

Introduction

The Federal Voting Assistance Program's 2012 Post-Election Report to Congress reported that active duty military (ADM) members who used voting resources supplied by FVAP or the Department of Defense (DoD) were more likely to return their ballots. The report went on to say that FVAP would continue to examine the nature of the relationship between the use of FVAP/DoD resources and participation. This Research Note provides a detailed analysis of the 2012 Post-Election Survey data, which uses several well-known statistical methodologies to produce estimates of differences in the probability of participation between resource users and nonusers, controlling for differences in relevant characteristics of these groups.

During the 2012 election cycle, FVAP provided the following voting resources:

- **FVAP's website, FVAP.gov.** In addition to providing absentee voting information to UOCAVA voters, the site allowed users to download the Federal Post Card Application (FPCA) and the Federal Write-In Absentee Ballot (FWAB), two FVAP-prescribed forms that allow potential voters to register to vote, request absentee ballots, and cast backup ballots. The site also featured online assistants for each form that guided voters through each item on the forms and provided detailed State-specific information and requirements.
- **Voting Assistance Guide (VAG).** This detailed handbook, updated every two years, provided State-specific voting information—including deadlines, process details and contact information—in electronic and print formats.
- **FVAP Call Center.** This center provided assistance to callers during the months leading up to the 2012 presidential election.

Other DoD components provided the following voting resources:

- **Unit Voting Assistance Officers (UVAOs).** Throughout each Service, military members provided voting assistance at the unit level to military members and their dependents.
- **Installation Voter Assistance (IVA) Offices.** These dedicated voter assistance offices were established on military installations as a requirement of the Military and Overseas Voter Empowerment (MOVE) Act of 2009. They provided voting support to military members, their dependents, and other voters who visit the offices.

FVAP's 2012 Post-Election Report to Congress reported that ADM members who used voting support resources supplied by FVAP or DoD were more likely to return their ballots.

The analysis conducted for the 2012 Post-Election Report to Congress focused on the voting behavior of the ADM population captured in the FVAP Post-Election Survey, the extent to which they used the FVAP resources and other voting resources provided by DoD, and how satisfied the users were with the resources. To try to determine the direct impact of the use of DoD voting assistance resources on the probability an individual voted, FVAP's 2012 Post-Election Report also included an analysis that compared respondents who received an absentee ballot and used at least one of three resources (the FVAP website, UVAOs and IVA Offices) to respondents who received a ballot but did not use any FVAP or DoD resources. The analysis found that while 86% of respondents who used at least one resource submitted an absentee ballot, only 80% of respondents who did not use a resource submitted an absentee ballot. This meant that, for the first time, FVAP was able to document a positive relationship between the use of DoD voting assistance resources and a voter's likelihood of actually participating and returning a ballot.

This kind of impact on participation is the clearest indicator of not only FVAP program effectiveness, but also overall effectiveness for DoD efforts. However, it is difficult to draw causal relationships between resource use and participation. These results could indicate that using one of the DoD resources facilitates the *Uniformed and Overseas Citizens Absentee Voting Act (UOCAVA)* population in submitting their absentee ballots, but it is possible that respondents who used a DoD resource may systematically differ from those who didn't. For example, resource users may have been older or more educated people both of whom are more likely vote; if the DoD resources hadn't been there, they would have made sure they found the same information somewhere else.

Methodology

To assess the impact of DoD resources on voter registration and participation, the first step is to categorize UOCAVA respondents¹ to FVAP's Post-Election Survey of Active Duty Military Members (hereafter, Post-Election Survey) into two groups: those who used a resource and those who did not. Following the analysis in FVAP's 2012 Post-Election Report to Congress, this analysis focused on the effects of three specific resources: the FVAP website, UVAOs and IVA Offices. These three resources are the primary gateways to other resources and services, including the FPCA, FWAB, FVAP Call Center and the VAG. Because estimates of the effects of the FVAP website, UVAOs, and IVA Offices likely encompass the effects of the other voting resources provided by DoD, this analysis did not examine the specific impacts of the specific voting forms, the Call Center, or the VAG.²

The analysis of the impact of DoD voting assistance is restricted to those three resources, but estimating the separate impact of each one is complicated by the fact that they are not independent interventions. The effect of using a resource can vary based on whether an individual has used another resource, making it difficult to separate the contributions of each resource and complicating the estimation of the effects on registration and participation. For example, UVAOs or IVA Office staff may assist voters by directing them to the FVAP website, and the effect of the UVAO and IVA Office could actually be due to use of the website. In these cases, the impact on registration or participation of using more than one resource would not equal the sum of the impacts of using each one of those resources.

To account for this issue, this analysis identified seven possible groups that correspond to different possible definitions of resource use. Table 1 lists these groups and the percentage of UOCAVA voters in the Post-Election survey that fell into each one.

1 For this analysis, UOCAVA respondents were defined as those who responded positively to a question on the FVAP Post-Election Survey asking if they were more than 50 miles from their legal place of residence on Election Day 2012. Members of Reserve units that were active during the survey's sampling period were also included in the sample. Results did not substantively shift when respondents living within 50 miles were included in the model.

2 In the Post-Election Survey sample, approximately 84% of FPCAs, 72% of FWABs, and 74% of VAGs were accessed through the use of the FVAP website, UVAOs or IVA Offices.

TABLE 1. RESOURCE GROUPINGS AND PERCENTAGE OF USERS

RESOURCE(S) USED	PERCENTAGE OF UOCAVA RESPONDENTS IN THIS RESOURCE SCENARIO
UVAO	42.7%
IVA Office	22.1%
FVAP Website	41.9%
UVAO and/or IVA Office	46.4%
UVAO and/or FVAP Website	61.7%
IVA Office and/or FVAP Website	51.2%
One or More Resources (UVAO and/or IVA Office, and/or the FVAP Website)	63.3%

For example, in the UVAO scenario, the comparison in registration and participation is between those who have used the UVAO and those who have not; UVAO users may have also used the website or an IVA Office. The analysis then compares the registration and participation of people who did or did not use one or more of the resources. The estimated differences in these groups will be used to examine the effect of different resources on registration and participation in the military's UOCAVA population.

Regression analysis estimates the effects of the DoD resources on registration and participation while holding constant factors that may provide alternative explanations for the difference in registration and participation between people who do and do not use resources. The characteristics controlled for include demographic, socioeconomic and geographic factors commonly included in individual-level models of political participation (Leighley & Nagler, 2013; Wolfinger & Rosenstone, 1980). Demographic characteristics include sex, age, race/ethnicity and family status (if they are married and/or have children). Education level and military pay grade are used as proxies for socioeconomic level. Geographic factors include the region of the United States of the respondent's legal residence. A more detailed description of the regression methodologies used here can be found in Appendix A.

Regression analysis estimates the effects of the DoD resources on registration and participation while holding constant factors that may provide alternative explanations

In addition to these traditional factors, an additional set of factors was included to address the unique environment of ADM UOCAVA voting. Specifically, job-related characteristics—such as whether the individual was involved in combat operations during the 2012 election, whether the respondent had changed duty location at any time in the year preceding the election, or whether the individual had Reserve or active duty status—that could have impacted the respondent's ability to vote and access DoD services were also included. To control for differences that might have been caused by differences across installations or locations, the analysis also

included the fractions of other respondents in each respondent's location who vote in 2010, were involved in combat operations and changed duty station.³ This allows the analysis to account for respondents who were in locations where logistics, combat conditions and other factors may have increased the difficulty of voting.

The Post-Election Survey also included questions on interest in the election and intention to vote, as well as the respondent's assessment of the fraction of time between Labor Day and Election Day in 2012 that he or she had access to government and nongovernment websites. However, these responses were not included in this analysis because respondents may have taken into account whether they registered, voted or used a resource in the 2012 election when reporting their interest level and Internet access before the election (Pearson, Ross, & Dawes, 1992). Controlling for these variables would lead to invalid inferences about the effect of resource use on registration and participation.⁴

Results

The models⁵ provide estimates of the impact of DoD resource use on registration and participation by giving the percentage of registrations and votes that can be attributed to the resource. It should be noted that these impact estimates assume no unobserved differences between resource users and nonusers and must therefore be interpreted with caution. This assumption, as well as methods that can be used to lessen it, are discussed in more detail in Appendix B. In Tables 2a and 2b, 95% confidence intervals are presented with the estimated impacts to reflect the uncertainty associated with the estimates of resource impact. Results for the regression coefficients used to calculate these resource impacts can be found in Appendix D.

TABLE 2A. OLS IMPACT OF RESOURCE USE ON REGISTRATION

SCENARIO	LOWER BOUND OF 95% CONFIDENCE INTERVAL	MEAN IMPACT	UPPER BOUND OF 95% CONFIDENCE INTERVAL
UVAO	-1.1%	-0.3%	0.5%
IVA Office	-1.1%	-0.6%	0.01%
FVAP Website*	6.8%	7.8%	8.8%
UVAO and/or IVA Office	-0.9%	0.0%	0.9%
UVAO and/or Website*	5.3%	6.5%	7.8%
IVA Office and/or Website*	5.6%	6.8%	8.0%
One or More Resources*	5.0%	6.5%	7.9%

*Impact statistically significant at 5% level.

- 3 Bases where combat operations are ongoing and redeployment rates are high are likely to be negatively correlated with access and use of military ballots, because paper ballots have to be shipped using logistical networks with limited capacity (Pew Center on the States, 2009).
- 4 Although not recommended for the final model, it should be noted that the inclusion of these variables did not substantively impact the results.
- 5 Using ordinary least squares (OLS) regression.

For registration, the results suggest that using UVAOs and IVA Offices have little, if any, impact on likelihood of registration, both including zero in the 95% confidence interval. The FVAP website, on the other hand, has a positive and significant impact on registration, particularly in relation to the UVAO and IVA Office.

TABLE 2B. OLS ESTIMATES OF IMPACT OF RESOURCE USE ON PARTICIPATION

SCENARIO	LOWER BOUND OF 95% CONFIDENCE INTERVAL	MEAN IMPACT	UPPER BOUND OF 95% CONFIDENCE INTERVAL
UVAO*	0.6%	2.2%	3.9%
IVA Office	-0.3%	0.6%	1.5%
FVAP Website*	18.4%	20.6%	22.9%
UVAO and/or IVA Office*	2.6%	4.1%	5.6%
UVAO and/or Website*	16.6%	19.6%	22.6%
IVA Office and/or Website*	17.6%	20.3%	23.0%
One or More Resources*	17.8%	20.4%	23.1%

*Impact statistically significant at 5% level.

The impact of the three resources on participation appears somewhat consistent with the impact on registration. While the estimated impact of the UVAO is statistically significantly different from zero, the sizes of the mean independent impacts for both the UVAO and IVA Office are small. The results imply that the FVAP website had a significant positive effect on participation, and that its impact was larger than the respective impacts of the UVAO and IVA Office. For the combined categories, the point estimate of the impact is roughly equal to (or even smaller than) the impact of the FVAP website alone. One interpretation of this result is that whatever positive impacts the UVAO and IVA Office have on participation are not independent effects, but occur because they refer voters to the FVAP website.

The FVAP website had a significant positive effect on participation, and its impact was larger than the respective impacts of the UVAO and IVA Office.

Because there are limitations to the single regression method used above, an alternative modeling method known as Two-Stage Least Squares (2SLS) was also used to compare and contrast estimates. The use of 2SLS has the benefit of controlling for characteristics not captured in the survey, but also tends to result in estimates with much wider confidence intervals. Both models indicated that the respective impacts of UVAOs and IVA Offices were minimal, but that the FVAP website had a significant positive effect on voting. More information on this alternative model can be found in Appendix B.

Discussion

It is critical to understand the impact of the resources provided by DoD on the registration and participation of military voters. This analysis of FVAP's Post-Election Survey builds on the 2012 Post-Election Report to Congress in assessing the impact of the FVAP website, UVAOs and IVA Offices on registration and participation in the ADM UOCAVA population.

Isolating the individual impact of each resource is challenging, because the effect of one resource can vary based on whether an individual has used another one. This effort used regression-based modeling techniques to separate out the effects of individual-level demographic, socioeconomic and job-related differences between those who did and did not use the resources from the effect of each resource. Overall, the analysis found that the impacts for participation were larger than those for registration. This difference can primarily be attributed to the FVAP website, which had an estimated positive impact that was larger than those for the UVAOs and IVA Offices. Between the UVAOs and IVA Offices, only UVAOs showed a statistically significant, positive impact on participation. Taken together, the findings suggest that the tools and resources found on the FVAP website are promoting registration and participation behaviors of military UOCAVA voters. These findings were supported by a second methodology and are in line with the analysis in FVAP's 2012 Post-Election Report to Congress, showing that respondents who used at least one resource were more likely to submit an absentee ballot.

The findings suggest that the tools and resources found on the FVAP website are promoting registration and participation of military UOCAVA voters.

Future research efforts could further strengthen these findings. A limitation of this analysis is that resource users and nonusers may be different in ways that affect registration and participation, but that are not recorded in the Post-Election Survey. Differences in registration and participation could be the result of these unobserved characteristics. One possible characteristic is interest in voting and intent to vote, and some questions on the Post-Election Survey do address this. However, because the survey is conducted after the election, the data may not accurately reflect the respondents' attitudes before the election. To address this, FVAP may consider conducting a portion of its surveys using a pre- and post-design of the same sample of respondents. An alternative would be to gather greater administrative data dating to the pre-election period. For example, if data could be gathered with respect to the availability of respondents' UVAOs or IVA Offices prior to the election (number of sick days taken by the UVAO and IVA Officer, hours of operation, etc.), the causal effect between resource use and registration and participation could be examined. If proxies for UVAO and IVA Office access are strongly associated with respondent's use of these resources as well as registration or voting, that would be consistent with the use of these resources causing an increase in registration or voting propensity. Further examination of potential data sources can help FVAP identify specific impacts with more confidence.

References

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Appendix A: Estimating Resource Impacts

To obtain estimates of the differences in registration and participation in the military's UOCAVA population, linear probability models⁶ (LPM) are estimated using a method known as ordinary least squares (OLS) regression. Simple linear probability models (LPM) takes the following form:

$$\hat{V} = \beta R + C$$

In this equation, $\hat{V}$ is the estimated probability that a given respondent engages in a voting behavior (registration/participation); R is an indicator of whether the individual used a resource, which takes a value of 1 if the individual is a resource user and 0 if the individual is a nonuser; β is the estimated mean difference in the probability of registering or participating between resource users and nonusers; and C is the estimated probability that a nonuser registers or votes. Values for β and C are found using OLS regression, which picks estimates so as to minimize the sum of square differences between observed voting (which takes a value of 1 for those who registered or voted in the 2012 election and 0 for those who did not register or participate), and estimated voting propensity, $\hat{V}$, for the sample of UOCAVA respondents.

The impact of resource use estimated under the above model will only be valid if the sample of respondents who used the resources and those who did not are similar with respect to voting-salient characteristics. To relax this assumption, an extended LPM is estimated that takes the form:

$$\hat{V} = \beta R + \partial X + C$$

In this equation, X represents a set of observable factors that might be associated with both resource use and registration/participation, and β represents the association between these characteristics and registration/participation. In this model, the estimated impact of resource use, β , is the difference in registration/participation probability between resource users and nonusers, assuming that both groups are composed of individuals with the sample average of X .

Assuming that β can be interpreted as an effect, the impact of the resource on participation and registration is calculated using the equation:

$$\text{Resource Impact} = \frac{(\beta * \text{Resource Users as \% of UOCAVA population})}{(\% \text{ of UOCAVA population who registered/participated})}$$

In this, the percentage of the UOCAVA population who are resource users and who registered/participated⁷ is estimated using the nonresponse weighted Post-Election Survey sample. Each of the three components of the impact metric is thus estimated. To reflect the resulting uncertainty in the estimates of resource impact, 95% confidence intervals are presented with the estimated impacts.⁸

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- 6 Although the observed dependent variable in this analysis is dichotomous, this analysis uses OLS rather than a logit regression because the interest is in the marginal effect rather than the prediction. Angrist and Pischke (2009) argue that there is likely to be little difference between the marginal effect derived from OLS and that from a logit.
- 7 Using the nonresponse weights, approximately 79% of UOCAVA respondents reported being registered to vote in 2012, while approximately 53% reported voting.
- 8 To calculate the impacts and their confidence intervals, 10,000 random draws are taken from the distributions for the resource effect size, the estimated proportion of resource-users and the estimated proportion of registrants/voters. For each draw, an impact is calculated. The mean and variance of the resulting 10,000 impacts are used to determine the point estimate and confidence intervals, respectively.

Appendix B: Two-Stage Least-Squares Regression

Even after controlling for demographic, socioeconomic, geographic and other military-specific characteristics of respondents to the FVAP Post-Election Survey, resource users and nonusers may still be different in ways that could impact registration and participation, but not in ways the survey can measure. To address this limitation, a method known as two-stage least-squares (2SLS) regression was explored. Differences in access to UVAOs, IVA Offices and the FVAP website are assumed to be due to differences in personnel and facilities between Services and regions. The 2SLS regression produces an estimate of the difference in the probability of registration and participation between individuals with a high probability of using a resource on account of being stationed at bases with high resource accessibility to those with a low probability of using a resource on account of being stationed at bases with relatively low resource accessibility. Because Service members have little influence on where they are stationed, these two groups are not expected to differ in unobserved differences in motivation to vote. The differences can therefore be interpreted as causal. For the UVAOs and IVA Offices, the measure of accessibility used in this analysis is the number of all other survey respondents in the respondent's location who used the resource, as a percentage of the sum of resource users in the location and respondents who reported not using the resource because it was unavailable when they attempted to use it.⁹ For the FVAP website, the measure of accessibility is the number of Internet connections per 100 people in the region of the world where the respondent is based.¹⁰

The 2SLS model takes the following form:

$$\begin{aligned} 2) \hat{V} &= \beta \hat{R} + \partial X + C_v \\ 1) \hat{R} &= \alpha Z + \theta X + C_r \end{aligned}$$

In this model, Z is an instrumental variable, $\hat{R}$ is the respondent's predicted probability of using a resource, and α is the estimated relationship between the instrument and the probability that the respondent is a resource user. The basic idea of 2SLS is to find some characteristic of the respondent, henceforth known as the *instrument*, which is assumed to be associated with resource use, but not directly associated with the unobservable factors that are associated with both resource use and registration and participation propensity. The probability of the respondent using a resource is then predicted using this instrument. The effect of resource use on the probability of registration and participation that aligned with the OLS regression results is then found using OLS by comparing respondents who have a relatively high predicted probability of using the resource to those who have a low predicted probability of using the resource.

The results for the 2SLS regressions implied that resource use has different impacts on registration and participation that align with the OLS regression results. However, these estimated impacts were for the most part neither precise nor statistically significant.

⁹ Location is defined by the combination of Service, geographic region (Western Hemisphere, Europe, etc.) and full-time/Reserve status. The definition of nonusers depends on the particular Service. For UVAOs/IVA Offices, nonusers are defined as those who reported not using a UVAO/IVA Office because their location does not have a UVAO/IVA Office. Nonusers of the FVAP website were defined as those who reported not having web access.

¹⁰ Data on Internet use is taken from the World Bank's World Development Indicators and is for the year 2012. For the purpose of assigning respondents to a World Bank region, respondents in the "Near East and Africa" were assigned to the "Middle East and North Africa (developing only)." "North America and Western Hemisphere" were assigned to "Latin America & Caribbean (all income levels)." "Europe and Eurasia" was equated with "Europe and Central Asia (all income levels)." "South and Central Asia" was equated with "South Asia." "East Asia" was equated with "East Asia and Pacific (all income levels)." Domestic ADM respondents were assigned to the United States.

To obtain precise, accurate estimates of the effect of resource use on registration and participation would require an instrument that has a strong relationship to resource use while having no association with determinants of respondent propensity that are not captured in the control variables. The best source of such an instrument would probably be in facility-level administrative data on UVAO and FVAP website availability that accurately captures external variation in respondent resource access. Future research on this topic should explore means of linking administrative and survey data.

Appendix C: Definitions of Outcome and Control Variables

The specific outcome and control variables used in the OLS and 2SLS models are the following:

- VOTE_recode (1 if stated voted in 2012, 0 if did not vote)
- REGVOTE_recode (1 if voted in 2012 or didn't vote but stated registration, 0 if not registered)
- VOTE2010_GROUP (fraction of other respondents in respondent's location who voted in 2010 election)
- OVERSEAS (1 if respondent stationed overseas, 0 if not)
- RESERVE (1 if respondent in Reserve service, 0 if not)
- COMBATOPS (1 if respondent involved in combat operations around time of the election, 0 if not)
- COMBATOPS_GROUP (fraction of other respondents in respondent's location who were involved in combat operations around time of election)
- MALE (1 for males, 0 for females)
- CHANGEDUTY_recode (1 if changed duty station in 12 months before election, 0 if not)
- CHANGEDUTY_GROUP (fraction of other respondents in respondent's location who changed duty station in 12 months before election)
- FAMSTAT (1 for single with children, 2 for single without children, 3 for married with children, 4 for married without children)
- CEDUC (1 if less than high school or no education, 2 if some college or associate degree, 3 if bachelor degree in college, 4 if MA/PhD/professional degree)
- AGE_5 (1 is 18-24, 2 is 25-29, 3 is 30-34, 4 is 35-44, 5 is older than 45)
- XCPAY2 (1 for paygrade E1-E5, 2 for E6-E9, 3 for W1-W5, 4 for O1-O3, 5 for O4-O6)
- CRACE_ETH (1 for non-minority, 2 for non-Hispanic Black, 3 for Hispanic, 4 for all others)
- LEGALRESR (Region of United States containing respondent's legal residence)

Appendix D: OLS Regression Results

**TABLE D1A. OLS ESTIMATES OF IMPACT OF RESOURCE USE ON REGISTRATION,
ACCOUNTING FOR OBSERVABLES**

	UVAO	IVA OFFICE	WEB	UVAO/IVA OFFICE	UVAO/WEB	IVA OFFICE/ WEB	UVAO/IVA OFFICE/ WEB
	-.005	-.020	.147	0.000	.082	.105	.079
	(.007)	(.010)*	(.010)***	(.007)	(.008)***	(.009)***	(.009)***
N	6,654	6,825	6,839	6,830	6,779	6,828	6,832
R ²	.10	.10	.14	.10	.11	.12	.11

Note. Standard errors clustered by Service-Reserve Status-Region are in parentheses. Control variables comprise sex, race/ethnic category, age category, education category, paygrade category, child/marital status category, U.S. region of legal residence, indicators for Reserve status, individual and estimated mean of location involvement in combat operations, estimated voting propensity of respondent's location and individual and estimated mean of location change of duty station.

**TABLE D1B. OLS ESTIMATES OF IMPACT OF RESOURCE USE ON PARTICIPATION,
ACCOUNTING FOR OBSERVABLES**

	UVAO	IVA OFFICE	WEB	UVAO/IVA OFFICE	UVAO/WEB	IVA OFFICE/ WEB	UVAO/IVA OFFICE/ WEB
	.027	.014	.263	.044	.168	.211	.170
	(.012)**	(.011)	(.014)***	(.008)***	(.013)***	(.014)***	(.011)***
N	6,390	6,554	6,569	6,559	6,510	6,559	6,563
R ²	.14	.13	.20	.14	.16	.18	.16

Note. Standard errors clustered by Service-Reserve Status-Region are in parentheses. Control variables comprise sex, race/ethnic category, age category, education category, paygrade category, child/marital status category, U.S. region of legal residence, indicators for Reserve status, individual and estimated mean of location involvement in combat operations, estimated voting propensity of respondent's location and individual and estimated mean of location change of duty station.