Research Report

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The Employment Effects of the My Career Advancement Account Scholarship for Military Spouses

An Analysis of the 2011 Cohort

Active-duty military spouses face difficulty maintaining a career amid the constraints and demands of military life. In particular, the impact of frequent moves to new duty station locations on military spouse employment has been repeatedly documented in research studies (e.g., Burke and Miller, 2016; Wang and Pullman, 2019). Significantly, these challenges could affect retention: In a survey conducted by Blue Star Families, 18 percent of married active-duty service members reported that they consider challenges with spouse employment as a primary factor in considerations to leave the service (Strong et al., 2021).

Federal policymakers are focusing on improving job opportunities for military spouses to promote the economic security of military households. In late 2021, the White House's Joining Forces Interagency Policy Committee released a written strategy to strengthen U.S. military families and listed increased economic opportunity for military families as a policy priority (Joining Forces Interagency Policy Committee, 2021). Congress also continues to pursue policies aimed at supporting military spouse employment,

KEY FINDINGS

- The evidence presented in this report and in previous research suggests that the My Career Advancement Account (MyCAA) Scholarship is supporting its target population.
- We found consistent and sustained evidence that in 2018, spouses who used MyCAA funds had employment rates 10 percentage points higher than before they received the scholarship and 6 to 8 percentage points higher than similar nonusers up to seven years after using the scholarship.
- Employed MyCAA Scholarship users show an upward earnings trajectory after enrollment, reversing what was a flat or decreasing earnings trajectory before using the scholarship.
- MyCAA Scholarship usage is associated with increased personnel readiness, as well as increased attachment to military service.

most recently with bipartisan legislation proposed in 2021 that would incentivize employers to hire military spouses (H.R. 2974, 2021).

These policy initiatives build on the U.S. Department of Defense's (DoD's) programs to support military spouses, specifically the creation of the Spouse Education and Career Opportunities (SECO) program in 2007. SECO encompasses various programs and initiatives, one of which is the My Career Advancement Account (MyCAA) Scholarship, the initiative evaluated for this short report.[1]

MyCAA offers up to $4,000 to military spouses with approved career plans that can be used for tuition and fees related to associate's degrees, certifications, or licenses in portable career fields. The scholarship was developed to achieve several goals: greater satisfaction with military life, increased family financial stability, improved health and wellness of the military community, and increased retention, thereby improving the overall readiness of the armed forces (Office of the Deputy Under Secretary of Defense, 2008).

Eligibility for the current version of the scholarship, implemented in 2010, is tailored to spouses of service members who are relatively new to military life and are early on in their careers. Indeed, these are the spouses most likely to be unemployed, but also with the most to gain from employment in terms of cumulative earnings. According to the 2019 Active Duty Spouse Survey ([ADSS]; see Office of People Analytics, 2020, for the results described here), unemployment was most common among spouses married to junior enlisted service members, younger spouses, spouses with children, and spouses without bachelor's degrees—most of whom fall in the MyCAA target population.

Understanding the effectiveness of MyCAA is critical for determining whether the scholarship meets its goals, whether it is cost-effective, and how it could be improved. The research described here focuses on the employment and earnings outcomes of the cohort of MyCAA users who enrolled between October 2010 and December 2011, shortly after the scholarship took its present form. This report extends early research with the same cohort (Miller et al., 2018) and complements another update of that work, which found that service members with MyCAA-user spouses remain in active duty at higher rates, up to ten years after scholarship usage (Knapp et al., 2019).

Here, we use a weighted propensity score match that compares MyCAA Scholarship users with similar eligible nonusers. We merge three sources of data: (1) administrative MyCAA application and usage data from SECO, (2) demographic data from the Defense Manpower Data Center (DMDC), and (3) annual earnings from the Social Security Administration (SSA). These data allow us to observe characteristics of eligible spouses and their service members at the time the scholarship was implemented in October 2010; see who applied for and used scholarship funds at the beginning of the eligibility window; and view employment and earnings before and after the scholarship usage period. We are able to observe spousal employment trajectories through 2018, the most recent year available in SSA records, and at least four years after the latest date that spouses in this cohort could use their scholarship funds.

The results extend and refine employment and earnings findings from an early evaluation of this cohort (Miller et al., 2018).[2] Building on that earlier work, the current matching method rules out several potential explanations for the estimated differences between users and nonusers, including spouses' employment history, variation in local job market opportunities, and variation in demographic or military career characteristics of the service member and household. In addition, Knapp et al., 2019, used similar methods to provide evidence that MyCAA has a

Abbreviations

ADSS	Active Duty Spouse Survey
DMDC	Defense Manpower Data Center
DoD	U.S. Department of Defense
FICA	Federal Insurance Contributions Act
MyCAA	My Career Advancement Account
OASDI	Old-Age, Survivors, and Disability Insurance
PCS	permanent change of station
PSM	propensity score matching
SECO	Spouse Education and Career Opportunities
SSA	Social Security Administration

causal connection to the service member's continuation in the military.

Previous Literature

Military spouses face significant challenges when it comes to employment and earnings, and a sizeable amount of research has emerged to investigate the issue. These studies show that military spouses earn less than their civilian peers and face additional challenges in continuing their careers after moves associated with a service member's permanent change of station (PCS). Cooke and Speirs, 2005, show that both male and female military spouses earn substantially less than their civilian counterparts, a finding reiterated by Harrell et al., 2004. According to Burke and Miller, 2016, after a PCS move, military spouses suffer a 14 percent decline in earnings, on average, and a much higher likelihood of zero earnings for the year. Hosek et al., 2002, conclude that military spouses earn roughly two-thirds of what their civilian counterparts make annually and that they suffer larger wage losses than their civilian counterparts when they move. Recent analyses show that PCS moves have lasting negative impacts on spouses' careers (Wang and Pullman, 2019) and life satisfaction (Costello, 2020) and that employment levels of military spouses worsened in the years immediately following the Great Recession (Whitby and Compton, 2018). Researchers have recommended spousal career programs as a means of mitigating the constraints of military life and emphasizing the pursuit of portable careers (Ott, Morgan, and Akroyd, 2018; Bradbard et al., 2019).

For military families, a spouse's income can be important in ensuring financial security. The most recent evidence from the Status of Forces survey shows that 24 percent of active-duty service members experienced food insecurity within one year of completing the survey (Office of the Under Secretary of Defense for Personnel and Readiness, 2022b). Rates of food insecurity were higher for junior enlisted service members and those whose spouses were unemployed. Moreover, the same survey showed that junior enlisted service members were most likely to lack emergency savings and that financial challenges increased the likelihood that a spouse held a negative view of military participation (Office of the Under Secretary of Defense for Personnel and Readiness, 2022a). By focusing primarily on spouses of junior enlisted service members, MyCAA targets military families most likely to be in financial distress. Moreover, by funding training in portable career fields, MyCAA is meant to ensure that spousal careers are more resilient to PCS moves—which themselves can be a source of financial strain (Military Family Advisory Network, 2019). Second sources of income can be an important form of insurance against such financial shocks; Blundell, Pistaferri, and Saporta-Eksten, 2016, and Mankart and Oikonomou, 2017, discuss this in the context of civilian households.

By focusing primarily on spouses of junior enlisted service members, MyCAA targets military families most likely to be in financial distress.

Outside of a military context, there exists a large amount of research that provides insight into the possible effects of education and training scholarships similar to MyCAA. Evidence suggests that job training programs, such as the Job Corps program and the Workforce Investment Act Adult program, have provided meaningful increases to wages among workers (Lee, 2009; Heinrich et al., 2013; Flores et al., 2012). Furthermore, research often finds heterogeneity in the effectiveness of training programs. One study on the Job Training Partnership Act (Abadie, Angrist, and Imbens, 2002) found that training was relatively more effective for women in lower quantiles of earnings, whereas it elevated earnings only for men who were in the upper half of the distribution of trainees. These findings suggest that targeting is important and that better understanding of the

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heterogeneous effects of MyCAA funding will be important in developing a more-effective program in the future.

Formal higher education is another path to higher earnings that is often cited by researchers, but effects are still heterogeneous. For example, researchers at the Brookings Institution (Owen and Sawhill, 2013) find that the average return to obtaining a college degree is positive, but not universally: The effects depend on the specific subject area. Other scholars find that a college degree is beneficial in terms of earnings for both the average and marginal student (Oreopoulos and Petronijevic, 2013). Still others find that there are returns to education early in life but that there are minimal benefits to formal education in later adulthood and that on-the-job training might be a more-valuable means of acquiring skills (Silles, 2007). Some of these diverging opinions give continued relevance to early calls made in the field for additional research concerning how returns to education vary based on individual characteristics (Card, 1999).

Of course, the benefits of education and training programs are available only to those who enroll and persist. As such, incentives and scholarships represent another possible avenue for boosting enrollment and completion of training programs and, subsequently, wages and income. For instance, payment incentives for community college students were shown by Barrow et al., 2014, to increase the number of credits earned and marginally improve academic performance and effort. Especially for low-income students, merit aid has been found to boost bachelor's degree completion (Angrist, Autor, and Pallais, 2022) with projected lifetime earnings exceeding marginal educational spending. After considering the cost of scholarships, researchers estimate that average expected lifetime rates of return for universal scholarship programs are significant (Bartik, Hershbein, and Lachowska, 2016).

In sum, research generally finds that education, training, and scholarship programs can substantially increase employment rates and earnings with long-term effects on lifetime income. These findings offer context for the potential value of training programs, education, and scholarship opportunities for military spouses.

MyCAA Details, Data, and Methods

The MyCAA Scholarship

The purpose of the MyCAA Scholarship is to support military spouses who seek training in portable career fields—that is, fields whose skills are in demand across multiple locations, occupations, or industries.[3] Such skills provide career flexibility required by frequent PCS moves that are part of active-duty service. To that end, the MyCAA Scholarship provides up to $4,000 in tuition and examination assistance for eligible spouses for the pursuit of associate's degrees, occupational certificates, or licenses in approved fields (Department of Defense Spouse Education and Career Opportunities, 2021). Using U.S. Department of Labor assessments, DoD establishes which career fields are eligible for the scholarship, but spouses can request that careers not included on the DoD career list be permitted. Examples of eligible career fields include health and human services (e.g., psychologist, dietician, dentist, medical billing), education, animal services, construction, and information technology. For example, spouses might use funds to obtain or update occupational licenses (such as a real estate license) following an interstate move. Funding is generally limited to $2,000 per year. Spouses could attend school full-time or part-time and could also work while in school.

The current version of the MyCAA Scholarship was implemented in October 2010. Spouses of active-duty service members are eligible if they are mar-

ried to active-duty military personnel in the earliest pay grades of a military career and are not on active duty themselves. Interested individuals must create an account and write an individual education plan, which must be approved by DoD. Once the applicant is admitted to a DoD-approved institution, they must submit financial assistance requests to DoD, which will then provide the funding directly to the institution each academic period. After their first academic period, recipients must remain in good standing and remain qualified for MyCAA to receive additional funds. MyCAA plans must be completed in three years (although rare exceptions exist), with a lifetime funding cap of $4,000.

Spouses are no longer eligible for MyCAA funds if they have reached the funding limit; they have failed a class under the scholarship and not sought a waiver; they have failed two classes under the scholarship; they have become active-duty federal service members themselves; they are no longer married to their service member; or their service member has been promoted beyond the eligible pay grades or has left active-duty military service.

Data

To analyze spouse employment and earnings contingent on MyCAA usage, we used a combination of MyCAA program data, DMDC personnel data, and SSA earnings records. We started by identifying the set of all eligible spouses using administrative data from the DMDC. The data recorded demographic characteristics of military service members and dependents on a monthly basis from 2007 to 2018, the most recent year for which we can access SSA earnings records. From these data, we identified military spouses and the number of dependent children in the household. We observed service member characteristics that determined spousal eligibility for MyCAA. We also observed demographic and career characteristics of the service member, specifically service member branch of service, race, age, gender, education, and location. Finally, we observed the spouse's age and gender. Spousal education level, race, and ethnicity are not included in DMDC files.

From the DMDC data, we identified married couples in which the spouse was eligible to use MyCAA funds at some point in the first year of the program, between October 2010 and December 2011.[4] We refer to this as the *enrollment window*. For these couples, we accessed MyCAA program data from SECO. These data indicate whether a spouse applied for educational plans between October 2010 and December 2011 and, if so, details of each plan and the amount of scholarship funds spent. Using these data, we split the sample into two groups:[5]

- **MyCAA users:** These are spouses who obtained approval between October 2010 and December 2011 and who used any scholarship funds before the three-year deadline of December 2014. There are 35,123 users (10 percent of the eligible population).
- **Nonusers:** These are spouses who did not use any scholarship funds, even if they applied and had an educational plan approved. There are 326,973 nonusers who were eligible during the enrollment window.

There are multiple reasons a spouse might be approved for but not use funds, such as losing eligibility or choosing not to enroll in their chosen educational program; such spouses represent 2.2 percent of the full sample of all eligible spouses. There are also spouses who express interest in the program by setting up an online account but do not end up applying for funds; such spouses represent 1 percent of the sample. These groups are too small to allow for matching on the full set of data available, so they are included with other nonusers in our analysis.[6]

We linked SSA earnings records for the 362,096 eligible spouse/service member pairs. These records were linked through an agreement between the RAND Corporation, DMDC, and SSA, under which DMDC provided SSA with the name and Social Security number for each individual in our sample and SSA verified the earnings records for those individuals. SSA used programs that we developed to compute aggregate statistics or estimate parameters of statistical models that were then reviewed for privacy concerns and provided to us.

SSA administers the Old-Age, Survivors, and Disability Insurance (OASDI) program. SSA is able to link records for persons who contribute to OASDI—this constitutes most workers in the United States,

with a few exceptions.[7] Indeed, SSA verified records for 93 percent of our sample (336,021 spouses).[8] Characteristics of the verified sample align closely with the characteristics of the full sample, suggesting that lack of verification is not systematically associated with characteristics that determine program eligibility (see Table A.1). Using the verified sample, we analyzed the reported earnings using those reported for the Federal Insurance Contributions Act (FICA) payroll tax. OASDI and Medicare are funded through the FICA payroll tax. FICA payroll taxes are capped for OASDI at a maximum taxable limit, but payroll taxes for Medicare are not capped. We use earnings reported for Medicare for our analysis.

Analytic Approach

For the purposes of analysis, we define a spouse as *employed* in a calendar year if he or she reports Medicare earnings larger than zero that year. We calculated employment rates each year and then analyzed earnings for individuals who were employed each year. Because of SSA data limitations, our definition of employment will exclude anyone who works for pay but does not report OASDI earnings. Moreover, the definition does not indicate anything about the intensity or nature of the work: whether a person is employed at one or more jobs, works full- or part-time, works the whole year or part of a year, or switched jobs at any point in time. However, as noted also in Miller et al., 2018, there are numerous advantages to our dataset, including administrative data (rather than self-reported), a rich set of household characteristics to incorporate into our analysis, and data on both user and nonuser households.

Our research question asks whether the MyCAA Scholarship meaningfully improves users' careers, specifically their employment rate and earnings. Unlike in a randomized experiment, in which random assignment to the program allows for direct calculation of treatment effects, self-selection into MyCAA usage poses an analytical problem for answering whether the program improves users' employment rates or earnings. MyCAA user households differ from nonuser households in various ways (see Table A.1). Users are more likely to be married to enlisted service members (less likely to be married to commissioned officers) and are more likely to be an Army spouse (less likely to be an Air Force spouse). Our prior work showed that service members married to users were also slightly younger and were more likely to be male, to be Black or Hispanic, and to have experienced a disruptive event during the application window (a deployment or a PCS move [Miller et al., 2018]).

MyCAA users and nonusers could also differ in unobserved ways. For example, MyCAA users might be more motivated than nonusers to create an educational plan, might be more aware of the scholarship, or could have a greater existing need for an educational credential. These differences mean that we cannot automatically attribute differences in outcomes to the scholarship. For example, if we observe that MyCAA users are more likely than nonusers to be employed in the years following the enrollment window, it could be that both scholarship usage and employment are explained by a greater desire to work outside the home.

To control for selection on observable characteristics, we use propensity score matching (PSM). This is a standard tool in the program evaluation literature, allowing for causal inference in nonexperimental settings. A propensity score is an empirical estimate of the probability that an individual spouse is a MyCAA user, given all of their observable characteristics. PSM chooses only the most similar nonusers as a comparison group, excluding the most dissimilar nonusers from analysis.[9]

We calculated propensity scores for each household using all demographic variables available in the data as of December 2011. We included a lagged employment indicator for each year back to 2009 to account for spouses' employment histories prior to and during the eligibility window. We then matched each user household with up to five nonuser households with a similar propensity score. We confirmed that after matching, the covariates are well balanced between user and matched nonuser households (see Table A.2 for a balance table and the appendix for additional details on the method). This means that our matched nonuser group "looks like" user households at the end of the enrollment window.

We then calculated the treatment effect of MyCAA usage equal to the difference in employment

rates between user and nonuser spouses for each year from 2012 through 2018 (the most recently available data from SSA). These treatment effects can be interpreted as difference-in-difference estimates: that is, the relative changes in the probability of employment among MyCAA users after receipt of the scholarship, compared with nonusers.

One additional source of selection is geographic variation in usage: The benefits of a MyCAA Scholarship can vary based on the local labor market. To proxy for local labor markets, we use commuting zones. These are geographic units covering the entire United States; each commuting zone is defined as a combination of counties using commuting data from the Census Bureau (Autor and Dorn, 2013). As a sensitivity analysis, we calculated propensity scores within commuting zone, service branch, and years of service bins and then matched user and nonuser households within those bins. This analysis resulted in a smaller sample size because bins with few MyCAA users had to be excluded from computations. But the results control for geographic differences that might be relevant for explaining MyCAA Scholarship uptake, including variation in the value of MyCAA-supported credentials across local labor markets.

Does MyCAA Usage Increase Employment?

The PSM results are shown in Figure 1. The figure shows differences in employment rates between MyCAA user and nonuser spouses. In the unmatched sample (dotted lines), two patterns are apparent. First, the difference is always positive, indicating that MyCAA users had higher rates of employment than nonusers throughout our observation period. Second, the difference is decreasing prior to and during the enrollment period (indicated by the vertical black lines). This indicates that the employment rate of those who eventually used MyCAA funds declined relative to others prior to receipt of the scholarship.

This relative decline in employment is commonly observed in program evaluation studies and is known as the *Ashenfelter dip* (Ashenfelter, 1978). The dip highlights the potential confounding influence of selection bias when comparing users and nonusers: Because users experienced a decline in employment, they were more likely to need or desire MyCAA funding to pay for additional schooling or career credentials.

The PSM eliminates the Ashenfelter dip. By design, the matched nonuser sample is selected to have the same average employment trajectory prior to the beginning of the program. Thus, the matched differences (solid lines) are zero from 2009 through 2011. After scholarship usage began in 2012, MyCAA users still show higher rates of employment than their matched nonuser counterparts, beginning with a 3 percent difference in 2012 and growing through 2014, at which point most MyCAA users would have reached the end of their scholarship funding period. After that, the difference hovers just below 7 percent through 2018. Therefore, MyCAA usage is associated with a persistent increase in the probability of working for at least six years after MyCAA enrollment.

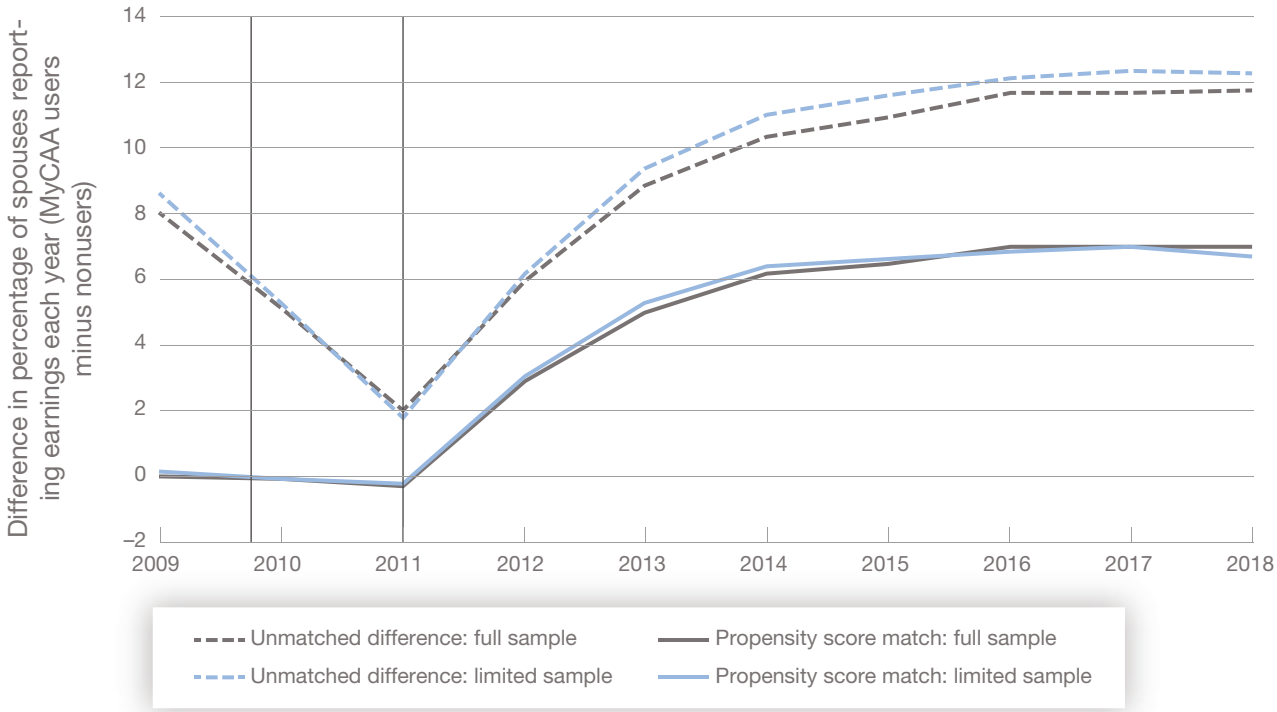
Similarly, the matched difference is smaller than the unmatched difference because MyCAA users are unconditionally more likely to work than nonusers prior to the enrollment window. Therefore, nonusers in the matched sample who by construction "look like" MyCAA users are also more likely to have been employed than unmatched nonusers, shrinking the estimated difference between the two groups.

To put the difference in perspective, Figure 2 shows the postenrollment employment rate for spouses who used MyCAA funds. In 2012, the year after first using funds, 54 percent of MyCAA users were employed. That number grew over time, and by 2018, 67 percent were employed. Given these

MyCAA users had higher rates of employment than nonusers throughout our observation period.

FIGURE 1

Matched and Unmatched Differences in Employment Between MyCAA Users and Nonusers, 2009 Through 2018



SOURCE: DMDC data merged to SSA Medicare earnings records.

NOTE: The full sample consists of 32,950 MyCAA Scholarship users and 303,071 nonusers. PSM resulted in matches between 32,948 MyCAA users and 157,974 nonusers. Calculations within commuting zone, service branch, and years of service bins eliminated bins with few users. The resulting sample consists of 19,330 users and 157,494 nonusers, with matches between 18,742 users and 76,552 nonusers. Standard errors (not plotted) show that the matched differences are statistically significant at the 1 percent level after 2011. The vertical black lines show the MyCAA enrollment window, October 2010–December 2011.

levels of employment, MyCAA users are about 10 percent more likely than matched nonusers to be employed as of 2018. These levels also compare favorably with military spouses in general: At the time of the 2019 ADSS, 50 percent of active-duty spouses were employed.[10]

Interpreting Matched Employment Results

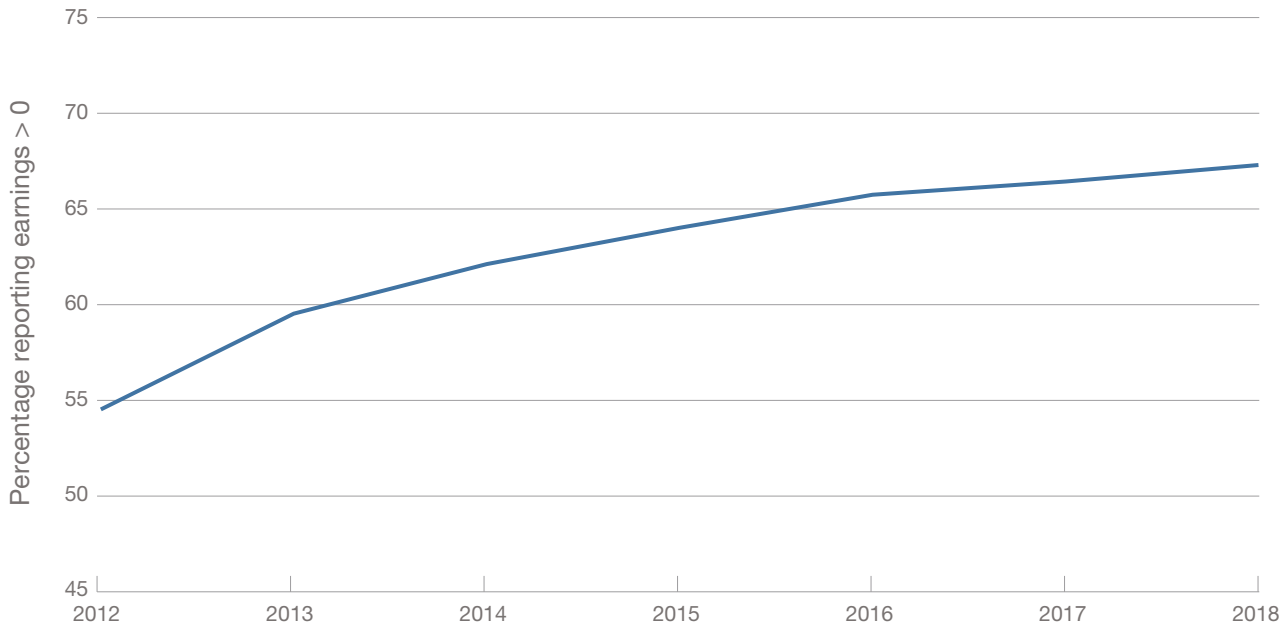
The findings illustrated by Figure 1 raise the question of whether MyCAA has a causal effect on employment: Did MyCAA funds meaningfully enable users to find employment that they would not otherwise have been eligible for, or does MyCAA assist spouses who would have found a job anyway?

Either story could be true, depending on unobservable differences between users and nonusers, particularly regarding their desire to remain in the labor force and their awareness of the MyCAA program. PSM yields a causal interpretation only under stringent assumptions regarding selection on unobservable characteristics. Our results do eliminate some competing noncausal explanations for any differences in employment between users and matched nonusers. We can rule out observable demographic characteristics as an explanation for the differences: number of children, age, gender, length of marriage since the service member joined the military, and such service member career characteristics as pay grade. We can also rule out differences in the service member's career history because we match on whether a service member was deployed, had a PCS move, or was promoted in each year going back to 2009.

Importantly, we can further rule out spouses' historical attachment to the labor market because

FIGURE 2

Employment Rate of MyCAA Users in Postenrollment Period, 2012–2018



SOURCE: DMDC data merged to SSA Medicare earnings records.
NOTE: The sample consists of 32,950 MyCAA Scholarship users.

we also match on spousal employment history going back to 2009. In our sensitivity analysis matching within commuting zone, service member years of service, and service branch, we can rule out differences in local labor market characteristics and local differences in awareness of MyCAA among spouses with similar amounts of experience with military life.

It is the case that we cannot rule out all unobservable differences and so cannot say with certainty that there is a causal effect. However, given that we control for employment history, there would need to be a differential *change* in spousal attachment to the labor market among MyCAA users versus nonusers. Such a change is difficult to justify because we have also controlled for a variety of confounding factors that might affect a spouse's interest in working: number of children, sponsor deployment, and PCS moves.

Rather than unobserved changes in labor force attachment, we believe unobserved differences in spousal awareness could explain some of the effects. Evidence from the ADSS indicates that some spouses in the nonuser sample wanted additional education and could not afford it but did not know about MyCAA. As late as 2019, after the end of our observation window, the plurality (46 percent) of ADSS respondents reported that they were unaware of the MyCAA Scholarship (Office of People Analytics, 2020). Moreover, 41 percent stated that they would like to be enrolled in school or training but were not currently; of those, 73 percent said cost of education was a barrier. Although the results were not disaggregated based on respondents' MyCAA eligibility, the survey showed that several years after the program began there was still latent need for MyCAA. Unobserved differences in pursuing additional education or training, therefore, do not explain all differences between users and nonusers.

Ultimately, although we caution against drawing a causal connection between MyCAA and employment outcomes, we conclude that MyCAA supports military spouses who want to work and that lack of awareness of the program remains a barrier to uptake and to pursuit of further education. Moreover, Knapp et al., 2019, showed that a spouse's MyCAA usage is associated with higher

continuation rates of their sponsoring service member. Therefore, the MyCAA Scholarship is supporting military families with a higher-than-average commitment to military life, and its users go on to have higher-than-average rates of employment several years after program participation.

Do MyCAA User Earnings Increase Over Time?

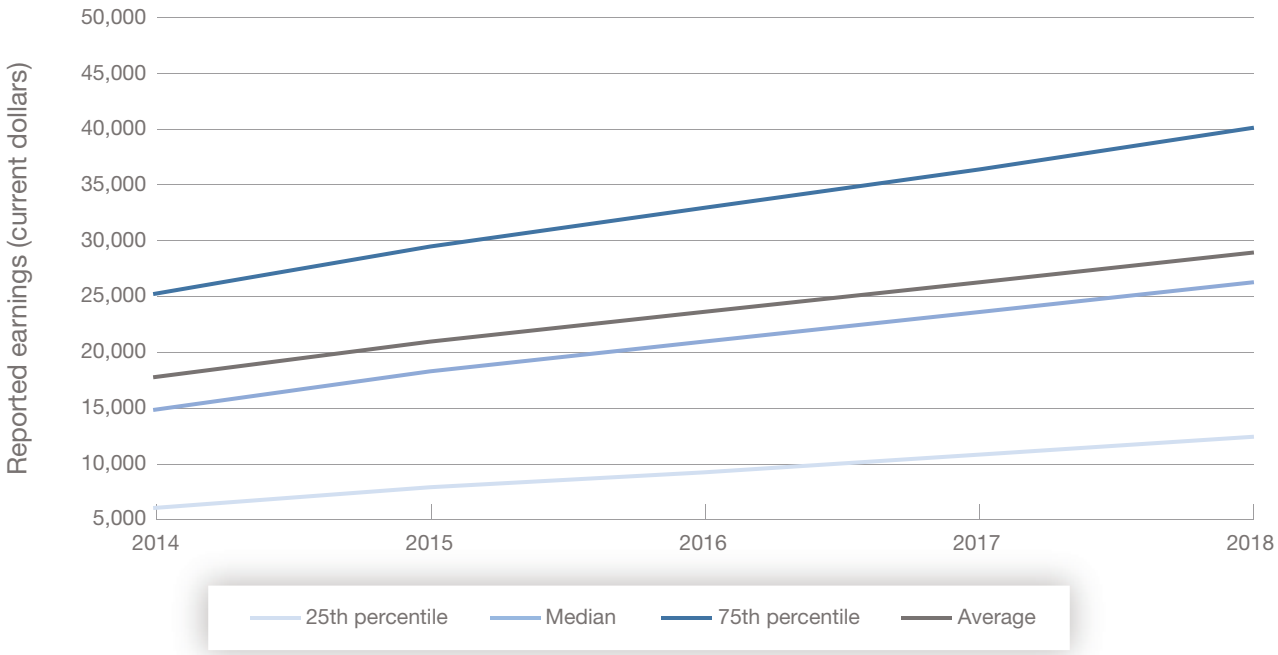
MyCAA is associated with higher rates of employment after enrollment. The natural next question is whether users' earnings improve over time, conditional on users being employed. Miller et al., 2018, showed that working spouses who eventually used MyCAA had flat income trajectories in the years prior to the program, between $10,000 and $11,000 from 2007 to 2010, and that their incomes dipped between $9,000 and $10,000 in 2011. However, after they started using funds, earnings began to rise, hitting nearly $14,000 in 2013.[11]

We updated these calculations for working MyCAA users through 2018.[12] Figure 3 shows the distribution of earnings among working MyCAA users in each year since 2014, in current (i.e., not inflation-adjusted) dollars. The average earnings (gray line) increase linearly, from $17,536 in 2014 to $28,647 in 2018. The year-on-year increase of $2,800 is on par with that observed by Miller et al., 2018, starting in 2011. This represents a 10 to 16 percent increase in nominal wages each year, well above the national average during this period (Economic Policy Institute, 2022).

Figure 3 also shows the median and interquartile range (75th and 25th percentiles) of the earnings distribution for working MyCAA users. It is typical of income distributions that the average is higher than the median, as is true here. However, the median has kept pace with the average over time. The percentiles also increase linearly, although the distribution of income has widened: The interquartile range has increased by more than $8,000, from $19,025 in 2014 to $27,618 in 2018. Still, at all percentiles shown, earnings grew between 60 and 105 percent over four

FIGURE 3

Distribution of Earnings Among MyCAA Users with Positive Earnings



SOURCE: DMDC data merged to SSA earnings records.
NOTE: By *current* dollars, we mean non-inflation-adjusted dollars.

years. Miller et al., 2018, previously found that as of enrollment in 2011, employed users earned about $9,400 on average; based on this finding, earnings roughly tripled by 2018.

The findings described above might obscure differences between users based on demographic characteristics. Table 1 shows 2018 employment rates and earnings conditional on working based on the characteristics of MyCAA users as of the end of the enrollment period. Employment rates show more variation than earnings. Users married to a service member in pay grade O-2 were least likely to be employed (52 percent), whereas users who enrolled in an associate's degree program were most likely to be employed (70 percent); other subgroups had employment rates in between. However, regardless of characteristics, working spouses had median earnings of between $24,000 and $29,000 and average earnings between $27,000 and $31,000. The only exception was spouses of officers, whose median and average earnings were higher.

Given the evidence from ADSS that working spouses experience breaks in employment after PCS moves (Friedman, Miller, and Evans, 2015), we also examined employment rates and earnings over time based on years of service in 2011. Because PCS moves

TABLE 1
Employment and Earnings Outcomes for MyCAA Users as of 2018

Characteristic as of 2011	*N*	Percentage Reporting Earnings in 2018	Median Earnings If >0, 2018	Mean Earnings If >0, 2018
All users	32,950	67.2	$26,106	$28,647
Married to E-3	5,508	69.8	$25,303	$27,388
Married to E-4	12,488	69.2	$25,409	$27,811
Married to E-5	11,534	65.9	$26,818	$29,366
Married to O-2	734	51.9	$29,746	$32,466
Enrolled in associate's degree program	14,652	70.1	N/A	N/A
Enrolled in certification program	22,062	65.8	N/A	N/A
Army spouse	16,456	67.8	$25,329	$27,702
Air Force spouse	5,344	66.2	$27,309	$29,841
Marine Corps spouse	5,434	68.3	$26,331	$28,833
Navy spouse	5,716	65.5	$27,629	$30,152
Metropolitan area	26,790	67.3	$26,330	$29,062
Micropolitan area	4,620	67.3	$26,409	$28,646
Small town	833	70.6	$25,505	$27,461
Rural area	347	69.2	$24,036	$26,141
Unknown urban/rural	3,149	67.6	$26,344	$28,317
0 children	12,877	67.1	$28,294	$30,912
1 child	9,944	66.7	$25,510	$28,128
2 or more children	12,918	68.4	$24,620	$27,440

SOURCE: DMDC data merged to SSA earnings records.

NOTE: This table reflects unadjusted earnings for MyCAA users only. Earnings by type of educational program were not calculated. *N* = sample size; N/A = not available.

occur regularly, service members with the same years of service should experience PCS moves around the same time. Thus, breaks in their spouses' employment should be observable in the following year's data. However, we did not find any dips in employment rates in any year among users regardless of the service member's years of experience at the time of enrollment. Nor did we observe significant deviations from the trend line for earnings conditional on employment. Thus, we do not find evidence that MyCAA users experience substantial breaks in their careers because of PCS moves—however, future research could verify that pattern by examining individuals' employment trajectories over time rather than comparing group averages.[13]

Conclusion and Future Research Questions

The evidence presented here and in our previous research (Miller et al., 2018; Knapp et al., 2019) suggests that MyCAA is supporting its target population: military families with a commitment to active duty and in the pay grades that are most vulnerable to financial stress. In households using MyCAA Scholarships, spouses are more likely to be employed, and service members serve longer careers in active duty, compared with similar households that did not use the scholarship. In addition, employed MyCAA users show an upward earnings trajectory after enrollment, reversing what was a flat or even decreasing earnings trajectory before using the scholarship.

Our findings are consistent with the possibility that MyCAA strengthens military families' financial stability. Evidence also suggests that at least some nonusers did not use the program because of lack of awareness rather than lack of need or desire; moreover, cost constraints are inhibiting some spouses from pursuing further education or training. Therefore, there is latent demand for the program. Recent initiatives might improve awareness and uptake, such as the Joining Forces Interagency Task Force's commitment to expand MyCAA Scholarship eligibility to include national testing and continuing education credits, in addition to expanding or changing other SECO initiatives (Joining Forces Interagency Policy Committee, 2021).

Combined with the conclusions of Knapp et al., 2019, our findings show that MyCAA Scholarship usage is associated with increased personnel readiness (through increased financial stability), as well as increased attachment to military service (through higher continuation rates). Therefore, MyCAA supports the readiness of the U.S. armed forces and is an investment in those military families with higher-than-average attachment to military life, providing funds with which military spouses materially increase their families' financial stability.

This work, like the prior work on which it is based, examined the first cohort of spouses who were eligible for the current incarnation of the scholarship. The results raise several questions that remain unanswered. Below, we discuss a few of the most relevant directions for future research.

First, future research should address some of the estimation challenges posed by our data and examine additional patterns that were unexplored here. In particular, a matched earnings analysis would provide context for the increase in users' earnings shown in Figure 3. Prior literature emphasizes the relevance of heterogeneity in program effects, and more fully assessing that heterogeneity for MyCAA is an important future step. To that end, analyses of MyCAA usage and outcomes by additional demographic characteristics and geographic location would provide additional guidance for improving program outreach and understanding which spouses benefit most from the program. Analyses by type of credential and field of study would also help DoD assess the types of careers that are eligible for MyCAA funds and target the program to those fields with the most benefit for spouse users.

Second, research should examine whether MyCAA usage has changed since 2011 and whether the outcomes of later cohorts mirror those of the cohort studied here. Have the characteristics of MyCAA users changed? Have enrollment rates risen, and why or why not? The 2019 ADSS found that the plurality (46 percent) of all military spouses had never heard of the program (Office of People Analytics, 2020), so it is likely that awareness still poses a barrier to enrollment. Are users from later years

experiencing similar rates of employment as the users in this study?

Research could also seek additional evidence for the benefits of MyCAA by examining the postseparation outcomes of MyCAA user households after service member separation. In the SSA administrative data, both spouses' and service members' earnings continue to be observable after the individual DMDC records are terminated. Research should establish whether the benefits of MyCAA change after separation: Are the earnings and employment of spouses different depending on whether their service member stays in the military or separates? In addition, to what extent do MyCAA users' earnings fill a household income gap in case a newly separated service member does not find immediate employment?

Additionally, research could describe employment and earnings outcomes for MyCAA users before and after stressful military career events, such as deployments and PCS moves. Does the MyCAA Scholarship provide a buffer against the adverse career impacts of these events? Relatedly, do any of the patterns examined above differ by the type of educational credential, the field of study, the geographic location, or the type of school?

Finally, research could examine how pandemic-related changes to work have affected military spouses. Have work-from-home policies made it easier or more difficult to maintain a career as a military spouse? Have pandemic unemployment rates differed between spouses who used MyCAA and those who did not? How has the pandemic shifted the career fields in which spouses work? Have these changes—or the pandemic at large—affected the usefulness or need for MyCAA-eligible educational credentials? The answers to these questions could inform the future of the MyCAA Scholarship program as military families adapt to a new era of work.

Appendix: Data and Methods

This appendix provides additional details on the analytic dataset and the statistical methods used to calculate the results.

Record Verification

As explained in this report, DMDC records of service members or spouses might fail to be verified by SSA, either because the person does not have any OASDI earnings or because of a mismatched name or Social Security number. This raises a concern that the analytic sample of verified records might be observably different from the full sample of all eligible spouses. Table A.1 provides a comparison of the full (DMDC-only) sample and the verified (SSA) sample for the characteristics that determine program eligibility, based on eventual MyCAA usage.

Comparing the DMDC-only and SSA-verified columns for each spousal group, the characteristics of the verified sample align closely with the characteristics of the full sample. This suggests that lack of verification is not systematically associated with characteristics that determine program eligibility.

Comparing the corresponding columns for users versus nonusers, it is apparent that users differ from nonusers. Users are more likely to be married to enlisted service members (less likely to have a commissioned officer service member) and are more likely to be an Army spouse (less likely to be an Air Force spouse). Our prior work showed that service members of users were also slightly younger and were more likely to be male, to be Black or Hispanic, and to have experienced a disruptive event during the application window (a deployment or a PCS move).[14] These differences support the use of the propensity score to find an observably similar comparison group for MyCAA users.

Propensity Score Matching

In describing the PSM methodology used in this report, we draw from a related RAND report (Knapp et al., 2019), with omissions and minor adjustments. Prior work provides extensive guidance on using propensity score methods. Using data from a randomized experiment, Heckman, Ichimura, and Todd, 1997, and Heckman et al., 1998, examined how such methods perform compared with the "true" experimental treatment effect. These foundational studies found that matching can closely replicate causal estimates from experimental data, but care must be taken to ensure

TABLE A.1

Characteristics of Eligible MyCAA Users as of December 2011, by Scholarship Usage

Characteristic as of December 2011	Percentage of MyCAA Users		Percentage of MyCAA Nonusers	
	DMDC Data Only (*N* = 35,123)	Verified SSA Data (*N* = 32,950)	DMDC Data Only (*N* = 326,973)	Verified SSA Data (*N* = 303,071)
Married to E-1	<0.1	<0.1	1.6	1.6
Married to E-2	1.9	2.0	2.5	2.5
Married to E-3	16.2	16.7	14.1	14.3
Married to E-4	38.2	37.9	32.6	31.1
Married to E-5	35.2	35.0	34.6	35.1
Married to E-6 or higher	2.8	2.8	6.3	6.7
Married to commissioned officer	3.9	3.7	6.4	6.7
Married to warrant officer	1.6	1.6	1.9	2.0
Army spouse	50.6	49.9	45.8	46.0
Air Force spouse	15.7	16.2	20.5	21.3
Marine Corps spouse	16.5	16.5	14.0	13.0
Navy spouse	17.2	17.3	19.7	19.7

NOTE: *N* = sample size.

that the estimates are valid. They recommend matching within geographic area (as we do within commuting zone) and incorporating preintervention measures of outcomes (in this case, employment in each year prior to program eligibility) to control for unobservable time-invariant characteristics. More-recent work has reaffirmed these recommendations (Caliendo, Mahlstedt, and Mitnik, 2017).

The empirical framework is as follows: MyCAA usage is the treatment, indicated by the binary variable $D = 1$. Service members and their spouses have observable characteristics X. Each spouse has two possible outcomes at each time t, Y_{1t} or Y_{0t}, which are binary variables indicating employment in year t after having used scholarship funds (Y_{1t}) or not (Y_{0t}). We observe only one outcome in reality, depending on treatment status: $Y_t = D\,Y_{1t} + (1 - D)\,Y_{0t}$.

We are interested in the effect of MyCAA on those who use it, i.e., the average treatment effect on the treated (ATET), defined as

$$ATET_t = E\left[Y_{1t} | D = 1, X\right] - E\left[Y_{0t} | D = 1, X\right].$$

Matching is warranted because a comparison group must be constructed for which

$$E\left[Y_{0t} | D = 0, X\right] = E\left[Y_{0t} | D = 1, X\right],$$

allowing for estimation of ATET even though $E\left[Y_{0t} | D = 1, X\right]$ cannot be estimated directly from the data.

The validity of matching relies on assumptions outlined in Rosenbaum and Rubin, 1983. The primary assumption is that the outcomes Y_{1t} and Y_{0t} are independent of treatment once they are conditioned on the observables:

$$\left(Y_{0t}, Y_{1t}\right) \perp D | X.$$

In addition, it is assumed that for any combination of characteristics X, the spouse has a positive probability of selecting into treatment and of opting out. In other words, it is not certain that a spouse will definitely enroll in MyCAA or definitely not enroll:

$$0 < \Pr(D = 1 | X) < 1 \; \forall X.$$

If both assumptions are satisfied, then, as Rosenbaum and Rubin, 1983, show, the untreated group provides a valid comparison for the treated group in the sense that the distribution of untreated outcomes is the same as the distribution for the treatment group if they had not used MyCAA:

$$E\left[Y_{0t} | D = 0, X\right] = E\left[Y_{0t} | D = 1, X\right] = E\left[Y_{0t} | X\right].$$

In addition, under these assumptions, instead of conditioning on the full set of variables X, we can condition only on the probability of selecting into treatment. This probability is estimated by the propensity score, which becomes a sufficient statistic for matching the treatment and control groups.

The assumptions are quite stringent, as they require that selection into treatment depends only on characteristics that are observable to the researcher (Heckman and Robb, 1985). As explained in Heckman, Ichimura, and Todd, 1997, they also require that researchers know just as much information about the treatment as do the prospective participants. In other words, if eligible users condition their usage decision on information that is unknown to the researchers—including personal payoffs of the scholarship—then the assumptions would be violated.

Local job opportunities constitute one source of unobserved variation. To control for local labor markets, we performed a sensitivity analysis that matched users and nonusers within the commuting zone. We linked each household's zip code to the commuting zone using the 2000 definition from Autor and Dorn, 2013. Households located abroad were grouped together as a separate zone. Across commuting zones, uptake varies from 0 percent to more than 15 percent of all eligible users.[15] We then calculated propensity scores for separate bins defined by a combination of commuting zone, years of service, and service branch. We matched users and nonusers within each bin.

For both the full-sample matching and the within-bin matching, propensity scores were estimated as the predicted probabilities from a probit regression using regressors X listed in Table A.2, plus a quadratic term in spouse's age and interactions between spouse's age and number of children, with one regression for each bin:

$$Probit(MyCAA\ User) = \beta_0 + \beta_1 \cdot X + \beta_2 \cdot age + \beta_3 \cdot age^2 + \beta_4 \cdot age \times number\ of\ children + \epsilon.$$

From the probit regression, we calculated for each spouse a predicted probability that they used MyCAA. MyCAA users were matched to nonusers within the same bin using propensity score, using the PSMATCH package in SAS (SAS Institute Inc., 2018). We matched each user to five nearest neighbors (with replacement) using a caliper equal to one-quarter of the standard deviation of all propensity scores (as recommended by Rosenbaum and Rubin, 1985).

Covariate Balance

To check the quality of the PSM, we examined covariate balance. If the matched users and nonusers have the same distributions of observable characteristics, the standardized difference in means should be zero. Table A.2 shows the standardized differences for the two matched samples used in the analysis. The values are very close to zero for all variables.

TABLE A.2

Standardized Differences in Observable Characteristics Between MyCAA Users and Matched Nonusers

Characteristic (As of December 2011)	Standardized Difference, Matched Full Sample	Standardized Difference, Matched Commuting Zone/Years of Service/Service Branch Bins
Propensity score	0.014	<0.001
Spouse age in years	–0.011	–0.004
1 child less than 5 years old	<0.001	–0.001
2 or more children less than 5 years	<0.001	0.004
1 total dependent child	–0.002	0.004
2 or more total dependent children	–0.005	<0.001

Table A.2—Continued

Characteristic (As of December 2011)	Standardized Difference, Matched Full Sample	Standardized Difference, Matched Commuting Zone/Years of Service/Service Branch Bins
Location		
East North	–0.003	<0.001
East South	0.002	<0.001
Middle Atlantic	–0.001	<0.001
Mountain	<0.001	<0.001
New England	0.002	-
Outside USA	–0.001	<0.001
Pacific	0.001	<0.001
South Atlantic	0.001	<0.001
West North	–0.004	<0.001
West South	<0.001	-
Other	–0.001	0.002
Air Force	0.002	<0.001
Marine Corps	0.002	<0.001
Navy	0.002	<0.001
Service member years of service		
1	0.002	<0.001
2	–0.003	<0.001
3	<0.001	<0.001
4	0.003	<0.001
5	0.005	<0.001
6	0.004	<0.001
7	<0.001	<0.001
8	0.002	<0.001
9	0.001	<0.001
10 or more	0.003	<0.001
Married less than 2 years	–0.006	<0.001
AFQT Category I, II, or III	–0.005	<0.001
Service member age in years	–0.010	<0.001
Service member pay grade		
E-1	–0.006	–0.001
E-2	0.003	0.001
E-3	0.004	<0.001
E-4	<0.001	<0.001
E-6	–0.005	<0.001
Commissioned or warrant officer	–0.004	–0.003
Service member education		
Less than high school	–0.004	–0.001
Associate's degree	–0.005	0.003
Bachelor's degree or higher	–0.002	0.002

Table A.2—Continued

Characteristic (As of December 2011)	Standardized Difference, Matched Full Sample	Standardized Difference, Matched Commuting Zone/Years of Service/Service Branch Bins
Service member race/ethnicity		
American Indian/Alaska Native	−0.001	−0.002
Asian/Pacific Islander	−0.003	−0.002
Black (not Hispanic)	<0.001	0.013
Hispanic	-0.004	0.001
Other	<0.001	<0.001
Unknown	−0.002	−0.001
PCS move in 2011	<0.001	<0.001
Service member promoted since 2009	−0.003	0.003
Service member promoted since 2010	−0.005	0.001
Spouse employed in 2009	<0.001	0.003
Spouse employed in 2010	−0.001	−0.001
Spouse employed in 2011	−0.006	−0.005

SOURCE: DMDC data merged to SSA earnings records.
NOTE: The full-sample calculations are based on 32,950 MyCAA Scholarship users and 157,974 matched nonusers. The within-bin calculations are based on 18,742 users and 76,552 matched nonusers. AFQT = Armed Forces Qualification Test.

Notes

1 Miller et al., 2018, provides additional information on other SECO initiatives, and Figure 1.1 in that report provides a map of the SECO portfolio.

2 This study also fits in a broader portfolio of RAND National Defense Research Institute research on SECO, including internal monitoring for the Military SECO Program (Gonzalez, Miller, and Trail, 2016), the Military Spouse Employment Partnership (Gonzalez et al., 2015), and military spouse survey results on education, employment, and awareness of the MyCAA Scholarship program (Friedman, Miller, and Evans, 2015).

3 The description of the program and cohort in this section is based on the report of the early evaluation of this cohort (Miller et al., 2018).

4 Spouses must go through an application process and meet with a program representative prior to being approved for MyCAA funds. Therefore, ineligible spouses would not be able to use funds, and we do not have to worry about noncompliance in our analysis.

5 The sample used here is similar to that used in Knapp et al., 2019. The reported sample sizes might differ because the earlier study, which focused on continuation, excluded eligible households if the sponsor left active duty prior to December 2011. That sample requirement is not instituted here because the focus is on employment and earnings outcomes for spouses rather than service continuation outcomes for service members.

6 Miller et al., 2018, referred to these groups respectively as "nonstarters" and "interested non-users," and Chapter 3 of that report provides some detail on the characteristics of those spouses vis-à-vis users and other nonusers. We include these spouses in our comparison sample because they improve match quality by providing a larger set of spouses who "look like" users.

7 One exception is state and local public-sector employees covered by their own disability insurance plans. Other exceptions might include workers who are not reporting earnings (e.g., those paid in cash) and some part-time workers.

8 In addition to reasons given above, a person might not have a verified record if their name or Social Security number is listed differently or incorrectly in the DMDC database compared with the SSA database.

9 As indicated in the note in Figure 1, in our full-sample PSM, two MyCAA users were excluded because there were no comparable nonusers; 154,974 nonusers (out of 303,071, or 52 percent) matched to at least one user to form the comparison group.

10 This statistic is imputed from our prior report analyzing ADSS data (Friedman, Miller, and Evans, 2015), which states 64 percent in the labor force and a 22 percent unemployment rate, suggesting that 49.9 percent of spouses were currently working at the time the ADSS was conducted.

11 See Miller et al., 2018, Figure 5.4.

12 Although a matched earnings analysis, analogous to that in Figure 1, would be relevant here, because of contract constraints with SSA we were unable to perform those computations.

13 These results are not shown because the patterns are similar to those plotted in Figures 2 and 3.

14 See Knapp et al., 2019, Table 1, for these summary statistics.

15 See Knapp et al., 2019, Figure 2, for a map of MyCAA usage by commuting zone.

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About This Report

Active-duty military spouses' career opportunities are a policy concern. Past research and surveys have shown that, compared with spouses of U.S. civilians, spouses of U.S. military personnel tend to earn less and are more likely to be unemployed or underemployed. Spousal career challenges also contribute to dissatisfaction with and separation from military service. Accordingly, the 2021 Joining Forces Interagency Policy Committee includes strengthening economic opportunity for military families as a policy priority.

The Department of Defense's Spouse Education and Career Opportunities (SECO) program is one source of support for military spouses pursuing civilian careers. SECO is a portfolio of initiatives that provide career development and employment assistance for military spouses, one of which is the My Career Advancement Account (MyCAA) Scholarship. Eligible military spouses may use scholarship funds to pursue associate's degrees, occupational certificates, or licenses in portable career fields.

To support the effective design and implementation of programs such as MyCAA, the authors analyzed the employment outcomes for the cohort of MyCAA users who enrolled shortly after the scholarship in its present form began in October 2010. This research is part of a larger portfolio of work studying SECO initiatives. Much of the description of MyCAA and the study cohort is drawn from a prior RAND report (Miller et al., 2018), with some adjustments. Compared with earlier research on MyCAA, this study used more-advanced statistical models to refine comparisons between households that used MyCAA funds and households that were eligible but did not use these funds.

This research should be of interest to decisionmakers responsible for programs and policies supporting military households and scholars who study military personnel issues. It might also be of interest to researchers who study employee compensation and benefits and decisionmaking more generally, especially for secondary earners and mobility-constrained employees.

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