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Authors:

Gegam Shagbazian, Riccardo Camboni, Paola Valbonesi

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Set-Aside Procurement and Small Business Growth: evidence from Russia*

Gegam Shagbazian[†] Riccardo Camboni[‡] Paola Valbonesi[§]

Abstract

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[†]Department of Economics and Management, University of Padova; shagbazyangv@gmail.com

[‡]Department of Economics and Management, University of Padova; riccardo.camboni@unipd.it

[§]Department of Economics and Management, University of Padova; paola.valbonesi@unipd.it

1 Introduction

One common form of affirmative action adopted by governments to support small business enterprises (SBEs) is to procure goods and services through set-aside (SA) auctions. In these auctions, participation is restricted to SBEs, thereby excluding medium and large firms from competing and expanding procurement opportunities for smaller businesses. These programmes exist in several countries, including the USA, Japan, Brazil, and Russia.

In Russia, affirmative action to support SBEs was enacted in 2006, requiring each public buyer to purchase at least 15% of their annual procurement value from SBEs via SA auctions. The literature focuses mainly on the impact of these auctions on prices (Athey et al., 2013; Nakabayashi, 2013; Reis and Cabral, 2015; Shagbazian et al., 2026). Despite their importance, the impact of such programmes on firm growth has not been widely studied.

This paper addresses this gap by providing empirical evidence on how winning SA auctions affects SBE growth. We combine a database of Russian public procurement auctions for granulated sugar (2011–2013) with firm-level financial data on bidders. Our final sample comprises 11,150 auctions and 608 participating SBEs. We estimate the effect of winning an SA auction on revenue, revenue growth, employment, and employment growth using the Inverse Probability Weighting (IPW) method to adjust for selection bias and balance covariates across winners and non-winners.

Our estimates show that winning is associated with a 26% increase in revenue in a given year and approximately 13.7% higher employment growth between the previous and current periods. We find no separate effects on revenue and employment between young and old firms; however, it appears that winning helps older firms expand into other public procurement markets. Older firms are more likely to experience spillover effects when they win SA contracts, due to their established reputation and accumulated skills.

We contribute to the growing branch of literature on the impact of public procurement on firm growth and performance (Ferraz et al., 2015; Lee, 2021; Cappelletti et al., 2024; Li et al., 2026), among others. It has been shown that winning at least one contract increases firm growth by 2.2% during the quarter (Ferraz et al., 2015). (Fadic, 2020) finds that a 10% increase in demand from government contracts raises wage expenses and fixed assets by about 5% in the same year, while no spillover effects on sales to the public or private sectors are

observed. Using administrative data from Kenya, (Mensah et al., 2025) shows that becoming a government contractor can significantly boost a firm’s performance, increasing productivity by 27% and employment by 10%. Moreover, public purchases can increase capital investment by financially constrained private firms (Hebous and Zimmermann, 2021). While previous research has focused on the effects of general public procurement contracts, our paper focuses exclusively on the effects of SBE-specific SA auctions, thereby providing evidence on the programme’s effectiveness. Our findings are consistent with those of (Cavgias et al., 2025), who reported positive effects of winning an SA auction on earnings and employment growth.

The rest of the paper is organised as follows: Section 2 describes the data. Section 3 discusses the empirical strategy. Section 4 presents the results, and Section 5 concludes.

2 Data description

Our estimated sample consists of 608 SBEs that have available information on firm revenue, total assets, number of employees, age, and public procurement contracts won. The panel spans three years (2011–2013), and each observation is identified by a unique combination of the firm ID¹, and the year.

The distribution of the number of years that firms appear in the sample indicates that the panel data is highly unbalanced: 77 percent of firms are observed in only one year, approximately 15% of firms appear in two consecutive years and 2.5% appear in two non-consecutive years, and roughly 5% percent are observed in all three years (see Table 1).

Table 2 presents summary statistics for the main variables. On average, firms in the sample have revenues of around 57.4 million rubles (\$1,865,453), total assets of 23.5 million rubles (\$763,730), and 31 employees. The average age is eight years, with a maximum of 22 years. Around 23% of the firm-year observations correspond to firms that won an SA auction, with an average contract value of 479,255 rubles (\$15,575). The value of other public procurement contracts is considerably larger at 13.4 million rubles (\$435,489).²

¹Each firm in the dataset is identified by a unique combination of its Tax Identification Number (TIN/INN) and KPP. The KPP (“Tax Registration Reason Code”) is a nine-digit code indicating the tax office where the firm is registered and the reason for its registration.

²For reference, the average exchange rate over the sample period (2011–2013) was 30.77 Russian rubles per US dollar.

Table 1: Panel Observation Patterns

Years Observed	Freq.	Percent
2011 only	90	14.80
2012 only	121	19.90
2013 only	256	42.11
2011 & 2012	25	4.11
2012 & 2013	68	11.18
2011 & 2013	15	2.47
2011, 2012 & 2013	33	5.43
Total	608	100.00

Notes: The table reports the distribution of firm-level observations across years in the sample, given that all control variables are observed.

Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>Firm Characteristics</i>					
Revenue (RUB)	782	57,400,000	65,900,000	18,000	367,000,000
Number of Employees	782	31.36	24.61	1	100
Total Assets (RUB)	782	23,500,000	40,700,000	10,000	569,000,000
Firm Age	782	8.08	5.87	1	22
<i>Procurement Variables</i>					
Other Public Procurement (RUB)	782	13,400,000	28,500,000	0	245,000,000
Win SA Auction (dummy)	782	0.230	0.421	0	1
SA Total Amount (RUB)	782	479,255	4,175,009	0	111,000,000

Notes: The sample includes firms that participated in at least one SA auction for sugar during the sample period. Monetary values are expressed in Russian Rubles (RUB). Win SA Auction is a dummy variable equal to one if the firm won at least one SA auction in a given year.

3 Empirical strategy

Our baseline estimated regression is the following:

$$y_{it} = \beta_0 + \beta_1 \text{WonSA}_t + \beta_2 \ln(\text{OtherPPC}_{it}) + \mathbf{x}_{it-1}^\top \boldsymbol{\delta} + \alpha_r + \lambda_t + \varepsilon_{it} \quad (1)$$

where the outcome variable takes four different values: the log of revenue at time t , denoted $\ln(\text{Revenue}_{it})$; the revenue growth rate, defined as $\ln(\text{Revenue}_{it}) - \ln(\text{Revenue}_{it-1})$; the log of the number of employees at time t , denoted $\ln(\text{Employees}_{it})$; and the employee growth rate, defined as $\ln(\text{Employees}_{it}) - \ln(\text{Employees}_{it-1})$. The variable of interest is a binary variable equal to one

if a firm won at least one SA auction in a given year, and zero otherwise. Since firms that win SA auctions may also be more active in public procurement more broadly, we control for other procurement contracts using $\ln(\text{OtherPPC}_{it})$. Failing to account for this could confound the estimated effect of SA with the general effect of public procurement on firm performance. The vector $\mathbf{x}_{it-1}$ includes controls for the log of total assets, the log of the number of employees, and firm age, all measured at time $t - 1$. Additionally, we include region and year fixed effects. Note that firm-fixed effects regressions would result in imprecise estimates with large standard errors, since within-firm variation is limited (see Table 1). Standard errors clustered at the firm level.

Our identification strategy faces two distinct selection challenges. Firstly, our estimation sample is limited to SBEs that participated in sugar supply auctions between 2011 and 2013. Consequently, our analysis focuses only on firms that supply to state buyers, rather than those operating exclusively in private markets, and we do not observe firms that never entered the public procurement market for sugar. Therefore, our estimates should be interpreted as the effect of winning an SA auction conditional on participation in public procurement rather than for the broader population of SBEs. Secondly, even within this selected sample, the allocation of treatment is not random. Some firms win SA auctions at least once, some win repeatedly, and some never win, but still participate in auctions. These firms may differ systematically in observable and unobservable characteristics that affect performance. To address selection based on observable factors, we implement inverse probability weighting (IPW), which reweights firms based on their likelihood of winning an SA auction. This approach then constructs treated and control groups with comparable observable characteristics. However, this approach does not address initial selection into public procurement participation. Therefore, our estimates reflect the impact of SA auctions among firms that are already active in the public procurement market, rather than on all firms. We estimate the propensity scores required for IPW by modeling the probability of winning an SA auction using the following specification:

$$\ln\left(\frac{p_{it}}{1 - p_{it}}\right) = \beta_0 + \beta_1 \text{ParticipatedSA}_{it-1} + \beta_2 \text{WonSA}_{it-1} + \mathbf{z}_{it-1}^\top \boldsymbol{\gamma} \quad (2)$$

where p_{it} is the probability of winning a SA auction by a firm i at time t ; we control for past participation in SA auctions, as well as for winning, and for previous observable firm

characteristics, such as the log of total assets, the log of the number of employees, age, the log of other PPCs, and their interactions. The results are in Table A1. After estimating the propensity score $\hat{p}_i$, treated firms ($WinSA_{it} = 1$) are weighted by $1/\hat{p}_i$ and control firms ($WinSA_{it} = 0$) by $1/(1 - \hat{p}_i)$, reweighting the sample so the covariate distribution of controls matches that of the treated group (see Figures A1, A2, A3, and A4). Note that propensity scores are limited to the common support region. Finally, Equation 1 is estimated with the weights.³

4 Results

The results in Table 3 show the effects of winning an SA auction on firm performance using OLS. Winning is positively and significantly associated with log revenue (0.231, $p < 0.05$), but has no significant effect on revenue growth. Since the model is in logs, the effect is interpreted as $(\exp(0.231) - 1)$, suggesting that winning increases revenue by approximately 26%. We also found no significant effects on the number of employees or their growth rate. Among the controls, the log of other PPC has a positive and significant effect on log revenue, log employment and employment growth rate. This is probably because it takes into account the total value of other procurement contracts. In contrast, the SA variable captures the effect of a one-off event, and SA sugar contracts constitute a small share of PPCs. Log total assets is positively associated with log revenue, revenue growth rate and log employment; however, the relationship between employment growth is negative. Firms with larger total assets tend to generate higher revenues and employ a larger workforce. However, they may have lower rates of employment growth because larger firms tend to be older and expand more slowly. Firm age is negatively associated with log revenue and employment growth. All regressions include year and region fixed effects.

Table 4 shows the IPW estimates of the impact of winning an SA auction on a firm's performance. Winning is positively associated with log revenue (0.230, $p < 0.05$) and employment growth (0.129, $p < 0.10$). On average, firms that win an SA auction experience employment

³One common approach is to compare winners and runners-up in an auction; however, due to missing financial information on SBEs, we could not generate a sufficient number of pairs consisting of winners and runners-up. Overall, we obtain 52 distinct firms for which financial information is available for at least one other participant, accounting for a total of 137 observations.

growth rates approximately 13.7% higher than those that do not; however, this estimate is only significant at the 10% level. The effects on revenue growth and log employment are not significant. The results are qualitatively similar to those obtained using OLS. This could be due to the good baseline overlap of control variables between treated and control units. Although IPW addresses selection based on observable factors by reweighting observations according to the estimated propensity score, it does not account for unobserved factors that could influence the likelihood of winning an SA auction or the outcome of firm growth.

Table 3: Effect of Winning SA Auction on Firm Performance

	Log Revenue	Revenue Growth	Log Employment	Employment Growth
Won a SA _t	0.231** (0.091)	0.154 (0.111)	0.033 (0.069)	0.099 (0.077)
Log(Other PPC) _t	0.097*** (0.018)	0.020 (0.017)	0.021* (0.011)	0.038*** (0.012)
Log(Total assets) _{t-1}	0.321*** (0.036)	0.576*** (0.035)	0.056** (0.022)	-0.057*** (0.021)
Log(Num. of empl.) _{t-1}	0.190*** (0.044)	0.358*** (0.049)	0.586*** (0.037)	
Age _{t-1}	-0.015* (0.008)	-0.006 (0.007)	0.007 (0.006)	-0.018*** (0.006)
Year FE	✓	✓	✓	✓
Region FE	✓	✓	✓	✓
Observations	769	717	769	769
R-squared	0.516	0.693	0.659	0.170

Notes: This table presents the results of Equation 1 estimated by OLS, as discussed in Section 3. Clustered standard errors at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

4.1 Additional results

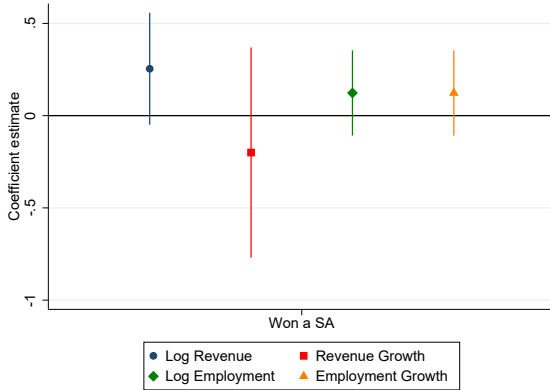
We estimate regressions separately for young and old firms, defined as those below and above the median age of 6 years, respectively. The results are shown in Figure 1. There are no significant effects on the outcome variables across age groups. Lastly, we estimate whether winning an SA can affect future contracts in other markets. Specifically, we examine: (i) the probability of winning an NSA contract in the next period; (ii) the logarithm of the total value of NSA contracts won; and (iii) the logarithm of the value of other PPC contracts won in markets other than the sugar market in the next period. The results are shown in Figure 2c. Winning an SA auction leads to an 84% increase in contract value for old firms in other markets, whereas young firms show no significant effect. The results suggest that established firms are more likely to

utilize the spillover effect. Other specifications show no significant effect.

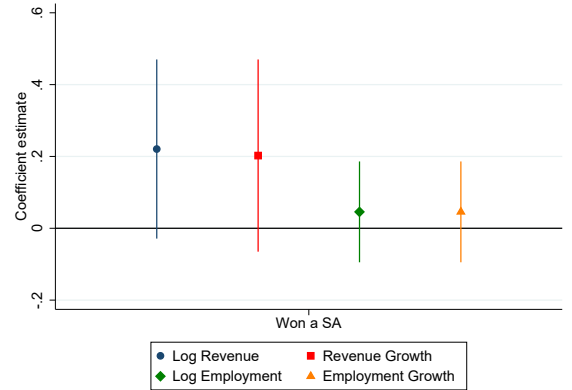
Table 4: Effect of Winning SA Auction on Firm Performance. IPWRA

	Log Revenue	Revenue Growth	Log Employment	Employment Growth
Won a SA _t	0.230** (0.095)	0.031 (0.152)	0.106 (0.071)	0.129* (0.076)
Log(Other PPC) _t	0.083*** (0.029)	0.002 (0.028)	0.017 (0.015)	0.032** (0.016)
Log(Total assets) _{t-1}	0.349*** (0.043)	0.509*** (0.043)	0.020 (0.030)	-0.072** (0.028)
Log(Num. of empl.) _{t-1}	0.165*** (0.053)	0.375*** (0.062)	0.702*** (0.044)	
Age _{t-1}	-0.004 (0.009)	-0.003 (0.008)	0.003 (0.008)	-0.011 (0.007)
Year FE	✓	✓	✓	✓
Region FE	✓	✓	✓	✓
Observations	533	511	533	533
R-squared	0.592	0.624	0.726	0.262

Notes: This table presents the results of Equation 1 estimated by IPW, as discussed in Section 3. Clustered standard errors at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.



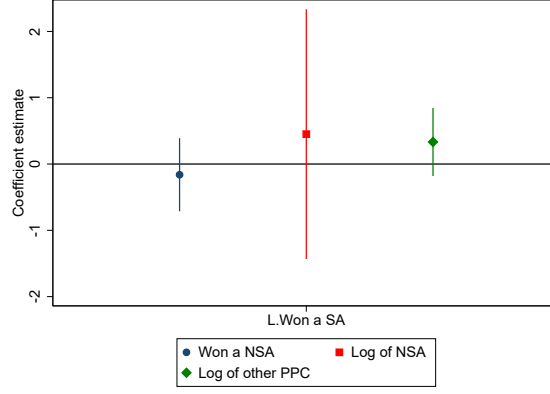
(a) Young firms



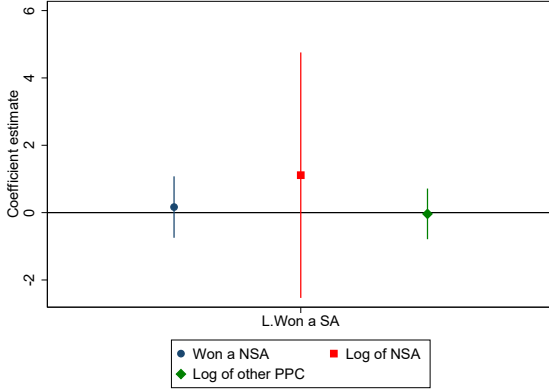
(b) Old firms

Figure 1: Estimated effects of winning an SA by age

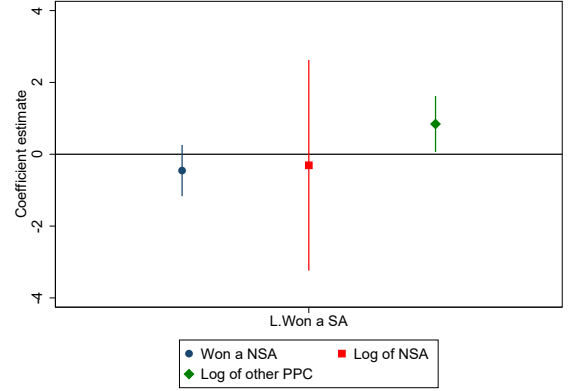
Notes: This figure presents the results of estimating Equation 1 for the subset of young firms with age below six years (Panel A) and for the subset of old firms with age at or above the median - six years (Panel B), as discussed in Section 4.



(a) Panel A: Full sample



(b) Panel B: Young firms



(c) Panel C: Old firms

Figure 2: Effect of Lagged SA Wins on Market Outcomes

Notes: Panel A reports estimates of the effect of lagged SA winning on subsequent market outcomes discussed in Section 4. All estimates are obtained using inverse probability weighting (IPW). The probability of winning an NSA is estimated using a weighted logit model, while the remaining outcomes are estimated using weighted linear regressions. Panel B presents the same set of estimates for young firms, defined as firms with an age below the median (6 years). Panel C presents the corresponding estimates for older firms, defined as firms with an age at or above the median (6 years or more). All specifications include lagged employment, firm age, and lagged total assets, as well as year fixed effects; regressions for continuous outcomes additionally include region fixed effects as discussed in Section 3.

5 Conclusion

Using PPC data for the supply of sugar, this paper examines the impact of winning an SA auction on SBE performance. Our findings indicate that winning an SA auction leads to an immediate increase in firm revenue and also positively affects employment growth. This employment effect is only detected in the IPW estimates. Furthermore, established firms are more likely to increase their public procurement activity in other markets following an SA win. However, the limitations of the data underscore the need for more rigorous research using more comprehensive datasets to better evaluate the impact of SA auctions on SBE growth and targeted firm outcomes across different sectors.

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Appendix

Table A1: Estimating propensity score. Logistic regression

	Win SA
Participated in SA_{t-1}	0.280 (0.348)
Won SA_{t-1}	1.342*** (0.415)
$\text{Log}(\text{Total assets})_{t-1}$	-0.072 (0.091)
$\text{Log}(\text{Num. of empl.})_{t-1}$	-0.045 (0.109)
Age_{t-1}	0.045 (0.175)
Age_{t-1}^2	-0.002 (0.004)
$\text{Log}(\text{Total assets})_{t-1} \times \text{Age}_{t-1}$	-0.000 (0.011)
$\text{Log}(\text{Other PPC})_{t-1}$	-0.024 (0.050)
Constant	-0.008 (1.331)
Observations	539
Wald χ^2	40.786
Pseudo R^2	0.068

Notes: This table presents the estimation results of Equation 2, as discussed in Section 3. Clustered standard errors at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

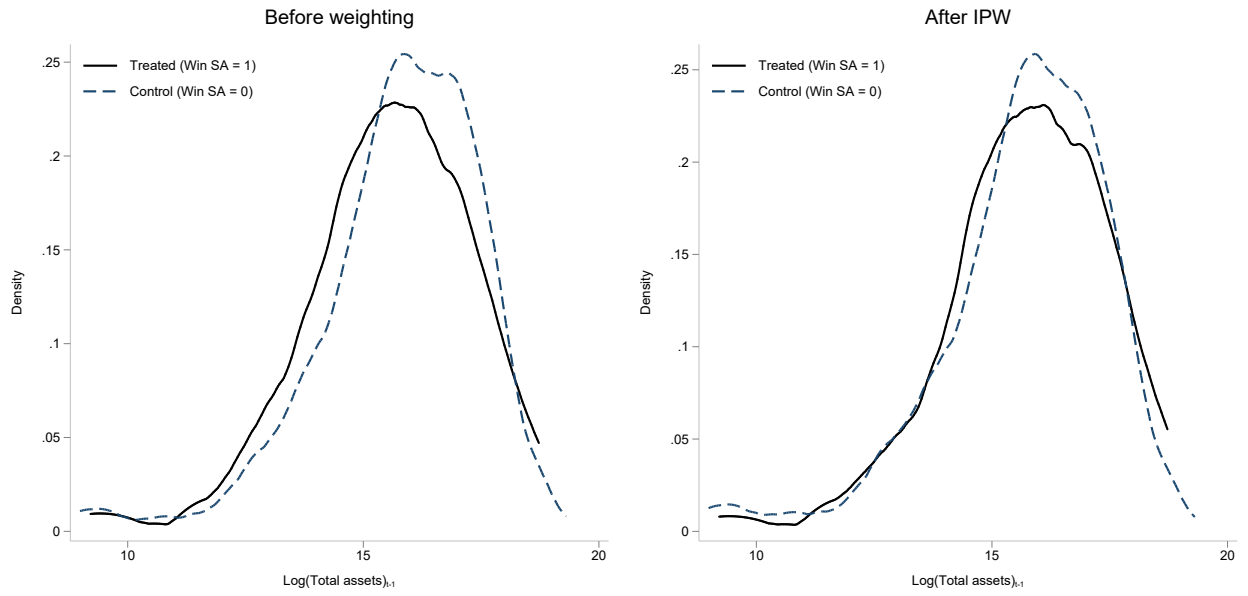


Figure A1: Total assets (balance check)

Notes: The figure shows overlapping kernel distributions of treated and control firms by winning an SA auction, for both raw and weighted observations of the log of total assets at $t-1$.

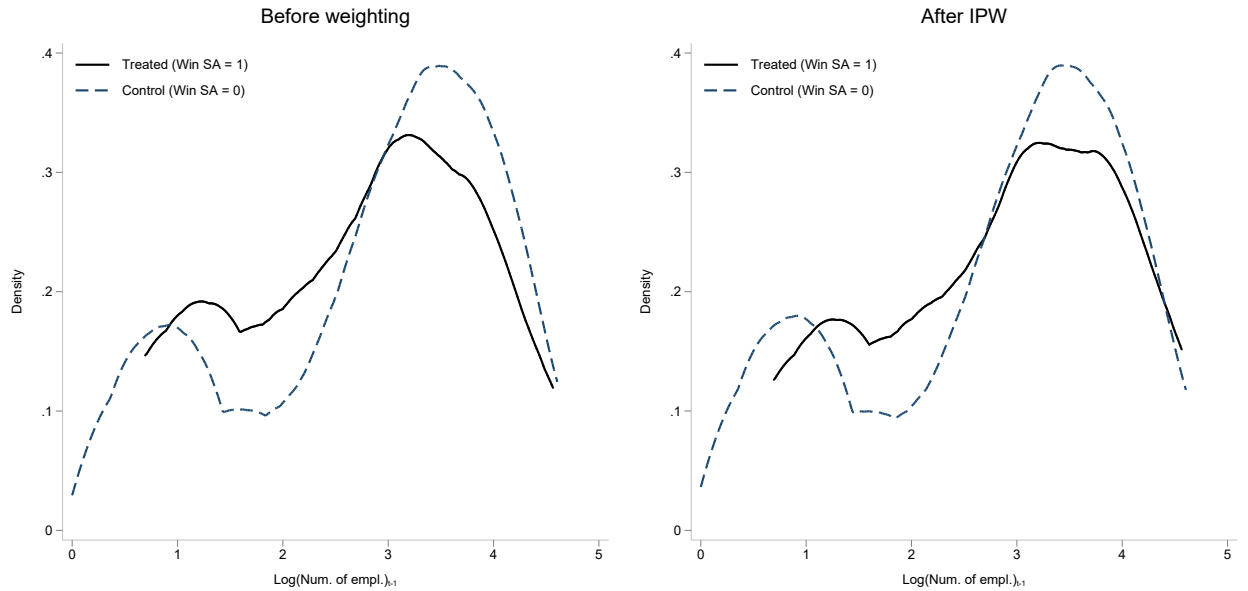


Figure A2: Number of employees (balance check)

Notes: The figure shows overlapping kernel distributions of treated and control firms by winning an SA auction, for both raw and weighted observations of the log of the number of employees at $t-1$.

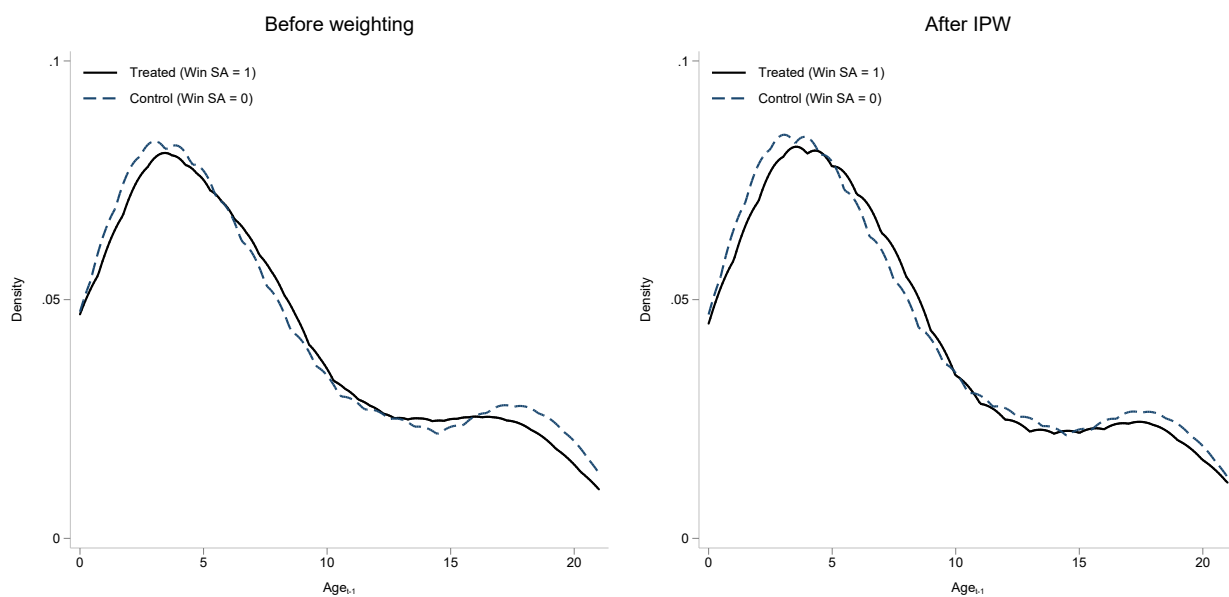


Figure A3: Age (balance check)

Notes: The figure shows overlapping kernel distributions of treated and control firms by winning an SA auction, for both raw and weighted observations of age $t-1$.

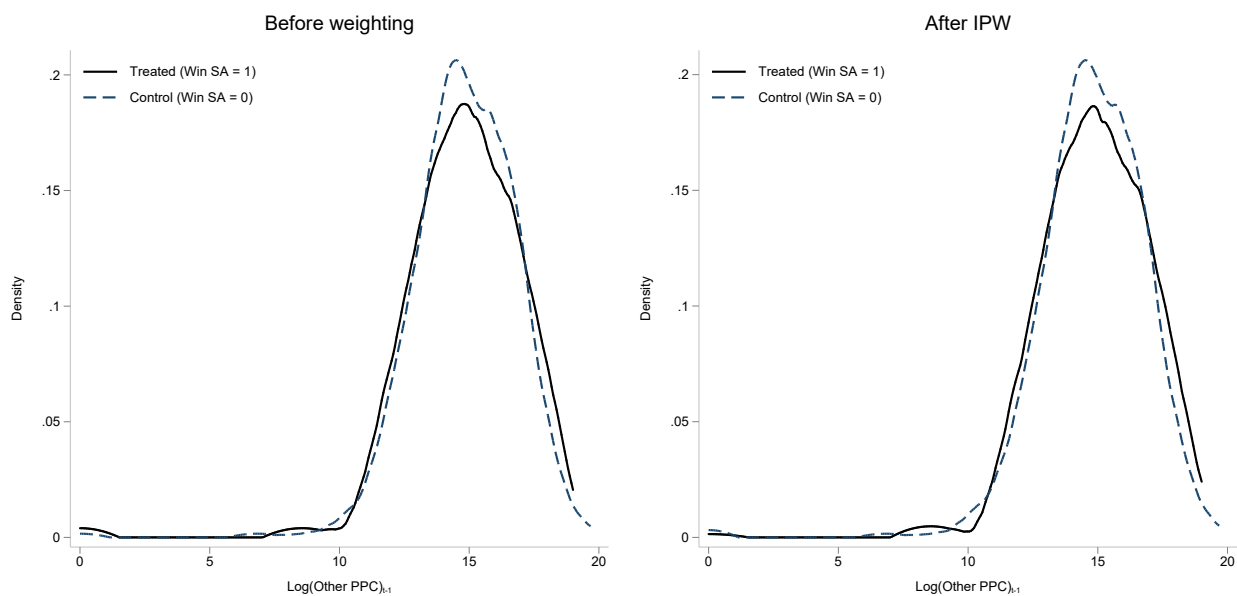


Figure A4: Other public procurement contracts (balance check)

Notes: The figure shows overlapping kernel distributions of treated and control firms by winning an SA auction, for both raw and weighted observations of the log of other PPC $t-1$.