Online Appendix for "Statistical Discrimination and Affirmative Action in the Lab"

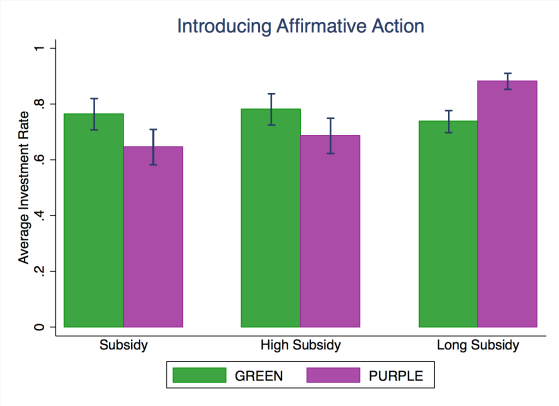
Ahrash Dianat Federico Echenique Leeat Yariv

Abstract

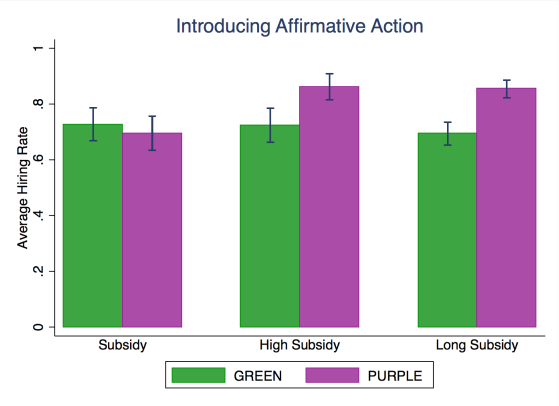
We reproduce the main results of the paper using data from all sessions as well as from the last 5 rounds of each stage and illustrate that results remain qualitatively similar. We also present various robustness regression analyses, including ones containing data from our demographic survey and risk elicitations.

1 Comprehensive Data from all Sessions

In the paper, most of the analysis is conducted using the 12 out of 15 sessions in which statistical discrimination was successfully induced. Figures 1 and 2 reproduce the figures capturing the main results of the paper, Figures 4 and 6, using data from all experimental sessions. As can be seen, results resemble those reported in the paper: affirmative action is effective in eliminating discrimination, but its removal yields reemergence of discrimination. One exception is the Long Subsidy treatment, in which after affirmative action is lifted, there are no significant differences in hiring of GREEN and PURPLE workers. This is, in part, due to the fact that two of the three sessions in which discrimination was not induced correspond to the Long Subsidy treatment. Thus, data for the Long Subsidy treatment relate to groups that are substantially less discriminatory to begin with.

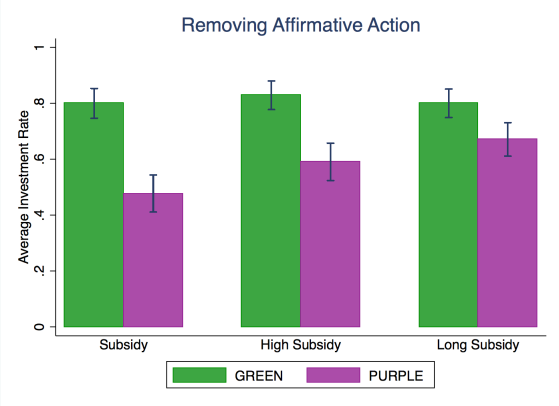


(a) Investment

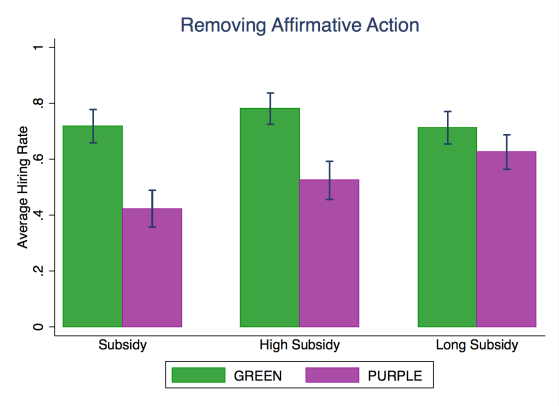


(b) Hiring

Figure 1: Investment/hiring decisions during affirmative action using data from all experimental sessions



(a) Investment

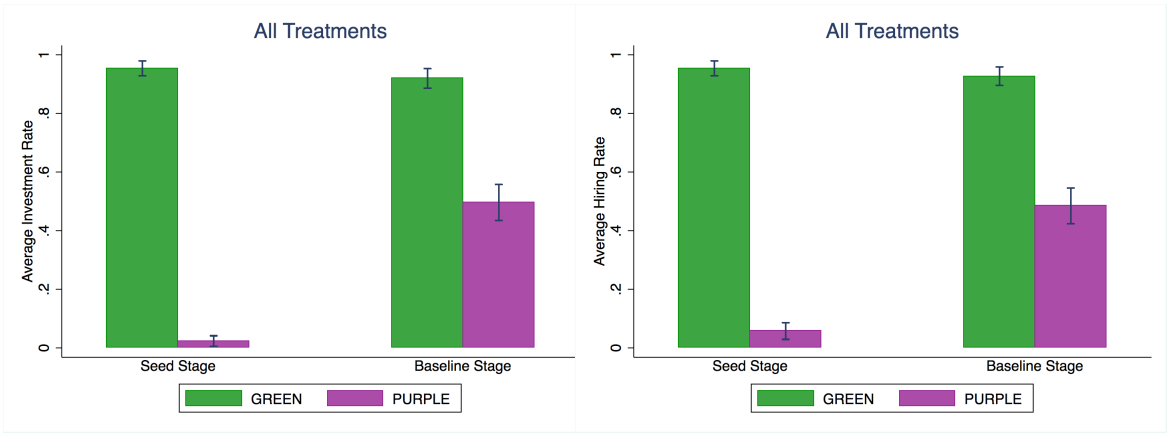


(b) Hiring

Figure 2: Investment/hiring decisions after affirmative action using data from all experimental sessions

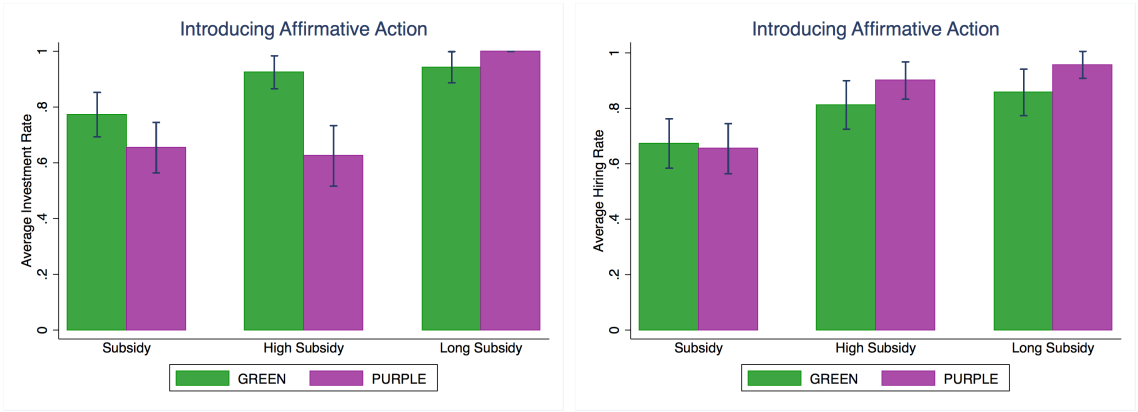
2 Learning within Stages

One may worry that the first few rounds of each stage are tainted by subjects' attempt to learn various features of the relevant game. Figures 3 - 5 reproduce Figures 2, 4, and 6 presented in the paper using data from the last five rounds of each stage. As can be readily seen, results resemble those reported in the body of the paper.



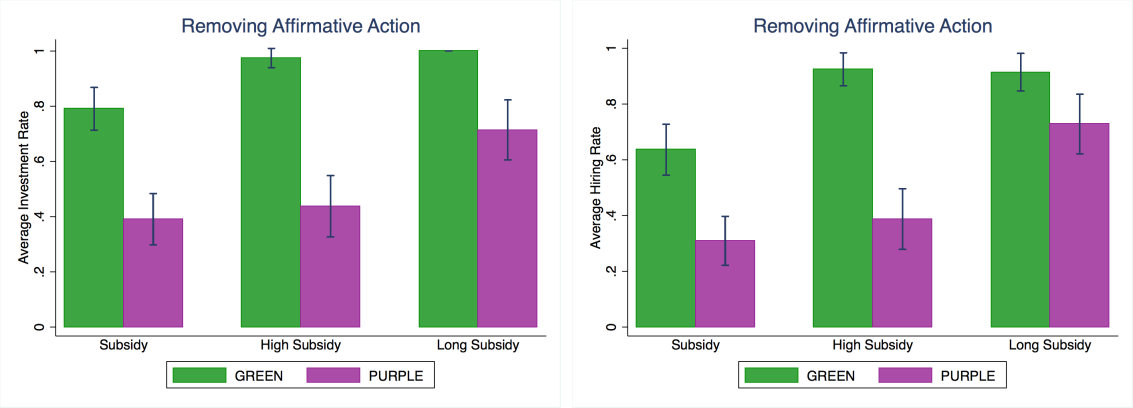
(a) Investment (b) Hiring

Figure 3: Investment/hiring decisions before affirmative action using data from the last five rounds of each stage



(a) Investment (b) Hiring

Figure 4: Investment/hiring decisions during affirmative action using data from the last five rounds of the stage



(a) Investment (b) Hiring

Figure 5: Investment/hiring decisions after affirmative action using data from the last five rounds of the stage

3 Survey Responses and Risk Attitudes as Controls

As mentioned in the body of the paper, we elicited risk attitudes at the end of each session using two tasks of the form suggested by Gneezy and Potters (1997). Namely, subjects had to allocate 200 tokens (translating to 2 dollars) between a safe project, which returned the amount of tokens invested for sure, and a risky project. In one task, the risky project returned 2.5 times the amount invested with 50% probability and 0 otherwise; in the second task, the risky project returned 3 times the amount invested with 40% probability and 0 otherwise. In addition, we had subjects fill a survey containing various demographic questions.[1]
Tables 1 and 2 reproduce the regression analysis reported in Tables 5 and 6 in the paper, add responses to the risk elicitations and survey as controls. Specifically, the control variables we use are constructed as follows:

- Female: dummy variable that equals 1 if the subject identifies her gender as "Female"
- Minority: dummy variable that equals 1 if the subject identifies her ethnicity as "Hispanic", "African American", or "Native American"[2]
- Right-Wing: dummy variable that equals 1 if the subject identifies her political views as "Moderate", "Conservative", or "Very Conservative"[3]

[1]Details of the survey are available at `http://www.leeatyariv.com/papers/Discrimination_Demographics.pdf`

[2]No subjects identified as Native American in our experimental sessions.

[3]In the experiment, only 7% of subjects identified as either "Conservative" or "Very Conservative". Constructing the variable in this fashion allows us to classify 34% of subjects as "Right-Wing".

- Risk Task 1: the number of tokens the subject chooses to invest in the first risk task (from 0 to 200)
- Risk Task 2: the number of tokens the subject chooses to invest in the second risk task (from 0 to 200)

VARIABLE: Hire	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.178***	0.336***	0.308***	
	(0.064)	(0.061)	(0.065)	
Removing AA	-0.088	-0.056	0.095	0.095
	(0.076)	(0.055)	(0.077)	(0.077)
Introducing AA (first half)				0.310***
				(0.063)
Introducing AA (second half)				0.305***
				(0.071)
Female	-0.070	-0.016	-0.106	-0.106
	(0.089)	(0.145)	(0.067)	(0.067)
Minority	-0.041	-0.301**	-0.076	-0.076
	(0.082)	(0.116)	(0.113)	(0.113)
Right-Wing	-0.015	0.014	-0.019	-0.018
	(0.086)	(0.103)	(0.102)	(0.102)
Risk Task 1	0.000	-0.002	0.000	0.000
	(0.001)	(0.002)	(0.001)	(0.001)
Risk Task 2	0.001	0.003	0.001	0.001
	(0.001)	(0.002)	(0.001)	(0.001)
Constant	0.494***	0.583***	0.674***	0.674***
	(0.121)	(0.189)	(0.124)	(0.124)
Observations	660	480	560	560
Number of subjects	44	32	28	28

Table 1: Results from OLS regressions. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VARIABLE: Firm Belief	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.086**	0.079**	0.212***	
	(0.039)	(0.034)	(0.038)	
Removing AA	0.031	-0.011	0.173***	0.173***
	(0.055)	(0.034)	(0.042)	(0.042)
Introducing AA (first half)				0.188***
				(0.034)
Introducing AA (second half)				0.236***
				(0.045)
Female	-0.064	0.043	-0.093	-0.092
	(0.062)	(0.109)	(0.057)	(0.057)
Minority	-0.093	-0.215**	-0.007	-0.005
	(0.068)	(0.103)	(0.063)	(0.064)
Right-Wing	-0.024	-0.121	-0.001	-0.004
	(0.069)	(0.092)	(0.073)	(0.073)
Risk Task 1	0.000	-0.001	-0.001	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)
Risk Task 2	0.000	0.002	0.001	0.001
	(0.000)	(0.001)	(0.001)	(0.001)
Constant	0.502***	0.505***	0.663***	0.663***
	(0.087)	(0.158)	(0.076)	(0.075)
Observations	660	480	560	560
Number of subjects	44	32	28	28

Table 2: Results from OLS regressions. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

As transparent from these tables, even with the additional controls, coefficients on treatment dummies remain virtually identical to those reported in the paper. Furthermore, all but one control in one treatment, reflecting membership in a minority group, exhibit no significant effect on hiring decisions or reported beliefs across treatments. Given the number of controls and treatments, we suspect the significant effect we see for minority membership might be spurious.

4 Identifying Firm Types

One might suspect that firms' responses to affirmative action policies being introduced and removed depends on the extent to which they treat GREEN and PURPLE workers differently initially, in the baseline stage. In this section, we identify firm "types" according to their likelihood of hiring a PURPLE worker in the baseline stage. We then inspect firms' responses to affirmative action and its removal, in terms of hiring patterns and reported beliefs, for different types separately.

Specifically, we first calculate each firm's average hiring rate for GREEN workers in our baseline Stage 2 ($Stage2_G$) and average hiring rate for PURPLE workers in the baseline Stage 2 ($Stage2_P$). Using these values, we define a variable $Stage2_\Delta = Stage2_G - Stage2_P$ that captures each firm's level of discrimination. The types are then constructed as follows:

- Non-discriminatory: $Stage2_\Delta \leq 0$
- Low-discriminatory: $Stage2_\Delta \in (0, 0.50]$
- High-discriminatory: $Stage2_\Delta > 0.50$

Across all treatments, the 134 subjects in firm roles are divided as follows: 40% are non-discriminatory, 29% are low-discriminatory, and 31% are high-discriminatory. Of the non-discriminatory firms, 87% have equal hiring rates between GREEN and PURPLE workers ($Stage2_\Delta = 0$) and 13% favor PURPLE workers in their hiring decisions ($Stage2_\Delta < 0$).
Tables 3 - 5 reproduce the regression analysis reported in Table 5 separately for different firm types, while Tables 6 - 8 reproduce the regression analysis reported in Table 6 separately for different firm types.

Unsurprisingly, we see little effect of affirmative action or its removal on actions or beliefs of non-discriminatory firms. The patterns for firms that are initially discriminatory are qualitatively in line with those reported in the paper: affirmative action alleviates discrimination, its removal brings the market close to its baseline prior to affirmative action, and beliefs are less responsive to affirmative action than hiring likelihoods. Furthermore, the Long Subsidy treatment is more effective in eroding some discriminatory tendencies. All these effects are more pronounced for highly discriminatory firms.

VARIABLE: Hire	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	-0.121*	-0.003	-0.009	
	(0.067)	(0.052)	(0.009)	
Removing AA	-0.365***	-0.038	-0.075	-0.075
	(0.117)	(0.061)	(0.050)	(0.050)
Introducing AA (first half)				0.000
				(0.000)
Introducing AA (second half)				-0.017
				(0.017)
Constant	0.848***	0.878***	1.000***	1.000***
	(0.088)	(0.121)	(0.000)	(0.000)
Observations	243	155	218	218
Number of subjects	17	10	12	12

Table 3: Results from OLS regressions for non-discriminatory firms. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VARIABLE: Hire	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.170	0.342***	0.233***	
	(0.119)	(0.052)	(0.032)	
Removing AA	-0.155	-0.088	-0.036	-0.036
	(0.090)	(0.132)	(0.152)	(0.153)
Introducing AA (first half)				0.224***
				(0.035)
Introducing AA (second half)				0.239***
				(0.042)
Constant	0.567***	0.588***	0.711***	0.711***
	(0.072)	(0.086)	(0.049)	(0.049)
Observations	168	144	156	156
Number of subjects	11	9	7	7

Table 4: Results from OLS regressions for low-discriminatory firms. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VARIABLE: Hire	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.467***	0.603***	0.770***	
	(0.105)	(0.092)	(0.053)	
Removing AA	0.193	-0.067	0.429**	0.429**
	(0.119)	(0.075)	(0.134)	(0.134)
Introducing AA (first half)				0.754***
				(0.053)
Introducing AA (second half)				0.791***
				(0.058)
Constant	0.173***	0.200***	0.209***	0.209***
	(0.042)	(0.035)	(0.057)	(0.058)
Observations	249	181	186	186
Number of subjects	16	13	9	9

Table 5: Results from OLS regressions for high-discriminatory firms. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VARIABLE: Firm Belief	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.000	0.043	0.092*	
	(0.050)	(0.060)	(0.045)	
Removing AA	-0.180**	0.056	0.055	0.055
	(0.081)	(0.046)	(0.040)	(0.040)
Introducing AA (first half)				0.086
				(0.049)
Introducing AA (second half)				0.097*
				(0.045)
Constant	0.700***	0.747***	0.811***	0.811***
	(0.064)	(0.090)	(0.064)	(0.065)
Observations	243	155	218	218
Number of subjects	17	10	12	12

Table 6: Results from OLS regressions for non-discriminatory firms. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VARIABLE: Firm Belief	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.084	0.035	0.177***	
	(0.063)	(0.062)	(0.035)	
Removing AA	0.034	-0.115*	0.105	0.105
	(0.060)	(0.055)	(0.058)	(0.058)
Introducing AA (first half)				0.161***
				(0.012)
Introducing AA (second half)				0.189**
				(0.054)
Constant	0.441***	0.448***	0.709***	0.709***
	(0.066)	(0.070)	(0.066)	(0.066)
Observations	168	144	156	156
Number of subjects	11	9	7	7

Table 7: Results from OLS regressions for low-discriminatory firms. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VARIABLE: Firm Belief	Subsidy (1)	High Subsidy (2)	Long Subsidy (3)	Long Subsidy (4)
Introducing AA	0.177**	0.124*	0.419***	
	(0.079)	(0.062)	(0.066)	
Removing AA	0.204**	-0.007	0.383***	0.383***
	(0.090)	(0.049)	(0.100)	(0.100)
Introducing AA (first half)				0.376***
				(0.063)
Introducing AA (second half)				0.477***
				(0.076)
Constant	0.321***	0.375***	0.408***	0.408***
	(0.055)	(0.042)	(0.076)	(0.077)
Observations	249	181	186	186
Number of subjects	16	13	9	9

Table 8: Results from OLS regressions for high-discriminatory firms. Standard errors are shown in parentheses and are clustered at the individual level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.