



The impact of preference programs in public procurement: Evidence from veteran set-asides[☆]

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HIGHLIGHTS

- Expanding set-asides to veteran-owned firms increased new entry.
- Set-asides did not lead to deterioration in competition or performance.
- Commercial markets are an efficient area for expanding set-asides within procurement.

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ABSTRACT

Veteran-owned businesses receive preferential treatment in procurement by the U.S. Department of Veterans Affairs, the largest civilian federal agency by procurement spending. We study a 2016 Supreme Court ruling that expanded the scope of these set-asides and estimate its effects on targeted firms and procurement outcomes. The ruling increased the share of purchase order contracts awarded to service-disabled veteran-owned small businesses. Gains accrued both to incumbent vendors and to first-time VA contractors, including firms that had previously registered but had not won federal awards. We find little evidence of changes in competition for awards, and no significant impact on contract execution performance. The results suggest that, in commercial procurement markets with relatively low barriers to entry, set-asides can expand access for targeted firms without detectable deterioration in government procurement outcomes.

1. Introduction

Public procurement is often used as a tool to achieve distributional goals. In the United States, federal procurement explicitly aims to assist and increase the participation of small businesses,¹ and establishes minimum shares of contracting dollars that should be awarded to specific types of small firms.² On top of these minimum requirements,

individual agencies may develop additional programs to foster the participation of disadvantaged firms. The most prominent example is the Department of Veterans Affairs (VA)'s Veterans First program. Enacted in 2006, it uses a "rule of two" that states that contracts should be set aside for service-disabled veteran-owned small businesses (SDVs), unless the contracting officer does not have "*a reasonable expectation that two or more small business concerns owned and controlled by [service-disabled]*

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¹ "It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect, insofar as is possible, the interests of small-business concerns in order to preserve free competitive enterprise, to insure that a fair proportion of the total purchases and contracts or subcontracts for property and services for the Government [...] be placed with small-business enterprises, to insure that a fair proportion of the total sales of Government property be made to such enterprises, and to maintain and strengthen the overall economy of the Nation." (15 USC 631(a)).

² This includes targets for small businesses, small disadvantaged businesses, women-owned small businesses, and service-disabled veteran-owned small businesses. For the specific agency-level goals, see <https://www.sba.gov/document/support-agency-contracting-goals>.

veterans will submit offers and that the award can be made at a fair and reasonable price that offers best value to the United States.”³ The VA is the largest civilian federal agency in terms of procurement dollars—spending over \$60 billion in FY2023—which makes this an important program with large stakes for both spending and SDV success.

In this paper, we study the effectiveness of procurement preference programs in improving outcomes for the targeted firms, as well as their impact on the agencies that implement them. Relative to the size of affirmative action in procurement, the study of its effects has been underexplored, often concentrated in specific sectors, and lacking the use of sharp policy variation. We fill this gap by studying a plausibly exogenous expansion of the VA’s Veterans First program following an unexpected Supreme Court ruling. In June 2016, the Supreme Court overturned two lower courts’ rulings that had upheld a more restrictive application of the set-aside requirements by the VA. Using data on the universe of federal procurement contracts, we first show that, following the 2016 decision, contracts awarded to SDV firms increased sharply. Across all VA procurement awards, the share of awards received by SDVs nearly doubled, from 11% in 2014–15 to 20% in 2017–18. This increase was concentrated within purchase order awards, a category that includes smaller, non-specialized contracts often sourced from commercial vendors (such as those providing IT services and medical supplies).

We use this policy expansion to estimate the effect of the program on the outcomes of targeted SDV firms. To estimate the impact on existing SDV vendors, we use a difference-in-differences design comparing SDVs to non-SDV vendors before and after 2016. After the 2016 policy expansion, existing SDVs were 6 percentage points more likely to win VA purchase order awards in any given year. SDV registrants with no prior observed federal award also benefited,⁴ although the effect for this group was small compared to the treatment effects for existing SDVs. In dollar terms, we estimate the largest treatment effect for SDVs who regularly contract with the VA, as their total dollars awarded increased by 0.82 log points. Existing SDVs were also modestly more likely to remain active in federal procurement after the policy change, although we find no corresponding increase in continuously active procurement registration.

Next, we document a substantial increase in new SDV contractors resulting from the policy change, with awards to new SDV entrants more than doubling after 2016. Using cohort analyses, we estimate that relative to other new entrants, new SDV firms were younger in age after 2016, suggesting they were able to win their first VA award within a shorter time frame after registration. However, for these first-time VA contractors, we do not find evidence of improved survival as measured by active-registration length or gaps in active procurement registration. New entrants were also no more likely to win awards from non-VA agencies.

We also investigate the effect of the policy on VA procurement outcomes. To do so we exploit differential exposure to the policy change by product or service code (PSC4). We show that PSC4 codes with higher initial shares of Federal Supply Schedule (FSS) usage were more affected by the Supreme Court ruling that closed this loophole in the “rule of two”. Using a difference-in-differences design, we find that purchase order awards in categories more exposed to the policy change faced greater competition, in both the number of bids and the likelihood of an award receiving more than one bid. On the other hand, the remaining FSS orders became less competitive, such that competition across all affected

awards was roughly stable. Although data limitations preclude us from measuring effects on award unit prices, we find no evidence that this expansion of awards to SDVs significantly affected contract execution performance. Combining these findings with the positive impacts on targeted firms, our results suggest that the expansion of veteran set-asides for this relatively simple and standardized set of products generated substantial benefits for the targeted population, without much evidence of deteriorating outcomes for the VA as the buyer.

The existing literature analyzing the impact of preference programs has generally documented higher procurement costs resulting from these policies. This may be due to the common context of highway procurement auctions (Marion, 2007, 2009; Krasnokutskaya and Seim, 2011), where significant barriers to entry exist. In the case of construction projects, Cappelletti and Giuffrida (2026) find that federal set-asides similar to our policy result in higher rates of participation but negative impacts on performance outcomes. For broader procurement contexts, however, studies have found more scope for cost-effectiveness (Nakabayashi, 2013; Corns and Schotter, 1999). We add evidence from the procurement of goods and services supplied by commercial vendors, where we expect the lowest barriers to entry. We find that the expansion of set-asides increased awards to the targeted population with no detectable decline in performance.

While most studies have focused on the impact of preference programs on procurement costs, few have studied the outcomes of the targeted population. Importantly, these effects may not be uniform across potential beneficiaries. The existing evidence is mixed, with some studies finding improved outcomes for targeted firms (De Silva et al., 2012; Chatterji et al., 2014; Cappelletti et al., 2024) while others do not (Myers and Chan, 1996; Bates and Williams, 1996; Cappelletti and Giuffrida, 2026). Rosa (2023) also shows that diversity targets can still lead to inequities if contractors can discriminate within the targeted population. We contribute to this literature by exploiting a large exogenous policy change to provide causal identification, and find that while the targeted population clearly benefited in terms of entry and increased awards, the largest gains accrued to the most experienced vendors. For first-time VA contractors, however, we find no clear improvement in post-entry survival as measured by continued procurement registration, a result that stands in contrast with previous evidence of significant and sustained positive effects on firms from initial receipt of government contracts (Ferraz et al., 2015; Lee, 2022; Di Giovanni et al., 2022; Hjort et al., 2020). Apart from the different contexts, one factor explaining this divergence may be that targeted firms in our setting faced increased competition for purchase orders, precluding more significant and sustained gains.

In summary, we contribute to the procurement literature by demonstrating that the impact of preference programs is sensitive to the markets in which they are implemented. By focusing on a policy that affected commercial vendors rather than specialized construction projects, we provide new evidence that the typical equity-efficiency trade-off may be less of a concern in commercial procurement markets, where cost asymmetries and entry barriers may be less significant. This helps us understand more generally how set-asides can be designed to yield improvements in equity at lower efficiency costs. Importantly, however, our context of set-asides for SDVs is also among the more restrictive set-asides used in procurement, compared with targets for other small businesses. Thus, within comparable commercial procurement markets with low barriers to entry, our estimates can plausibly be viewed as an upper bound on the distortions introduced by less restrictive set-asides.

The remainder of this paper is organized as follows. Section 2 provides background on how the VA’s preference programs operate. Section 3 discusses our procurement data, and provides descriptive findings about the policy change. Section 4 presents our empirical analyses of the impacts on veteran-owned businesses, and Section 5 presents our empirical analyses of the impacts on VA procurement outcomes. Section 6 concludes.

³ In practice, the exemption to this set-aside rule may apply often, since U.S. federal procurement is characterized by relatively low levels of competition and a high share of single-bid awards (Kang and Miller, 2022; Carril, 2022; Carril et al., 2026).

⁴ We define this group as firms with a recorded initial procurement registration between January 2011 and June 2014, an active registration in November 2014, and no federal award observed before July 1, 2014. Registration is recorded in the System for Award Management (SAM).

2. Background

Preference programs in procurement take two main forms: bid subsidies and set-asides. Bid subsidies give certain vendors a competitive advantage in open auctions, while set-asides restrict participation to a given set of vendors. Since 1988, there have been government-wide procurement goals for awards to small businesses, with the current goal of 23% of dollars awarded. Within the umbrella of small businesses, there are additional procurement goals for several targeted categories. These include a 3% goal for awards to service-disabled veteran-owned small businesses (SDVs), 5% to women-owned small businesses, 5% to small disadvantaged businesses (including minority-owned), and 3% to HUBZone businesses. These awards are primarily allocated through small business set-asides, and are often facilitated by the Small Business Administration.⁵

The VA is currently the largest federal agency outside of the Department of Defense in terms of federal procurement dollars. Its spending has risen steadily over the last decade, from less than \$20 billion in initial awards in FY2010 to almost \$50 billion by FY2022. In 2006, the creation of the Veterans First Contracting Program increased the preference for veteran-owned small businesses in contracts originating from the VA. The agency follows a “rule of two” for procurement contracts, in which every contract must be set aside for service-disabled veteran-owned small businesses if there is a reasonable expectation that there would be at least two qualified businesses in that category. Within the hierarchy of VA set-asides, SDVs are given the topmost priority, followed by non-disabled veteran-owned businesses. Thus, in cases where two or more SDVs could be expected to bid, the set-aside would require the VA to accept bids only from SDV firms.

Prior to 2016, the VA interpreted the “rule of two” as not applying to delivery orders through Federal Supply Schedules (FSS). FSS are long-term contracts awarded by the General Services Administration (GSA) and used by federal agencies to order commercial supplies and services at pre-negotiated prices. This allowed the VA to routinely order goods and services online at pre-negotiated prices, without having to solicit new contracts. We exploit the *Kingdomware v. United States* Supreme Court ruling on June 16, 2016, which prevented the VA from circumventing the “rule of two” by ordering directly from FSS vendors, thereby causing the requirement to apply to *all* VA procurement actions. For goods and services that could previously be ordered through FSS delivery orders, we would now expect a substitution away from delivery orders and into one-time purchase orders set aside for SDVs, resulting in a net increase in purchase orders.

The primary way contracting officers determine whether qualified businesses exist is through the pre-certification of vendors as SDVs, which is required for them to bid on these set-asides. In addition to meeting revenue thresholds to be considered a small business, becoming certified as an SDV requires at least fifty-one percent controlling ownership by a service-disabled veteran. This requirement is likely to severely limit the ability of existing non-veteran-owned firms to pass themselves off as an SDV. Additionally, SDVs are subject to the same subcontracting rules as all set-asides, which prevent the awardee from subcontracting out more than 50% of the amount paid to a non-SDV firm.

Service-disabled veterans are those receiving compensation from the VA for a service-connected disability. The VA’s Disability Compensation program awards monthly benefits to veterans with one or more service-connected disabilities, and now compensates almost 30% of the veteran population.⁶ There is no means-testing, and disability recipients are not

restricted to the elderly. In FY2022, the most common age range of new recipients was between 20 and 30 years of age, and over 40 percent of all recipients are under the age of 55 (VBA, 2023). Thus, many service-disabled veterans are early in their working lives, and may benefit from the opportunity to start their own small businesses. Coile et al. (2021) find that increases in disability benefit receipt lowered rates of overall employment, but increased the probability of self-employment among near-elderly veterans.

The effectiveness of the VA’s Veterans First Program may also depend on the size of the service-disabled veteran population. Since the early 2000s, the VA Disability Compensation program has experienced unprecedented growth, and in FY2022 the share of veterans qualifying as service-disabled was roughly 29% (compared to 9% in 2000) (VBA, 2023). However, because non-service disabled veterans are second in the VA set-aside hierarchy behind SDVs, we would expect that in the absence of the expanding SDV population, the VA’s set-asides would have affected the broader veteran population instead.⁷

3. Data

Our primary data source is the Federal Procurement Data System (FPDS), which consists of the universe of contracts awarded by the federal government from October 2008 through June 2023, and is accessible through usaspending.gov. We focus on the initial action that obligates funding to each contract to identify the award date. FPDS records the funding and awarding agency, award type, product or service code, dollar amount obligated, and the ownership/status classifications of the awarded vendor, including whether the firm is service-disabled veteran-owned, veteran-owned, woman-owned, minority-owned, or otherwise classified as a small business. FPDS also identifies whether an award was made under a preference program, such as an SDV set-aside, and whether a delivery order was placed through a Federal Supply Schedule. The data also include the number of offers received, which we use to measure competition. Limitations of the FPDS include not reporting the values of losing bids, unit prices and quantities separately, or the government’s internal budget or engineer’s estimate.

A secondary source of data is the System for Award Management (SAM.gov). SAM provides the list of registered firms that are allowed to compete for and receive government contracts, even if they have not won awards. Firms are required to renew their registration every year, and they can be excluded from SAM if there is evidence of “a lack of business honesty or integrity (...) based upon regulation, statute, executive order or other legal authority”. We obtain semiannual snapshots of SAM from November 2014 through May 2024, and use them to create a panel of registered firms. This allows us to infer entry and exit from the federal procurement market of individual firms, which are identified by either their CAGE or UEI number.

Because SAM does not include information about veteran-owned statuses, we further supplement these data with Veteran Certification Applications submitted to the Vets First Verification Program from January 2014 to April 2021. This verification program is a required step for SDVs, as it provides the verification needed to qualify for set-asides. 23,187 unique businesses applied and were approved over this period, although the actual number that went on to win contracts is significantly lower. We match veteran certifications to SAM registrants using firm name and address, and we are able to match 85 percent of veteran certifications.

(\$3757/month in benefits). The most common disabilities are ringing in the ears, limited knee movement, hearing loss, PTSD, and lower back pain or neck pain.

⁷ Appendix Figure A.3 plots the distribution of firm organizational structure in 2019, the first year this information is consistently reported in FPDS. While SDVs were slightly less likely to be corporations and more likely to be partnerships, the overall distribution of organizational type is relatively similar across SDVs, non-disabled veterans, and woman- or minority-owned firms.

⁵ Small business designation is based on employment or revenue thresholds, and varies by industry. With the modal employment threshold at 500 employees and the majority of revenue thresholds above \$10 million, all but the largest firms would qualify as small businesses.

⁶ The amount of compensation is determined based on the number and severity of service-connected disabilities, with veterans receiving a combined disability rating that ranges from 10% (\$166/month in benefits) to 100%

3.1. Descriptive statistics

The four categories of award types are BPA calls, definitive contracts, delivery orders, and purchase orders. Both BPA calls and delivery orders are orders placed against indefinite delivery vehicles (IDVs), which are umbrella agreements to purchase an indefinite quantity of supplies or services over a specified period of time at a pre-negotiated price.⁸ Meanwhile, standalone awards are classified as either purchase orders if they are awarded using simplified acquisition procedures (a streamlined purchase process for awards that fall below a dollar threshold),⁹ or definitive contracts otherwise. From 2013 to 2015, delivery orders accounted for 54 percent of initial awards, while purchase orders accounted for 40 percent.

Table 1 reports summary statistics for VA awards before and after the policy change, using 2013–2015 as the pre-period and 2017–2019 as the post-period. The VA's preexisting preference program is most visible among definitive contracts: in the 2013–2015 pre-period, SDVs received 34.8 percent of definitive contract awards—far above any other listed ownership category—compared with only 6.2 percent of purchase order awards. In the 2017–2019 post-period, their purchase order award share rose to 26.8 percent. Within purchase orders, SDVs also received larger awards on average: the mean award value was \$35,110 for SDVs, compared with \$22,840 for non-disabled veteran-owned firms and \$20,160 for firms outside the listed ownership categories. While most VA procurement is for medical products, these orders make up a smaller share of SDV awards; less specialized services, such as maintenance and repair, account for a larger share of SDV purchase orders.

Fig. 1 breaks down the SDV share of the largest categories of VA purchase order awards, and shows that after the policy change, the share of awards going to SDVs rose the most in the medical products category. Meanwhile, medical services – a category likely to have the highest barriers to entry – were mostly awarded to non-veteran firms, and this continued to be the case even after the policy change. We will leverage these product-level differences later in Section 5, using heterogeneous exposure to the policy change across product categories to estimate its effects on VA procurement outcomes.

3.2. 2016 policy change

The June 2016 Supreme Court ruling, which prohibited procurement officers from using federal supply schedules as a workaround to the “rule of two”, could be predicted to affect certain award types more than others. Purchase orders, which can be viewed as the closest substitute to ordering through an FSS, should receive a boost in SDV awards if there had previously been substantial scope for procurement officers to circumvent the “rule of two”.

Fig. 2 plots the raw FPDS contract data for awards funded by the VA. Panel A aggregates total dollars (in millions) awarded to SDV, non-SDV veteran, woman- or minority-owned, and all other firms. Across the four award types, we see the clearest rise in SDV awards for purchase orders, starting in the second half of 2016. We would also expect a gradual rise in SDV awards for delivery orders, if officers who had previously been ordering from a non-SDV FSS were now forced to solicit IDVs from SDV vendors instead. Appendix Figure A.1 shows similar patterns for the total counts of awards.

⁸ BPA calls are orders from an authorized Blanket Purchase Agreement, which is a specific type of IDV used by civilian agencies. All other IDV orders, including those from Federal Supply Schedules, are classified as delivery orders.

⁹ Purchase orders are issued using simplified acquisition procedures. At the end of our sample, the general Simplified Acquisition Threshold was \$250,000. However, FAR Subpart 13.5 authorized simplified procedures for certain commercial products and commercial services above that threshold and up to \$7.5 million. Thus, some purchase orders can exceed the general Simplified Acquisition Threshold. Because high-value purchase orders are rare but can disproportionately affect dollar-weighted outcomes, we winsorize the top 1% of dollar award values.

Table 1
Summary Statistics of VA Awards.

A: Before Policy Change (2013–2015)				
Percentage shares (%)	BPA Call	Definitive Contract	Delivery Order	Purchase Order
Contract value (\$1000's)	148.59	740.14	188.89	21.52
SDV	7.19	34.80	8.86	6.23
Non-disabled Veteran	2.99	3.92	3.76	3.67
Woman-owned	9.59	5.66	9.12	5.13
Minority-owned	5.96	4.76	3.26	4.14
Observations	15,806	11,743	236,227	172,515
Restricting to Purchase Orders				
Percentage shares (%)	SDV	Non-disabled vet	Woman/Minority	Rest
Contract value (\$1000's)	35.11	22.84	24.19	20.16
Medical products	63.82	68.67	65.70	78.03
Maintenance/Repair	8.63	7.09	6.09	6.44
IT/Tech	1.47	1.23	1.99	1.58
Prof/Admin services	1.73	2.23	3.79	1.58
Observations	10,743	6332	14,491	140,949
B: After Policy Change (2017–2019)				
Percentage shares (%)	BPA Call	Definitive Contract	Delivery Order	Purchase Order
Contract value (\$1000's)	215.18	874.05	486.63	44.01
SDV	15.50	49.96	18.39	26.83
Non-disabled Veteran	4.08	3.07	2.31	3.01
Woman-owned	6.39	3.55	4.95	4.37
Minority-owned	5.02	2.39	1.53	2.05
Observations	12,023	9950	151,814	114,564
Restricting to Purchase Orders				
Percentage shares (%)	SDV	Non-disabled vet	Woman/Minority	Rest
Contract value (\$1000's)	65.93	36.43	40.24	35.55
Medical products	69.14	65.82	65.49	76.22
Maintenance/Repair	5.57	8.08	7.90	7.63
IT/Tech	1.70	1.62	2.36	1.84
Prof/Admin services	1.24	2.29	4.76	1.53
Observations	30,734	3452	6789	73,589

Includes all initial action awards funded by VA. All ownership and product rows are percentage shares; contract values and observation counts are shown in levels. Statistics are reported first by award type, and then by small business ownership status for purchase orders only.

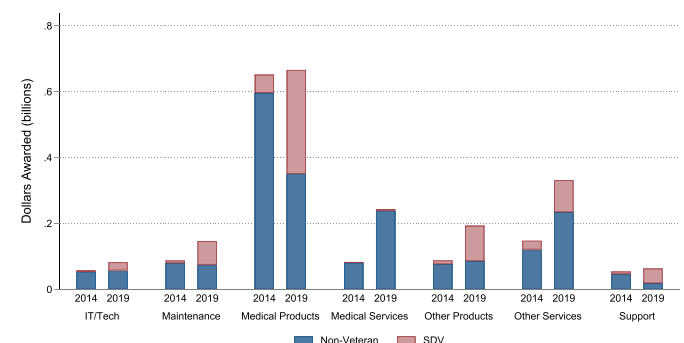
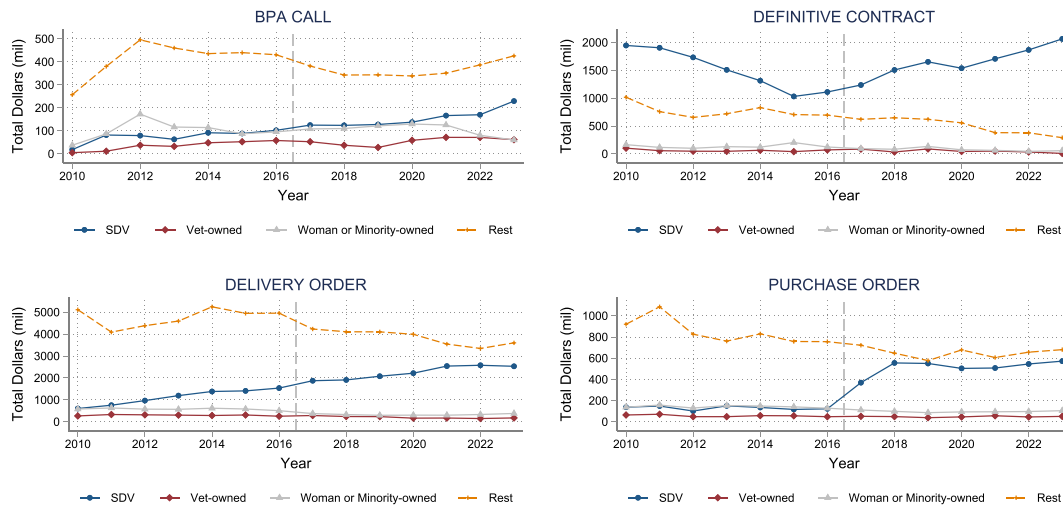


Fig. 1. VA awards by vendor type (2010–2023). (A). Total dollars (in millions); (B). Purchase Orders; FPDS initial action contracts funded by VA. Years are redefined to run from July of the prior year through June of the current. Rest includes all other vendors, and award values are winsorized at the top 1% within each award type. In Panel B, the series for Rest is plotted on the secondary (right) y-axis in both subpanels.

Panel B is restricted to purchase orders and plots the share of awards and the share of dollars going to each type of firm. In the yearly series shown in the figure, awards to SDVs increased immediately, from a

A. Total Dollars (in millions)



B. Purchase Orders

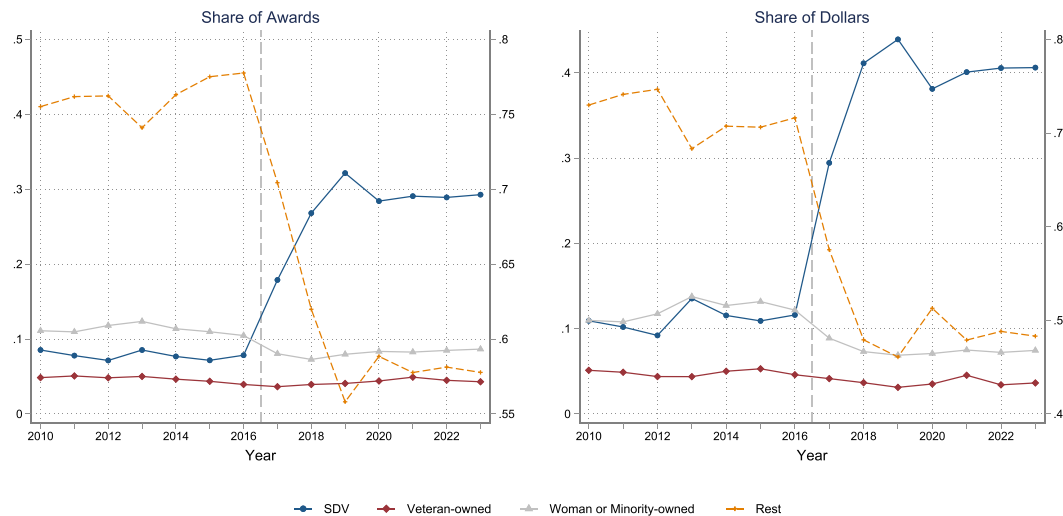


Fig. 2. Most common categories of VA Awards. Total purchase order dollars funded by VA in 2014 and 2019, by category, for the 5 most common categories in 2014. The remaining products and services are grouped together as other products or other services. Bars are split by SDV status; awards to non-disabled veteran-owned firms are excluded, so the bars do not sum to the total VA purchase orders.

2014–15 pre-policy average of 7.5% to 27% in 2018, the second full year after the policy change. The right panel shows an even sharper increase in the share of dollars awarded. In dollar terms, SDV businesses went from receiving \$126 million in purchase orders per year in 2014–15 to about \$553 million per year in 2018–2019, a more than fourfold increase. Meanwhile, Appendix Figure A.2 shows no evidence of changing award behavior among non-VA agencies, which were unaffected by the Supreme Court ruling.

To check for manipulation of SDV status, Appendix Figure A.4 graphs the number of vendors (identified by their UEI number) that were observed switching to SDV status among vendors that initially appear as non-SDV. Although there is a small bump in the year immediately following the policy change, the overall number of businesses that switch is extremely low.

This significant growth in purchase orders indicates that the ruling clearly had an impact on this dimension of contracting, although it is unclear whether the original motivation for using the loophole was due to lower acquisition costs or a simpler procedure. Our analysis of outcomes

for SDV firms focuses on purchase orders. To study VA procurement outcomes, we also include FSS delivery orders and examine the combined PO + FSS sample. Note that the spike in SDV purchase orders does not appear to be offset by a corresponding reduction in awards to other firm groups (see the purchase-order panel in Panel A of Fig. 2). This pattern motivates the difference-in-differences analysis in Section 4, which compares SDV firms to other groups of firms before and after the policy change.

4. Impacts on veteran-owned businesses

The previous section documents a significant increase in awards to SDV businesses after the 2016 policy change. We now quantify this treatment effect separately for the two groups of firms that may have benefited from this reform: existing SDV firms and new SDV entrants.

4.1. Existing businesses

We first estimate the impact on existing SDVs using a difference-in-differences design. We compare (subgroups of) SDV firms to non-SDV

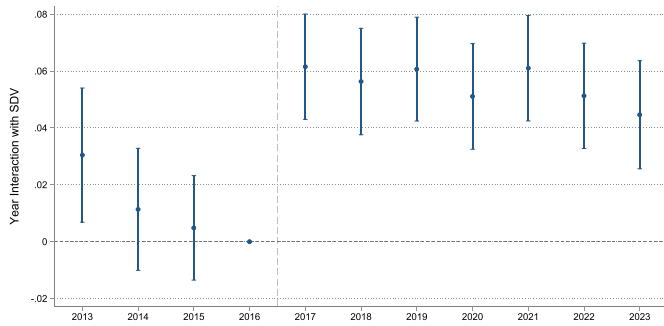


Fig. 3. Indicator for winning an award - existing businesses (2013–2023). Estimates of Eq. (1) ($N = 226,930$). Balanced panel of 1577 SDV businesses and 19,053 other non-SDV, non-veteran-owned businesses that won \$5000 or more in VA purchase order awards between July 2009 and June 2012. Observations are at the firm-year level, and the outcome is an indicator variable for winning a purchase order from July of the previous year to June of the current year (mean = 0.158). Regression estimates of the SDV*time interaction are plotted with 95% confidence intervals, and standard errors are clustered at the firm level. Controls include time FEs and firm FEs.

vendors, before and after the policy change. We estimate a series of specifications of the form:

$$Award_{it} = \alpha_i + \gamma_t + \sum_{s \neq 2016} \beta_s \cdot SDV_i \cdot \mathbb{1}\{t = s\} + \epsilon_{it} \quad (1)$$

where an observation is a firm (i) by year (t), and t is defined as the one-year period starting from July of $t-1$ to June of t . $Award_{it}$ is an indicator for whether the vendor won a purchase order award from the VA, and SDV_i is an indicator for whether the firm is an SDV. Our coefficients of interest are β_s , which correspond to the difference in the prevalence of winning awards between SDV and non-SDV firms, relative to the omitted period of 2016.¹⁰ Our analysis sample includes all VA purchase order awards between July 2012 and June 2023, although we use the full FPDS database starting in 2008 to identify existing businesses.

We first estimate the above specification on a sample of existing firms that previously won VA purchase order awards of at least \$5000, between July 2009 and June 2012.¹¹ As in a standard difference-in-differences design, our main identification assumption is the existence of parallel trends. This implies that, in the absence of a Supreme Court ruling, outcomes for SDVs would have evolved in parallel with non-SDVs. While this assumption is not directly verifiable, the raw purchase order awards plotted in Figure A.5 show the two groups moving in parallel from 2012 to 2016, followed by a sudden increase for SDVs only starting in 2017. The year-specific estimates also allow us to assess whether there was evidence of a pre-trend in the period from 2013 to 2016. Because the policy change induced procurement officers to shift orders from federal supply schedules to purchase order awards (i.e., the total amount of purchase orders increased), it is unlikely that the policy resulted in negative spillovers for non-veteran firms.

Fig. 3 plots the estimates of β_s from Eq. (1) for existing firms excluding non-disabled veteran-owned firms. The pre-period estimates move toward zero as 2016 approaches, and increase significantly and persistently after the policy change. After 2016, existing SDVs were 6 percentage points more likely to have won a VA contract in any given year. In the first year after the policy, an increase of 6.2 percentage points equates to a 26 percent increase in the prevalence of SDV awards, relative to the pre-expansion mean of 24 percent. To compare the treatment effect for SDVs relative to other disadvantaged small businesses,

¹⁰ Since the Supreme Court ruling occurred in June 2016, we consider $t = 2017$ (which starts on July 1, 2016) as the first post-treatment period.

¹¹ Restricting to awards of \$5000 or more excludes 18% of preexisting firms; robustness to this exclusion is reported in Appendix Table A.1.

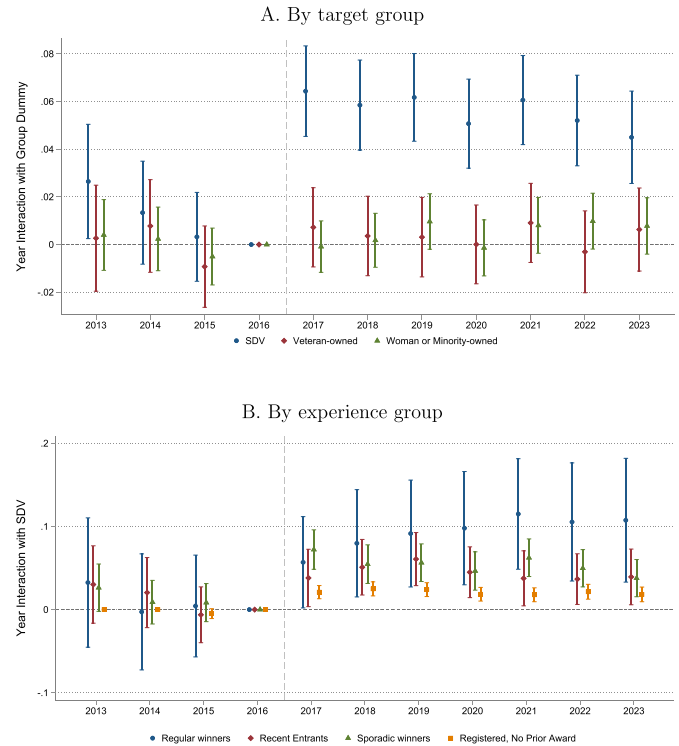


Fig. 4. Heterogeneity in award winning - existing businesses (2013–2023). (A). By target group; (B). By experience group. Estimates of Eq. (1). Panel A plots estimates from a single balanced panel ($N = 247,676$) of 1626 SDVs, 1886 non-disabled veteran-owned businesses, 4608 woman- or minority-owned businesses, and 14,396 other businesses that won \$5000 or more in VA purchase order awards between July 2009 and June 2012. Panel B plots estimates from four separate regressions of balanced panels: regular winners ($N = 26,301$), recent entrants ($N = 56,826$), sporadic winners ($N = 143,803$), and registered firms with no prior observed federal award ($N = 395,064$). The last group consists of firms with a recorded initial SAM or legacy CCR registration between January 1, 2011 and June 30, 2014, code 'A' in the November 2014 snapshot, and no federal award observed before July 1, 2014; its regression begins in 2015 because earlier registration snapshots are unavailable. FPDS records awards but not losing bidders, so registration does not establish that a firm bid. Observations are at the firm-year level, and the outcome is an indicator for winning a purchase order from July of the previous year to June of the current year. Regression estimates of the SDV*time interaction are plotted with 95% confidence intervals, and standard errors are clustered at the firm level. Controls include time FEs and firm FEs.

Panel A of Fig. 4 plots the estimates of a specification that not only includes SDV interactions, but also interactions for being a non-SDV veteran-owned business, and for being a woman- or minority-owned business. The omitted category includes all other vendors, including small businesses that do not have any of the previous designations. In contrast to SDVs, the other two categories of firms experienced no statistically significant difference in awards after the policy change.

To test for heterogeneous treatment effects for firms with varying degrees of procurement “experience”, we next estimate Eq. (1) on four mutually exclusive subgroups. We divide our sample of existing firms into three subgroups: (i) *regular winners* defined as firms who won a purchase order award every year from 2010 to 2012, and whose awards totaled \$100k or more; (ii) *recent entrants* defined as firms who won their first VA award in 2011 or 2012; and (iii) *sporadic winners* defined as all the remaining firms with some purchase order award in our sample. We then identify a fourth subgroup of *SAM registrants with no prior observed federal award*: businesses with a recorded initial SAM registration between January 1, 2011 and June 30, 2014, actively registered as of

Table 2
Difference-in-Differences estimates (2013–2023).

A. Outcome: Any VA Purchase Order Award					
	All Existing Winners (1)	Regular Winners (2)	Recent Entrants (3)	Sporadic Winners (4)	Registered No Prior Award (5)
Post*SDV	0.0441*** (0.00672)	0.0896*** (0.0232)	0.0338** (0.0135)	0.0448*** (0.00777)	0.0233*** (0.00289)
R ²	0.498	0.567	0.446	0.420	0.434
ymean	0.157	0.449	0.115	0.122	0.00278
sdvmean	0.0722	0.0902	0.0677	0.0708	0.0420
N	247,676	28,050	62,436	157,190	395,064
B. Outcome: ln(Total Dollars Awarded)					
	All Existing Winners (6)	Regular Winners (7)	Recent Entrants (8)	Sporadic Winners (9)	Registered No Prior Award (10)
Post*SDV	0.584*** (0.0709)	0.818*** (0.124)	0.494*** (0.183)	0.417*** (0.0972)	1.061*** (0.324)
R ²	0.669	0.647	0.664	0.608	0.693
ymean	10.76	11.49	10.41	10.35	11.14
sdvmean	0.0948	0.0864	0.0957	0.101	0.535
N	35,034	12,187	6217	16,630	878

Pooled estimates of Eq. (1). Observations are at the firm-year level (defined from July of the previous year to June of the current year) and include firm and year FEs. Column 1 includes all small businesses that won \$5000 or more in VA purchase order awards between July 2009 and June 2012, while columns 2–5 represent mutually exclusive subgroups. The final column includes firms with a recorded initial SAM or legacy CCR registration between January 1, 2011 and June 30, 2014, code ‘A’ in the November 2014 SAM snapshot, and no federal award observed before July 1, 2014, subject to the analysis-sample restrictions. FPDS records awards but not losing bidders, so the data do not reveal whether these firms submitted losing bids or did not bid. Panel B is conditional on having won an award in that period. Award values are winsorized at the top 1% within each award type. Robust standard errors clustered at firm level in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

November 2014, and no federal award observed before July 1, 2014.¹² This is a policy-relevant group of interest, as it is not clear whether the policy change would allow these existing vendors with no prior contracts to start receiving awards.

Panel B of Fig. 4 plots the estimates from four separate regressions, one for each experience group. We observe a statistically significant and sustained increase in the prevalence of winning an award for every single subgroup of SDVs. However, the treatment effect for SDV registrants with no prior observed federal award is only one-third as large as the estimates for the other three groups. Immediately after the 2016 policy change, SDVs in this group were 2.1 percentage points more likely to win a VA purchase order award in any given year. Meanwhile, the three subgroups of existing winners all experienced treatment effects of roughly 4 percentage points or more, with the treatment effect for regular winners growing to 9 percentage points by 2019.

Pooled difference-in-differences estimates for each subgroup are reported in Table 2. We report estimates for $Post * SDV$, which interacts SDV status with an indicator for 2017 and later. Panel A shows that among the subgroups of firm experience, regular winners experienced the largest average treatment effect of 9 percentage points. While SDV registrants with no prior observed federal award increased their likelihood of winning by 2.3 percentage points, this is a large increase relative to their sample mean of only 0.3%. Panel B then estimates the impact on total award value, conditional on having won an award. We estimate a statistically significant increase in award values for all

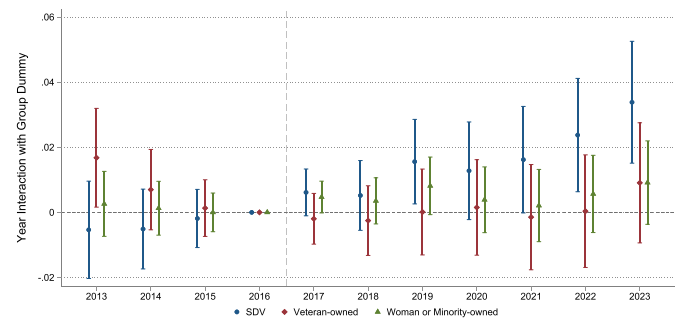


Fig. 5. Survival in FPDS - existing businesses (2013–2023). The figure ($N = 247,676$) plots estimates from a single balanced panel regression, of Eq. (1). Observations are at the firm-year level, and the outcome for year t is an indicator equal to one if the firm's final observed federal award occurs on or after July 1 in $t - 1$. The measure is absorbing and does not require an award during year t . Regression estimates of the SDV*time interaction are plotted with 95% confidence intervals, with standard errors clustered at the firm level. Controls include time FEs and firm FEs.

subgroups. Among the existing winners, it is the subgroup of regular winners that experiences the largest increase in log total dollars awarded (0.82 log points).

Finally, we estimate whether the 2016 policy change impacted survival in the federal procurement market. Our proxy measure for survival in year t is an indicator for whether the firm's final observed award from any federal agency occurs on or after July 1 of $t - 1$. The measure is absorbing and does not require the firm to win an award during year t . Fig. 5 plots the estimates from Eq. (1) that includes time effects interacted with SDV, non-SDV veteran-owned business, and woman- or minority-owned business dummies. Compared to the other two groups, SDVs were slightly more likely to remain active in federal procurement in the years following 2016, with the effect growing gradually over time. Pooled difference-in-differences estimates in Table 3 imply a statistically significant increase in the likelihood of continued procurement for SDV firms, and no change for veteran-owned and woman- or minority-owned firms. However, when we proxy for survival using continuous registration in SAM (a pre-requisite for submitting bids), we estimate a precise null effect for SDVs (Column 3).

4.2. New VA contractors

In this section, we investigate the effects of the policy on new entrants into VA procurement. We define a first-time VA contractor as a business whose first observed VA award is a purchase order, and assign the business to the July–June cohort s in which that award occurred.¹³ Below, we also consider an alternative definition of firms that are new to the VA and the federal procurement market altogether. Note that these definitions differ from generic “firm entry” and that new entrants need not be young in establishment age. Still, they capture the idea that the policy may have attracted new firms that were not previously participating in this market.

The raw data show that the policy increased awards to first-time VA contractors as well as to incumbent firms. In Fig. 6, the share of VA purchase order awards allocated to SDV firms receiving their first VA award more than doubles after June 2016. Panel B shows a similar pattern for the stricter group of firms whose first VA award occurs in the same month as their first observed federal procurement award.¹⁴

¹² The November 2014 snapshot is the earliest registration snapshot available. We define prior award status as of July 1, 2014 so that the 2015 and 2016 July–June periods remain available as pre-treatment observations.

¹³ By first VA award we mean the first observable VA award since the start of our FPDS data in October 2008.

¹⁴ Meanwhile, in Figure A.6 we observe no discernible change in first-time contractors among non-VA purchase orders.

Table 3
Difference-in-Differences estimates of survival (2013–2023).

	Any VA Purchase Order Award (1)	Any Federal Award (2)	Continued Registration in SAM (3)
Post*SDV	0.0454*** (0.00683)	0.0193*** (0.00706)	0.00312 (0.00262)
Post*Veteran	0.00347 (0.00606)	−0.00554 (0.00697)	−0.000175 (0.00317)
Post*Woman/Minority	0.00464 (0.00418)	0.00434 (0.00471)	0.00184 (0.00217)
R^2	0.498	0.807	0.947
ymean	0.157	0.331	0.330
N	247,676	247,676	202,644

Pooled estimates of Eq. (1). Observations are at the firm-year level (defined as July of the previous year to June of the current year) and include firm and year FEs. Column 2 uses an absorbing FPDS survival measure that equals one in year t if the firm's final observed federal award occurs on or after July 1 of $t - 1$; it does not require an award during year t . Column 3 uses an absorbing measure of continuously active SAM registration. An annual period is active when either the preceding November or the current May snapshot records SAM Extract Code 'A'; the measure remains zero after the first inactive annual period. Column 3 excludes 2013–2014 because registration snapshots are unavailable before November 2014. Robust standard errors clustered at the firm level in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

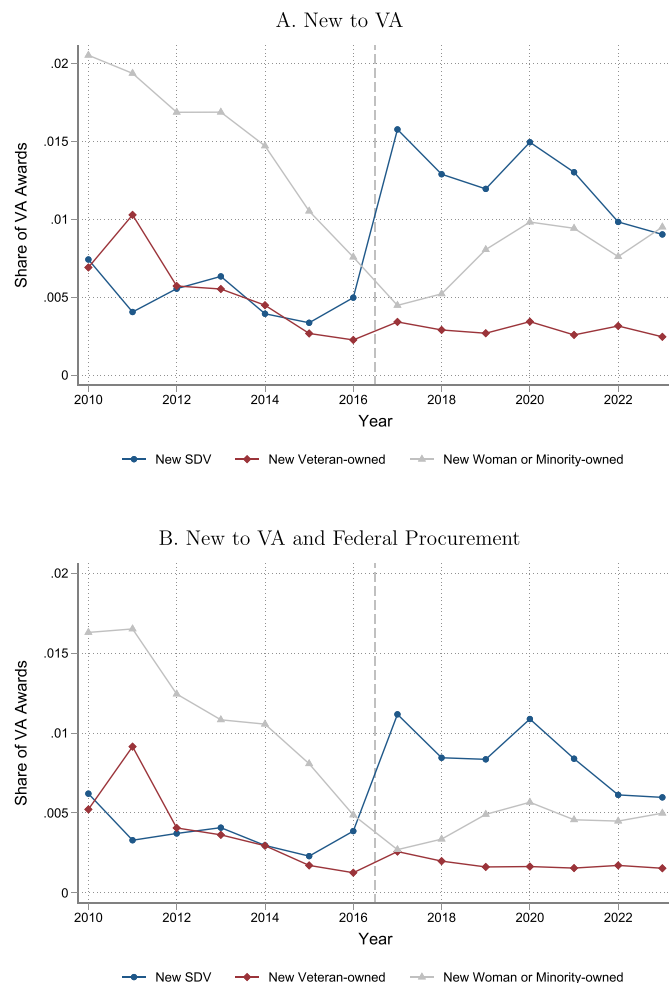


Fig. 6. Share of VA awards to new entrants (2010–2023). (A). New to VA; (B). New to VA and federal procurement. Restricts to VA purchase order awards. Panel A defines new entrants as those winning a VA award for the first time. Panel B defines new entrants as those winning a VA award within the same month as their first federal procurement award.

More formally, we conduct a cohort analysis to compare new SDV entrants to other disadvantaged entrants before and after the policy change. For each cohort of new entrants (over the one-year period s from July to June), we estimate regressions of the following form, which include only one observation per firm:

$$\begin{aligned} Outcome_i &= \alpha_{s(i)} + \beta_0 \cdot SDV_i + \gamma_0 \cdot Veteran_i + \mu_0 \cdot Woman/Minority_i \\ &+ \sum_{s \neq 2016} (\beta_s \cdot SDV_i + \gamma_s \cdot Veteran_i + \mu_s \cdot Woman/Minority_i) \\ &\cdot \mathbb{1}\{s(i) = s\} + \epsilon_i \end{aligned} \quad (2)$$

where i indexes firms, $s(i)$ indexes the cohort of firm i , SDV_i is an indicator for whether the firm is an SDV, $Veteran_i$ is an indicator for whether the firm is non-SDV veteran-owned, and $Woman/Minority_i$ is an indicator for whether the firm is woman- or minority-owned. Our coefficients of interest are β_s , which correspond to the change in the outcome gap between SDV and other small entrants in cohort s , relative to the gap in the omitted 2016 cohort. To benchmark these results, we compare these coefficient estimates to γ_s and μ_s , the corresponding estimates for veteran and woman- or minority-owned businesses.

Our primary outcome of interest is the age at first award, where age is measured by the number of months since the initial registration date in SAM (i.e., entry into the procurement market). We restrict our sample to firms that were ever registered in SAM, which requires us to begin our sample in 2014. For comparability across the two age outcomes in Table 4, each sample includes only firms for which both the initial registration date and the business start date are observed.¹⁵ Prior to 2017, the mean age at first award was 52 months for SDVs, 67 months for woman- or minority-owned businesses, and 72 months for the rest.

Fig. 7 plots the estimated coefficients on SDV status in Panel A, and a comparison with other disadvantaged firms in Panel B. Immediately after the policy change, the age at first award of new SDVs fell by about 15 months relative to non-veteran owned new entrants (measured relative to the 2016 cohort gap). The decline in the age at first award remains relatively stable post-2016, whereas Panel B shows that other disadvantaged firms experienced no decline in their age at first award. Pooled treatment effects, estimated using a difference-in-differences design, are presented in Table 4. We estimate an average decline of 11 months for SDV firms in Column 1.

We also use information on the year each business was established to estimate the firm's actual age. We construct an indicator for young firms less than 3 years of age and repeat the pooled difference-in-differences estimation. The point estimate in Column 2 of Table 4 implies that post-2016 new SDV entrants were 5.1 percentage points more likely to be young, although the estimate is not statistically significant. The age-at-award results therefore provide clearer evidence that new SDV entrants were able to win their first award within a shorter time frame than before. Columns 3 and 4 repeat the analysis for entrants whose first VA award occurred in the same month as their first award from any federal agency. The point estimates remain negative for months since registration and positive for the young-firm indicator, but both are imprecisely estimated.

In Columns 5 and 6, we compare these results to estimates of new entrants to non-VA agencies as a placebo test. Although we still estimate a small decline in age for new SDV entrants post-policy change, the decline is also present for woman- or minority-owned firms that were untreated. This points to an overall trend of new disadvantaged firms gaining access to procurement awards, so our estimates in Columns 1–2 are likely an overestimation of the policy's true impact on firm age at entry. Still,

¹⁵ Although our SAM database begins in 2014, initial registration dates extend as far back as 1997. Within our matched sample, fewer than 0.8% of firms won their first award before their recorded initial registration date, so we do not believe there is much scope for measurement error.

Table 4
Estimates of age at first award (2014–2023).

	New to VA Months since Registration (1)	Indicator: Age ≤ 3 (2)	New to VA and FPDS Months since Registration (3)	Indicator: Age ≤ 3 (4)	Non-VA Placebo Months since Registration (5)	Indicator: Age ≤ 3 (6)
Post*SDV	−11.01*** (3.923)	0.0505 (0.0362)	−6.467 (4.026)	0.0343 (0.0509)	−5.616*** (1.852)	0.0545** (0.0224)
Post*Veteran	−0.980 (6.223)	0.0434 (0.0315)	−12.80* (7.496)	0.0922 (0.0561)	−0.494 (2.195)	0.00911 (0.0190)
Post*Wmn/Minor	−0.341 (3.737)	0.000859 (0.0233)	2.562 (4.122)	−0.0671* (0.0402)	−2.675** (1.172)	0.0384*** (0.0105)
SDV	−23.84*** (3.442)	0.241*** (0.0330)	−7.551** (3.606)	0.295*** (0.0469)	−7.118*** (1.606)	0.204*** (0.0197)
Veteran	8.590* (4.759)	−0.0370 (0.0253)	13.10** (6.388)	−0.0778* (0.0460)	0.745 (1.823)	0.0520*** (0.0165)
Woman/Minority	−4.726* (2.780)	0.0354* (0.0191)	−1.669 (3.151)	0.0969*** (0.0345)	1.521 (0.999)	0.0392*** (0.00923)
Initial size (log dollars)	−3.065*** (0.568)	0.0164*** (0.00332)	−1.980*** (0.607)	0.0223*** (0.00525)	−1.224*** (0.180)	0.00839*** (0.00142)
R^2	0.118	0.114	0.0605	0.126	0.0547	0.109
Dep Var Mean	73.07	0.212	40.19	0.318	40.89	0.347
N	8411	8411	4497	4497	53,664	53,664

Pooled estimates of Eq. 2. Includes one observation per firm, and additional controls include FEs for year, month, major product group, and 2-digit NAICS. Odd columns report estimates for months since initial SAM registration, and even columns for whether the award was within 3 years of the business start date. Each column pair uses the common sample of firms for which both dates are observed. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

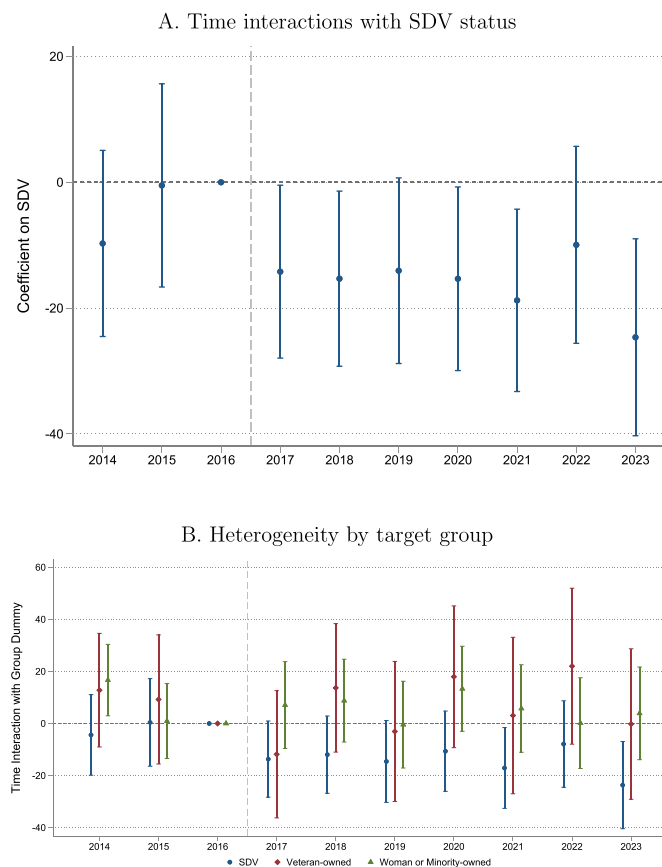


Fig. 7. Age in months at first award (2014–2023). (A). Time interactions with SDV status; (B). Heterogeneity by target group ($N = 8,695$). Each panel plots coefficient estimates from a single regression at the firm level, from Eq. 2. The outcome is measured as the number of months since initial SAM registration, and the mean across all cohorts is equal to 73 months (mean for SDV is 49, mean for non-disabled veteran is 89, and mean for woman/minority is 74). Controls include indicators for SDV, veteran, and woman/minority, and entry year FEs. Estimates are plotted with 95% confidence intervals using robust standard errors.

the magnitudes suggest that the policy had a significant causal effect on firm age above and beyond this underlying trend.

We also estimate whether new entrants were more likely to survive in the federal procurement market using active SAM registration. Registration length runs through the firm's last annual period with an active registration, and the gap outcome indicates an inactive period before that last active period. Results are reported in Appendix Table A.2, and we find no evidence that the policy increased either active-registration length or continuity for SDVs. One interpretation is that greater competition for purchase order awards may have offset survival gains for new SDV entrants. Another is that pre-2016 entrants who remained active after 2016 were also exposed to the policy, creating leakage across cohorts.

4.3. Spillovers across agencies

We estimate whether the increase in set-asides by the VA also led to spillovers to other federal agencies. We identify businesses that were awarded their first federal contract by the VA, and estimate the likelihood of winning a contract from any other federal agency within the next three years. We estimate a difference-in-differences specification to test whether SDV businesses experienced a change in their non-VA awards after the 2016 policy change, relative to their non-veteran counterparts. We estimate the following regression specification at the firm-year level from 2013 to 2023 (resulting in up to 4 observations per firm).

$$Spillover_{it} = \alpha_i + \beta * (t > 2016) * SDV_i + \gamma * SDV_i + Entrycohort_i + X_i' \delta + \epsilon_{it} \quad (3)$$

where i indexes firms and t indexes years. As outcome measures of spillovers to non-VA agencies in the three years following their initial VA award, we consider an indicator for any non-VA award, the log of the number of awards, and the log of dollars awarded. The log outcomes are defined only for firm-years with a positive destination-agency award. After controlling for entry-cohort and year fixed effects, β is our difference-in-differences coefficient of interest. To control for firm characteristics, X_i' includes the log dollar value of the initial award, the month of the initial award, major product group fixed effects, and 2-digit NAICS fixed effects.

Table 5 reports the regression estimates for new VA entrants in Panel A, and a reverse sample of non-VA entrants in Panel B. At baseline,

Table 5
Estimates of spillovers (2013–2023).

<i>A. Spillovers of New VA Entrants to Non-VA Awards</i>						
	Any Award (1)	(2)	ln(# of awards) (3) (4)		ln(dollars awarded) (5) (6)	
Post*SDV	−0.0116 (0.0200)	−0.0147 (0.0197)	0.174 (0.198)	0.170 (0.199)	−0.0976 (0.311)	−0.0661 (0.320)
SDV	0.101*** (0.0180)	0.0945*** (0.0177)	0.0792 (0.180)	0.0725 (0.185)	0.928*** (0.278)	0.817*** (0.289)
Initial size (log dollars)	0.00422*** (0.000932)	0.00304*** (0.000946)	0.0438*** (0.0131)	0.0430*** (0.0130)	0.127*** (0.0374)	0.114*** (0.0372)
R^2	0.0199	0.0447	0.0503	0.137	0.108	0.193
Dep Var Mean	0.0666	0.0666	0.730	0.731	10.73	10.73
Additional controls		X		X		X
<i>N</i>	32,896	32,896	2192	2187	2130	2126
<i>B. Spillovers of New Non-VA Entrants to VA Awards</i>						
	Any Award (1)	(2)	ln(# of awards) (3) (4)		ln(dollars awarded) (5) (6)	
Post*SDV	0.0360*** (0.00521)	0.0360*** (0.00518)	0.295** (0.115)	0.306*** (0.116)	−0.273 (0.281)	−0.267 (0.293)
SDV	0.0223*** (0.00395)	0.0224*** (0.00392)	0.0985 (0.105)	0.133 (0.104)	1.305*** (0.262)	1.293*** (0.276)
Initial size (log dollars)	0.000208** (0.0000910)	0.000205** (0.0000943)	−0.00741 (0.0116)	−0.00719 (0.0110)	0.0876*** (0.0241)	0.0818*** (0.0219)
R^2	0.0131	0.0204	0.0686	0.213	0.146	0.246
Dep Var Mean	0.00639	0.00639	0.433	0.434	10.72	10.72
Additional controls		X		X		X
<i>N</i>	356,164	356,164	2275	2267	2210	2203

Estimates of Eq. (3). Observations at the firm-year level, with at most four observations per firm (year of entry + the following three years). Log outcomes are defined only for firm-years with a positive destination-agency award. Regressions include entry-cohort and year FEs. Additional controls include FEs for month, major product group, and 2-digit NAICS. Robust standard errors clustered at the firm level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

new SDV vendors are 10 percentage points more likely than other new vendors to win contracts from other agencies after entry. However, the Post*SDV interaction is close to zero and not statistically significant, indicating no change in the likelihood of spillovers for SDVs after the policy change. The same is true for our intensive margin measures. On the other hand, Panel B shows that new entrants that did not initially contract with the VA are now more likely to win a VA award post-2016. This suggests that while new VA entrants did not experience spillovers to non-VA agencies, SDV vendors outside the VA did become more likely to win awards from the VA.

5. Impacts on VA procurement outcomes

Having documented the impact of the expanded use of preferences in VA awards on both incumbent and new-entrant SDVs, we now study the extent to which the policy affected VA procurement outcomes. Our identification strategy leverages differential exposure to treatment by product category. Prior to the 2016 Supreme Court ruling, the VA was able to circumvent the use of veteran set-asides by making delivery order purchases through Federal Supply Schedules (FSS), which are long-term contracts that the VA (and all agencies) use to order commercial supplies and services at pre-negotiated prices. Crucially, the General Services Administration, not the VA, determines which categories of goods and services fall under the scope of the FSS program. Therefore, we treat the prior usage of FSS awards as plausibly exogenous, and we would expect that the categories most exposed to the policy change would be the ones for which FSS orders made up a large share of awards pre-2016. Meanwhile, categories with the lowest FSS shares would be minimally exposed.

To calculate measures of exposure, we focus on the two years before the Supreme Court ruling, 2014 to 2015, and identify all delivery orders that originated from FSS. For each 4-digit PSC code j , we calculate $shareFSS_j$ as the number of recorded actions on FSS delivery orders divided by the total number of actions on delivery orders and purchase orders in calendar years 2014–15. We include purchase orders in the

denominator because they are the closest substitute for delivery orders; any product for which there is no existing delivery vehicle would be procured via a standalone purchase order. Among the 229 product categories with at least 100 purchase-order or delivery-order action records in 2014–15, the FSS share ranges from zero to 0.9, with a median of 0.33.¹⁶

Fig. 8(A) graphs binned scatterplots of our 229 product groups, with $shareFSS_j$ on the x-axis. On the y-axis is the change in each outcome variable of interest, measured as the difference between the 2014–15 mean and the 2017–18 mean (the two years before and the two years after our policy change). The left subpanel shows that categories with the highest initial FSS shares experienced a significant decline in their usage after 2016, consistent with the closing of this loophole. The opposite relationship is shown in the next two subpanels: high initial FSS share is strongly correlated with both the growth in SDV awards and the growth in SDV set-asides after 2016. This provides clear evidence that the policy change induced procurement officers to replace FSS orders with SDV set-asides.

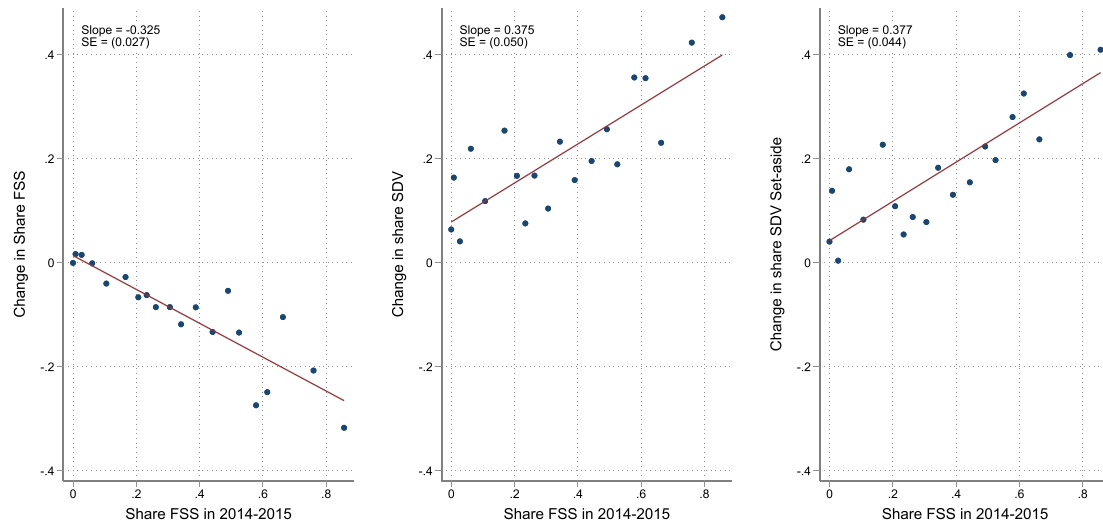
5.1. Competition and performance

To estimate how the policy-induced expansion of SDV set-asides affected VA procurement outcomes, we focus on two sets of outcomes: the extent of competition for awards and contract execution performance.¹⁷ The effects on these two margins are *ex ante* ambiguous. The mechanical effect of set-asides is to decrease competition, as a smaller set of

¹⁶ Categories with shares close to zero include: R&D, Nursing home/Long-term care services, Subsistence, and Architect/Engineering services. Categories with the highest shares include: Food prep and serving equipment, Rental equipment, Office furniture, and Family and internal medicine services.

¹⁷ Of course, another key outcome is award price. However, we are unable to assess the impact on unit prices, since the Federal Procurement Data System (FPDS) does not report prices and quantities separately, only the total award value. This limitation is shared with the procurement literature based on FPDS.

A. Changes in FSS usage and SDV awards



B. Increase in SDV awards

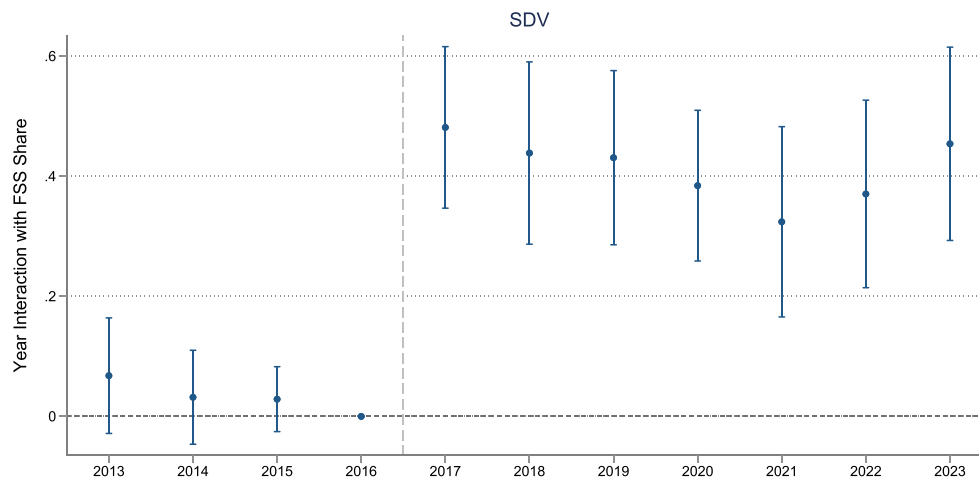


Fig. 8. FSS share is positively correlated with an increase in SDV awards. (A) Changes in FSS usage and SDV awards; (B) Increase in SDV awards. Panel A ($N = 228\text{--}229$ across subpanels): binned scatterplots by each code's FSS share from 2014–2015. The exposure sample requires at least 100 purchase-order or delivery-order action records in 2014–15. Each change on the y-axis is defined as the difference between the 2017–2018 share and 2014–2015 share. Panel B ($N = 427,523$): coefficients of year interacted with 2014–15 FSS share, from Eq. (4), with an indicator for an SDV award as the outcome. The regression is at the purchase-order award level and includes fixed effects for the July–June year, the federal fiscal year, PSC4 code, and awarding office code. Estimates are plotted with 95% confidence intervals using robust standard errors clustered at the PSC4 level.

firms is qualified to bid. However, the restriction may induce more firms to enter in equilibrium, and this entry effect may moderate or even more than compensate for the competition effect (Li and Zheng, 2009; Krasnokutskaya and Seim, 2011). Indeed, the entry effects we documented in the previous section already suggest that this mechanism may be quantitatively relevant. The impact on execution performance measures, such as cost overruns or delays, is similarly uncertain. First, restricting the set of participants from the same set of potential bidders may lead to different effects on performance depending on the underlying product characteristics (Carril et al., 2026). Second, the entry of new participants with potentially different execution capabilities further complicates a precise prediction of execution performance.

To study how contract outcomes changed following the expansion of set-asides, we estimate difference-in-differences specifications

comparing VA procurement outcomes for highly exposed categories to those of less exposed categories. Because the policy induced procurement officers to shift orders from FSS delivery orders to purchase orders, we expand our analysis sample in some specifications to include FSS delivery order awards. In particular, we estimate specifications separately for purchase orders, FSS delivery orders, and the combined PO + FSS sample, to assess the role of changes in the mix of award types. We identify FSS delivery orders through their parent contracts and measure performance at the individual-order level using the same definitions as for purchase orders. Delays compare the completion date recorded on the last action with the initial expected completion date; overruns compare cumulative obligations across the award's recorded actions with its initial award value.

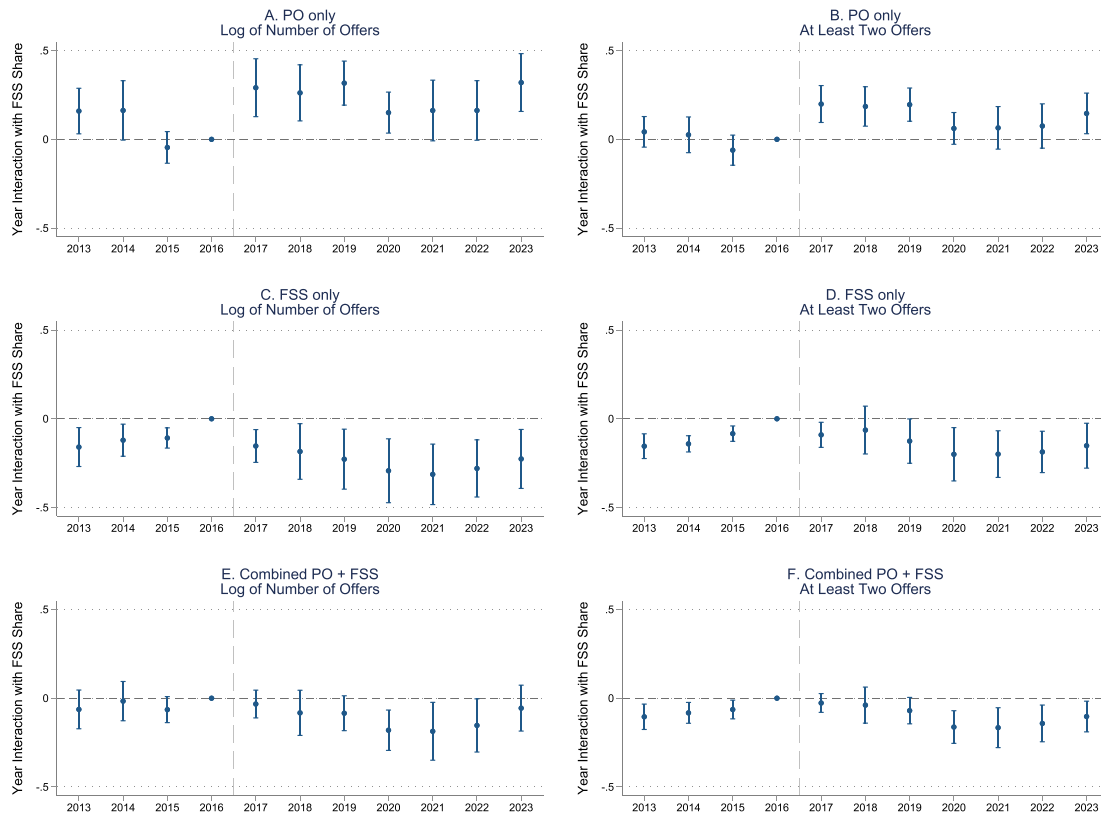


Fig. 9. Competition across award types and PO + FSS Sample. ($N = 427,522$ in panels A–B; 233,497 in C–D; 661,050 in E–F) Plotted are coefficients of year interacted with 2014–15 FSS share, from Eq. (4), with 2016 omitted. Each regression is at the award level and includes fixed effects for the July–June year, federal fiscal year, PSC4 code, and awarding office code. Rows show POs, delivery orders under FSS contracts, and the combined PO + FSS sample. Offer counts are uncapped; zeros are recoded to one and code 999 is treated as missing. Estimates are plotted with 95% confidence intervals using robust standard errors clustered at the PSC4 level.

In the following equation at the award level, i denotes the vendor, j denotes the PSC4 product code, o denotes the awarding office, f denotes the federal fiscal year, and t is defined as the one-year period starting from July of $t - 1$ to June of t . Here α_t are fixed effects for these July–June years, λ_f are fiscal-year fixed effects, γ_j are PSC4 fixed effects, and ϕ_o are awarding-office fixed effects:

$$\text{Outcome}_{ijof t} = \alpha_t + \lambda_f + \gamma_j + \phi_o + \sum_{s \neq 2016} \beta_s \cdot \text{shareFSS}_j \cdot \mathbb{1}\{t = s\} + \epsilon_{ijof t} \quad (4)$$

Our coefficients of interest are the β_s on the year dummies interacted with shareFSS_j , our continuous measure of the 2014–15 FSS share defined earlier, which ranges from 0 to 90 percent. Standard errors are clustered at the PSC4 level. The identifying assumption is that in the absence of the policy change, VA contracting outcomes would have evolved similarly for all product categories. Panel B of Fig. 8 estimates Eq. (4) with having an SDV vendor as the outcome. The pre-period shareFSS_j interactions are statistically insignificant, while after 2016 SDV awards rose sharply in product categories with higher initial FSS shares. Panels A–B of Figs. 9 and 10 can then be interpreted as estimating the reduced form effect of this expansion of SDV awards. Because the expansion also meaningfully shifted procurement away from FSS orders and into Purchase Orders, Panels C–D estimate the corresponding effect of the policy for the sample of FSS awards. Panels E–F then combine both award types to estimate the net effect.

To measure the extent of competition for awards, we use the number of offers received in the solicitation of the procurement contract.

Because 85 percent of purchase orders only receive a single offer, the most meaningful increase in competition occurs when more than one offer is received. Thus we not only estimate effects on the log number of offers, but also on an indicator for whether more than a single offer is received. In the three years following the policy change, purchase orders in the highest FSS categories were almost 20 percentage points more likely to face competition (Fig. 9, panel B). This positive effect on competition then fades over time. However, when we estimate the same event study for FSS orders, we observe a statistically significant and sustained decline in competition (Fig. 9, panels C–D). This pattern is consistent with acquisitions for which greater SDV participation was expected—those for which the Rule of Two may have been more likely to apply—shifting toward purchase orders. When the two award types are pooled together, we estimate small declines in reported competition in some later post-policy years (Fig. 9, panels E–F). However, the pooled difference-in-differences estimates for the combined PO + FSS sample are negative but not statistically distinguishable from zero at the 5% level (Table 6, columns 1–2). Some caution is warranted in interpreting these competition results, since trends before 2016 are not perfectly parallel.

Meanwhile, we estimate no statistically significant difference in contract performance following the 2016 Supreme Court ruling, as measured by indicators for experiencing delays beyond the expected duration of the contract, or cost overruns above the base contract value. Patterns are similar across the Purchase Order, FSS, and Combined PO + FSS samples, suggesting a limited role for compositional effects (Fig. 10). Additionally, Table 6 reports estimates from pooled difference-in-differences regressions of Eq. (4). These pooled estimates

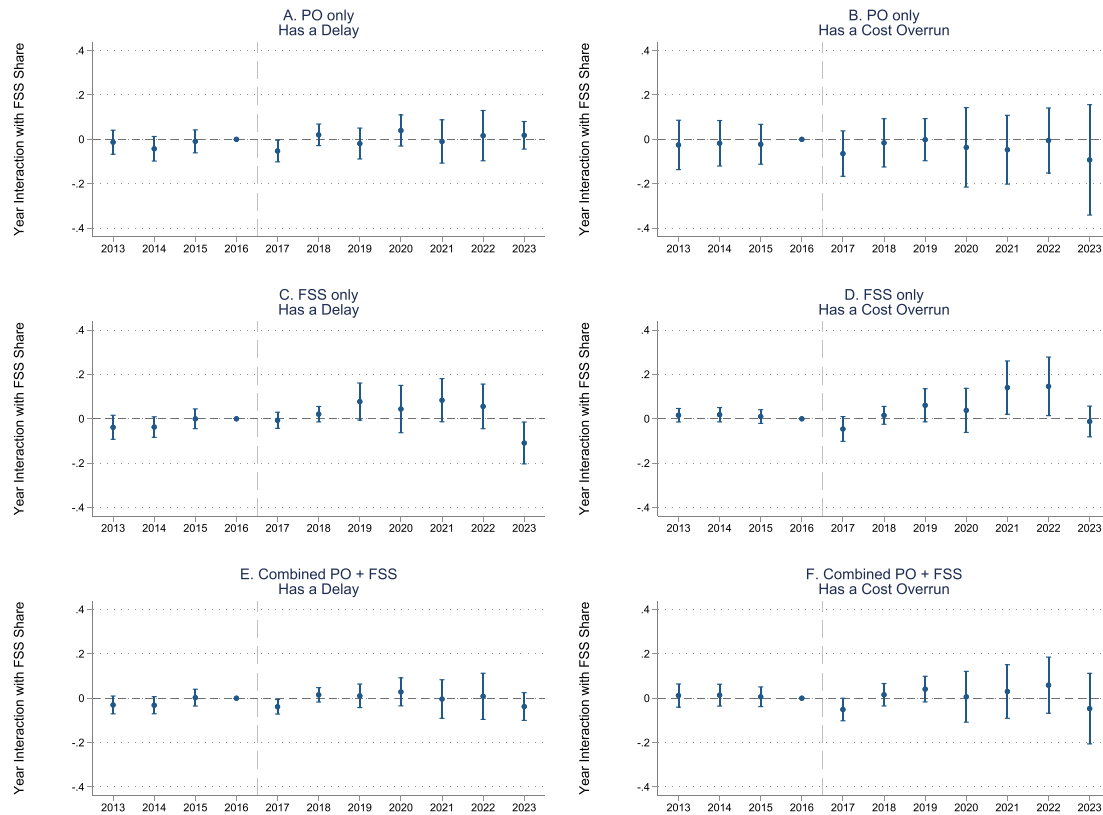


Fig. 10. Contract performance across award types and PO + FSS Sample. ($N = 394,614$ in panel A; 403,745 in B; 217,270 in C; 223,341 in D; 611,916 in E; 627,115 in F) Plotted are coefficients of year interacted with 2014–15 FSS share, from Eq. (4), with 2016 omitted. Each regression is at the award level and includes fixed effects for the July–June year, federal fiscal year, PSC4 code, and awarding office code. Rows show POs, delivery orders under FSS contracts, and the combined PO + FSS sample. Regressions exclude awards with missing outcomes. A delay occurs when actual contract duration exceeds its initial expected duration; an overrun is a positive dollar change after rounding to the nearest dollar. Estimates are plotted with 95% confidence intervals using robust standard errors clustered at the PSC4 level.

are consistent with the year-specific estimates in Figs. 9 and 10. Appendix Table A.9 reports the corresponding specifications for delays measured in days, overruns measured in dollars, and overruns measured in dollars relative to the initial award value. The pooled estimates for the combined PO + FSS sample remain statistically indistinguishable from zero, and are qualitatively consistent with the results from Table 6.

5.2. Discussion

The results do not support the view that increased access to VA procurement contracts by SDVs came at the cost of a large decline in competition or worse execution performance for the VA. While standalone purchase order competition rose substantially due to new SDV entrants competing for newly set-aside awards, analyzing the combined PO + FSS market reveals that overall market competition remained roughly stable. We can also measure market concentration in purchase orders by calculating the Herfindahl–Hirschman Index (HHI) over time. Appendix Figure A.8 shows that the aggregate HHI remains relatively stable after 2016, and concentration among SDVs, if anything, declines. Consistent with our findings in Table 2, this suggests that while the entry of new SDVs may have increased competition, large preexisting vendors still won proportionally more of the set-asides.

One important caveat to our results is our inability to observe award prices. This is an unfortunate feature of the data available for federal awards (FPDS). It is possible that SDV set-asides may lead to increased procurement costs, which could complicate the evaluation of

the policy.¹⁸ However, the policy change we study specifically shifted procurement away from FSS delivery orders and into one-time purchase orders. Appendix Figure A.9 shows that mean purchase-order award value for SDVs increased in categories with the highest initial FSS shares, more than tripling from 2016 to 2017. While we cannot observe whether this is due to price or quantity, the sheer size of the increase is suggestive that officers are now placing bulk orders instead of purchasing one at a time for a pre-negotiated price. If this is true, it is possible that the policy could result in lower unit prices due to volume discounts, even when average award value increases.

Another relevant aspect is the scope of the policy expansion, which affected the procurement of commercially available goods and services that could previously have been purchased through FSS. This implies that the affected contracts primarily involve standardized goods and services. Evidence from the Department of Defense suggests that for these relatively simple contracts, more competition is likely to translate into lower prices at the award stage, with little effect on post-award performance (Carril et al., 2026). On the other hand, this means that we may not observe the same type of null effects on performance if the policy is applied to more complex contracts. Relative to larger, more specialized acquisitions, purchase orders may, therefore, be a more efficient sphere through which governments can increase their preferences for disadvantaged businesses.

¹⁸ Indeed, other preference programs such as bid subsidies have been shown to increase procurement costs (Marion, 2007, 2009; Krasnokutskaya and Seim, 2011).

Table 6
Procurement outcomes by award type and PO + FSS sample (2013–2023).

	(1) Log reported offers	(2) At least two offers	(3) Any delay	(4) Any overrun
<i>Purchase orders</i>	0.157*** (0.048)	0.133*** (0.034)	0.018 (0.020)	−0.019 (0.032)
Dep Var Mean	0.186	0.154	0.066	0.058
N	427,522	427,522	394,614	403,745
<i>Direct FSS orders</i>	−0.107** (0.048)	−0.015 (0.041)	0.044** (0.021)	0.015 (0.020)
Dep Var Mean	0.297	0.274	0.077	0.048
N	233,497	233,497	217,270	223,341
<i>Combined PO + FSS</i>	−0.060* (0.035)	−0.015 (0.028)	0.014 (0.016)	−0.006 (0.021)
Dep Var Mean	0.225	0.196	0.070	0.055
N	661,050	661,050	611,916	627,115

The table reports coefficients on the post-2016 indicator interacted with baseline FSS exposure in award-level regressions. Standard errors clustered by PSC4 appear in parentheses. Dependent-variable means and award counts are calculated over each regression's estimation sample. All regressions include July–June year, federal fiscal year, PSC4, and awarding-office fixed effects. FSS orders are delivery orders directly matched to an FSS parent. The combined PO + FSS sample pools both award types without reweighting. Missing outcomes are excluded. Offer counts are uncapped, with zero recoded to one and 999 treated as missing. Any delay indicates a positive cleaned delay; any overrun indicates a positive cleaned dollar change after rounding to the nearest dollar. Sample sizes across outcomes may vary due to missing data and fixed-effect singleton exclusions. Appendix Tables A.7 and A.8 report versions of this table with a common sample across columns. Table A.7 requires all four outcomes to be observed; Table A.8 retains the larger sample with observed offers and codes missing performance outcomes as no delay or overrun. Results are broadly similar, and the main qualitative conclusions are unchanged. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Conclusion

The Department of Veterans Affairs awards a large and growing share of civilian federal procurement contracts (over \$30 billion annually since FY2020). While preference programs such as the VA's set-asides for service-disabled veteran business owners are intended to level the playing field for disadvantaged firms, whether this fosters new entrepreneurship or simply increases awards to existing qualified vendors is of great policy relevance.

We evaluate the effectiveness of the VA's SDV preference program in improving the outcomes of targeted businesses and find that the 2016 expansion in scope increased awards to vendors that had not previously contracted with the government. This included not only new businesses but also active SAM registrants with no prior observed federal awards. While the program helped new vendors win initial awards, it did not necessarily improve their post-entry survival as measured by active SAM registration.

On the other hand, we find no negative impacts on VA procurement outcomes. Despite a significant shift of procurement activity from pre-negotiated FSS schedules to set-aside purchase orders, we find little overall impact on competition and no significant change in contract execution performance. These findings suggest the VA's use of SDV set-asides for commercially available products and relatively low-value contracts has been successful in improving access for the target population, without detectable deterioration in the procurement outcomes we observe. Thus in markets with the lowest barriers to entry, set-asides have the potential to be an effective policy tool for achieving distributional goals without sacrificing procurement efficiency.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used Codex to review their analyses and check for replicability. The authors reviewed and

edited the output as needed and take full responsibility for the content of the published article.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at doi:10.1016/j.jpubeco.2026.105805.

Data availability

Data will be made available on request.

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