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# Institutions and Geographic Concentration in VA Mortgage Lending

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Kerry Spitzer  
Baystate Health

Lauren Lambie-Hanson  
Federal Reserve Bank of Philadelphia

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## **Abstract**

The U.S. Department of Veterans Affairs (VA) home loan guaranty program lowers the cost of homeownership for veterans and their families by removing the barriers of a down payment and private mortgage insurance. Even with the recent growth in the program and the attractive terms, many veteran homeowners have not used it. As a consequence, some areas of the country with large numbers of veterans have disproportionately few VA loan originations, even after controlling for area housing market conditions. We explore the role of institutions in explaining the disproportionate concentration of loan originations in county-level Home Mortgage Disclosure Act data, and we test whether the presence of military installations, VA facilities, and veterans service organization posts within each county contributes to lending patterns. We find that close proximity to a military site is a strong positive predictor of county-level rates of VA mortgage lending, even after controlling for the number of veterans and service members living in the area.

The Veterans Affairs home loan guaranty is one of the benefits for veterans that were established under the Servicemen's Readjustment Act of 1944, commonly known as the GI Bill.

The VA home loan program is among the first federal programs designed to increase rates of homeownership and assist veterans and their families in reintegration to civilian life (Retsinas and Belsky 2002). Today, veterans are less likely than the general public to face a housing cost burden and more likely to be homeowners (Arnold, Bolton and Crowley, 2013). Nonetheless, there are large numbers of veterans, particularly younger veterans and those in single-parent households who face extreme housing cost burdens. For example, 32% of all post-9/11 veteran families face a housing cost burden and half of single-parent, post-9/11 veteran families are housing cost-burdened (Hanson and Woods, 2016).

Through the Department of Veterans Affairs (VA) home loan program, the federal government lowers the effective cost of homeownership for hundreds of thousands of veterans and service members annually. While it is unknown how many families are able to move from being renters to homeowners because of this program, it is popular among veterans because it helps to lower the initial and ongoing cost of homeownership. In the 2010 National Survey of Veterans, 66% of veterans who ever had a mortgage reported that they had utilized the program and about half of those who had used it cited the no-down-payment option as driving their decision (Westat, 2010). A more recent study from the Consumer Financial Protection Bureau found that servicemembers (including both active duty servicemembers and veterans) who are first-time homebuyers have been increasingly turning to VA mortgages rather than conventional loans (Clarkberg and Lapid, 2019).

While the share of the population that has served in the military is declining, VA lending has been on the rise since the last recession. The number of VA purchase-mortgage originations in 2017 was over triple the volume in 2005, while conventional loan originations were at 51% of the 2005 peak. Use of the program also varies geographically; it is underutilized in high-cost, coastal areas that are home to many veterans. This paper examines recent VA mortgage use and whether the presence of military and veterans institutions can help explain its uneven distribution across the United States.

Research from a variety of disciplines has documented patterns between the presence of certain institutions in a community and the economic and social outcomes of residents and neighborhoods. In the case of our study, institutions can directly contribute to the use of VA loans

by counseling prospective borrowers on how to use their benefits, a service that is often collocated with VA medical centers. In addition, institutions such as military bases, veterans centers, medical centers, clinics, and veterans service organizations may have an indirect impact by facilitating communication between prospective borrowers and others who have knowledge of the program.

We hypothesize that close proximity to military and veterans facilities can serve as a positive predictor of VA mortgage use, assuming these institutions directly or indirectly increase awareness of the program. We create a county-level panel dataset that includes measures of the number of home loan originations by type of mortgage (conventional, VA, and Federal Housing Administration loans), distances to VA facilities and military installations, and counts of the largest veterans service organizations' posts: American Legion, Veterans of Foreign Wars, AMVETS, and Military Officers of America. Because the relationship between community institutions and lending patterns could be confounded by other factors, we include controls for county-level demographics and housing market conditions.

Using a multi-level, longitudinal model, we find that proximity to military bases is a strong positive predictor of VA loan use, even controlling for the approximate size of the population that is eligible to borrow using the program. The share of loans that are VA loans decreases in areas with higher housing costs, although there are more VA loans per eligible borrower in higher-cost areas and places that have experienced more rapid house price appreciation. This suggests that in high-cost areas veterans either use alternative types of mortgages that allow greater loan amounts and require fewer administrative hurdles, or they are priced out of homeownership because they lack sufficient income to buy, relative to nonveteran homebuyers in these high-cost markets. Overall, veteran homeownership rates and incomes are higher than their non-veteran counterparts, but the relationship between income and homeownership and veteran status is complicated, as the effects of military service appear to vary both across eras of service and across race and gender (Angrist et al. 2011; Dalton and Heerwig 2011; Vick and Fontanella 2017).

## **1. Literature**

There are numerous examples in the literature of how community institutions and amenities affect individuals' behavior.<sup>1</sup> For example, Card (1993) documents the relationship between proximity to colleges and individuals' schooling and earnings outcomes, and Mikhed and

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<sup>1</sup> See Sampson, Morenoff, and Gannon-Rowley (2002) for a thorough discussion of how institutions and competing factors influence social processes in a community.

Scholnick (2014) find that facing higher travel costs to visit a bankruptcy trustee makes it less likely that Canadian consumers will file for bankruptcy. Peterson, Krivo, and Harris (2000) show that neighborhood crime rates in Columbus, Ohio in 1990 were negatively correlated with proximity to recreation centers but positively correlated with proximity to bars. Although the institutions that are present in a community may, in some cases, be spuriously related to individual and neighborhood outcomes, they may also have a causal impact on communities. Matsaganis (2008) explains how institutions such as churches provide settings for communication, specifically information-sharing about public health issues, improving health literacy and access to care.

Despite their large geographic footprint and role in local employment markets, there are few studies that explore the relationship between military bases and individual outcomes (Meadows et al., 2013). Military installations, VA facilities, and the density of veterans service organizations may increase the social capital of veterans and, in turn, increase knowledge and use of the VA home loan guaranty program. While our data do not allow us to observe individual behavior or neighborhood-level characteristics, we hope it will help lay the groundwork for future research about the VA home loan program and the effects of military bases on local communities and housing markets.

The existing literature on the VA home loan guaranty program mostly debates its impact on housing markets and the shape of the urban landscape following World War II (Altschuler and Blumin, 2009; Bennett, 1996; Humes, 2006). Historically, minority and women veterans, while formally eligible, were unable to utilize the program due to racist and sexist lending practices of the times (Altschuler and Blumin, 2009; Mettler, 2005). More recently, Fischer and Rugh (2018) examine HMDA data from 1990 to 2015 and find that VA lending has contributed to integration of residential neighborhoods.

Fetter (2013) finds that the VA loan guaranty program increased rates of homeownership primarily through lowering the age at which many Americans bought their first homes. Vigdor (2006) finds that removing liquidity constraints, in the case of the VA loan guaranty by removing the need for a down payment, may have the unintended consequence of increasing home prices for those who do not use the program. Quigley (2006) shows that, in recent decades, the credit quality of VA borrowers has generally been riskier than that of other types of borrowers, but rates of foreclosure have been only slightly higher than conventional loans and lower than FHA loans. Goodman, Seidman, and Zhu (2014) compare FHA and VA loan performance and find that VA

loans perform better after controlling for borrower characteristics. They attribute this to differences in lending rules that govern each program.

There has been little recent analysis on which veteran consumers choose VA mortgages, with the exception of a novel analysis by the Consumer Financial Protection Bureau. In that study, Clarkberg and Lapid (2019) use a dataset of consumer credit records matched to Department of Defense's Servicemembers Civil Relief Act data to track changes in the use of VA loans among first-time homebuying servicemembers. They find that under 40% of these first-time homebuyers used VA mortgages to purchase in 2006-2007, as compared to nearly 80% by 2016. The uptick in VA use was similar for prime and nonprime servicemembers.

To our knowledge, no studies have explored explanations for geographic disparities in utilization, the focus of this paper. The most relevant work focuses on use of the FHA loan program, which has a number of parallels with the VA program: low down payments, many first-time homebuyers, and a surge in use during and after the mortgage crisis.

The FHA and VA programs play a key role in stabilizing the mortgage market when credit from other sources contracts, ensuring the availability of credit, particularly to those without the ability to make large down payments (Passmore and Sherlund 2018). Duca and Rosenthal (1991) explain that FHA mortgage originations rise when the overall default risk in an area increases. While FHA mortgages have standard underwriting rules across space, conventional mortgage lenders are free to ration credit by using more stringent underwriting in areas where default risk is more prevalent (Ambrose, Pennington-Cross, and Yezer, 2002).

Immergluck (2011) demonstrates that even after controlling for numerous loan-, borrower-, neighborhood-, and MSA-level characteristics, there remains considerable variation in the use of FHA mortgages across different metro areas. He points out that areas heavily reliant on FHA financing would be particularly hard hit by any policy changes that reduced the availability or generosity of the FHA program. Although making up a smaller volume of loans, the VA program should have a similar stabilizing effect on area housing markets. Interestingly, FHA and VA lending might actually be particularly sensitive to the next financial crisis. As Kim et al. (2018) document, as of 2016, three-quarters of FHA and VA loans were originated by nonbanks, which are not as well capitalized as depository institutions and may be particularly vulnerable to liquidity pressures in times of economic stress.

In the remainder of this paper, we first offer a brief history of the VA program, describe its current characteristics, and document the disparity in the use of VA mortgages across geographies. We then turn to a multivariate analysis of this disparity and its changing characteristics over time. Finally, we discuss these results and conclude.

## **2. VA Lending Program**

### **2.1 Brief History and Description of the Modern VA Lending Program**

As with the other provisions of the GI Bill, the VA loan program was originally designed to assist World War II veterans with their readjustment to civilian life (Frydl, 2009). To be eligible, a borrower must be a current active-duty service member or a veteran who provided a minimum threshold period of service, which can range from 90 days to 24 continuous months.<sup>2</sup>

The main components of the VA loan program are the purchase and refinance mortgage guaranty benefits. During federal fiscal year 2017 (October 2016-September 2017), 740,389 VA purchase and refinance loans were guaranteed, with 49% being refinancings (US Department of Veterans Affairs 2018, pp. 190—192). The remaining 51% were mortgages for the purchase or construction of homes. Of these, 41% of borrowers were first-time homebuyers. In this paper, we focus on the purchase mortgages, since their origination volume is not as sporadic as that of the refinance mortgages, and as Quigley (2006) argues, purchase mortgages more directly promote homeownership.

The VA loan program facilitates homeownership for qualified veterans and active service members in several ways. First, because the VA provides a guaranty of a portion of the principal balance, the borrower does not have to purchase private mortgage insurance, helping to substantially reduce a borrower's monthly payments. Second, the program requires no down payment, resulting in lower upfront costs for homebuyers. In fact, 80 percent of VA purchase loans made during fiscal year 2017 involved no down payment (US Department of Veterans Affairs 2018, p. 192).<sup>3</sup>

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<sup>2</sup> A detailed description of current eligibility rules can be found at [http://www.benefits.va.gov/HOMELOANS/purchaseco\\_eligibility.asp](http://www.benefits.va.gov/HOMELOANS/purchaseco_eligibility.asp). Rules differ for veterans who served during different periods.

<sup>3</sup> Most borrowers incur a VA funding fee, which can be paid up front by the borrower, rolled into the mortgage principal, or paid by the seller. The amount of the funding fee is a function of the size of the down payment, whether the borrower is taking cash out, the borrower's type of military service (regular vs. Reserves or National Guard), whether this is the borrower's first or a subsequent VA loan, and other factors. Fees commonly range from 1.25% to 3.3% of the loan amount, although they can be waived for certain veterans with service-related disabilities. Current fees are posted at [https://www.benefits.va.gov/homeloans/purchaseco\\_loan\\_fee.asp](https://www.benefits.va.gov/homeloans/purchaseco_loan_fee.asp).



## 2.2 Substitutes for VA Loans

The main substitutes for VA loans are FHA and conventional mortgages. As with VA loans, FHA purchase loans allow borrowers to put little money down, currently just 3.5%. The borrower pays for mortgage insurance provided by the FHA. Because of this government insurance, lenders are willing to provide lower interest rates and allow greater flexibility in borrower credit standards, relative to conventional loans with low down payments. Like the FHA program, VA loans are restricted to owner-occupants.

Borrowers who do not use VA or FHA mortgages will generally take out conventional loans. Conventional borrowers who make down payments of less than 20% of the purchase price must generally buy private mortgage insurance. Mortgage insurance can be costly. Borrowers must continue to pay private mortgage insurance until they have established the 20% equity threshold. Conventional loans have no particular loan limit, although in order to be securitized by the government sponsored enterprises Fannie Mae and Freddie Mac, they must be at or below the “conforming” loan limit, which was \$417,000 in most parts of the country until 2017, when it was increased to \$424,100.

Because VA mortgages allow borrowers to put no money down and do not require payment of mortgage insurance fees, they are usually the most cost-effective option for qualified borrowers. In some instances, FHA interest rates may be below the rates of comparable VA loan products for a particular borrower, which may provide an incentive for using the FHA program. However, a veteran would need to supply the necessary down payment, and the interest rate difference would have to be large enough to offset the cost of the FHA mortgage insurance premiums. Finally, a veteran cannot use multiple VA loans concurrently, which may also influence the decision of whether to choose an FHA or VA mortgage for a particular purchase.

VA loans do not have loan limits per se, but there are maximum guaranty amounts, and the Department of Veterans Affairs publishes the maximum loan amounts that can be originated in each county with zero down payment. In recent years, these “loan limits” were set to the same values as the Fannie/Freddie conforming loan limits for single-family residences, including the feature that higher-cost areas receive commensurately higher loan limits. Unlike with the Fannie/Freddie limits, however, VA loans may be originated in excess of the threshold, although this triggers a down payment requirement. For 2017, we find that for only about 3% of VA loans

originated nationally did the origination amount exceed this published zero-down-payment “loan limit,” but in high-cost counties 6% exceeded the threshold.

### **2.3 Use of the VA Program since 1990**

According to Home Mortgage Disclosure Act (HMDA) data, each year since 1990, between about 125,000 and 380,000 VA purchase mortgages have been originated. As a percentage of all VA, conventional, and FHA mortgages, VA mortgage originations tend to be counter-cyclical. VA lending made up just 1.9% of purchase mortgages at the market’s height in 2005 with 113,000 loans, but as conventional lending shrunk in the housing market recovery, VA lending increased dramatically—both in levels and as a percentage of all lending (Figure 1). By 2017, VA loans made up 9.4% of all mortgages, with 380,000 originations—over 3 times the 2005-2007 annual volume and the highest number of VA purchase originations since HMDA data collection began. Interestingly, although the housing market has recovered in most areas and conventional purchase mortgages have increased, VA lending has continued its surge, perhaps owing to the absence of zero-down-payment alternatives and general tightness of the credit box in the conventional mortgage market (Goodman 2017).

### **2.4 Disparities in Use of VA Program**

VA lending is most prevalent in the mid-Atlantic, the southeast, the west coast, and the Rocky Mountain states (Figure 2). We consider veterans aged 64 or younger and active servicemembers to constitute the population most likely to use VA mortgages *to purchase* homes, so we focus on this group. We refer to them as the “eligible” population, since this count is the best available proxy for the number of qualified residents who could use the program to buy a home.

A considerable number of counties with large numbers of veterans and active servicemembers have relatively low volumes of VA mortgages originated, particularly before the mortgage crisis (Figure 3). Most of these are areas with higher home values, as indicated by the concentration of blue circles in lower right corner of each chart. In 2017, most of the low-VA outliers contained high-cost coastal cities in New York, New Jersey, Massachusetts, and California (Figure 4). Higher house prices could also serve as a barrier for first-time homebuyers. For this reason, we control in our analysis below for house price levels, rates of house price appreciation, and rates of homeownership over time.

On the other hand, some counties appear to have considerably more VA mortgage originations than we would expect, given the relative numbers of eligible residents (top left corners of Figures 3 and 4). The objective of this paper is also to help explain why those places have seen such a large share of VA lending.

### **3. Data**

We create a unique data set from several sources. To measure volumes of loan originations at the county level we use HMDA data from 2006 to 2017. In addition, we obtained county-level demographics from the American Community Survey (ACS). To measure house price levels and changes, we use county-level home value indices provided by Zillow. We also use data on the locations of military installations and veterans' services facilities from the U.S. Department of Defense and the U.S. Department of Veterans Affairs, respectively. Finally, we collected post location data from four large national veterans service organizations: the American Legion, AMVETS, Military Officers Association of America, and Veterans of Foreign Wars. We conduct our analysis at the county level, the finest level of geography at which each type of data is available.<sup>4</sup>

#### **3.1 Home Mortgage Disclosure Act**

HMDA data are reported by depository institutions and certain for-profit, nondepository institutions. The data are compiled each year by the Federal Financial Institutions Examination Council. We restrict the sample to first-lien, owner-occupied purchase mortgages that are VA, conventional, or FHA loans. We total the number of originations each year by county. Table 1 presents summary statistics.

#### **3.2 Census**

We include several measures from the 1-year ACS for the years 2006—2017, as displayed in Table 1. To capture the veteran population that may be eligible for and most likely to use the program, we include the civilian population aged 18 to 64 who are veterans and the population over 18 who are in the armed services.

#### **3.3 Zillow**

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<sup>4</sup> We are primarily constrained by the availability of annual Census data, which is difficult to obtain for many areas below a county level. Similarly, while Zillow does provide house price indices at the zip code level, these are not available for as many areas of the county as their county-level series.

We use data from Zillow to measure county home values. Unlike self-reported estimates of home values from sources such as the ACS, Zillow data are calculated based on home price transactions and adjusted using hedonic characteristics.<sup>5</sup>

### **3.4 Veterans Affairs Facilities**

We hypothesize that VA hospitals, clinics, and veterans centers might encourage the dissemination of information about the loan program and have a positive relationship with program use. VA hospitals may act as a hub of activity for veterans and share their campuses with organizations that provide non-medical services to veterans, such as Disabled American Veterans offices. We include VA cemeteries as an initial falsification test—if cemeteries were correlated with more VA loans, we might suspect that simply having a greater historical presence of veterans—and therefore VA facilities—would be the true explanation for our findings. However, we find no evidence of such a relationship.

In order to test whether proximity to VA facilities is associated with higher use of VA loans, we obtained a shapefile of VA facility locations as of March 31, 2012 from the National Center for Veterans Analysis and Statistics.<sup>6</sup> Because this is a snapshot of facilities, it may overstate (understate) the proximity of some counties to VA facilities in areas where there have been closures (openings) of VA facilities over the period we examine. We measure the distance from the center of each county to the nearest VA hospital, clinic, veterans center, and VA cemetery. The mean and median distance from the center of a county to each facility is reported in Table 2.

### **3.5 Military Installations**

We hypothesize that proximity to a Department of Defense (DOD) site—particularly, one that employs a large number of people—will have a positive relationship with VA loan originations. Lenders and borrowers located near bases may have greater awareness of the program, which could result in a greater incidence of VA lending, even after accounting for the size of the eligible population living near bases. We obtained the locations of 818 military installations from the DOD.<sup>7</sup> In order to focus on installations that employ a large number of people and are likely to have an effect on the use of VA loans, we matched the DOD files to the

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<sup>5</sup> For more information on how the Zillow index is calculated or to obtain the data, visit <https://www.zillow.com/research/data/>. Data acquired from this site on December 19, 2018; we downloaded data for the market segment “all homes” for all available counties. Aggregated data on this page is made freely available by Zillow for non-commercial use.

<sup>6</sup> Files are available at [http://www.va.gov/VETDATA/docs/Maps/VA\\_Facilities.zip](http://www.va.gov/VETDATA/docs/Maps/VA_Facilities.zip).

<sup>7</sup> Files are available at <https://explore.data.gov/download/wcc7-57p3/ESRI>.

Defense Manpower Data Center (DMDC) personnel data for 2009.<sup>8</sup> We used this file to exclude installations with fewer than 100 DOD personnel. We then measured the distance from the center of each county to the nearest major DOD site.<sup>9</sup>

Large numbers of military families live near DOD sites, and active-duty service members may use the program to buy a home after 90 continuous days of service. Further, retired military servicemembers enjoy select privileges at bases even after separating from the military, and as a result, they may be likely to purchase homes near bases in order to continue to benefit from both the social connections and the amenities available on the base. We attempt to account for these facts by controlling in our models for the number of active-duty servicemembers and veterans under age 65 living in a county. Unfortunately, the Census Bureau's estimates of servicemembers living in a county exclude those deployed overseas at the time of data collection. Thus, to the extent that servicemembers and their families purchase homes while stationed elsewhere, the data will underestimate the “eligible population,” and the presence of a DOD site may be a proxy for the presence of military families of deployed servicemembers. Because the majority of borrowers who use the program do so after active-duty service, we do not expect that miscounts in the number of active service members drive our results.<sup>10</sup>

### **3.6 Veterans Service Organizations (VSOs)**

We collected post locations from four major VSOs: the American Legion, Veterans of Foreign Wars of the United States (VFW), AMVETS, and the Military Officers Association of America (MOAA). These four organizations are among the largest membership organizations listed in *2012/2013 Directory of Veterans and Military Service Organizations* published by the VA.

All four VSOs we study state as part of their mission advocating at the local and federal level for the interests of veterans and their families. In addition, the organizations sponsor community programs that are intended to increase patriotism and support for American troops. The organizations differ in their size and in their membership criteria. In order to estimate the

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<sup>8</sup> Files are available at

<https://www.dmdc.osd.mil/appj/dwp/getfile.do?fileNm=M02.zip&filePathNm=pubSelectedLocations>.

<sup>9</sup> We also compared the DMDC data to the ACS measure of active-duty service members. We found a very strong correlation between DMDC counts of personnel by location of employment and the ACS measure of active-duty service members by residence, suggesting that many service members employed at domestic bases live in the county where they work and that the ACS data are a comparable measure of active-duty service members.

<sup>10</sup> According to the National Survey of Veterans, 81.4% of veterans who used the program did so after service (Westat, 2010).

effect of VSOs, we geocoded the address of each post. We count the number of posts within each county and calculate their density, using the county land area.

### **3.7 Sample**

We restricted our sample to counties that were included in the 1-Year ACS for all years from 2006 through 2017, each of these has a population of 65,000 or more. We limit the sample in this way in order to reduce noise in estimates coming from sparsely populated areas and to allow us to capture annual variation in the control variables. We further restrict the sample to the 657 counties for which Zillow county-level home value indices were available for the entire study period.

Our sample of 657 counties includes counties from all 50 states and the District of Columbia. In 2017, our sample of counties had a total population of 258 million individuals and a veteran population of 13.7 million. This represented roughly 81 percent of the total population and 72 percent of the veteran population in 2017.

Within our sample, the median number of VA mortgages originated in a county annually was just 118, with the median ranging from a low of 51 in 2006 and a high of 238 in 2016. When VA lending was at its lowest, conventional lending was near its height for the period, and as conventional lending fell throughout the housing bust, VA lending was on the rise (Figure 1). FHA lending resembles VA lending in this regard, although the median level of FHA lending peaked in our sample counties in 2009.

From 2006 to 2017, VA mortgages as a percentage of all loans originated rose dramatically, from under 2 percent of loans to over 9 percent.<sup>11</sup> This is striking, because the share of young adults serving in the military has declined over time, and the veteran population has decreased and aged. Roughly 10% of adult residents in the typical county in our sample were veterans, and most of these were veterans aged 64 or younger. In half of the sample counties, only 0.1 percent or fewer of the adult residents overtime were active servicemembers (Table 1).

## **4. Estimation Strategy**

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<sup>11</sup> The Veterans Benefits Improvement Act of 2004 significantly increased the standard guaranty amount, which would be expected to increase demand for the program. However, as shown in Figure 1 Panel B, the number of VA loans originated did not dramatically increase until 2008. Beginning in 2008, high-cost areas in the continental US also qualified for greater guaranty amounts, which should also have increased VA demand, although during the same period, FHA and conventional loans—VA substitutes—were experiencing similar loan limit increases in these high-cost areas.

We use a mixed-effects or multi-level model in order to estimate the effect of time-invariant variables (e.g., proximity to major military installations) on both the initial levels and change over time in the use of the VA loan program.<sup>12</sup> The mixed-effects model allows each county to have a unique trajectory of VA lending over the sample period. The model allows us to account for the clustering of county lending levels over time. The model has two levels: the first level represents the “within-county” change in VA lending over time, while the second level allows us to estimate the change in VA lending attributable to “between-county” differences.

We estimate two sets of these models. In the first, the dependent variable is the percentage of all purchase loans originated in a county that are VA mortgages. In the second set of models, the dependent variable is the VA loan origination rate, which we specify as the number of VA loans originated per 10,000 eligible residents (veterans aged 18 to 64 and service members).

Beginning with the first set,  $PCT_{ij}$  is the percentage of loan originations that are VA loans, in county  $i$  during year  $j$ , and the general form of the model is:

$$\begin{aligned}
 PCT_{ij} = & \gamma_{00} + \gamma_{10}YEAR_{ij} + \gamma_{20}PCTELIG_{ij} \\
 & + \gamma_{01}DIST_i + \gamma_{02}VSODENSITY_i \\
 & + \gamma_{30}HSGMKT_{ij} + \gamma_{40}INCRATIO_{ij} + \gamma_{03}STATE_i + (\varepsilon_{ij} + \zeta_{0i} + \zeta_{1i}YEAR_{ij})
 \end{aligned}$$

in which  $PCTELIG$  is our estimate of the percentage of a county's adult population that is either in the military or a veteran between ages 18 and 64.  $DIST_i$  is a vector of time-invariant variables indicating distance from the county center to the key military and VA sites, which we hypothesize may be associated with greater utilization of the VA loan program. For military installations, the distance measure is set to zero if a major installation is located within the county, otherwise it is equal to the natural log of the number of miles from the county center to the nearest major installation. For VA sites we include the natural log of the distance from the county center to the nearest VA hospital, VA clinic, veteran center, and VA cemetery. Note that we include VA cemeteries to test for a spurious relationship between the siting of VA facilities and variation in VA lending.  $VSODENSITY_i$  is the time-invariant natural log of the number of veteran service organizations per thousand square miles in each county.

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<sup>12</sup> For more information on mixed-effects models, we recommend Singer and Willett (2003). Note that because several of our main question predictors are time-invariant, it is not possible to estimate our models using a simple linear model with county-specific fixed effects.

**HSGMKT**<sub>ij</sub> is a vector of three variables related to the conditions of the local housing market. We include the percentage of housing units in a county that are owner-occupied, the natural log of the Zillow median home value in the county, and the year-over-year percentage change in the median value.

We include a measure of the median income of veteran males relative to nonveteran males, **INCRATIO**<sub>ij</sub>, to control for variations in the relative purchasing power of veterans across-counties. Although on average in our sample the median income of veterans was higher than nonveterans (a ratio of 1.18), in certain areas, veterans may have considerably less purchasing power. For example, in San Francisco in 2017, the ratio was 0.76.

Finally, we include a set of state fixed effects, **STATE**<sub>i</sub>, to control for time-invariant characteristics of states that may influence utilization of the VA home loan program. For example, several states provide additional incentives to veteran home buyers.

In the second set of models the dependent variable is the number of VA loans per 10,000 potentially eligible adults (**RATE**):

$$\begin{aligned} \text{RATE}_{ij} = & \gamma_{00} + \gamma_{10} \text{YEAR}_{ij} + \gamma_{20} \text{PCTELIG}_{ij} \\ & + \gamma_{01} \text{DIST}_i + \gamma_{02} \text{VSODENSITY}_i + \gamma_{30} \text{HSGMKT}_{ij} + \gamma_{40} \text{INCRATIO}_{ij} \\ & \gamma_{03} \text{STATE}_i + (\varepsilon_{ij} + \zeta_{0i} + \zeta_{1i} \text{YEAR}_{ij}). \end{aligned}$$

The independent variables are the same in both models.

## 5. Results

We find a strong relationship between VA loan originations and home values. Higher home values are associated with a lower percentage of VA loans but more VA loans per 10,000 eligible adults. In addition, we find that proximity to major military installations is associated with greater use of the program, both in terms of the percentage of all loan originations and when measured as a rate. We do not find evidence that VA facilities are associated with utilization of the program. We find mixed evidence for an association between VA lending and that the density of VSOs – VSO density is not associated with percentage of loans that are VA but is negatively associated with the rate of VA lending. We interpret this result to suggest that VSOs are not causally linked to VA borrowing. VSO densities are high in the Midwest and Great Plains states, where unobserved macroeconomic conditions (population shifts, local economic factors) may be driving lower rates of VA loan originations.

### 5.1 VA Loans as a Percentage of All Originations



The first model (1) includes our key independent variables, including measures of proximity to military installations, VA facilities, and VSOs. In addition, it includes controls for housing market conditions and state fixed effects. Distance to the nearest major military installation is strongly negatively correlated with the share of originated loans that are VA mortgages, despite including a control for the share of the adult population (aged 18-64) that are veterans or active servicemembers, which should be a fairly accurate proxy for the population eligible for borrowing through the VA program.

Interestingly, other measures of proximity to institutions show no relationship. We find no support for an association between the density of VSOs and VA loan program utilization. We also find no evidence that proximity to the VA facilities matters: the coefficients on distances to VA clinics, hospitals, veterans centers, and cemeteries are all near zero. While we find it reassuring that proximity to VA cemeteries was not significant, there were reasons to expect, *a priori*, that VSOs and other types of facilities might have a measurable, though small, impact.

Intuitively, VA lending is less common in counties where house prices are higher and where appreciation is greater. As previously discussed, larger loan values are permitted with no down payment in designated high-cost areas, but even those loan limits may be binding for some borrowers. In high-cost areas, 6% of borrowers in 2017 exceeded the loan limit for a loan with zero down payment, and another 9% of borrowers took out a loan below but near (within 5%) of the loan limit. In areas not designated as high-cost, borrowers did not seem as affected by these limits: 3% of borrowers exceeded the limit and 5% took out a loan near the limit.

In addition to loan limit considerations, veterans may have less purchasing power relative to nonveterans in high cost areas. For this reason, we include the ratio of veteran to nonveteran median income as a control in the models. The result is intuitive: there is a significant and positive association between veteran-to-nonveteran income and the share of VA loans in a county. In counties where male veterans' income outpaces the income of other male residents, it makes sense that VA loans would make up a greater share of the loan originations. Interestingly, the rate of owner occupancy in a county is negatively associated with VA loan use. This is surprising, since the VA program is intended for owner occupants.

Our preferred model (2) eliminates variables that did not have a significant association with the share of VA loans in a county. The upper plots in Figure 5 present the associated effects of moving from the .25 quantile, to the median, and the .75 quantile levels of two key variables,

distance to DOD installation and Zillow home value index, on the share of loans that are VA. Counties with a major military installation have a 3.7 -percentage-point larger share of VA loans, on average, than counties that are the median distance from an installation (20 miles). This is economically significant, as the county median VA share has ranged from 1.8 to 9.4 percent during our sample period.

The measures of housing market conditions are all statistically significant, but the most substantive finding is that as house prices increase, the percentage of VA loans decreases. Moving from a county with the median Zillow home value, \$150,200, to a county with home values of \$214,925 (the .75 quantile level) is associated with a 2.1 -percentage point decrease in the share of VA loans.

### **5.2.1 Robustness Checks**

We estimate a model (3) to test whether our findings also apply to the percentage of loans that are FHA. We anticipate that distance to major DOD sites should have no relationship with FHA loans, except in that FHA mortgages are a substitute for VA loans. The coefficient on *PCTELIG* remains significant, but negative, suggesting an inverse relationship between FHA loans and the presence of veterans. This is consistent with FHA and VA loans being similar loan products, and, holding other factors constant, increasing the percentage of veterans and military service members reduces utilization of FHA loans. In areas with more veterans, demand for FHA loans may be lower due to a higher percentage of the population being eligible for a more attractive loan product.

The key finding from our third model is that the coefficient on the distance to major DOD installations approaches zero and becomes statistically insignificant. This supports the conclusion that proximity to major DOD installations to VA lending in particular, rather than simply to low-down-payment, government-insured lending.

### **5.3 VA Originations per 10,000 Eligible Residents**

Results from the models where the outcome variable is the number of VA loan originations per 10,000 eligible adults (veterans aged 18—64 and service members) tell a similar story to the percentage VA models. We find that house values in a county remains a strong predictor of VA loan utilization and that proximity to major DOD installations is associated with higher rates of VA loan originations. We find evidence that the density of VSOs is negatively associated with the rate of VA loan originations. We again find no evidence that VA facilities are associated with VA

lending, and the veteran-to-nonveteran median income ratio measure remains positive but becomes statistically insignificant.

There is association between proximity to a military installation and VA home loans is statistically significant and meaningful. Moving from a county with a military installation to a county the median distance from an installation (20 miles) is associated with a 70-loan decrease in the number of loan originations per 10,000 eligible residents (Figure 5). This is a substantive effect given that over our sample period the median number of VA loans per 10,000 eligible in a county is 143.

Most control variables have intuitive signs. An increase in the Zillow home value from the median level (\$150,200) to the .75 quantile level (\$214,925) is associated with a 43.5-loan increase in the number of VA loans per 10,000 eligible residents. Again, this is economically and statistically significant. The rate of owner occupancy remains significant but is positive. This seems intuitive in that in areas where homeownership is higher we see more VA loans among those eligible.

Counter to our hypothesis, in this model VSO density is negative and significant. We interpret this finding to suggest that some unobserved factors are driving the results, not that VSOs dampen VA lending. There is also a negative relationship between the percentage of the population that is VA eligible and the amount of VA lending that occurs per eligible member of the population. VSO density and the overall presence of veterans could be associated with other demographic or economic factors that are negatively associated with VA lending.

### **5.3.1 Robustness Checks**

In our final model (3) we change the outcome variable from the rate of loan originations per 10,000 veterans under 65 and service members to the rate of FHA loan originations per 10,000 adults under 65. The association with distance to the nearest major military installation is insignificant and approaches zero. We also estimate the main models on a subset of the sample, excluding the counties at or above the 95<sup>th</sup> percentile with respect to land area. The results were strongly robust.<sup>13</sup>

## **6. Discussion**

Our finding of a positive relationship between VA borrowing and proximity to DOD installations is robust to alternative specifications and cannot be explained away by the share of

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<sup>13</sup> Full results are available from the authors upon request.

the population that is eligible to participate, the relative economic status of veterans to nonveterans, area house prices, or the level of demand for general low-down payment lending in the area (as evidenced by FHA borrowing). The robustness of these results provides strong support for the hypothesis that institutions matter and help influence VA lending patterns. More research is necessary to explore the mechanisms.

Our analysis is limited by the type of data available on facilities and veterans. For example, we are constrained by the scale we have chosen. Choosing the county as the unit of analysis enables the creation of a panel data set but limits us because distances from the county center to the nearest VA facility and major DOD installation are an imperfect measure of accessibility for individuals. Another limitation is the available data on veterans themselves. Using the ACS data does not allow us to identify the actual eligible population. As a result, we use a proxy measure: the Census Bureau's count of all active servicemembers and veterans aged 18-64. The fact that most military servicemembers do not use the VA home loan program until after service increases our confidence in using this proxy measure.

While we recognize these data limitations, we have no reason to suspect that they lead us to systematically over or under-estimate distances or numbers of veterans. However, measurement error can lead us to estimate less precise effects, which are also biased toward zero. In other words, this measurement error could bias us against finding significant results. Finally, we caution that the 1-year ACS and Zillow data are available for only certain counties, so our findings may not be generalizable outside of our sample, particularly low-density areas.

Some important questions are whether there are differences in lender supply between areas with and without major DOD installations, and whether these differences pose potential risks to communities. For example, Kim et al. (2018) explain that nonbanks are largely reliant on warehouse lines of credit provided by large banks and are not capitalized to the extent of depository institutions, which makes them more susceptible to failure in the event of another economic downturn. This is particularly true since nonbanks have greater FHA exposure, which the authors explain carries greater financial risk than originating and servicing other types of loans. Areas with greater VA exposure, such as areas near bases, may thus be more reliant on nonbanks and may be more sensitive to possible future failure of some of these less capitalized institutions.

We find that *within* the VA market, lending patterns are similar, on average, in these two types of counties. In 2017, nonbanks originated 65% of the VA loans in the counties with major

DOD installations and also 65% of VA loans in counties without major DOD installations. The top seven lenders in terms of 2017 loan volume in counties with DOD installations were the same institutions that made up the top seven in non-DOD counties.<sup>14</sup> In DOD counties these firms made 33% of the loans originated that year, and in non-DOD counties they made 31% of the loans. The mean Herfindahl-Hirschman Index value for VA lenders in DOD counties was 632, and the mean HHI in non-DOD counties was 652, indicating that both groups of counties have unconcentrated VA lending markets, on average, which helps mitigate concerns about how the failure of a small number of VA lenders might affect communities near DOD installations.<sup>15</sup>

## **7. Conclusion**

The VA program is a powerful tool for encouraging affordable, sustainable homeownership for veterans. The program allows buyers to purchase with no down payment, and although higher LTV loans are usually at greater risk of default, recent research from the Consumer Financial Protection Bureau finds that VA loans perform similarly to conventional mortgages held by military servicemembers, which require larger down payments (Clarkberg and Lapid, 2019).

In recent years, the VA home loan guaranty program has grown both as a share of all mortgage originations and in the total number of originations. The growth of the program partly reflects the increasing appeal and availability of these loans relative to conventional mortgages. It remains to be seen if the program will continue to grow or stabilize if the housing market continues to improve and credit requirements loosen further. Fannie Mae and Freddie Mac have been offering loans with down payments as low as 3% since late 2014, but most buyers using VA loans put zero down. The appeal of VA mortgages may be compromised if no-money-down loans return in large numbers to the conventional mortgage market.

We find that use of the program has been strongest in areas near major military installations and VA lending as a share of all mortgages has increased faster in places where a higher share of the population are veterans or active-duty military. Many of these counties had disproportionately low VA utilization at the peak of the housing market, when eligible borrowers were presumably

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<sup>14</sup> Each HMDA respondent is treated as a separate lender in this analysis. The top three lenders in both counties (in identical order) were Mortgage Research Center, USAA Federal Savings Bank, and Navy Federal Credit Union. The remaining four lenders were Caliber Home Loans, Wells Fargo, Quicken, and Fairway Independent Mortgage Corporation.

<sup>15</sup> Importantly, the upper tail of the HHI distribution is thin: fewer than a dozen counties in our sample have HHIs in excess of 1500, and just four of these counties have military installations. The Department of Justice considers HHI values of 1500-2500 to be “moderately concentrated” (Department of Justice, 2019).

using alternative forms of low-down-payment lending. The strong positive association between VA lending and military installations, but not VA facilities, suggests that there is something unique about housing markets around bases. More research is needed to understand why this is. One possibility is that lenders, real estate brokers, and buyers and sellers are more willing than in other areas to engage in the process of financing a home purchase with a VA loan, which can be perceived as more burdensome because it requires specialized appraisals and inspections. This could be due to greater familiarity with the program or a desire to assist veterans and members of the military community.

Stakeholders who wish to increase veterans' access to homeownership may want to look to VA and military institutions to help provide outreach to veterans, lenders, and real estate brokers. The assistance provided by the VA home loan guaranty is effective at lowering the cost of homeownership, and, arguably, it is in areas with high housing costs that assistance is most needed. In tight housing markets, where sellers often have multiple offers, the added administrative burden of the program may be enough to discourage its use. Moreover, survey evidence has documented that many veterans are simply unaware that the program exists.

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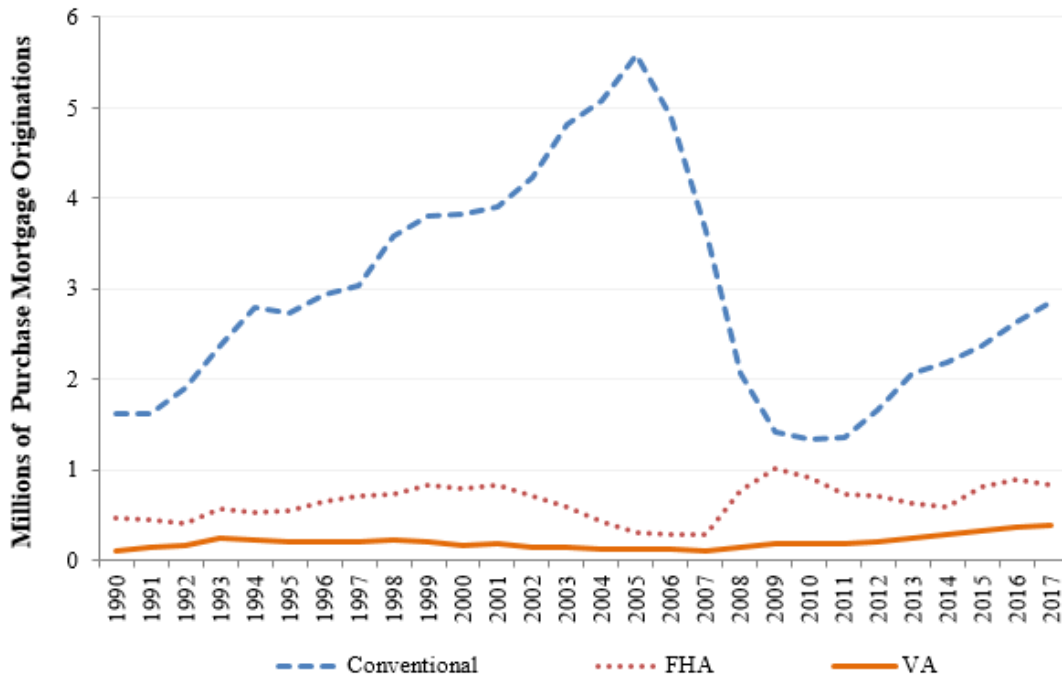
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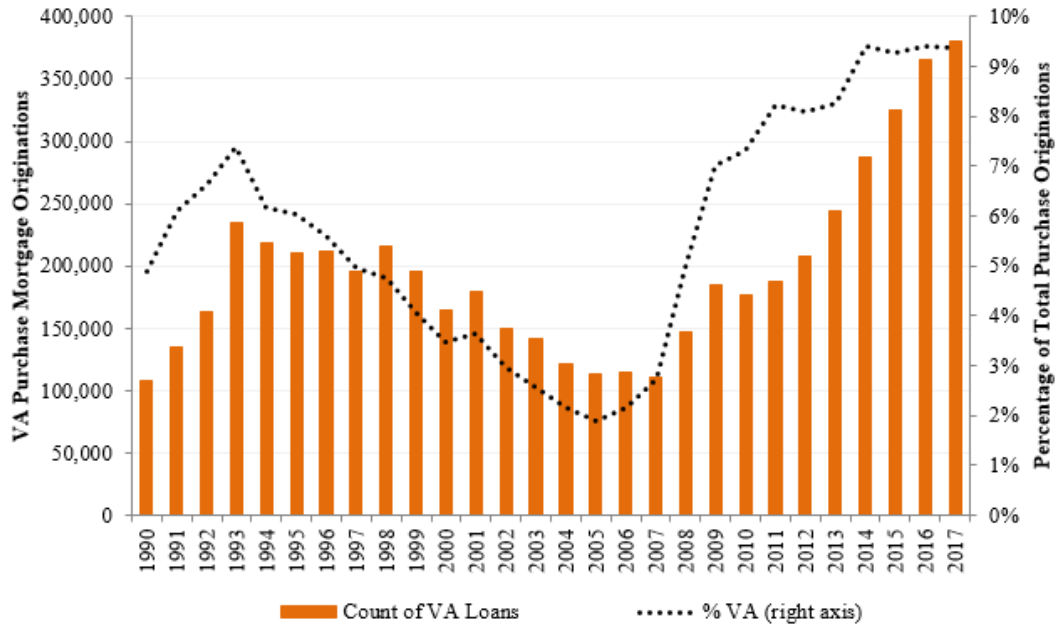
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**Figure 1: Purchase Mortgage Originations, 1990-2017.**

**Panel A: Origination Volume by Mortgage Type and Vintage**

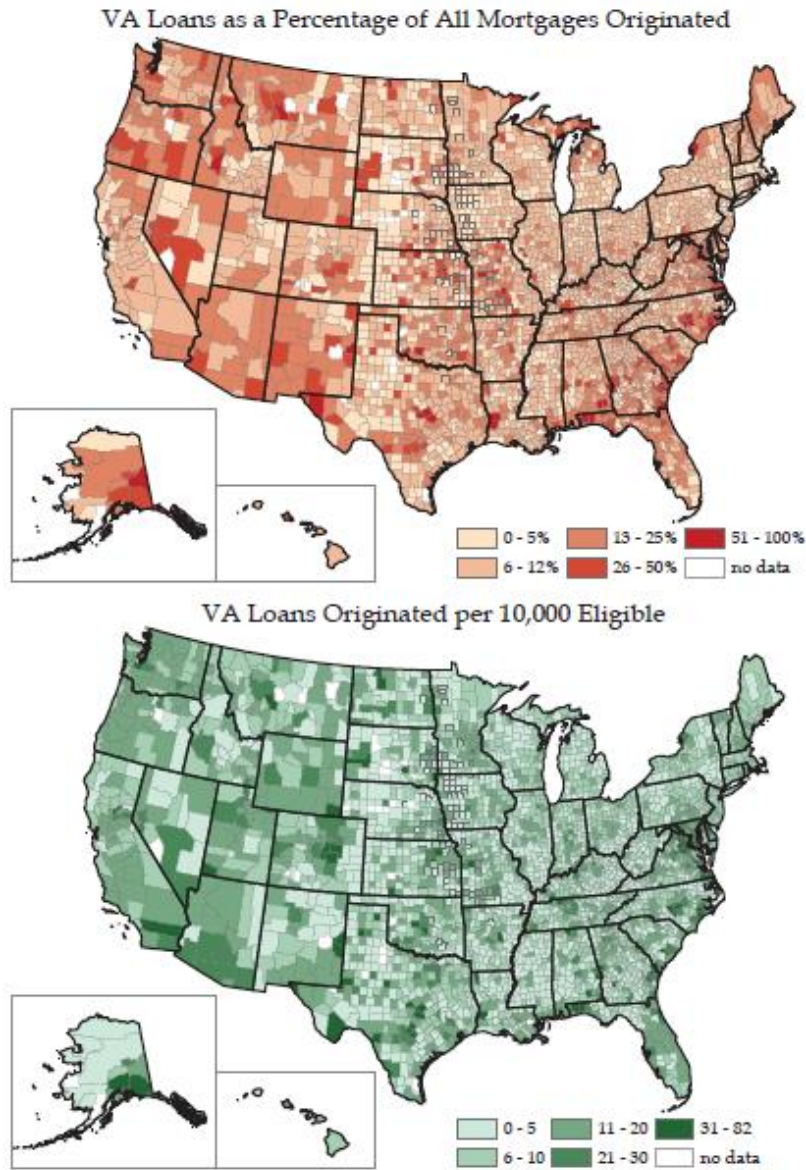


**Panel B: VA Origination Volume and Share of Total Purchase Loans by Vintage**



Source: Home Mortgage Disclosure Act data. Note: Purchase mortgages only are included, with loans limited to first liens beginning in 2004, when lien information was first reported in HMDA. Farm Service Agency and Rural Housing Service loans are excluded from the analysis.

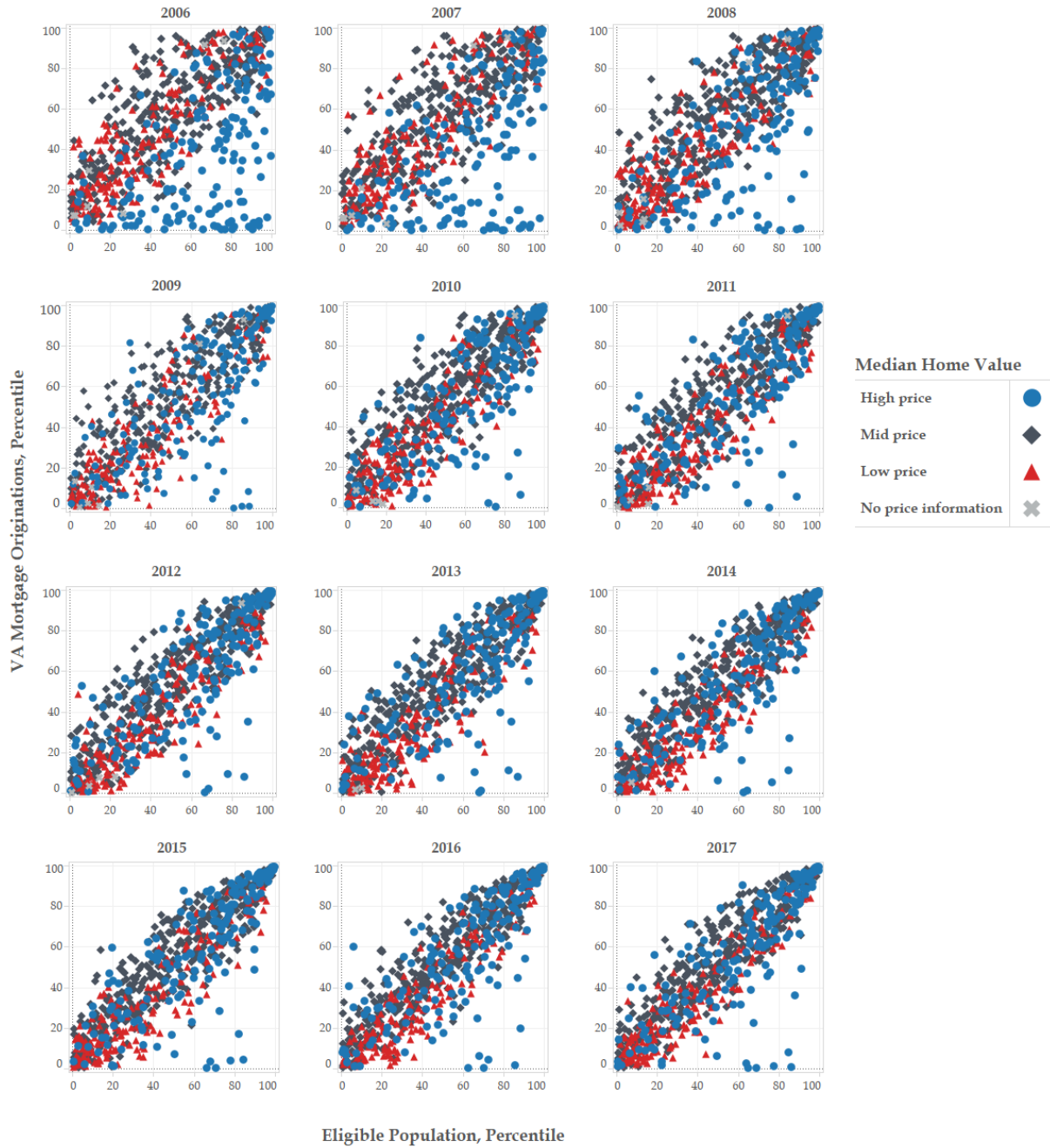
**Figure 2: VA Loans Originated in 2012.**



Sources: Home Mortgage Disclosure Act and U.S. Census Bureau data.

Note: "Eligible" population includes veterans aged 18-64 and active service members, according to the 2012 5-Year American Community Survey. First-lien purchase mortgages only are included.

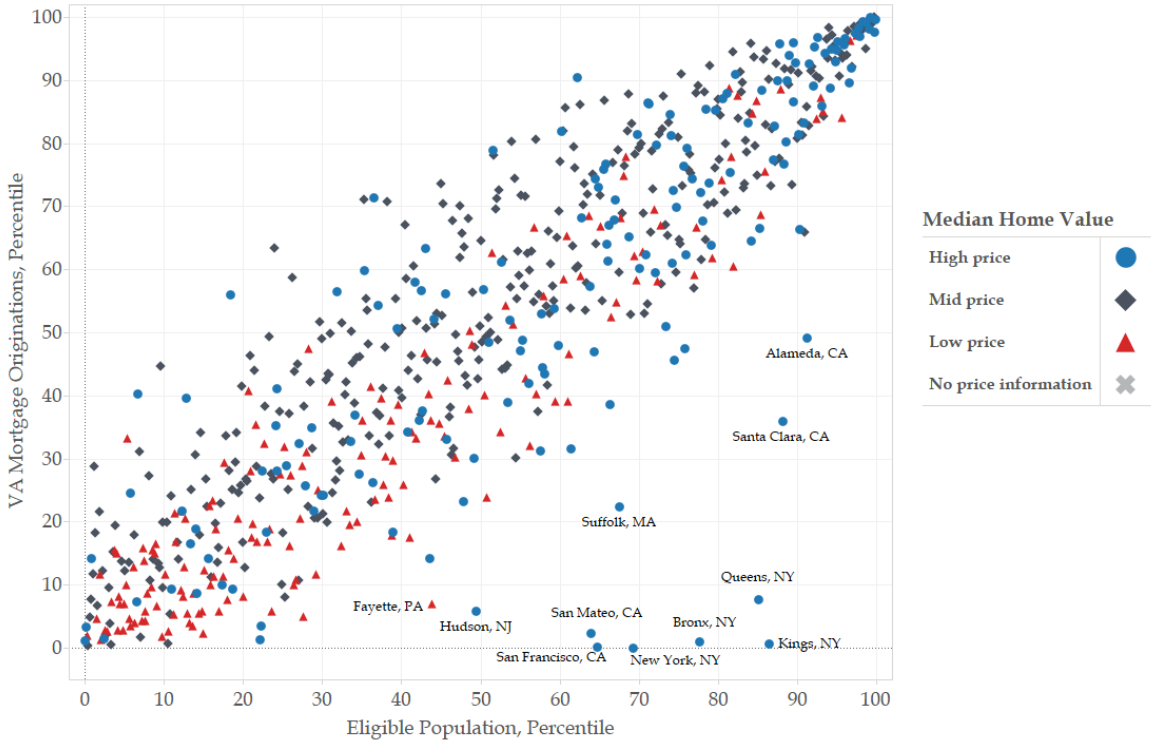
**Figure 3:** Counties Ranked by Eligible Population and Volume of VA Loans Originated, 2006-2017.



*Sources:* Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, and Zillow data.

*Note:* For each calendar year counties are ranked by eligible population (number of VA mortgage originations) and assigned a percentile value which is displayed along the x (y) axis.

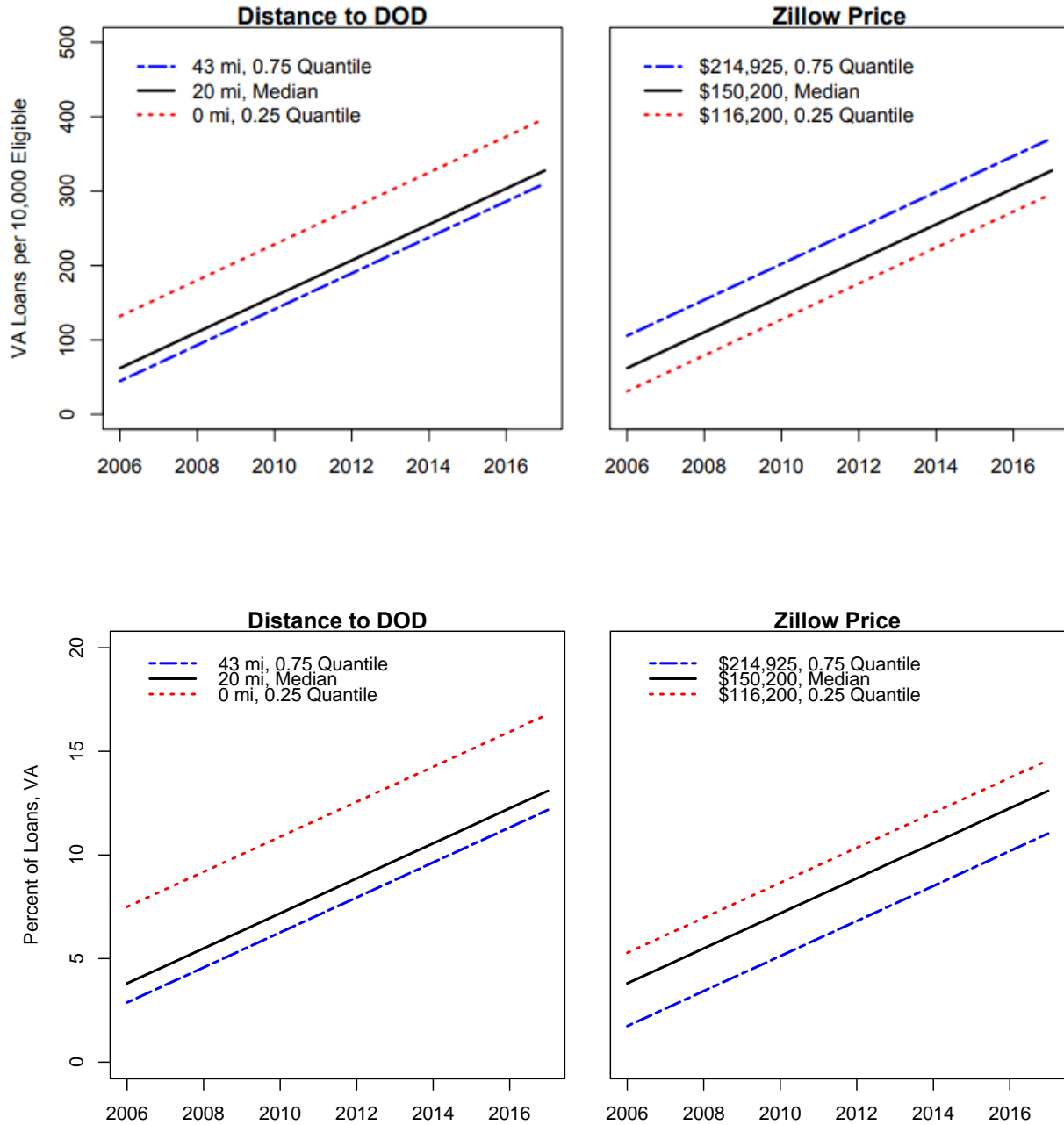
**Figure 4:** Counties Ranked by Eligible Population and Volume of VA Loans Originated, 2017.



*Sources:* Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, and Zillow data.

*Note:* Counties are ranked by eligible population (number of VA mortgage originations) and assigned a percentile value which is displayed along the x (y) axis.

**Figure 5:** Relationships Between County Characteristics and Predicted Utilization of Loans VA.



*Sources:* Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, U.S. Department of Defense, U.S. Department of Veterans Affairs, and Zillow data.

*Note:* Based on Model 2, all control variables other than year and those displayed are set to median levels.

**Table 1:** Summary Statistics of County Loan Origination Volumes, Demographics, and Housing Market Characteristics.

<b>Median Values</b>	<b>2006-2007</b>	<b>2008-2011</b>	<b>2012-2014</b>	<b>2015-2017</b>	<b>All Years</b>
<b>HMDA Variables</b>					
VA originations	51	91	148	226	118
Conventional originations	2,111	718	956	1,378	1,109
FHA originations	169	527	423	550	428
% Originations VA	2.1	5.9	8.4	9.3	6.8
% Originations FHA	7.1	38.1	26.4	26.0	27.2
VA originations per 10,000 eligible	50	91	180	313	143
FHA originations per 10,000 adults	15	42	32	44	35
Ratio of VA to FHA originations	0.30	0.16	0.33	0.38	0.27
<b>ACS Variables</b>					
Population	176,821	182,700	190,083	195,734	185,890
Number of veterans	15,781	15,342	13,986	13,077	14,449
% Veterans [civilian population only]	11.1	10.2	9.0	8.1	9.5
Number of veterans aged 18-64	9,747	8,917	7,423	6,458	8,106
% Veterans [civilian population aged 18-64 only]	8.1	7.2	5.8	5.0	6.5
Number in armed forces	179	219	147	148	176
% in armed forces	0.1	0.1	0.1	0.1	0.1
% Eligible	8.3	7.4	5.9	5.1	6.7
Ratio veteran to non-veteran income [males only]	1.12	1.14	1.13	1.12	1.13
% Housing units owner-occupied	70.2	68.7	67.0	66.8	68.0
<b>Zillow Variables</b>					
Zillow Home Value Index [nominal \$]	\$165,650	\$146,300	\$139,900	\$160,700	\$150,200
Year-over-year % change in Zillow Home Value Index	3.6	-3.8	1.7	5.1	1.2

*Source:* Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, and Zillow data. *Note:* Counties are included here if they were included in the 1-Year ACS from 2006-2017 and had Zillow county-level house price data for each year 2006-2017 (including backward-looking measures of house price change).



**Table 2:** Summary Statistics of County Proximity to Facilities.

	Mean	Median	SD
Distance in miles to nearest...			
VA hospital	48	33	102
VA clinic	18	14	14
Veteran's center	27	23	21
VA cemetery	42	35	33
Military base or other major installation	28	20	34
% with bases or installations in county	38%		
# VSO posts per 1,000 sq miles	34	17	68

*Source:* Authors' analysis of data from the U.S. Department of Defense, American Legion, AMVETS, Military Officers Association of America (MOAA), and Veterans of Foreign Wars.

*Note:* Counties are included here if they were included in the 1-Year ACS from 2006-2017 and had Zillow house price data for each year 2006-2017 (including backward-looking measures of house price change).



**Table 3: VA Loans as a Percentage of All County Mortgage Originations.**

	VA Mortgages as Percent of All Originations		FHA Mortgages as Percent of All Originations
	(1)	(2)	(3)
Constant	81.825*** (4.081)	79.193*** (3.291)	247.322*** (7.319)
Year (0=2006)	0.845*** (0.019)	0.845*** (0.019)	1.017*** (0.043)
% of Population VA Eligible	0.192*** (0.025)	0.193*** (0.025)	-0.220*** (0.055)
ln Miles to Nearest...			
Major DOD installation	-1.242*** (0.148)	-1.224*** (0.142)	-0.277 (0.149)
VA Clinic	0.143 (0.299)		
VA Hospital	0.251 (0.337)		
Veterans Center	-0.182 (0.308)		
VA Cemetary	-0.610 (0.322)		
VSO Density	-0.503 (0.386)		
% of Housing Units Owner Occupied	-0.085*** (0.013)	-0.082*** (0.013)	-0.025 (0.029)
Ratio of Veteran to Non-veteran Income	1.083*** (0.194)	1.084*** (0.194)	1.097 (0.718)
Zillow House Price...			
ln Median Home Value	-5.737*** (0.237)	-5.751*** (0.234)	-18.549*** (0.575)
Year-over-Year Percentage Change	-0.072*** (0.004)	-0.072*** (0.004)	-0.886*** (0.016)
State Fixed Effects	Y	Y	Y
Observations	7,884	7,884	7,884
Deviance	38,285.3	38,290.9	58,481.7

Source: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, U.S. Department of Defense, Zillow, American Legion, AMVETS, Military Officers Association of America (MOAA), and Veterans of Foreign Wars data.

Note: \*\*\*, \*\*, and \* represent statistical significance at 0.1, 1, and 5 percent levels, respectively. Standard errors are displayed in parentheses. Counties are included here if they had 1 Year ACS estimates and Zillow house price data for each year 2006-2017 (including backward-looking measures of house price change). "Eligible population" is the count of residents aged 18-64 who are veterans or armed forces service members. "Percentage eligible" captures the share of adults aged 18-64 who fit this description of eligibility. VSO density is calculated as ln(veteran service organization posts per 1,000 square kilometers). Major Department of Defense Installations refer to DOD sites catalogued by DMDC in the 2009 personnel report that have 100 or more personnel.

**Table 4: VA Loan Originations in County per 10,000 Eligible Residents.**

	VA Mortgages per 10,000 Eligible Residents under Age 65		FHA Mortgages per 10,000 Eligible Residents under Age 65
	(1)	(2)	(3)
Constant	-1247.283*** (76.774)	-1205.305*** (64.616)	102.106*** (12.478)
Year (0=2006)	24.112*** (0.567)	24.144*** (0.567)	2.209*** (0.080)
% of Population VA Eligible	-13.857*** (0.533)	-13.779*** (0.532)	0.356*** (0.099)
ln Miles to Nearest...			
Major DOD installation	-23.263*** (2.510)	-23.112*** (2.488)	-0.262 (0.305)
VA Clinic	1.122 (5.034)		
VA Hospital	5.079 (5.662)		
Veterans Center	7.735 (5.184)		
VA Cemetary	-7.157 (5.415)		
VSO Density	-37.837*** (6.524)	-42.426*** (5.235)	2.897*** (0.654)
% of Housing Units Owner Occupied	1.446*** (0.274)	1.472*** (0.272)	0.288*** (0.054)
Ratio of Veteran to Non-veteran Income	4.649 (4.154)		
Zillow House Price...			
ln Median Home Value	122.144*** (4.967)	121.426*** (4.946)	-8.559*** (1.041)
Year-over-Year Percentage Change	1.248*** (0.088)	1.246*** (0.088)	-0.730*** (0.023)
State Fixed Effects	Y	Y	Y
Observations	7,884	7,884	7,884
Deviance	86,715.8	86,721.6	64,628.8

Source: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, U.S. Department of Defense, Zillow, American Legion, AMVETS, Military Officers Association of America (MOAA), and Veterans of Foreign Wars data.

Note: \*\*\*, \*\*, and \* represent statistical significance at 0.1, 1, and 5 percent levels, respectively. Standard errors are displayed in parentheses. Counties are included here if they had 1 Year ACS estimates and Zillow house price data for each year 2006-2017 (including backward-looking measures of house price change). "Eligible population" is the count of residents aged 18-64 who are veterans or armed forces service members. "Percentage eligible" captures the share of adults aged 18-64 who fit this description of eligibility. VSO density is calculated as ln(veteran service organization posts per 1,000 square kilometers). Major Department of Defense Installations refer to DOD sites catalogued by DMDC in the 2009 personnel report that have 100 or more personnel.