Economics of Education Review 29 (2010) 73–82

Contents lists available at ScienceDirect

Economics of Education Review

journal homepage: www.elsevier.com/locate/econedurev

Military deployments and children's academic achievement: Evidence from Department of Defense Education Activity Schools

Rozlyn C. Engel*, Luke B. Gallagher, David S. Lyle

U.S. Military Academy, Department of Social Sciences, Lincoln Hall, West Point, NY 10996, United States

ARTICLE INFO

Article history:
Received 22 February 2008
Accepted 12 December 2008

JEL classification:
I
I2
I21

Keywords:
Human capital

ABSTRACT

Household disruptions – such as divorce, relocation, and parental absence – have long concerned researchers interested in the educational attainment of children. Here, we consider a plausible source of exogenous variation in work-related parental absences—military deployments to Iraq and Afghanistan in the 2002–2005 period. Combining the standardized test scores of children enrolled in Defense Department schools with their military parent's personnel data, we evaluate the effect of a soldier's deployment on the academic achievement of his or her children. We find that deployments have modest adverse effects in most academic subjects, with lengthy deployments and deployments during the month of testing associated with the largest detrimental effects. Evidence also suggests that these adverse effects may persist for several years.

1. Introduction

In recent years, the question of how various types of household disruptions – such as marital dissolution, household relocations, and changes in maternal labor supply – affect children's academic achievement have occupied researchers for two primary reasons. First, family disruptions have potentially large welfare effects on children via human capital accumulation and lower lifetime earnings. Second, these questions are technically difficult to answer because parents might easily be taking the academic performance of their child into consideration when making decisions that affect their children's schooling environment. For example, recent papers by Gruber (2004) and Katz, Kling, and Liebman (2001) have highlighted the need for careful empirical analysis in this area.

Despite the significant interest in how well children manage family disruptions, research on the closely related question of how work-related parental absences affect children is relatively scarce. Theory provides little firm guidance on the expected direction of the effect. On one hand, a parent's absence could disrupt a child's learning by reducing direct supervision of the child's academic work, by reducing general parental time with children, by disrupting parental roles within the household, and so on. On the other hand, a parental absence could lead to improved academic outcomes if the child develops a greater sense of responsibility or if the parental absence is correlated with higher household income. This question appears to lend itself more readily to empirical analysis.

Interestingly, the small body of existing research on work-related absences has focused disproportionately on military populations, mainly because of the unique nature of military service with its intermittent deployments. Pisano (1992) studied the effects of military deployments to the Gulf War in 1990 and found small adverse affects in reading scores for 158 sixth grade girls. Angrist and Johnson (2000) found that absences due to Gulf War deployments impacted marital dissolution and spousal labor supply, but did not affect child disability rates. Using deployments to the Balkans in the late-1990s, Lyle (2006) found modest

* Corresponding author. Tel.: +1 845 938 5212.
E-mail address: rozlyn.engel@usma.edu (R.C. Engel).

0272-7757/$ – see front matter. Published by Elsevier Ltd. All rights reserved.
doi:10.1016/j.econedurev.2008.12.003

adverse effects in math scores for approximately 13,000 military children living in Texas.

In one sense, deployments may seem a narrow military matter, but as the largest single employer in the United States, with 2.2 million personnel spread over 50 states and over 150 countries, the U.S. Department of Defense's deployment policies affect numerous American communities and hundreds of thousands of families. More than 43% of military households have children, and about 84% of these children are under the age of 14. Moreover, both the frequency and duration of deployments have increased as a result of the Global War on Terror: the U.S. Army increased the share of its active forces deployed from 8% in 2001 to 38% in 2007 and the average length of an Army deployment increased from 6 months to 15 months during that same period. As of February 2007, 700,000 children of military service members have experienced a parental absence as a result of a military deployment.[1] The stress that deployments place on military members and their families has important implications for the long-term viability of the all-volunteer force, the bedrock of U.S. national security system for more than three decades.

This paper expands on existing research in four separate and significant ways. First, ours is the only paper to consider child outcomes in the post-9/11 environment, which has seen a significant increase in troop deployments. The paper has an immediate relevance in the current debate about the impact of deployments on military households. Second, the data set used in this paper is much larger and more geographically diverse than those used in previous work, enhancing the validity and relevance of the estimates presented here. Third, this paper is the first to consider academic achievement across five separate academic subjects, as well as total academic achievement. These results lend added depth to our understanding of how parental absences affect child outcomes. Fourth, we consider several new dimensions of a parent's deployment, including how the length of the deployment and the timing of the deployment come into play. In short, none of the previous studies has presented nearly so comprehensive a picture of children's academic achievement during a parent's absence, and none has captured child outcomes in the current operational environment facing military parents.

Using the test scores and personal characteristics of roughly 56,000 school-age children enrolled in Department of Defense schools between 2002 and 2005, together with administrative data on their military parent's service record, we find that a parent's deployment in the past year reduces his or her child's total test score by 0.42% points. We also estimate the marginal adverse effect of an additional month of deployment to be 0.11% points. Further analysis shows that the effects are most significant for math and science; they are less pronounced, though still statistically significant, for language arts, social studies, and reading. Evidence also suggests that the timing and duration of a parent's deployment matters, and that the adverse effect may persist for several years. Overall, we find that parental absences, within this military context, are associated with slightly lower academic achievement for children.

[1] Figures for the share of the active force deployed, the average length of an Army deployment, and the number of children affected by Army deployments come from Army data files (TAPDB).

2. Department of Defense Schools and the U.S. Army

The Department of Defense has provided "on post" schools for selected military bases in the United States and abroad since the end of the Second World War.[2] The Department of Defense Educational Activity (DoDEA) school system comprises 223 schools in 7 U.S. states, 2 U.S. territories, and 13 foreign countries and contains just over 100,000 students from pre-kindergarten to 12th grade. Approximately two-thirds of children enrolled in the DoDEA system attend a school located outside the United States and about 45% of the students are from Army households. Our sample contains 56,116 observations for DoDEA-enrolled children of enlisted Army personnel between 2002 and 2005.

DoDEA administers the Terra Nova Multiple Assessment Test in March of each year. Widely used across the United States, the Terra Nova is a set of testing instruments that asks a battery of questions designed to "measure concepts, processes, and objectives taught throughout the nation". Although there are some "open-ended" questions, the majority are traditional multiple choice questions. All children in grades 3 through 11 within the DoDEA system must take the Terra Nova test. For each child, we observe a normal curve equivalent (NCE) total score and five subscores in math, science, language arts, social studies, and reading. The NCE ranges from 1 to 99 and is an equal interval metric, making it suitable for regression analysis.

To each child's academic record, we merge his or her parent's administrative data, including deployment history. We infer deployment status from a form of supplemental compensation called hostile fire pay (HFP), which soldiers receive only under specific, well-defined criteria—deployments to hostile operational theatres.[3] We link receipt of monthly HFP with the months of a standard school year, which begins in August and proceeds through March when students take the Terra Nova exams. Accordingly, we construct several deployment variables from HFP data: *ever deployed* equals one if the military parent receives any HFP during the current school year and zero otherwise; *months deployed* equals the number of months that the military parent receives HFP during the current school year; and several variables are constructed to capture the precise months during which the military parent is receiving HFP. We also observe the child's gender and race, as well as the military parent's gender, marital status, education level, occupational specialty, rank, and AFQT score.

[2] See U.S. Department of Defense Education Activity (2005) for more details.

[3] Other studies have used family separation allowance (FSA) to classify absences. Our identification strategy does not permit the use of FSA because it includes discretionary episodes of absences such as schooling, which could introduce bias from the potential endogenous relationship between absences characterized by FSA and children' academic achievement.