**CHAPTER 13**

# Analysis of Financial Support to the Surviving Spouses and Children of Casualties in the Iraq and Afghanistan Wars

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## Summary

Over a decade of operations in Iraq and Afghanistan has focused the nation on meeting the needs of military families, especially families of servicemembers who were injured or killed in combat. The President directed the Secretary of Defense, as part of the Eleventh Quadrennial Review of Military Compensation (QRMC), to focus part of its review on "Compensation benefits available to wounded warriors, caregivers, and survivors of those fallen servicemembers" (Obama 2009). The research documented in this report, and sponsored by the 11th QRMC, responds to that directive by providing the first comprehensive, quantitative assessment of the impact of combat deaths on household labor market outcomes. It also assesses the extent to which payments that surviving spouses and children receive from the DoD, VA, and Social Security Administration compensate for earnings losses attributable to combat deaths.

### Study Design

This study measures the impact of combat deaths on the financial well-being of surviving spouses and children. Our focus is on married servicemembers with deployments to Iraq or Afghanistan ending between June 2003 and December 2006. We obtained longitudinal, administrative data from military personnel records, casualty records, and annual Social Security earnings databases, which we linked together using Social Security numbers of servicemembers and their spouses. We combined this information with data on payments made to surviving spouses

*The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.*

and children from the Department of Defense, Department of Veterans Affairs, and Social Security Administration. Together, these data enable us to estimate the impact of combat death on household income and earnings and to assess the degree to which cash benefits from the federal government compensate surviving household members for their financial losses.

In our sample of 347,078 married servicemembers who deployed in 2003 to 2006, the casualty records show that 1,184 (or 0.3 percent) were killed in combat. We compared the labor market earnings of households experiencing a combat death in the years following deployment with the labor market earnings of deployed but uninjured servicemember households. Because the risk of combat death is likely correlated with characteristics of servicemembers that could themselves affect household labor market outcomes (e.g., pay grade, military occupation, risk-taking behavior), we made these comparisons controlling for a rich array of individual-level characteristics, including labor market outcomes for both servicemembers and spouses prior to deployment. This approach accounts for potentially unobserved factors that are unique to specific households and fixed over time, and increases the likelihood that our results capture the causal effect of combat death on household earnings. Nevertheless, these controls are imperfect, and the patterns we document could in theory also partially reflect other uncontrolled characteristics of households, which would undermine such a causal interpretation.

### Labor Market Earnings Effects

We find that household labor market earnings decline substantially in the years following a combat death. The estimated drop in annual household earnings over the first four years following a fatality ranges from $63,000 to $68,000 for members of the active component and from $59,000 to $65,000 for members of the reserve component. There appears to be little change in the magnitude of the effect over the first four years. The main driver of the labor market earnings drop is naturally the loss of the service member's own earnings. We also found, however, that declines in spousal earnings are significant over the first four years. These losses range from $4,600 to $5,500 for active component spouses and from $7,700 to $8,800 for reserve component spouses.

### Estimated Replacement Rates

Surviving spouses and children can potentially receive recurring monthly benefits from a number of federal sources, including the Department of Defense (DoD), the Department of Veterans Affairs (VA), and the Social Security Administration (SSA). In addition, family members are eligible to receive one-time payments from

the Servicemembers' Group Life Insurance program, the DoD Death Gratuity, and combat zone tax forgiveness. Many of these survivor payments are received tax free, which we account for in our analysis.

On average, recurring benefits from these sources offset over two-thirds of the estimated losses in household labor market earnings attributable to combat deaths over the first four years following the fatality. Excluding lump-sum payments, the estimated effect of a combat death on total household income—defined as the sum of servicemember and spousal labor market earnings plus survivor compensation from the recurring sources listed above—in the fourth year following deployment is negative for both reserve and active component members, but substantially smaller than the estimated effect on earnings. The post-compensation income loss in year 4 for active component members averages about $20,000, or about 30 percent of the total earnings loss in that year. For reserve component members, the post-compensation income loss of $14,000 is about 22 percent of the total drop in household earnings.

The household income replacement rate in year 4, defined as the ratio between actual income (including all recurring forms of survivor benefits from the DoD, VA, and SSA) and expected income had the servicemember returned uninjured from his or her deployment is 78 percent for the median surviving spouse household in the active component and 88 percent for the median surviving spouse household in the reserve component. Taking into account the value of the lump-sum payments (mainly from the Death Gratuity and Servicemembers' Group Life Insurance) spread over a 20-year horizon increases the average replacement rates to 116 percent and 122 percent for the surviving families members of the active and reserve components, respectively. Within each component, the household income replacement rates are lowest for servicemembers who had no dependent children at the time of their deaths and are highest for households with more than two dependent children.

The household income replacement rate includes the value of the surviving spouse's earnings (and earnings loss) as well as the predicted income growth that the servicemember would have experienced had the servicemember not been injured. An alternative measure of the generosity of survivor benefits is the individual income replacement rate, which is the ratio of survivor benefits to the servicemember's own pre-deployment income. The median individual replacement rates in our sample are 68 percent and 72 percent for members of the active and reserve components, respectively, when we consider only recurring benefits, and 170 percent and 184 percent when we include lump-sum payments amortized over 20 years. The comparison relative to the member's own pre-deployment income is more similar to the basis for compensation used in other recurring survivor benefit programs,

where benefits are adjusted for inflation but not for predicted income growth, and where spouse income is ignored. For example, family members of DoD civilian employees who die while performing their official duties are compensated based on the provisions of the Federal Employee Compensation Act using a compensation formula based on prior earnings. The key finding of substantial income replacement (over two-thirds) from recurring payments and complete income replacement from recurring plus lump-sum payments is consistent across the different replacement rate measures.

## Discussion

Among the many hardships of military deployment is the possibility of injury and death. In our sample of 347,078 married servicemembers who deployed in 2003 to 2006, 1,184 (or 0.3 percent) were killed in combat. The research documented in this report uncovers the financial impact of these losses on the surviving household members. The substantial decline in labor market earnings experienced by these households, due primarily to the loss of the member's own earnings, is to a large extent offset by recurring payments from the DoD, VA, and SSA. When the lump-sum survivor payments are included in the analysis for a period of 20 years, the average surviving spouse household receives survivor compensation that replaces more than 100 percent of lost earnings.

This research has not sought to answer the difficult normative question of whether the replacement rates reported here are appropriate. The appropriate level of benefits depends in large part on the overarching goals and constraints associated with a particular compensation system. Heaton et al. (2012), for example, argue that the structure and amount of compensation provided to families of combat casualties should adjust to reflect policymaker preferences regarding the desirability of fulfilling goals such as compensating for economic loss, ensuring a stable inflow of new personnel into the military, and appropriately recognizing the sacrifice of those who have given the ultimate sacrifice in serving the country. While normative questions surrounding benefit adequacy are important, resolving them lies beyond the scope of the present inquiry.

# 1. Introduction

Over a decade of operations in Iraq and Afghanistan has focused the nation on meeting the needs of military families, especially families of servicemembers who were injured or killed in combat. According to official casualty records, 6,370 members of the U.S. military were killed during, or as a result of injuries sustained during, their deployments to Iraq or Afghanistan between October 7, 2001 and March 5, 2012.[1]

Little is known about the economic impact of combat deaths on surviving household members. The present study provides some of the first empirical evidence on this issue. The analysis includes married active and reserve component servicemembers whose deployments ended between 2003 and 2006, and follows their and their spouses' subsequent labor market and other compensation through 2010. By comparing earnings trajectories of uninjured households to those of households that experience a combat death, we are able to quantify the financial impact of combat-related deaths on the surviving spouses and children of deceased servicemembers. We first estimate the impact of a servicemember's death on household earnings. Next, we measure the extent to which survivor benefits and compensation from various federal government sources provide financial replacement for lost earnings. This study does not attempt to quantify the non-financial losses experienced by spouses and children or the non-financial types of support that may be available to them.

The closest previous study is a 2007 report (Christensen et al. 2007) that assessed the financial status of military widows by comparing their income to the income of widows in the general population using data from the Current Population Survey (CPS). Similar to this report, that study considered both spousal earnings and compensation from the DoD and VA, including the tax advantage from such payments. However, that study differs from this one in several ways. First, that study compared different groups of widows (military and civilian), whereas we estimate the impact of combat deaths relative to outcomes for military spouses of servicemembers who return from their deployments without injuries. That study was also a cross-sectional analysis that compares levels of income, rather than changes in income around the time of death. Many widows in that study were observed years or decades after the servicemember's death. Unlike the present analysis, that study was not focused on combat-related deaths; the population was older and the deaths were mainly non-combat-related.

The remainder of this report has the following structure. Chapter Two describes the data we employ to define our sample and measure key variables such as combat

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1. http://siadapp.dmdc.osd.mil/personnel/CASUALTY/castop.htm accessed on March 12, 2012.

deaths, labor market earnings, and survivor compensation and presents descriptive statistics related to these variables. Chapter Three describes our empirical approach. Chapter Four reports the estimated effects of combat death on labor market earnings and total household income including survivor compensation, respectively. Chapter Five discusses the fraction of earnings losses that are replaced by existing disability compensation mechanisms and Chapter Six concludes.

## 2. Data

This study draws on administrative data on combat-related injury and death, labor market earnings, and disability and survivorship compensation obtained from DoD, VA, and SSA. This Chapter explains how we used those data to construct our analysis sample and construct key measures of injury and earnings.

### Sample Definition

Our initial sample for this study consists of over 700,000 active and reserve component members deployed to Afghanistan and Iraq who completed the Post-Deployment Health Assessment (PDHA-DD Form 2796) or appear in DMDC's Casualty File between June 1, 2003 and December 31, 2006.[2]

All servicemembers deployed outside of the continental United States to a land-based location with no fixed U.S. medical treatment facility for 30 or more continuous days must complete the PDHA within five days of the end of deployment. As stated on DD Form 2796, the principal purpose of the PDHA is "to assess your state of health after deployment outside the United States in support of military operations and to assist military healthcare providers in identifying and providing present and future medical care to you." To this end, the PDHA records information about current physical and mental health as reported by the servicemember and documents concerns regarding environmental exposures. PDHA administration has been required since 2003.[3]

To the PDHA sample, we then added servicemembers who appear in the Casualty File, but not in the PDHA data, between June 1, 2003 and December 31, 2006. The Casualty File is the source of official statistics on U.S. casualties sustained in support of OEF/OIF. Any servicemember whose regular duty assignment is disrupted as a result of an injury sustained during hostile action is recorded in the Casualty File

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2. We include in our sample servicemembers reporting a deployment location of Kuwait or Qatar under the assumption that these individuals were in fact deployed to Iraq and Afghanistan during at least part of their deployment. Most deployments to these areas in our data occur in 2003 and likely reflect the pre-Iraq invasion buildup of military forces.

3. See DoD MCM-0006-02 "Updated Procedures for Deployment Health Surveillance and Readiness."

along with information about the nature of their injury including the date the injury was sustained. Many of these individuals will not complete a PDHA because the seriousness of their injuries obviates the need for conducting such an assessment.[4]

For each servicemember in our sample, we selected the latest deployment that ended before January 1, 2007. Beginning and end dates of deployment were obtained from self-reports in the PDHA or, for servicemembers who appear in the Casualty File, but not in the PDHA, from DMDC's Global War on Terror Contingency File.[5]

### Demographic Covariates and Spouses

Data on age, gender, component, race/ethnicity, pay grade, education, score on the Armed Forces Qualification Test (AFQT),[6] military occupational specialty, and state of residence come from DMDC's Work Experience File (WEX) and the Defense Enrollment Eligibility Reporting System (DEERS). We also employed DEERS to identify which servicemembers were married in the year prior to deployment and the Social Security Number (SSN) of their spouse. We identified 224,977 spouses of active component (AC) members and 122,101 spouses of reserve component (RC) members in our sample. Our analysis sample is restricted to servicemember households for which we identified a spouse in the year before deployment.[7]

### Fatalities and Injuries

We employed the PDHA and Casualty File to measure fatalities and injuries in our sample. Medical professionals at a field hospital or other medical treatment facility categorize servicemembers who appear in the Casualty File as having a non-serious ("non-life altering"), serious ("life-altering"), or very serious ("life-threatening") combat injury. Individuals who died as a result of their injuries (either immediately or after some time) are counted as fatalities. In our sample of married service members, we observe 893 combat-related deaths in the AC and 291 in the RC. Table 2.1 reports the number of combat deaths by component and year in our sample.

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4. It is likely that some deployed servicemembers fail to complete the PDHA for reasons other than serious injury. We have no reason to believe, however, that this incomplete coverage biases the results reported here.

5. The Global War on Terror Contingency File employs data provided by the services and military pay data to determine dates of deployment. We could have used this data source to define our sample, but chose to use the PDHA instead because of our desire to employ the health data recorded on that form (see below).

6. AFQT scores are available only for enlisted personnel.

7. For the purposes of this analysis households are defined consistently over time based upon the identities of the spouses in the pre-deployment year, regardless of their actual marital status in future years. Thus we do not consider the role of post-deployment marital dissolution, a topic that has been examined by other researchers (e.g. Karney and Crown 2007).

**Table 2.1—Number of Combat Fatalities Among Married Servicemembers, By Year and Component**

|  | AC | RC |
|---|---|---|
| 2003 | 31 | 24 |
| 2004 | 322 | 89 |
| 2005 | 246 | 125 |
| 2006 | 294 | 53 |
| Total | 893 | 291 |

For individuals who do not appear in the Casualty File, we employ data on injuries referred for follow-up care, and the individual's own assessment of whether his or her health changed for the worse while deployed:

❖ No injury: Was not referred for follow-up care and did not state health worsened during deployment

❖ Health worsened: Stated health worsened during deployment, but was not referred for follow-up care[8]

❖ Referred: Stated health worsened during deployment and injury was referred for follow-up care

The analysis sample includes servicemember households in all of the injury groups, including fatalities and uninjured. We estimated separate effects of each type of injury and found similar estimates to those reported in Heaton, Loughran, and Miller (2012). Those results are not reported in this report, however, because the focus of this analysis is on combat deaths. Nevertheless, the fact that this analysis includes controls for injuries is important for the interpretation of the results. In all cases, the effects of combat death are calculated relative to the benchmark case that no injury was recorded at the end of the deployment.

## Labor Market Earnings

Our measure of labor market earnings includes cash compensation received from the Department of Defense and civilian employers. Earnings data employed in this research come from SSA and DMDC. SSA records in its Master Earnings File (MEF) earnings from all sources subject to Medicare taxes, including household

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8. The specific question on the PDHA is "Did your health change during this deployment?" Respondents could choose "Health stayed about the same or got better" or "Health got worse."

employers and the self-employed.[9]   These earnings data are considered to be of very high quality and have been used in many empirical studies, including a number of studies related to the labor market outcomes of veterans (e.g., Angrist 1990, Angrist 1998, Christensen 2007, Loughran, Klerman, and Martin 2006, EconSys 2008, Heaton and Loughran 2011, Loughran et al. 2011).

Not included in SSA earnings records are military allowances (e.g., Basic Allowance for Subsistence (BAS), Basic Allowance for Housing (BAH), Family Separation Allowance (FSA)) and bonuses, which are not subject to Medicare taxes. To account for these significant sources of military earnings, we add these quantities to SSA earnings using individual-level pay records contained in DMDC's Active and Reserve Duty Pay Files. We obtained annual earnings data between 1995 and 2010 for 97 percent of our sample.[10] All earnings figures are deflated to $2010 using the Consumer Price Index (CPI-U).

Average household earnings amounts are reported in Table 2.2, separately by component, for households in which the servicemember returned uninjured from his or her deployment (the baseline group) and for those in which the servicemember died from a combat injury during deployment. In the year *before* deployment, household income is higher for servicemembers who were not injured during their deployments, and this is true for both servicemembers and their spouses. Married servicemembers in the AC and RC have similar amounts of total pre-deployment earnings, but RC spouses earn about twice the amount earned by AC spouses.

The moderate gap in household earnings between households with and without casualties before deployment increases dramatically afterward. In the AC, households without injuries average 10 times the annual earnings as those with deaths; in the RC, it is closer to 7.2 times. After deployment, spousal earnings account for about 17 percent of household earnings for uninjured members of the AC, and about 26 percent for uninjured RC members. For households with fatalities, after the first post-deployment year (when some households may be receiving delayed compensation on behalf of the servicemember), household earnings are all from the spouse. This is because our household income measure is based on servicemembers and spouses and it excludes gifts or other contributions from other family members, such as adult children, parents, or siblings.

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9.  See http://www.ssa.gov/OP_Home/cfr20/404/404-0000.htm for a list of employment categories that are exempt from Medicare taxes. Unlike Social Security earnings, Medicare earnings are not capped at the Social Security taxable limit.

10. Virtually all servicemembers should appear in the SSA data since basic pay is subject to Medicare tax. Match rates below 100 percent, therefore, are likely due to discrepancies in the names, Social Security numbers, or dates of birth used to match servicemembers to SSA records.

## Table 2.2—Summary Statistics by Component for Uninjured and Fatalities

| | AC | | RC | |
| --- | --- | --- | --- | --- |
| | **Uninjured** | **Deaths** | **Uninjured** | **Deaths** |
| **Pre-deployment Earnings** | | | | |
| Servicemember | 53,713 | 50,405 | 53,925 | 48,137 |
| Spouse | 11,040 | 9,338 | 20,509 | 18,414 |
| Household Earnings | 64,753 | 59,743 | 74,434 | 66,552 |
| | | | | |
| **Post-deployment Household Earnings** | | | | |
| Year 1 | 75,905 | 6,527 | 79,899 | 11,409 |
| Year 2 | 79,121 | 6,537 | 83,421 | 11,322 |
| Year 3 | 80,381 | 7,427 | 86,031 | 11,530 |
| Year 4 | 81,931 | 7,899 | 86,911 | 11,805 |
| | | | | |
| **Post-deployment Spouse Earnings** | | | | |
| Year 1 | 12,484 | 6,076 | 21,096 | 11,397 |
| Year 2 | 13,705 | 6,537 | 21,930 | 11,322 |
| Year 3 | 14,674 | 7,427 | 22,422 | 11,530 |
| Year 4 | 15,161 | 7,899 | 22,400 | 11,805 |
| | | | | |
| **Demographics** | | | | |
| Age | 30 | 28 | 36 | 34 |
| Male | 0.94 | 1.00 | 0.95 | 0.99 |
| White | 0.71 | 0.76 | 0.75 | 0.73 |
| Black | 0.18 | 0.11 | 0.12 | 0.09 |
| Hispanic | 0.10 | 0.13 | 0.08 | 0.05 |
| Married in pre-deployment year | 1.00 | 1.00 | 1.00 | 1.00 |
| No high school diploma | 0.07 | 0.10 | 0.12 | 0.11 |
| High school diploma | 0.63 | 0.68 | 0.43 | 0.54 |
| Some college | 0.11 | 0.08 | 0.21 | 0.15 |
| Bachelor's degree | 0.13 | 0.12 | 0.17 | 0.15 |
| Graduate degree | 0.06 | 0.03 | 0.07 | 0.04 |
| AFQT | 58 | 57 | 58 | 61 |
| | | | | |
| **Military Service** | | | | |
| Army | 0.62 | 0.75 | 0.77 | 0.89 |
| Air Force | 0.24 | 0.02 | 0.15 | 0.00 |
| Marine Corps | 0.10 | 0.20 | 0.03 | 0.07 |
| Navy | 0.04 | 0.02 | 0.05 | 0.04 |

**Table 2.2—Summary Statistics by Component for Uninjured and Fatalities (Continued)**

| | AC | | RC | |
|---|---|---|---|---|
| | Uninjured | Deaths | Uninjured | Deaths |
| Pay grade: junior enlisted | 0.34 | 0.40 | 0.26 | 0.32 |
| Pay grade: senior enlisted | 0.48 | 0.44 | 0.55 | 0.56 |
| Pay grade: warrant officer | 0.12 | 0.09 | 0.12 | 0.06 |
| Pay grade: junior officer | 0.02 | 0.01 | 0.04 | 0.02 |
| Pay grade: senior officer | 0.02 | 0.03 | 0.02 | 0.02 |
| Pay grade missing | 0.01 | 0.03 | 0.01 | 0.02 |
| | | | | |
| Pre-Deployment Health | | | | |
| Self-reported health: Excellent | 0.28 | 0.30 | 0.22 | 0.24 |
| Self-reported health: Very good | 0.30 | 0.29 | 0.34 | 0.33 |
| Self-reported health: Good | 0.15 | 0.16 | 0.18 | 0.17 |
| Self-reported health: Fair | 0.01 | 0.02 | 0.01 | 0.01 |
| Self-reported health: Poor | 0.00 | 0.00 | 0.00 | 0.00 |
| Sought mental health counseling | 0.03 | 0.03 | 0.02 | 0.02 |
| Have a medical problem | 0.09 | 0.10 | 0.10 | 0.10 |
| Currently on light duty | 0.07 | 0.06 | 0.06 | 0.05 |

*Note:* All dollar amounts are reported in constant 2010 dollars.

In addition, our household measure does not account for income from new spouses. We defined household units based on marriage in the year before deployment in large part to avoid concerns about endogeneity in changes in marital status, but also because of data quality concerns regarding the exact timing of changes in marital status (especially for events that would lead to a termination in benefits) in the DEERS system. To the extent that surviving spouses are remarrying, and their new spouses have positive earnings, our omission will cause us to overstate the financial harm from combat deaths on surviving family members.[11]

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11. Although we have some information on remarriage in the data from the Survivor Benefit Plan, this information is unfortunately indirect and incomplete. Of the 627 cases of suspended benefits we observe in January 2012 (which is 5 to 8.5 years after the death dates), only 56 have the reason listed as remarriage (coded as "NAM" in the data).

## Survivor Benefits

Surviving spouses and children are potentially eligible to receive various forms of compensation from 3 primary sources: the Departments of Defense and Veterans Affairs, and the Social Security Administration. Recurring monthly payments are made through these programs:

- ❖ Survivor Benefit Plan (SBP)
- ❖ Special Survivor Indemnity Allowance (SSIA)
- ❖ Dependency and Indemnity Compensation (DIC)
- ❖ Social Security Administration Survivor Benefits

Those payments can take the form of annuities that are paid out as long as the surviving spouse or children maintain eligibility (SBP, SSIA, DIC). They also include some transition payments for the initial year or two following the servicemember's death (DIC and SSA benefits). In addition, surviving spouses or children can receive lump-sum payments from:

- ❖ Servicemembers' Group Life Insurance (SGLI)
- ❖ Death Gratuity
- ❖ Combat Death Tax Forgiveness

This section provides a brief description of the key features of these programs and outlines our data sources and methods of computing benefits for each surviving spouse household.

Table 2.3 summarizes these payments for our samples of households with combat deaths in the AC and RC. The first two columns of the table show the percent of these households receiving each of these benefits. The next two columns report average payment amounts, in constant 2010 dollars and adjusting for tax advantages when applicable, for the sub-sample of households that received each type of benefit.

## Table 2.3—Benefits to Surviving Spouses and Children

| | Percent Receiving | | Mean if Receiving | |
|---|---|---|---|---|
| | AC | RC | AC | RC |
| **Survivor Benefit Plan** | | | | |
| Year 1 | 71.91 | 73.45 | 12,485 | 13,676 |
| Year 2 | 71.46 | 71.72 | 12,510 | 13,829 |
| Year 3 | 70.79 | 70.69 | 12,589 | 13,977 |
| Year 4 | 69.78 | 70.34 | 12,895 | 14,024 |
| | | | | |
| **Dependency and Indemnity Compensation** | | | | |
| Year 1 | 100.00 | 100.00 | 28,390 | 27,872 |
| Year 2 | 100.00 | 100.00 | 23,457 | 23,652 |
| Year 3 | 100.00 | 100.00 | 23,451 | 23,197 |
| Year 4 | 100.00 | 100.00 | 23,796 | 23,630 |
| | | | | |
| **Special Survivor Indemnity Allowance** | | | | |
| Year 1 | 0.00 | 0.00 | | |
| Year 2 | 4.16 | 3.45 | 152 | 152 |
| Year 3 | 9.44 | 10.34 | 350 | 298 |
| Year 4 | 14.27 | 15.52 | 490 | 499 |
| | | | | |
| **Social Security Benefits** | | | | |
| Year 1 | 68.09 | 69.31 | 33,439 | 39,123 |
| Year 2 | 67.98 | 68.97 | 27,896 | 32,906 |
| Year 3 | 67.64 | 68.97 | 27,716 | 31,771 |
| Year 4 | 67.08 | 68.62 | 27,887 | 31,208 |
| | | | | |
| **Lump-Sum Payments with Tax Advantage** | | | | |
| SGLI | 100.00 | 100.00 | 655,976 | 660,340 |
| Death Gratuity | 100.00 | 100.00 | 163,994 | 165,085 |
| TSGLI | 1.08 | 1.72 | 129,125 | 160,091 |
| Combat Zone Tax Forgiveness | 45.96 | 64.14 | 2,196 | 3,288 |
| **Lump-Sum Payments without Tax Advantage** | | | | |
| SGLI | 100.00 | 100.00 | 436,453 | 437,864 |
| Death Gratuity | 100.00 | 100.00 | 109,113 | 109,466 |
| TSGLI | 1.08 | 1.72 | 92,307 | 105,768 |

*Note:* All dollar amounts are reported in constant 2010 dollars.

Survivor Benefit Plan

This SBP program is administered by the DoD. It provides monthly payments to eligible spouses, former spouses, and children of deceased service members. Coverage in the plan is provided at no cost to servicemembers while they are in active service. Upon retirement, servicemembers can elect to cover their spouses only, their spouses and children (in which case children receive payments if the spouse dies or loses eligibility through remarriage), or their children only. Spouses and former spouses are eligible for SBP payments until their death or remarriage (before age 55).[12] Children can receive payments as long as they are unmarried and under the age of 18 or 22 if they are enrolled in school. Children who become disabled before losing eligibility and are unable to support themselves can receive benefits for life. The base amount of the payment for a member who dies while serving on active duty is equal to 55 percent of what the servicemember's retirement pay would have been had he or she been retired as totally disabled, but cannot exceed 75 percent of the member's high 36 months (for members when entered military service after September 7,1980). This amount does not vary with the number of beneficiaries; if there are multiple children who are designated as beneficiaries, each receives an equal share of the total amount. Payments made to spouses are reduced by payments from the VA's DIC program, but child-only SBP benefits are not affected by DIC. SBP payments are taxed as regular income.

We obtained data from the military on the current payment amounts (as of January 2012) made to each beneficiary associated with a servicemember from our sample who died, as well as the amount of the DIC offset (if any). This allowed us to determine the base amount for that servicemember for 2011. Using the historical cost of living (COLA) adjustments applied to the SBP program, we were able to compute base amounts for past years as well. We assigned payments to all servicemember households currently receiving SBP payments starting from the day after the death date (pro-rated for the first month and then full months afterward).

Some households were not receiving payments in January 2012 because of loss of eligibility (remarriage for spouses, age or marriage for children), but may have received them in the past. For those households, we attempted to collect information on the amount of past SBP payments.

When available, we used information on the amount of SBP to which the person would be entitled if they were currently eligible (this is routinely maintained after loss

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12. Surviving spouses whose remarriage ends in divorce or widowhood can have their SBP benefits reinstated.

of eligibility because eligibility can sometimes be restored, for example, by ending a marriage or enrolling in school). For surviving spouses who were no longer receiving benefits due to remarriage, we assigned payments from the death date until the remarriage date (which we inferred from the date the current pay status started). For households in which the last child was no longer eligible to collect SBP as a dependent (because of age or marriage), we similarly used information on the past amount and the date of the most recent status change. Unfortunately, we were not able to access historical payments or base amounts for accounts that have been closed for over 18 months. For 327 surviving spouse households (or 28 percent, 250 in AC and 77 in RC) we have no record of any SBP payments, although it is possible that some of these families received some compensation. This limitation means that we may understate the value of this benefit to surviving spouses and children.

### Dependency and Indemnity Compensation

DIC payments are provided monthly to eligible survivors of veterans whose deaths are determined to be service-connected. The program is administered by the VA, and the amount depends on the number of children and the time since the member's death. Spouse DIC payments are made for the life of the spouse, provided that the spouse does not remarry before age 57 (payments can be reinstated if the remarriage ends). Children are eligible for payments until they turn 18. DIC pays an additional transitional monthly benefit for up to two years as long as there are surviving children under the age of 18. The amount of the transition benefit depends on the death date (which affects duration of payment), the time since the death (maximum duration is 24 months), and the age of the youngest child (transition payments stop on the first month after the month in which the youngest child reaches age 18). DIC paid to spouses offsets SBP payments if the spouse is the beneficiary (the DIC offset), and DIC payments are not taxed.

We computed the DIC payments in each month following the servicemember's death using the historical payment rules (generally updated each December) that specify amounts paid to surviving spouses and the amounts paid for each child under the age of 18. We used data from the DEERS system before the servicemember's death to determine the number of children and their ages. This information should be fairly complete, but it is possible that we missed children born after the servicemember's death, which would cause us to understate the benefit. Our lack of reliable data on remarriages means that our measure will tend to overstate payments to spouses who remarried within the first four years.

## Special Survivor Indemnity Allowance

Starting in October 2008, the Special Survivor Indemnity Allowance has been paid to surviving spouses whose SBP payments were offset by DIC. Maximum monthly payment amounts are fixed for each year, starting at $50 in fiscal 2009, with scheduled increases until 2017, when they will reach $317. The actual amount is the lesser of the amount of the DIC offset (the reduction in SBP) and the maximum amount. SSIA payments are taxed as regular income.

We computed the SSIA amount paid in each month to spouses by comparing the amount of the DIC offset to the maximum SSIA amount for that month and assigning the smaller value. We have data on current DIC offset amounts, and we computed historical DIC offsets using the method to compute spouse DIC payments described below. Child DIC payments are not offset and not counted towards SSIA. Because the latest deaths in our sample were in 2006, there were no SSIA payments in the first calendar year after any death (see Table 3), and some households in our sample (i.e. those experiencing combat deaths in 2003) did not receive SSIA in the first four post-deployment years due to the relatively recent establishment of this program.

## Social Security Survivor Benefits

Monthly Social Security payments may be paid to surviving spouses in certain cases. The amount paid is determined by the SSA based on the earnings history of the deceased servicemember. Spouses of any age who are caring for children of the servicemember (who are under the age of 16 or disabled) can receive 75 percent of the deceased worker's basic social security retirement amount. Monthly payments of 75 percent are also made to children under the age of 18, or the age of 19 if they are full-time students, or to children of any age who were disabled before the age of 18. Surviving spouses, including those who are not caring for young children of the deceased, can receive partial benefits starting at age 50 if they are disabled or otherwise at age 60, or full benefits at starting at their full retirement age. An additional lump-sum benefit (of up to $255) is paid by SSA to the surviving spouse who was living with the servicemember at the time of death (notwithstanding any temporary absence due to military assignment) or to surviving children. These payments are partially taxed. There is also an earnings offset for some surviving spouses (who have not reached full retirement age) so that the amount of the survivor benefit is reduced by $1 for every $2 of spousal earnings above a preset threshold, which was $14,640 in 2012.[13]

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13. Surviving spouses who have their survivor benefits reduced or suspended because of their labor market earnings may later be eligible for increased benefits from SSA when they reach full retirement age.

Our data source for SSA survivor benefits is SSA's Master Beneficiary Record (MBR) file, which records payments from all Social Security trust fund accounts to all beneficiaries. We constructed a measure of annual SSA benefits paid to each of our servicemember households by summing together two sets of payments: payments made to the servicemember or his or her spouse on any Social Security account and payments made to any person (such as a child under the age of 18 or an adult disabled child) made on behalf of the servicemember's or spouse's Social Security account. We removed duplicate payments that appeared in both categories and we did not distinguish between different types of payment from the Social Security trust fund (retirement, disability, and survivorship).

We used the monthly benefit paid (MBP) amount on the MBR to compute annual SSA survivor benefits. MBP records the payment amount for which the beneficiary was eligible in that month (and we exclude monthly benefits for which the beneficiary is listed as ineligible). MBP does not necessarily reflect the actual amount paid in that month because the amounts are retroactively updated to reflect the correct payment eligibility after changes in status. In cases where there was a delay between the initial application and the determination that the beneficiary qualified for survivor benefits, the actual payments may have started later than our data would indicate (and been increased temporarily to compensate for the delay). The total payment amounts in the data should be correct, however, because our data are from June 2011, which is over five years after the combat death dates in our sample. Table 3 shows that two-thirds of the surviving spouse households received benefits from SSA. Among those receiving benefits, the average annual amount in years 2-4 was about $30,000.

### Death Gratuity

The surviving spouses of the servicemembers who died in our sample would all qualify for the one-time Death Gratuity payment from the DoD. The amount of this payment was increased from $12,000 to $100,000 in May 2005. At that same time, DoD was instructed to make an additional payment of $88,000 to beneficiaries of servicemembers who died between October 7, 2001 and May 11, 2005, meaning that all households in our combat death sample received a total of $100,000. We assign all payments in the year after the servicemember's death. The death gratuity is not taxed.

### Servicemembers' Group Life Insurance

Active and reserve component members are eligible to purchase life insurance through the Servicemembers' Group Life Insurance program administered by the VA. The default enrollment is for the maximum (currently $400,000), though

members may elect to reduce the amount (in increments of $50,000) or cancel coverage. Servicemembers must opt out of SGLI and so the vast majority of service-members participate in the program. Beneficiaries can receive payments in lump sum or in equal payments over 36 months. For deaths that occurred between October 7, 2001 and September 1, 2005, the initial SGLI amount was $250,000, but this was increased to the full $400,000 in 2005 when the DoD made an additional Death Gratuity payment of $150,000. Because servicemembers who served in the theater of operations for Operation Enduring Freedom or Operation Iraqi Freedom were reim-bursed for their SGLI premiums, we assume that their surviving spouses all received the maximum amount in the first year after the death.

All servicemembers enrolled in SGLI are also automatically enrolled in Traumatic Injury Protection under Servicemembers' Group Life Insurance (TSGLI), which insures servicemembers against the occurrence of a list of specific traumatic injuries such as amputation, paralysis, burns, sight, hearing, facial reconstruction, coma, and traumatic brain injury.[14] TSGLI payments range between $25,000 and $100,000, in $25,000 increments, depending on the injury or combination of injuries incurred. All servicemembers participating in SGLI were made eligible for TSGLI beginning in December 2005 and, at that time, coverage was made retroactive to cover OEF/OIF injuries incurred between October 7, 2001 and November 30, 2005.[15] VA provided this project with a list of all servicemembers who had received TSGLI through May 2011 along with the date and amount received. Table 2.3 shows that a very small number (about 1 percent or 14 households) of the servicemembers who later died from their injuries also received TSGLI payments. We include these payments as part of their total compensation.

### Combat Zone Tax Forgiveness

If a member of the United States Military Services dies while in active service in a combat zone or from injury or disease received in a combat zone, the decedent's income tax liability is "forgiven" for the tax year in which the death occurred and for earlier tax years ending on or after the first day the member served in a combat zone in active service. "Forgiven" tax does not have to be paid. Any forgiven tax liability that has already been paid will be refunded, and any tax liability at the date of death will be forgiven.

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14. See http://www.insurance.va.gov/sglisite/tsgli/Schedule/Schedule.htm for a complete list of qualifying injuries and conditions.

15. Beginning in October 2011, the Veterans' Benefits Act of 2010 (PL 111-275) extends these retroactive bene-fits to qualifying losses incurred during this period regardless of servicemember location or prior SGLI enrollment status.

We compute the value of the tax forgiveness by estimating the amount of federal taxes paid on the servicemember's earnings in the year of death and all preceding calendar years during which the servicemember was deployed. We then assign this payment as a form of untaxed compensation in the calendar year following the death year.

### Tax Advantage

Military allowances, certain military pays (e.g., those received while serving in an officially designated combat zone), VA survivor benefits, SGLI, and a portion of SSA benefits are not subject to federal income, payroll, and Social Security (i.e., FICA) taxes. We computed the value of this federal tax advantage assuming no interest or dividend income or capital gains and that servicemembers are married with one dependent child.[16]  Specifically, we determined the amount of taxed income that the household would have had to receive to obtain that same amount of income after taxes. We apportioned the total value of the tax advantage to each tax advantaged earnings/disability compensation category according to the category's proportion of total earnings and compensation.

#### Lump-Sum Payments With and Without Tax Advantage

Income from the death gratuity, SGLI, and TSGLI are exempt from federal income taxes. Table 2.3 reports average payment amounts (for those receiving payments) for each of these forms of compensation, after adjusting for inflation and accounting for the tax advantage. For AC households, the amounts are $163,994 for the death gratuity, $655,976 for SGLI, and $129,125 for TSGLI. For RC households, the amounts are $165,085, $660,340, and $160,091, respectively. The death gratuity and SGLI amounts are substantially larger than the nominal amounts of $100,000 and $400,000. This is due in large part to the tax advantage, which is greater for lump-sum payments than for recurring payments spread over many years. Had they been taxed, these one-time payments would have increased the average tax rate paid by surviving spouse households. If we exclude the value of the tax advantage for these one-time payments, the inflation-adjusted values are significantly lower. For the AC, they are $109,113, $436,453, and $92,307. For the RC, they are $109,466, $437,864, and $105,768.

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16. Recall that all servicemembers in the sample were married in the year prior to deployment. The tax imputations do not account for state taxes or other features of the tax code such as personal exemptions, the federal Earned Income Tax Credit, or special widow tax credits.

## 3. Empirical Model

We seek to estimate the causal effect of deployment-related fatality on earnings and other labor market outcomes. In order to do this, we must form an estimate of the counterfactual labor market outcomes of servicemembers who were killed in combat and their spouses had they never been injured. Our estimate of the causal effect of fatality on labor market outcomes is then the difference between the observed labor market outcomes of surviving spouse households and their estimated counterfactual labor market outcomes. In our analysis we estimate counterfactual labor market outcomes as the outcomes of similarly situated servicemembers who were also deployed but who were uninjured (i.e., the control group).

Our main estimation challenge stems from the fact that the incidence of fatalities is likely to be correlated with a wide range of characteristics of servicemembers that determine their exposure to physical dangers during deployment, such as military occupation and attitudes toward risk, which may also independently affect success in the labor market. We address this challenge by controlling for such characteristics as completely as possible so that the resulting conditional correlation of fatality and labor market outcomes is not affected by those other factors.

In the case of household labor market earnings, we employ an empirical model that controls for fixed characteristics of servicemembers and spouses that are potentially correlated with both injury and earnings. Our model adjusts for initial earnings differences pre-deployment and then also allows for the possibility that differences in earnings growth over time are also related to observable differences in the characteristics of servicemembers. We estimate equations of the form:

$$\Delta y_{it} = \beta Injury_i + \gamma X_i + \varepsilon_i \quad (1)$$

where $\Delta y_{it}$ represents the change in earnings experienced by the household associated with individual servicemember $i$ between the year immediately prior to deployment and year $t$ following deployment,[17] $Injury_i$ indicates a vector of indicator variables capturing the nature of individual $i$'s deployment-related injuries (using the injury categories described previously and including death), $X_i$ represents a set of covariates, $\varepsilon_i$ represents an idiosyncratic error term, and $\hat{\beta}$ measures the estimated

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17. Because our earnings data are available on a calendar year basis, but deployments typically begin or end mid-year, we use the first complete calendar year immediately prior to and following the deployment start and end dates as the pre- and post-deployment years for the purposes of earnings measurement. We include fixed effects for end month of deployment and for pre- and post-deployment calendar years to account for differences across individuals in the time between redeployment and the calendar year in which earnings are measured.

effect of injury on earnings. Our main variable of interest is the indicator for combat death that is part of the *Injury* vector.

A key feature of equation (1) is the use of earnings changes rather than earnings levels as the outcome of interest. By subtracting out earnings in the pre-deployment year, we account for pre-existing differences in earnings between those who do and do not ultimately sustain an injury.[18] The potential for unobserved heterogeneity in earnings trajectories to bias estimates from equation (1) is further mitigated by the inclusion of a wide range of controls ($X_i$). A large body of research literature dating from Mincer (1974) demonstrates a relationship between demographic characteristics—work experience and education, in particular—and earnings growth. Thus, we include in $X_i$ a range of demographic characteristics including age and age squared, gender, race (white, black, and Hispanic), and educational attainment. Given that exposure to injury and earnings potential may differ across individuals with varying job assignments, we also control for pre-deployment rank and military occupation (36 categories). To account for potential business cycle effects and regional economic conditions, we control for deployment end date and state of residence. Finally, we have access to data on a range of individual-level characteristics that could be correlated with earnings growth, but which are typically unavailable to researchers estimating earnings equations. These characteristics include scores on the Armed Forces Qualification Test (AFQT), an achievement test designed to measure general aptitude, and several measures of pre-deployment health, including indicators for whether the servicemember had recently sought mental health treatment, whether the servicemember reported medical problems, and self-rated pre-deployment health.[19] The inclusion of controls capturing pre-deployment health accounts for the possibility that some of the differences in earnings growth we observe between the injured and uninjured could in theory reflect health problems that existed prior to injury. Table 2.2 includes a complete list of control variables used in the analysis.

To properly measure the earnings effects of injury, we must assume that after conditioning on our control variables idiosyncratic fluctuations in earnings, $\varepsilon_i$, are uncorrelated with injury status. We use differenced earnings and numerous controls

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18. One potential concern with estimating equations such as equation (1) is the possibility that earnings growth is also correlated with unobserved individual characteristics—for example, risk-taking attitudes— that are also correlated with injury. Heaton, Loughran, and Miller (2012) provide evidence from prior years that earnings growth trends were substantially similar across injury groups in the years before deployment. This supports the assumption in the regression model that the unobserved heterogeneity is not varying over time.

19. These pre-deployment health variables were obtained from the Pre-Deployment Health Assessment (DD Form 2795) administered by DoD to approximately 74 percent of our sample.

to account for many possible avenues through which this assumption may fail. Nevertheless, it remains possible that there are unobserved factors related to injury that also affect earnings growth, in which case our estimates might overstate or understate the true causal impact of injury on earnings.

The assumption underlying the linear model is that earnings growth is, on average, constant across households, after accounting for the additive effects of the covariates. An alternative approach would be to estimate a model of changes in log-earnings, which would require a different assumption about earnings growth. Here, the requirement about constant earnings growth would apply to log-earnings, which is equivalent to the assumption that earnings growth rates in proportion to earnings are the same across households, instead of absolute growth levels being the same. In estimation of equation (1), we prefer the specification that uses changes in earnings levels as the dependent variable, rather than changes in log-earnings, because it allows us to include observations with zero household income, which is especially relevant for our population of interest.[20]

Household earnings effects as measured using equation (1) incorporate both the direct effect of combat death on earnings that arise from the loss of the servicemember's own earnings as well as changes in productive capabilities and any participation effects for spouses, who are coping with the loss. The earnings effects for spouses may also reflect responses to the survivor benefit compensation system. In theory, the availability of survivor benefits could affect the labor market decisions of surviving spouses by increasing their "unearned income," which, in theory, can induce individuals to consume more leisure (and, conversely, supply less labor) than they would if there were no such system in place. To the extent that these benefits are lower than the lost earnings from the servicemember, this channel should not lower spousal earnings relative to the uninjured case. Nevertheless, our approach cannot disentangle the direct effect of combat death on productive capacity for spouses and the indirect effect from survivor compensation. This distinction is important for understanding how readily our results might generalize to other environments with different rules governing survivor payments. In particular, in environments offering

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20. Nevertheless, the logarithmic transformation has some attractive features; it can accommodate the potentially non-normal distribution of the errors in the earnings equation, arising from the fact that earnings are never negative and that the distribution of earnings is right-skewed. We confirmed the robustness of our findings by also estimating the models with a log-earnings specification. The estimated effects of combat death on the change in the log of household earnings in each of the first four years are very large (a decline of about 2 log-points for both AC and RC) and highly statistically significant. Accounting for recurring survivor benefits reduces the negative estimated impact to a decline of 0.6 in changes in log-income for the AC and a decline of 0.5 log-points for the RC (all significantly different from zero). One reason specifications in logs and levels tend to give similar results in this context is that among the military population earnings distributions tend to more closely approximate a normal distribution than among the general population.

survivor benefits substantially above or below current levels, or with different labor market disincentives for beneficiaries, it is possible that we would observe patterns of spousal and household earnings loss that vary from those documented in this report.

# 4. Results

This Chapter presents the results of estimating equation (1) for a variety of financial outcomes measured in the first four years following deployment, which we observe for all servicemembers in our sample. We begin by reporting estimates of the effect of combat death on household (servicemember plus spousal) labor market earnings. We then show that household earnings effects are predominantly accounted for by the loss of servicemember earnings. Finally, we show how well survivor benefits from the various sources offset the loss in labor market earnings by reporting estimates for the effect of combat death on total household income after benefit payments.

### Impact of Combat Death on Household Labor Market Earnings

Table 4.1 reports the estimated effects of combat death on household earnings in each of the first four years after the death date. These estimates ($\hat{\beta}$ in equation (1)) reflect the difference in earnings growth since the year prior to the deployment between households experiencing combat death and households with no injury in the given year, after controlling for factors that are related to both injury propensity and earnings growth potential. Assuming first-differencing and the inclusion of other controls adequately addresses the potential for omitted variables bias, the estimates can be interpreted as the average difference between actual earnings of households in which a servicemember died and expected earnings for that same household had the servicemember remained uninjured. Because their labor market experiences and opportunities are fundamentally different, we estimate separate models for active and reserve component members.

Household earnings are defined as total military and civilian labor market earnings (as reported to Social Security) for the servicemember and the spouse. The models were estimated separately for each year for members of the active and reserve components. The sample includes deployments by married servicemembers ending between June 2003 and December 2006. We exclude households with missing information (when we were unable to match military records with SSA data). In each year, the sample size is 224,977 for AC members and 122,101 for RC members.

**Table 4.1—Estimated Effect of Combat Death on Household Labor Market Earnings ($2010), By Component and Year**

| Year after deployment | AC | RC |
|:---:|:---:|:---:|
| 1 | -63244** | -58701** |
| | (1072) | (1775) |
| 2 | -66648** | -62104** |
| | (1089) | (1811) |
| 3 | -66566** | -64361** |
| | (1107) | (1879) |
| 4 | -67297** | -64594** |
| | (1156) | (1949) |
| Observations | 224977 | 122101 |

*Notes:* Heteroskedasticity-robust standard errors are in parentheses. ** denotes statistical significance at the 1% level.

For each component, and for each of the first four years, we find that combat death leads to sizable and statistically significant declines in household earnings. This is not surprising, of course, because of the loss of servicemember earnings. The size of the household earnings loss ranges from $63,000 to $67,000 for the AC and from $59,000 to $65,000 for the RC.

These amounts are comparable to, but larger than, average income in the pre-deployment year for servicemembers who died from combat injuries—$50,405 for the AC and $48,138 for the RC (see Table 2.2). One reason household income loss is above servicemember income before deployment is that the servicemember's own earnings would likely have increased after their deployment, had they survived. This is suggested by the earnings for uninjured servicemembers, which grew from $53,713 in the pre-deployment year to $66,769 in year 4 post-deployment for the AC ($81,931 household earnings minus $15,161 spousal earnings, Table 2.2) and $53,925 in the pre-deployment year to $64,511 in year 4 post-deployment for the RC ($86,911 household earnings minus $22,400 spousal earnings, Table 2.2).[21] A second reason for the large losses is that spousal income may have also declined. We explore this empirically in the next section.

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21. The level of income growth experienced by members of the control group depends on how long they remain in the military, whether or not they are deployed again (between January 2007 and December 2010), as well as their civilian labor market opportunities. See Heaton, Loughran, and Miller (2012) for information on separation rates over the first four post-deployment years. The current study focuses on the first four years after deployment. Although initial estimation (on the sub-sample of deployments ending in 2003) suggests that the earnings effects are stable from years 4 to 7, future work will be needed to determine the long-term financial effects of combat injury and death.

From the perspective of military compensation policy, these estimates of the effect of injury on labor market earnings are valuable because they are relatively invariant to the particular set of disability policies and programs in place at a particular moment in time.[22] The estimates thus provide positive guidance regarding the amount of compensation needed to replace lost earnings over time for households experiencing combat deaths, which is different from the normative questions of how financial compensation to surviving spouses and children should be structured and of how large benefits should be relative to the servicemember's pre-injury earnings or the income the household would have enjoyed if the servicemember had not been injured.

## Impact of Combat Death on Spousal Earnings

It is not obvious theoretically how combat deaths would affect the earnings of surviving spouses. On the one hand, spousal earnings may decline if the loss of their spouse has psychological effects that limit their ability to participate in the labor market, or if they face increased time demands at home, for example, related to childcare. To the extent that short-term compensation in the form of death benefits increases household income (we explore this in the next section), there may also be positive income effects that lead to lower spousal labor market attachment. Spouses receiving survivor benefits from SSA can also face high effective tax rates on their earnings after they exceed a preset threshold. On the other hand, spousal earnings may increase, possibly after some delay, if surviving spouses decide to increase their labor market participation and human capital investments in response to the income loss from their spouse. It is also possible that spousal earnings would not be affected by combat deaths, especially if spouses remarry within a few years of the loss.

**Table 4.2—Estimated Effect of Combat Death on Spousal Labor Market Earnings ($2010), By Component and Year**

| Year after deployment | AC | RC |
|:---:|:---:|:---:|
| 1 | -4600** | -7673** |
|  | (448) | (899) |
| 2 | -5459** | -8527** |
|  | (480) | (934) |
| 3 | -5270** | -8841** |
|  | (517) | (976) |
| 4 | -5215** | -8329** |
|  | (547) | (1047) |
| Observations | 224977 | 122101 |

*Notes:* Heteroskedasticity-robust standard errors are in parentheses. ** denotes statistical significance at the 1% level.

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22. They are not completely invariant because of the incentive effects described in the previous section.

Table 4.2 shows estimates for the impact of combat deaths on the earnings of surviving spouses. The sample includes all spouses who were married to the servicemembers prior to their deployment, and does not condition on later changes in marital status. Sample sizes are identical to the previous table: 224,977 for AC members and 122,101 for RC members.

The results indicate that surviving spouses had lower earnings in the years after their spouses' deaths. The size of this loss is about $4,500 to $5,500 for spouses of AC members and $7,500 to $8,500 for RC spouses. These amounts tend to increase between the first and second year and then remain surprisingly stable through year 4 after the death. This indicates that the psychological effects or time demands on surviving spouses may remain barriers to full labor force participation for several years. It is also possible that these declines in earnings are related to an income effect response to cash compensation received through the survivor benefits described in Chapter 2, and particularly to a substitution effect from the labor market disincentive created by the reduction in survivor payments from SSA for income levels above a preset threshold.

The estimated amounts of spousal income loss are nontrivial, but they reflect only about one tenth of the overall effect of combat death on household earnings. This confirms that the *main* source of the decline in household earnings is the loss of the servicemember's earnings. It is consistent with the general pattern that spousal earnings account for less than a third of total household earnings.

### Impact of Combat Death on Household Income from All Sources

The previous sections calculated the impact of combat deaths on household earnings. This section computes the impact of combat death on total household income by adding in the value of financial support to surviving spouses and children provided by the DoD, the VA, and the SSA, as described in Chapter 2.

Table 4.3 first considers net income effects after taking into account recurring but not lump-sum survivor benefits.[23] The table's first two columns focus on members of the AC while the second two focus on RC members. In each case, one column includes labor market earnings plus all recurring payments from DoD and VA (for retirement, disability, or survivor benefits) and the next adds payments from SSA as well. Sample sizes in this table are slightly lower than those in previous tables because we now exclude households in which the servicemember died for reasons that were

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23. Recurring payments include the SBP, DIC and SSIA, as well as SSA benefits. Lump-sum payments are from SGLI, TSGLI, Death Gratuity, and combat zone tax forgiveness.

**Table 4.3—Estimated Effect of Combat Death on Household Income ($2010), By Component, Year, and Income Definition**

| Year after deployment | Active Component | | Reserve Component | |
|---|---|---|---|---|
| | with Recurring DoD and VA Payments | with Recurring DoD, VA, and SSA Payments | with Recurring DoD and VA Payments | with Recurring DoD, VA, and SSA Payments |
| 1 | -26799** | -4290** | -21487** | 5255* |
| | (970) | (1112) | (1718) | (2115) |
| 2 | -36045** | -17387** | -30136** | -7978** |
| | (977) | (1049) | (1744) | (1966) |
| 3 | -36939** | -18564** | -33867** | -12647** |
| | (1000) | (1071) | (1821) | (2033) |
| 4 | -38441** | -20231** | -34738** | -14270** |
| | (1050) | (1116) | (1873) | (2069) |

*Notes:* Heteroskedasticity-robust standard errors are in parentheses. * denotes statistical significance at the 5% level, ** at the 1% level.

not combat-related.[24] In the remaining analysis, we observe 224,121 AC households and 121,864 RC households.

The results in the table show that recurring survivor benefits from the DoD and VA, as well as those from SSA, make a substantial contribution to the financial well-being of surviving spouse households. After adding in all forms of recurring survivor payments (in columns 2 and 4), the estimated effects of combat-related death remain negative and statistically significant. However, the income losses are 70 percent smaller than the earnings losses for AC members and 78 percent smaller than the earnings losses for RC members in Table 4.1. Hence, these recurring payments are having a meaningful impact by offsetting over two-thirds of the household earnings losses. Nevertheless, the average annual decline in household income for surviving spouse households remains on the order of about $20,000 (for active component spouses) and $14,000 (for reserve component) in the fourth year after the death.

The preceding calculations do not account for the large lump-sum payments that typically are received by survivors in the first year following a combat fatality. A natural question is how to factor in these payments in thinking about the overall income loss experienced by survivors. One approach is to compute how many years of the net decline in income could be replaced using the value of the lump-sum payments. This metric is a natural one if we imagine that the surviving spouse saves

24. The reason for this exclusion is that we were not able to obtain historical information on death benefits payments to their surviving spouses. Including these individuals without accounting for all of their income would introduce a positive bias in the estimates. The bias would likely be small, because these individuals are only a tiny fraction of the sample, but we nevertheless prefer to exclude them to ensure the validity of the estimates.

the bulk of the payment in an interest-bearing account, and only withdraws the amount needed each year to cover the shortfall between actual and expected income. However, while this calculation can provide one useful benchmark, it is worth noting that it omits any changes in household expenditures related to the servicemember's death. Some expenses will likely decline (such as food and clothing), but others may increase (childcare). For simplicity, we assume the real interest rate is zero.

For members of the AC, the total impact of combat deaths on household income over the first four years, excluding lump-sum payments, is -$60,472. The annual net income loss in year 4 was $20,231 (in 2010 dollars), which we assume stays constant in real terms in all future years.[25] The average value of the lump-sum payments was $822,865 for these households. This implies that the lump-sum payments could be used to maintain household income at a level equal to what it would have been had the servicemember not been injured for nearly 42 years after the servicemember's death.

For members of the RC, survivor compensation is even higher relative to earnings losses. These households experienced income losses over the first four years after the member's death totaling $40,130, with losses of $14,270 in year 4. Their lump-sum payments amounted to $828,085. Assuming that the annual income loss remains level at $14,270, this implies that the lump-sum payment could be used to replace the annual income losses for over 59 years after the servicemember's death.

Because of the progressive tax system, the value of the tax advantage for large lump-sum payments made in a single year can be substantially larger than the value of the tax advantage for the same total amount paid over many years. To avoid overstating the value of the lump-sum payments, we also provide a lower-bound calculation that takes the very conservative approach of omitting the value of the tax advantage for lump-sum payments entirely. The value of lump-sum payments to AC spouses assuming zero tax advantage is $547,572, which could be used to maintain household income for on average 28 years after the servicemember's death. For RC spouses, the lump-sum payments are worth $551,257 without the tax advantage (the slight difference between components is due to differences in timing of payments, TSGLI receipt, and combat zone tax forgiveness amounts), which implies that households could maintain their expected income for nearly 40 years following the servicemember's death.

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25. These results are not particularly sensitive to the assumption of constant income loss after year 4. For example, if we allow for future income for the comparison group to grow at 1.5 percent per year in real terms (about double average annual real income growth observed in the U.S. between 1992 and 2006), the lump sum payments would still last for over 33 years for AC households and over 44 years for RC households.

These calculations indicate that although the current lump-sum payments may not be sufficient to permanently replace the lost income associated with combat death, they are sufficient to replace lost income for surviving spouses and children for a transition period lasting several decades.

# 5. Discussion

The results in the preceding chapter demonstrated several patterns with respect to earnings loss: 1) household earnings losses following combat death of a household member are economically large and persistent over time; 2) most (approximately 90 percent) of these losses can be attributed to the loss of the deceased servicemember's own earnings, with the remainder attributable to declines in spousal earnings; 3) recurrent benefits replace a substantial fraction of earnings losses, but meaningful income losses remain after taking into account these benefits; and 4) accounting for both recurrent and lump-sum benefits suggests that combined benefits can fully offset household earnings losses for 20 years or more.

To what extent do these results allow us to draw conclusions about whether benefits are large or small, adequate or inadequate? Such questions are normative and the answers depend in large part on the overarching goals and constraints associated with a particular compensation system. Heaton et al. (2012), for example, argue that the structure and amount of compensation provided to families of combat casualties should adjust to reflect policymaker preferences regarding the desirability of fulfilling goals such as compensating for economic loss, ensuring a stable inflow of new personnel into the military, and appropriately recognizing the sacrifice of those who have given the ultimate sacrifice in serving the country. While normative questions surrounding benefit adequacy are important, resolving them lies beyond the scope of the present inquiry.

At the same time, our analysis does allow us to construct metrics likely to be useful to policymakers in considering whether current compensation policies meet the normative and other goals of DoD, families of servicemembers, and the public at large. One class of measures that capture the extent to which disability payments compensate for lost earnings are "replacement rates," which take ratios of income after benefits to income available without benefits. In some cases replacement rates are measured with reference to earnings prior to the injury, while in other settings replacement rates are measured relative to contemporaneous or expected future income. One reason both measures are commonly used to think about the size and adequacy of benefits is that the two measures can be used to inform different policy questions. For example, if the primary goal of a compensation policy is to ensure the injured households are no worse off economically than they were prior to the

injury, then pre-injury earnings is likely to provide an informative denominator in the replacement rate. Alternatively, if the goal of a compensation policy is to ensure that households experiencing injury are as well-off as they would have been had no injury occurred, a replacement rate that takes into account wage growth and other dynamics of earnings is likely to be preferred. Among economists, who typically think of welfare in utility rather than monetary terms, the latter approach is likely to provide a more natural starting place, but there is no consensus on this issue.

Recognizing the potential usefulness of different measures, in the discussion that follows we consider two different ways of constructing the replacement rate. Both replacement rate measures that we use gauge financial well-being using household income. As mentioned in the previous chapter, however, it is worth noting that the death of a servicemember may also affect household expenses. Some living expenses, such as food and clothing, will decline, while others, related to childcare and home repairs, may rise. Because of these changes in expenses, income-based approaches that do not account for changes in household size will provide an incomplete picture of financial well-being. Although it is not obvious how to account for the various changes in household expenditures that may follow a combat death, an expenditure-based concept can still be useful in interpreting the pattern of income-based replacement rates reported in this chapter. In particular, it provides some rationale for why higher replacement rates for households with (more) children may be appropriate. The proportional decrease in family size is smaller in those households and those households are more likely to experience increased expenses related to childcare.

### Household Earnings Replacement Rates

We first consider replacement rates relative to expected household income in the absence of injury as a measure of how survivor benefits affect the financial status of the household relative to what it would have been if the servicemember has not been injured. We call this the "household earnings replacement rate", which we define as the ratio of total household income, including spouse earnings and survivor benefits, relative to predicted household income if the servicemember had not been injured. Consider a household in which a surviving spouse has $10,000 in earned income and receives $50,000 in survivor compensation, bringing their total income to $60,000. If the household would have earned $70,000 in that year had the servicemember not been injured ($50,000 for the member and $20,000 for the spouse), then the estimated replacement rate for that household in that year would be 86% = $60,000/$70,000. This replacement rate measure provides an indication of how economically well-off an injured household would be relative to a similar uninjured household.

We computed expected household income for each surviving spouse household in each post-deployment year by adding the predicted increase in household income from the regression model described in Chapter 3 to actual household income in the pre-deployment year ignoring the parameter estimates for injury. Thus, expected household income is the household income our regression model predicts a servicemember would have earned in a given post-deployment year had that servicemember not been injured. A decline in household income relative to expected household income results in a replacement rate of less than 100 percent; an increase in household income relative to expected household income results in a replacement rate of more than 100 percent.

Table 5.1 reports the median[26] household earnings replacement rates across households for AC members, with the top panel calculating these replacement rates using only recurrent payments, and the bottom panel incorporating both recurrent and lump-sum payments.

The median household earnings replacement rate for the AC decreases from 87 percent to 78 percent over the first four years after the servicemember's death. The decline is likely due to the termination of some transition benefits (from VA and SSA) as well as the increasing likelihood that the dependent children have become adults or that the surviving spouse has remarried (household size is defined based on the year before the servicemember's deployment). Consistent with the fact that some benefits are only available for households with dependent children, the replacement rates are lowest for households with no children and tend to increase with family size. These patterns are also present for members of the RC, whose median replacement rates are reported in Table 5.2. Without accounting for lump-sum payments, median replacement rates in the RC decline from 105 percent to 88 percent over the first four years after the death. The finding that replacement rates for both AC and RC households tend to be below 100 percent when only recurring payments are considered is consistent with the regression model estimates in Table 4.3 showing a negative average impact of combat death on household income, after including recurring payments from DoD, VA, and SSA.[27]

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26. We report median values because they are less sensitive to outliers than the mean, and may more accurately capture the experience of the "typical" household that experiences a fatality. Because the distribution of replacement rates is right-skewed, the median is also a more conservative measure of the central tendency. For each of the household size groups and years that we consider, the mean replacement rate for that group is larger than the median rate reported in the table. The mean values of the year 4 replacement rates that exclude lump sum payments are statistically different from 100% at the 95% confidence level for both the AC and RC. The 95% confidence intervals for the mean replacement rates that include lump sum payments are larger than 100% for both the AC and RC.

27. Because the function is non-linear and replacement rates vary across individuals, there is no reason to expect that the average replacement rate would equal the ratio of average survivor benefits to average expected household income.

**Table 5.1—Median Household Earnings Replacement Rates: Active Component**

| No Lump-Sum Payments | | | | |
|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 |
| All Deaths | 0.87 | 0.81 | 0.79 | 0.78 |
| By number of children | | | | |
| 0 | 0.51 | 0.49 | 0.49 | 0.49 |
| 1 | 0.90 | 0.82 | 0.81 | 0.77 |
| 2 | 1.01 | 0.93 | 0.92 | 0.89 |
| 3+ | 1.11 | 1.01 | 0.99 | 0.96 |

| Lump-Sum Payments Amortized over 20 Years (without Tax Advantage) | | | | |
|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 |
| All Deaths | 1.29 | 1.19 | 1.19 | 1.16 |
| By number of children | | | | |
| 0 | 1.05 | 0.98 | 0.96 | 0.93 |
| 1 | 1.32 | 1.21 | 1.22 | 1.16 |
| 2 | 1.39 | 1.30 | 1.28 | 1.24 |
| 3+ | 1.49 | 1.37 | 1.33 | 1.29 |

| Lump-Sum Payments Amortized over 20 Years (with Tax Advantage) | | | | |
|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 |
| All Deaths | 1.42 | 1.29 | 1.28 | 1.24 |
| By number of children | | | | |
| 0 | 1.17 | 1.08 | 1.04 | 1.00 |
| 1 | 1.46 | 1.31 | 1.31 | 1.25 |
| 2 | 1.54 | 1.41 | 1.37 | 1.32 |
| 3+ | 1.62 | 1.48 | 1.43 | 1.39 |

**Table 5.2—Median Household Earnings Replacement Rates: Reserve Component**

| No Lump-Sum Payments | | | | |
|---|---|---|---|---|
| | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| All Deaths | 1.05 | 0.97 | 0.91 | 0.88 |
| By number of children | | | | |
| 0 | 0.75 | 0.69 | 0.63 | 0.62 |
| 1 | 0.94 | 0.84 | 0.77 | 0.76 |
| 2 | 1.15 | 1.04 | 0.99 | 0.93 |
| 3+ | 1.30 | 1.20 | 1.11 | 1.12 |

| Lump-Sum Payments Amortized over 20 Years (without Tax Advantage) | | | | |
|---|---|---|---|---|
| | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| All Deaths | 1.49 | 1.33 | 1.29 | 1.22 |
| By number of children | | | | |
| 0 | 1.15 | 1.12 | 1.03 | 1.06 |
| 1 | 1.43 | 1.29 | 1.18 | 1.15 |
| 2 | 1.51 | 1.33 | 1.31 | 1.27 |
| 3+ | 1.80 | 1.60 | 1.50 | 1.46 |

| Lump-Sum Payments Amortized over 20 Years (with Tax Advantage) | | | | |
|---|---|---|---|---|
| | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| All Deaths | 1.63 | 1.45 | 1.38 | 1.31 |
| By number of children | | | | |
| 0 | 1.27 | 1.21 | 1.10 | 1.13 |
| 1 | 1.56 | 1.40 | 1.28 | 1.24 |
| 2 | 1.63 | 1.42 | 1.38 | 1.34 |
| 3+ | 1.97 | 1.73 | 1.62 | 1.55 |

In incorporating the lump-sum payments into our replacement rate calculations, we must make a judgment as to how spread these payments across different years. Rather than assign them all to the first year, we include 5 percent of the value in each year. Assuming that real interest rates of about zero, this is the annual amount that the household would have available in each year if they spread the lump-sum amount over 20 years after the servicemember's death. The choice of 20 years is somewhat

arbitrary, but it is meant as an upper bound on the time it would take for a new child, born in the year after the servicemember's death, to reach adulthood.[28]

After accounting for lump-sum payments, we find overall replacement rates for both the AC (Table 5.1) and RC (Table 5.2) that are above 100 percent for a 20-year horizon, even when we omit the value of the tax advantage for the lump-sum payments.[29] Replacement rates are even higher when we add the value of the tax advantage on the portion (1/20) of the lump-sum payment attributed to each post-deployment year. This pattern is consistent with the calculations in the Chapter 4 that lump-sum income, allowing for the tax advantage or not, could replace lost earnings for over two decades.

The fact that estimated household earnings replacement rates are substantially above 100 percent may raise questions about the appropriateness of current levels of survivor compensation for these families. We note that there are economic arguments for providing replacement rates above 100 percent. First, a large body of evidence suggests that individuals typically enjoy real wage gains as they grow older, particularly early on in their careers. Survivor payments typically do not increase over time in real terms, meaning that over time the relative value of these benefits is likely to erode, and indeed the patterns in Tables 4.3, 5.1, and 5.2 suggest such erosion. Taking a lifecycle perspective, it may be logical to provide benefits above full replacement initially to account for the fact that those killed in combat will not enjoy the earnings growth expected for their uninjured peers. Economic theory also suggests that replacement rates above 100 percent can be justified for occupations (e.g., policing, fire fighting, military service) in which calculated risk-taking is desirable (Seabury, 2002), a perspective that might also rationalize higher payments for military versus civilian surviving households. Indeed, as seen here for the military, it is common for states and municipalities to provide police and firefighters with special payments in the event of disability or death above and beyond what would be given to the general public, leading to higher than typical replacement rates (LaTourrette, Loughran, and Seabury 2008). Moreover, replacement rates above 100 percent might also serve to partly compensate families for non-pecuniary losses, such as lost companionship of a loved one. Payments for such non-pecuniary losses are common in other compensation contexts involving injury and death.

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28. Amortizing over a shorter horizon would increase the annual value of the lump sum payments and hence increase the replacement rate. Using a longer horizon would decrease the replacement rates.

29. The exception is for AC households with no dependent children, two or more years after the servicemember's death. Median replacement rates remain over 90 percent.

## Replacement Rates Relative to Pre-Deployment Member Earnings

As an alternative replacement rate measure, in Tables 5.3 and 5.4, we consider replacement rates defined relative to the servicemember's own earnings in the pre-deployment year. We call this to "own earnings replacement rate." This measure focuses on the flows of income into the household attributable to the servicemember and allows us to assess whether households experiencing a combat death are as economically well-off following receipt of benefits as they were prior to the loss of life. The top panels of Tables 5.3 and 5.4 show that median[30] own earnings replacement rates tend to be below 100 percent when we only consider recurring payments.

The bottom two panels of Tables 5.3 and 5.4 show own earnings replacement rates that account for the value of lump-sum payments. Excluding the value of the tax advantage, median replacement rates over years 1-4 are roughly 170 percent for the AC and 190 percent for the RC. Including the tax advantage increases the median rates to about 185 percent for the AC and 200 percent for the RC. Replacement rates generally increase with the number of children. Across all family sizes, years, and components, replacement rates after accounting for these lump-sum payments are above 140 percent relative to the servicemember's own pre-deployment earnings.

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30. For this definition of the replacement rate in particular, the mean replacement rate is especially likely to be influenced by outlier observations with unusually high replacement rates in cases where the servicemember had very low pre-deployment income. The mean own earnings replacement rates corresponding to the family size groups and years after deployment in Tables 5.3 and 5.4 are in all cases larger than the median rates reported in the tables. As expected, the difference between mean and median rates is larger under this definition of the replacement rate than for the replacement rate relative to household income in Tables 5.1 and 5.2. The mean year 4 replacement rates that exclude lump sum payments are not statistically different from 100% at the 95% confidence level for either the AC or RC. At the 95% confident level, the mean replacement rates that include lump sum payments are statistically different from 100%, but not statistically different from 200%.

**Table 5.3—Median Own Earnings Replacement Rates Relative to Pre-Deployment Member Earnings: Active Component**

| No Lump-Sum Payments | | | | |
|---|---|---|---|---|
| | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| All Deaths | 0.68 | 0.67 | 0.66 | 0.68 |
| By number of children | | | | |
| 0 | 0.56 | 0.55 | 0.57 | 0.57 |
| 1 | 0.72 | 0.68 | 0.67 | 0.67 |
| 2 | 0.71 | 0.71 | 0.68 | 0.69 |
| 3+ | 0.80 | 0.76 | 0.75 | 0.78 |

| Lump-Sum Payments Amortized over 20 Years (without Tax Advantage) | | | | |
|---|---|---|---|---|
| | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| All Deaths | 1.74 | 1.70 | 1.70 | 1.70 |
| By number of children | | | | |
| 0 | 1.41 | 1.40 | 1.40 | 1.40 |
| 1 | 1.88 | 1.78 | 1.75 | 1.76 |
| 2 | 1.84 | 1.82 | 1.83 | 1.83 |
| 3+ | 1.89 | 1.84 | 1.83 | 1.83 |

| Lump-Sum Payments Amortized over 20 Years (with Tax Advantage) | | | | |
|---|---|---|---|---|
| | **Year 1** | **Year 2** | **Year 3** | **Year 4** |
| All Deaths | 1.93 | 1.87 | 1.85 | 1.83 |
| By number of children | | | | |
| 0 | 1.59 | 1.56 | 1.53 | 1.53 |
| 1 | 2.07 | 1.95 | 1.89 | 1.91 |
| 2 | 2.02 | 1.97 | 1.97 | 1.95 |
| 3+ | 2.08 | 1.98 | 1.99 | 1.96 |

**Table 5.4—Median Own Earnings Replacement Rates Relative to Pre-Deployment Member Earnings: Reserve Component**

| No Lump-Sum Payments | | | | |
|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 |
| All Deaths | 0.74 | 0.72 | 0.71 | 0.72 |
| By number of children | | | | |
| 0 | 0.75 | 0.75 | 0.72 | 0.68 |
| 1 | 0.75 | 0.71 | 0.72 | 0.74 |
| 2 | 0.70 | 0.68 | 0.68 | 0.68 |
| 3+ | 0.78 | 0.78 | 0.76 | 0.74 |

| Lump-Sum Payments Amortized over 20 Years (without Tax Advantage) | | | | |
|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 |
| All Deaths | 1.96 | 1.90 | 1.86 | 1.84 |
| By number of children | | | | |
| 0 | 1.69 | 1.65 | 1.65 | 1.65 |
| 1 | 1.97 | 1.92 | 1.88 | 1.91 |
| 2 | 1.93 | 1.82 | 1.79 | 1.80 |
| 3+ | 2.12 | 2.03 | 1.99 | 2.02 |

| Lump-Sum Payments Amortized over 20 Years (with Tax Advantage) | | | | |
|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 |
| All Deaths | 2.17 | 2.07 | 2.03 | 1.97 |
| By number of children | | | | |
| 0 | 1.91 | 1.84 | 1.84 | 1.87 |
| 1 | 2.19 | 2.12 | 2.05 | 2.03 |
| 2 | 2.12 | 1.98 | 1.94 | 1.94 |
| 3+ | 2.33 | 2.21 | 2.17 | 2.17 |

The median own earnings replacement rates presented in Tables 5.3 and 5.4 tend to be smaller than the household income replacement rates presented in Tables 5.1 and 5.2 (though not for all sub-groups) when the lump-sum payments are not considered. This may seem surprising at first because the base (the denominator in the fraction) is larger in the earlier tables where it includes both spousal earnings and income growth over time. This decreases the replacement rates in Tables 5.1 and 5.2 compared to those in Tables 5.3 and 5.4. However, the household income measure also includes spousal income in the numerator, which increases the replacement rate, because the decline in spousal earnings after the fatality is much smaller than the total elimination of the servicemember's own earnings.

One virtue of basing the replacement rate on the servicemember's pre-deployment earnings is that it allows for a rough comparison between compensation provided to survivors of combat death and compensation provided in some other contexts. For example, family members of civilian DoD employees who die while performing their official duties are compensated based on the provisions of the Federal Employee Compensation Act (FECA) using a compensation formula based on prior earnings. Under FECA, spouses of deceased civilian federal employees are entitled to recurring payments of 50 percent of base pay if they have no children, 60 percent if one child, and 75 percent if two or more children. Civilian federal employees also receive a lump-sum insurance payment similar to the SGLI payment through the Federal Employees Group Life Insurance (FEGLI) program; the default FEGLI amount is approximately equal to the decedent's annual pay plus $2,000.[31]

One natural comparison here is to consider the median own earnings annual replacement rate for military survivors based on the military compensation system to that of civilian DoD survivors provided by the civilian compensation system described above.[32] When we consider recurring payments in year 4 only (in the last column of the top panel of Table 5.3 and Table 5.4), we see that the military compensation system provides a higher replacement rate for both actives and reserves except in the case of families with two children, for whom replacement rates are a few percentage points below those in the civilian sector. After taking into account

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31. Reservists who also have civilian federal jobs who are activated and killed in combat may also be eligible for some components of FEGLI, but we ignore that possibility in the calculations that follow.

32. Although we incorporate data on military compensation received over all four of the first four post-deployment years in constructing these measures, at a conceptual level these particular replacement rates can be thought of as static over time, since neither the pre-injury earnings nor the absolute amount of the benefit would change under normal circumstances, unless there was a change in the number of dependent children (through marriage or age) or the surviving spouse remarried. In our military sample, we observe at least 627 cases of SBP benefits being terminated for surviving spouses or children because of loss of eligibility. Because we define family size for military households based on the pre-deployment year, this means that our comparison favors the civilian system (where we consider payments for a household that maintains full eligibility).

lump-sum payments amortized over 20 years (the middle panels of Tables 5.3 and 5.4),[33] we see that replacement rates for surviving families of combat casualties are substantially above those for civilian families. This difference can be traced to the higher basic coverage levels provided by SGLI ($400,000) relative to FEGLI (annual earnings + $2,000). If policymakers believe current compensation levels for survivors on the civilian side are adequate, the fact that replacement rates for military families are substantially above these for both the AC and RC suggests that military survivor compensation may also be viewed as adequate.

## 6. Conclusions

This report developed and estimated an empirical model measuring the financial impact of combat deaths in Iraq and Afghanistan on surviving spouses and children over a four-year horizon. We use information on earnings trajectories for uninjured servicemembers (and their spouses) who were deployed to Iraq or Afghanistan at the same time as those who were killed to estimate counterfactual earnings for what the households with combat fatalities would have earned if the servicemembers had not been injured. The key advantage of our modeling approach is the use of differenced outcome measures, which accounts for unobserved heterogeneity across individuals who ultimately do and do not suffer injury. We further control for a wide range of demographic characteristics in our analysis.

We find substantial household earnings losses following the deaths of servicemembers that increase over the first four years. For AC households the losses increase from $63,000 to $67,000 between years 1 and 4. Losses increase from $59,000 to $65,000 for RC households. Among both types of households, labor market earnings losses are primarily due to the loss in servicemember earnings, but we also observe statistically significant and practically important declines in the earnings of the spouses of fallen servicemembers.

Our discussion and analysis of survivor payments demonstrate that payments come from a variety of sources, including DoD, the VA, and SSA, and represent a mix of both recurrent and lump-sum payments. While recurrent payments alone are insufficient to fully compensate households for earnings losses following the death

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33. We do not take into account the tax-advantaged nature of the lump sum payments for this comparison. Under both systems, the lump-sum insurance payments are tax advantaged, but the value of the tax advantage under the civilian system will depend on the (unknown) exact earnings of the surviving spouse. Including the tax advantage would increase the disparity between the military and civilian replacement rates because the lump sum payments are substantially larger for military combat fatalities. Another complication in making the comparison arises from the fact that we do not have data on SSA payments to civilian DoD survivors. Hence, it is worth noting that the median replacement rates for the military fatalities all remain above 100 percent even if we exclude all SSA payments.

of a servicemember, lump-sum payments from SGLI and the death gratuity, when combined with recurrent payments, are sufficient to fully replace lost earnings for several decades.

There are many possible benchmarks one might consider in assessing the magnitude or adequacy of compensation. We discuss two such benchmarks—one based upon replacement of expected future earnings, and one based upon replacement of pre-injury earnings—and present replacement rates calculated for our sample using both benchmarks. Under both approaches replacement rates are generally less than 100 percent (although above two-thirds) when considering recurrent payments only and well above 100 percent after adding in amortized lump-sum payments. We also show that military survivor benefits are generally higher than benefits for survivors in the civilian federal system.

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