies for education level completed upon entry into military service, dummies for race and officer status, service time, number of dependents between age 1 and 22, and 3 dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in first 2 quarters of 1990, 3 dummies for marital status in 1990, and military compensation in the first and the second quarter of 1990. The standard errors reported in parentheses are heteroscedasticity consistent.

Table 5
Reduced Form Estimates-Handicap Status

	All Parents			All Parents First Year of Service Before 1990		
Dependent Variable	Mean (1)	Reduced Form (2)	R.F. with covariates (3)	Mean (4)	Reduced Form (5)	R.F. with covariates (6)
Time Away	20.8	6.60	6.08	21.4	6.51	6.13
		(.439)	(.394)		(.450)	(.411)
Temporary Handicaps	.053	.002	.003	.056	.001	.001
		(.006)	(.006)		(.006)	(.006)
Permanent Handicaps	.037	-.005	-.003	.037	-.006	-.004
		(.005)	(.005)		(.005)	(.005)
Sample Size	28898	28898	28898	27681	27681	27681

Table 5 Notes: Regressions with covariates include age, age-squared, 3 service dummies, 9 dummies for education level completed upon entry into military service, dummies for race and officer status, service time, number of dependents between age 1 and 22, and 3 dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in first 2 quarters of 1990, 3 dummies for marital status in 1990, and military compensation in the first and the second quarter of 1990. The standard errors reported in parentheses are heteroscedasticity consistent.

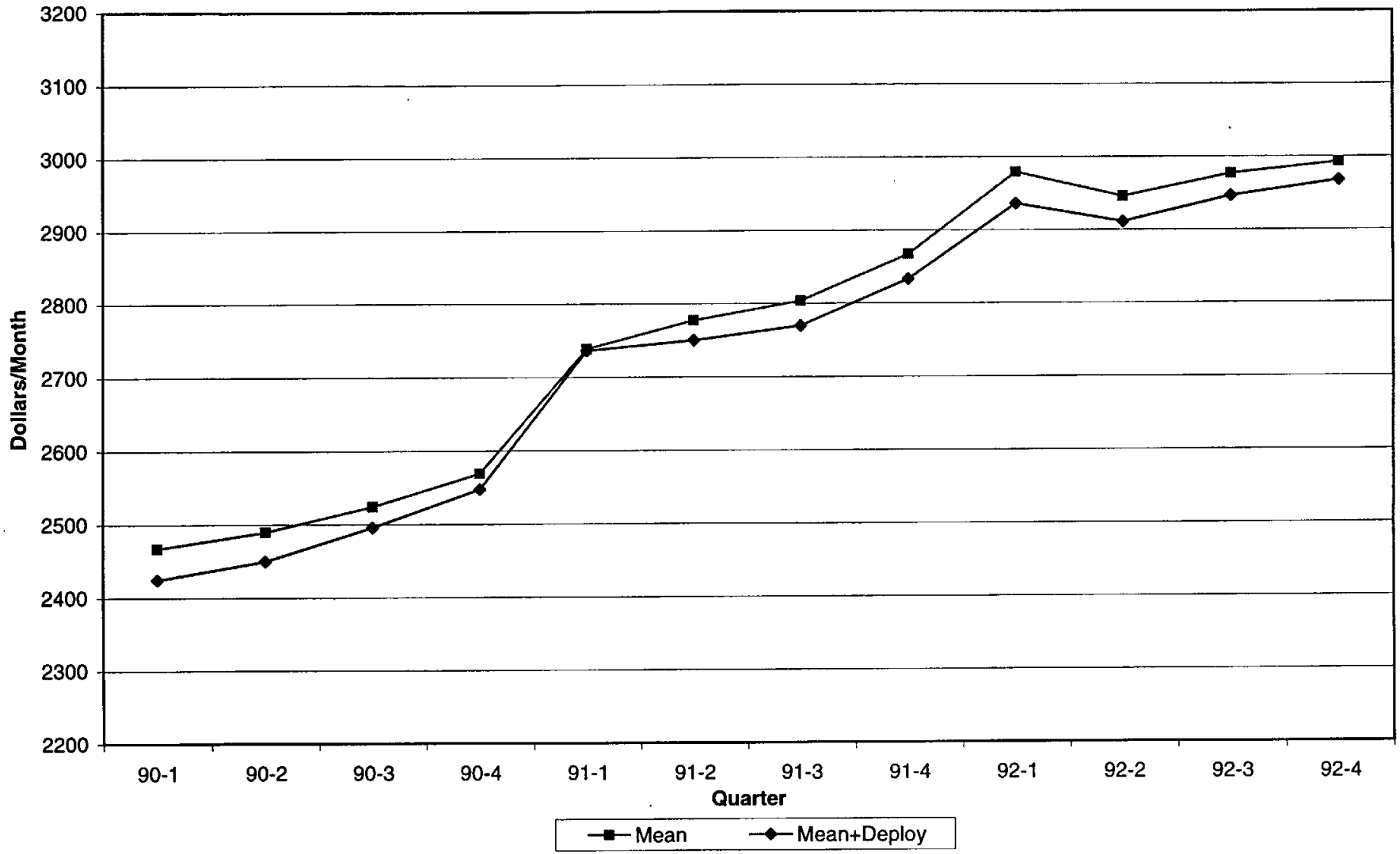

Figure 1. Regression Adjusted Earnings By Deployment Status for Military Personnel
Source: Tabulations from Joint Uniform Military Pay Files. See Appendix A for details.

APPENDIX

1. Military Income Records

The Department of Defense records pay data in an administrative record keeping system called the Joint Uniform Military Pay System (JUMPS). These files contain a record of all payments for military compensation by allowance category. For the purposes of this project, the Defense Manpower Data Center (DMDC) matched survey respondents to income records from the JUMPS files from January 1989 through December 1992. Because of a change in record keeping, records before 1991 were recorded for a single month each quarter and after 1991 were recorded monthly. Our data are for a single month each quarter. Records of zero pay, which appear for soldiers before they join the military, were excluded. Also, a few records showing negative pay were excluded. The pay measure in Figure 1 aggregates the largest pay components: basic pay, career sea pay, hostile fire pay, hazardous duty incentive pay, basic allowance for subsistence, basic allowance for quarters, family separation allowance, variable housing allowance, and the variable-housing-allowance-offset amount.

2. Information on pre-deployment marital status

Information on family status is recorded in the military's Defense Enrollment Eligibility Reporting System (DEERS) files. The DMDC matched data from the DEERS for March 1990 to the SOEP at our request. The data for pre-Gulf marital status indicates whether each survey respondent was married, divorced, legally separated, annulled, a widower, or married to another military service person as of March 1990. As noted in the text, a potential problem with these data is that information on changes in family status may be reported with a substantial lag.

Appendix Table 1
Descriptive Statistics
1992 D.O.D. Survey of Officers and Enlisted Personnel

Variable	Full Sample (1)	Men (2)	Women (3)	Male Parents (4)	Female Parents (5)
		Demographic Variables			
Sex	.592 (.491)	–	–	–	–
Age	32.0 (7.58)	33.1 (7.75)	30.2 (6.97)	35.7 (6.56)	32.7 (6.07)
High School Graduate	.405 (.491)	.427 (.495)	.372 (.483)	.428 (.495)	.420 (.494)
Some College	.157 (.364)	.142 (.349)	.178 (.383)	.150 (.357)	.199 (.399)
College Degree (2 or 4 year)	.382 (.486)	.361 (.480)	.413 (.492)	.337 (.473)	.334 (.472)
Married in 1992	.645 (.479)	.743 (.437)	.501 (.500)	.908 (.290)	.739 (.004)
Any Dependents Between Age 1 and 23	.532 (.499)	.636 (.481)	.379 (.485)	–	–
Non-White	.239 (.426)	.198 (.399)	.298 (.457)	.209 (.407)	.358 (.480)
		Outcomes			
Spouse's Employment Status	.673 (.469)	.574 (.494)	.882 (.323)	.544 (.498)	.869 (.337)
Divorced or Separated in 1992	.114 (.317)	.078 (.268)	.166 (.372)	.083 (.276)	.236 (.425)
Temporary Handicap	–	–	–	.045 (.207)	.053 (.224)
Permanent Handicap	–	–	–	.039 (.194)	.040 (.195)
		Service Variables			
Army	.243 (.429)	.237 (.425)	.253 (.435)	.256 (.437)	.273 (.446)
Navy	.278 (.448)	.260 (.439)	.304 (.460)	.246 (.430)	.276 (.447)
Air Force	.292 (.455)	.273 (.445)	.319 (.466)	.289 (.453)	.343 (.475)
Marines	.187 (.390)	.230 (.421)	.124 (.329)	.209 (.407)	.108 (.310)
Officer	.462 (.499)	.475 (.499)	.443 (.497)	.477 (.499)	.368 (.482)

Appendix Table 1(CONTINUED)

Variable	Full Sample (1)	Men (2)	Women (3)	Male Parents (4)	Female Parents (5)
Deployments	.205	.256	.130	.238	.099
	(.403)	(.436)	(.002)	(.426)	(.299)
Time Away	18.3	22.0	11.9	24.0	12.2
	(17.3)	(18.2)	(13.4)	(18.4)	(13.1)
Service Time	119	138	93.2	168	119
	(81.2)	(84.9)	(67.5)	(73.3)	(62.3)
		Sub-samples			
Enlisted Recruiter	.041	.066	.005	.087	.007
	(.199)	(.249)	(.071)	(.282)	(.082)
Regular Member Sample	.761	.682	.875	.600	.804
	(.426)	(.466)	(.330)	(.490)	(.397)
Full Time Reserve Component	.068	.098	.024	.118	.036
	(.252)	(.297)	(.153)	(.323)	(.185)
Longitudinal Sample	.130	.153	.096	.194	.153
	(.336)	(.360)	(.294)	(.396)	(.360)
Sample Size	59896	35473	24423	21693	8919
		1990 Service Sample			
Married in 1990	.672	.769	.519	.935	.764
	(.469)	(.421)	(.550)	(.247)	(.425)
Divorced or Separated in 1990	.041	.025	.067	.026	.090
	(.199)	(.155)	(.250)	(.161)	(.287)
Sample Size	52064	31865	20199	20964	8310

Appendix Table 1 Notes: Standard deviations are in parenthesis. Statistics are not weighted in this table. Education variables refer to schooling at the time of entry into military service.

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