# Affirmative action programs and business ownership among minorities and women

**Robert Fairlie · Justin Marion**

**Abstract** Affirmative action programs are commonly used as a means to level the playing field for minority- and women-owned firms in public procurement markets, and therefore may be a positive factor in business entry and survival. To the extent that affirmative action programs also apply to traditional labor markets, however, they may alter the opportunity cost of starting a business. We utilize the elimination of affirmative action in California and Washington States through voter initiatives to identify the effect of affirmative action on minority and female self-employment rates. In our base specifications, we find evidence of modest increases in self-employment among minorities and women in both California and Washington after elimination of affirmative action, consistent with the hypothesis that the opportunity cost of starting a business fell due to restricting opportunities in the traditional labor markets. The sign of the estimated effect, however, is not uniformly positive when considering specific race/gender groups, and the statistical significance of the main results is somewhat sensitive to the choice of control states.

R. Fairlie (✉) · J. Marion
University of California, Santa Cruz, Santa Cruz, CA, USA
e-mail: rfairlie@ucsc.edu

J. Marion
e-mail: marion@ucsc.edu

## 1 Introduction

Affirmative action programs are widely used in federal public procurement markets and by many states and local governments, and contracts awarded through these programs are a significant source of revenue for some firms owned by minorities and women. Many of the existing federal, state, and local government programs were created in the late 1970s and 1980s to develop minority and women enterprise, counter the effects of past discrimination, and reduce unemployment among minorities in urban communities.[1] For the past two decades, however, state and local programs have been both judicially and legislatively challenged and in many cases dismantled (e.g., Croson 1989). Recent ballot initiatives in California and Washington have significantly curtailed the use of affirmative action in these states, and similar initiatives are under consideration in other states as well. Understanding the impact of affirmative

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[1] See Boston (1999) and JCPES (1994).

action policies is therefore of considerable importance in the current policy debate.

In this paper, we estimate how business ownership rates of minorities and women changed in the wake of the elimination of affirmative action programs in California and Washington States. We use the natural experiment created by voter initiatives in California and Washington that eliminated the use of race or gender as criteria in public employment and contracting. The rates of minority business ownership before and after elimination of the programs in California and Washington are compared. To control for time-varying factors affecting business ownership in California and Washington and for minorities and women in the USA, we employ a triple-difference (DDD) estimator, which compares the self-employment rate of minorities and women relative to White men in treatment versus nontreatment states before and after eliminating affirmative action.

There are two primary mechanisms through which affirmative action can affect the business ownership rate. First, affirmative action in procurement can lead to greater profits for incumbent and potential entrant disadvantaged business enterprises (DBEs) if it increases public purchases of goods and services from minority- and women-owned firms. The greater profits increase the likelihood of entry by potential entrants and reduce the likelihood of exit on the part of incumbent DBEs. This can occur either from encouraging the utilization of DBEs that are as productive as their White male counterparts but are not getting opportunities due to discrimination or network limitations,[2] or by creating opportunities for DBEs that are not yet as cost effective. Prime contractors are often required to allot a specified percentage of the total amount of government contracts to minority-owned subcontractors and suppliers (Rice 1991; Myers 1997). Second, if affirmative action programs affect both employment and procurement, then elimination of these programs can potentially have the counterintuitive effect of increasing the self-employment rate among minorities and women. This is because limited or reduced labor market opportunities are found to lead to entry into self-employment (see Krashinsky 2005 and Parker 2004, for example).

In a paper with important implications for our study, Myers (2007) examines the effects of eliminating affirmative action in California due to Proposition 209 on employment, unemployment, nonparticipation, and the wages of minority workers. This study finds significant reductions in the employment rate of minority and female workers in California after the elimination of affirmative action, and corresponding increases in unemployment and nonparticipation. Eliminating affirmative action therefore may limit employment opportunities along with procurement opportunities. While Myers documents a transition out of employment and into unemployment and nonparticipation, our study will document a missing piece of the puzzle: whether the state of self-employment became more or less common, and as a consequence whether it ameliorated or contributed to the rising unemployment and nonparticipation of minorities and women.

Prior to Proposition 209 in California and Initiative 200 (I-200) in Washington State, affirmative action applied broadly to public contracting, employment, and college admissions. Affirmative action was a common feature of the allocation of public contracts at all levels of government in both states, though how it was implemented varied somewhat by state agency and locale. A common approach was to require state contractors to subcontract a portion of their contracts to disadvantaged business enterprises. California set a goal for the annual participation of minority- and women-owned firms in state contracts. Washington did not set a statewide goal, though the use of affirmative action was commonplace in state agencies; for instance, the Department of Transportation set a goal for participation of minority- and women-owned firms in highway construction contracts. Both California and Washington took affirmative action in state hiring.[3]

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[2] For evidence on blocked access to business networks, such as in construction, see Bates (1993), Feagin and Imani (1994), and Bates and Howell (1997).

[3] See Myers (2007) for a description of California's affirmative action programs in hiring. In Washington, the state identified protected groups based on the gap between state public employment of that group and their representation in the labor force. One significant program utilized to increase employment from these groups was a "plus three" program. If none of the top scoring seven applicants for a position were from a protected group, the three top scoring protected group applicants were added to the pool of final candidates. According to the *Seattle Times*, "plus three" hires accounted for 7% of Washington state employees.

California's Proposition 209 was passed by voters in 1996 and withstood a series of legal challenges in 1997. Many state agencies continued to use race- and gender-conscious methods in the awarding of state contracts, however, until Governor Wilson's executive order in March 1998 requiring the cessation of their use.[4] Washington's Initiative 200 was passed by the voters towards the end of 1998 and was implemented in January 1999.

Some of our findings indicate that self-employment rates among minorities and women were generally higher following elimination of affirmative action, consistent with the idea that minorities and women may turn to self-employment in response to the reduced employment opportunities documented in Myers (2007). This finding is robust to different definitions of self-employment, restricting the age of the sample, and removing from the sample the years immediately surrounding the policy changes. While in general our results indicate that self-employment rates rose following elimination of affirmative action, this was not uniformly true across all race and gender groups; for example, minority men in Washington experienced declines in self-employment. It is also worth noting that, while qualitatively similar, restricting the sample of control group states to those with minority compositions similar to California and Washington leads to estimated effects that are no longer statistically significant for the main specification.

One concern with empirical studies using law changes as natural experiments is that a law change may be chosen endogenously with respect to the outcome of interest. In this case, affirmative action laws may be abolished when they are no longer needed to support the self-employment of minorities or women because levels are perceived to be sufficiently high. This seems unlikely to be a concern for our study. First, the lag between the conception of a ballot initiative and eventual implementation is potentially several years. Second, the initiatives considered in our study were broad in scope. In particular, a primary focus of the initiatives taken up in California and Washington was on education, which is unlikely to be viewed by voters as closely related to trends in minority and female business ownership.

The self-employment of minorities and women is of considerable interest since self-employment traditionally has been one route of advancement for disadvantaged groups.[5] Minority firms are more likely to hire minorities, and it has been argued that promoting minority business growth may be a more effective method of reducing minority unemployment than overall economic and employment growth (Bates 1993; Boston 1999, 2006; US Census Bureau 1997). Minorities and women are often found to face discrimination in credit markets, which will tend to limit business formation among these individuals even when the return of the business exceeds the market borrowing rate (Blanchflower et al. 2003; Cavalluzzo et al. 2002). Low levels of personal wealth and liquidity constraints may also limit opportunities to start and operate successful minority businesses (Bates 1997; Fairlie 1999; Fairlie and Robb 2007, 2008).[6]

Furthermore, the opportunities for traditional employment may be more limited for minorities and women due to residential segregation, discrimination, and limited networks of employed friends and relatives. Self-employment is the primary alternative to the traditional labor market, and affirmative action may play an important role in creating business opportunities. Thus, racial disparities in business ownership may translate into broader income and wealth inequality (Bradford 2003). At the same time, racial disparities in business ownership may be exacerbated by the possibility that unprepared persons try their hand at self-employment in response to limited opportunity in the traditional labor market.

Billions of contract dollars are awarded annually to minority and women firms through affirmative

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[4] For instance, the California Department of Transportation continued to set requirements for participation of minority- and women-owned subcontractors in projects using state funds (Marion 2009). We use 1998 as the date of implementation of Proposition 209 in the analysis.

[5] We use the terms "self-employment" and "business ownership" synonymously in this paper. This follows the convention of the US Census Bureau in defining self-employment as being "self-employed in own not incorporated or incorporated business, professional practice, or farm."

[6] Racial disparities in business ownership do not appear to be due to differences in preferences, because African-Americans are found to be almost twice as likely as White Americans to attempt starting a business (Koellinger and Minniti 2006).

action programs, and these programs are in some forms controversial both politically and judicially.[7] However, relatively little is known about their effectiveness, and the sparse existing evidence is decidedly mixed. Myers and Chan (1996) examine New Jersey state procurement contracts, finding that the implementation of set-asides was unsuccessful at closing the award gap between minority and nonminority firms, while Marion (forthcoming) finds that affirmative action in the highway construction industry is successful at raising the utilization of minority-owned firms while impacting little the utilization of women-owned firms. In addition, these programs may raise the cost of public procurement (Marion 2009). The literature is also mixed regarding the success of these programs in increasing minority entrepreneurship. While Chatterji et al. (2009) find positive effects of affirmative action on rates of minority entrepreneurship, Blanchflower and Wainwright (2005) find little impact of affirmative action on minority entrepreneurship, though business ownership rates among White women may be positively impacted. Bates and Williams (1996) find that affirmative action programs may lead minority-owned firms to overextend themselves, leading to lower business success, yet Bates and Williams (1993) find that Black-owned businesses located in cities with Black mayors are more successful than those located in other cities.

The rest of the paper proceeds as follows. In Sect. 2, we describe the data we use. In Sect. 3, we discuss the statistical methods used to identify the effect of affirmative action, and in Sect. 4 we present the results regarding self-employment rates. Section 5 concludes.

## 2 Data

We use data from the 1990 to 2006 Current Population Survey (CPS) Outgoing Rotation Group (ORG) files. These surveys, conducted annually by the US Bureau of the Census and the Bureau of Labor Statistics, are representative of the entire US population. The ORG files contain annual samples that are roughly three times larger than those from a monthly CPS, such as the commonly used March Annual Demographic Files. The CPS is the only dataset large enough to allow for examining trends in self-employment for minority groups at the state level. Combining the 1990–2006 CPS data we have observations for more than 4 million individuals.[8]

Self-employed workers are defined as those individuals who identify themselves on the class-of-worker question as self-employed in their own not incorporated or incorporated business.[9] The ownership of both nonemployer and employer firms is captured. The class-of-worker question refers to the job at which the respondent worked the most hours during the reference week. As a result, one potential concern with this measure of self-employment is that some respondents may be simultaneously both self-employed and employed in the traditional labor market. If an individual with such simultaneous employment suffers a sufficient drop in hours in their traditional job, her class of work could switch to self-employment. Therefore, any factor that lowers traditional employment could lead to an increase in the measured self-employment rate, even with no change in the actual rate of self-employment. In our paper, we consider a change in affirmative action policy that alters the returns to both self-employment and traditional employment, so it is possible for this type of mismeasurement to bias either up or down the estimated effect of affirmative action in our design. However, this can only significantly bias our results if self-employment as secondary employment is common, which is not the case (Headd 2005).

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[7] For instance, the Small Business Administration reports that, in 2008, US $28.2 billion of federal procurement contracts was awarded to DBEs, 6.3% of the value of total federal procurement contracts awarded. At least 20 states have implemented affirmative action in contracting, in addition to numerous local governments (Insight Center for Community Economic Development 2007).

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[8] We do not examine transitions into and out of self-employment using matched annual CPS data because of the resulting reduction in sample size. Match rates for the ORG files range from 55% to 60%, and matching is problematic or impossible with the 1993, 1994, and 1995 waves. Also, conditioning on self-employment in the first survey year, which is necessary for estimating exit rates, results in a further reduction in sample size of roughly 90%. Finally, the effects of eliminating affirmative action are likely to work in same direction on entry and survival, which determine the self-employment rate, suggesting that the effect on the self-employment rate represents a good summary measure.

[9] Unpaid family workers are not counted as self-employed.

We restrict the sample to include only individuals aged 20–64 years to lessen concerns regarding retirement decisions. Unlike business-level datasets, the individual-level CPS includes information on non-business-owners, allowing us to directly measure business ownership rates. The CPS also includes detailed demographic and geographic information that is used to control for the determinants of business ownership.

The triple-difference approach we take to examine the effect of eliminating affirmative action on this measure of self-employment status requires classifying individuals along three dimensions. First, we are interested in comparing outcomes for minorities and women with those of White men. We therefore classify individuals along eight race/gender categories: White, Black, Latino, and other minority men; and White, Black, Latino, and other minority women. The "other" minority category includes Asian/Pacific Islander, Native American, and other races. We also classify individuals by state of residence to separately compare the treated states, California and Washington, with similar control states that did not change affirmative action policy. Finally, we classify observations into the pre-affirmative-action period and the post-affirmative-action period.

## 3 Methods

We are interested in estimating how eliminating affirmative action altered the self-employment rate of the treated group, minorities and women in California and Washington States. To investigate this question, we estimate a linear probability model of self-employment at the individual level. Although we control for measurable differences, unobservable factors could alter the self-employment decision over time, across states, and for minorities and women; for instance, shifts in demand or effective state business taxes could alter the self-employment rate in California over time. If this is correlated with the end of affirmative action, merely examining the change in self-employment for minorities and women will yield biased estimates of the effect of affirmative action.

To account for these unobserved factors that shift self-employment, we will employ the commonly used triple-difference (DDD) specification similar to that

used by Myers (2007).[10] Such a specification controls for year effects, state effects, and minority/women effects, as well as state-specific time effects, minority/women-specific time effects, and minority/women-specific state effects. The basic equation estimated for the self-employment probability is the following:

$$Y_{ist} = \gamma_0 + \gamma_1 I_{CA} + \gamma_2 P_{98} + \gamma_3 D + \gamma_4 I_{CA} * P_{98} + \gamma_5 D * I_{CA} + \gamma_6 D * P_{98} + \gamma_7 D * I_{CA} * P_{98} + \varepsilon_{ist},$$
(1)

where $D$ is an indicator for a minority or female individual, $P_{98}$ indicates post 1998, and $I_{CA} = 1$ if the individual lives in California. There are also similar terms for Washington, which have been suppressed here for convenience. The coefficient of interest is $\gamma_7$. It captures the change in the gap between minority/female and White self-employment in California relative to the rest of the USA. In other words, given how self-employment changed for minorities and women relative to White men in the rest of the USA, and given the change in self-employment for White males in California, did the self-employment rate for minorities and women change by more or less than expected?

We also extend the basic specification shown in (1) in several dimensions. First, we include a full set of state effects, $\alpha_s$, year effects $\lambda_t$, and vector of individual controls, $X_{ist}$, which include age, education, marital status, and urban status:

$$Y_{ist} = \alpha_s + \lambda_t + \gamma_3 D + \gamma_4 I_{CA} * P_{98} + \gamma_5 D * I_{CA} + \gamma_6 D * P_{98} + \gamma_7 D * I_{CA} * P_{98} + \beta' X_{ist} + \varepsilon_{ist}.$$
(2)

To allow for a richer set of controls for national trends in minority entrepreneurship, we also allow the year fixed effects, $\lambda_t$, to depend on race.

Our basic estimates combine minorities and women into one treatment group, though it is possible that the effect of affirmative action differs across racial/gender groups. Therefore, we will also estimate specifications that allow the coefficient $\gamma_7$ to differ

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[10] In the entrepreneurship literature, examples of studies using similar natural experiments include Fossen and Steiner (2009), who employ the DDD approach, and Oosterbeek et al. (2010), who use a difference-in-difference strategy. See Meyer (1995) for a detailed discussion of the natural experiment approach in the general setting.

across specific race/gender groups in California and Washington. We also recognize that factors influencing the self-employment decision are likely to differ in particular for men versus women. We therefore also estimate specifications (1) and (2) restricting the sample to men.

The basic identifying assumption, common to all DDD specifications, is that there were no state-specific shocks specifically affecting minority and female self-employment in California and Washington aside from the change in affirmative action policy. One way this assumption might be violated is if there exist pre-existing trends in minority business ownership specific to California and Washington. If business ownership rates among minorities and women were trending upward in California and Washington prior to elimination of affirmative action, then our estimate of $\gamma_7$ is likely to be biased upward. To address this concern, we estimate a specification that allows for separate race-specific year effects for California and Washington.

A second assumption of the model is that the trends in the self-employment rates of minorities and women in the rest of the USA represent what would have happened in California and Washington had affirmative action not been eliminated. This allows for a causal interpretation of the estimated coefficient $\gamma_7$. If affirmative action policies were changed in other states at the same time as in California and Washington, then our estimates of the effect of ending affirmative action will be biased, since a portion of the control group would receive the treatment of a change in affirmative action policy. According to a recent, thorough survey of affirmative action policies (Insight Center for Community Economic Development 2007) there was very little change in state affirmative action policies in the timeframe immediately surrounding the elimination of affirmative action in California and Washington. Affirmative action was used by 22 states to increase purchases from minority- and women-owned firms, 15 of which used contracting goals. In addition to California and Washington, this study identified only four other significant changes in state affirmative action programs. Ohio eliminated affirmative action in contracting in 1998, but almost immediately reinstated much of the program the following year. In 2000, Florida eliminated affirmative action goals in the award of state contracts, but replaced it with an

apparently successful diversity program. The only other two major changes in state-level affirmative action programs occurred in Louisiana in 1996 and Oklahoma in 2001, both of which eliminated consideration of race and gender in the awarding of state contracts. These changes occurred in states representing only a very small portion of our control group, and furthermore in years not coinciding with the policy changes under consideration.

### 3.1 Comparison group states

The choice of comparison group states included in the sample is important because the included states identify the national trends in minority business ownership rates. We estimate the model with two sets of control states. First, we estimate the model including all states, and in so doing compare trends in California and Washington relative to the rest of the USA. Second, we define a more refined control group by identifying states that have similar minority compositions as California and Washington. We choose the 15 states closest in minority population shares to California and Washington, which are reported in Appendix 1.

## 4 Results

### 4.1 Basic triple-difference results

We begin by presenting mean self-employment rates for women and minority men in California and Washington before and after elimination of affirmative action in Tables 1, 2, and 3, where the self-employment rate is defined as the percentage of population aged 20–64 years that is a self-employed business owner. From these means, we form the DDD estimates that represent the primary results of the paper. The sample runs from 1990 through 2006, and thus includes 8 years before and 9 years after elimination of affirmative action for California and 9 prechange years for Washington. We present the results separately for three definitions of the treatment group. In Table 1, we begin by grouping all women and minorities into the treatment group. In Tables 2 and 3, we present the results separately for minority men and all women, respectively.

**Table 1** Business ownership trends in states eliminating affirmative action versus rest of US women and minority men versus White men: Current Population Survey (1990–2006)

| | | Before 1998 | After 1998 | | Before 1999 | After 1999 |
|---|---|---|---|---|---|---|
| Panel A: California versus rest of USA (except WA) | | | | Panel B: Washington versus rest of USA (except CA) | | |
| California | | | | Washington | | |
| White men | | 0.1695 | 0.1520 | White men | 0.1324 | 0.1135 |
| Minority/female | | 0.0678 | 0.0694 | Minority/female | 0.0717 | 0.0686 |
| Diff | | −0.1017 | −0.0827 | Diff | −0.0606 | −0.0449 |
| | | (0.0020) | (0.0020) | | (0.0037) | (0.0034) |
| | DD | 0.0190 | | DD | 0.0158 | |
| | | (0.0026) | | | (0.0050) | |
| USA | | | | USA | | |
| White men | | 0.1345 | 0.1233 | White men | 0.1339 | 0.1226 |
| Minority/female | | 0.0541 | 0.0554 | Minority/female | 0.0544 | 0.0552 |
| Diff | | −0.0804 | −0.0679 | Diff | −0.0795 | −0.0674 |
| | | (0.0027) | (0.0020) | | (0.0026) | (0.0020) |
| | DD | 0.0125 | | DD | 0.0121 | |
| | | (0.0012) | | | (0.0012) | |
| | DDD | 0.0065 | | DDD | 0.0036 | |
| | | (0.0012) | | | (0.0012) | |

The sample includes all individuals aged 20–64 years

US estimates exclude California and Washington

While these estimates are not regression adjusted for other covariates, they serve several purposes. Presenting the mean self-employment rates facilitates evaluating the magnitude of the estimated effects. Also, it describes some basic trends in the self-employment gap between White men and minorities/women, as well as serving to illustrate the identification strategy used in the paper.

In panel A of Table 1, we present the results for California for the combined treatment group. Self-employment rates for minorities and women in California are 6.8% pre affirmative action, well below the 16.7% rate for White men. This represents a 10.1 percentage point gap in the self-employment rate in the years 1990–1997. After the elimination of affirmative action, this gap falls by 1.9 percentage points. The decline in the gap resulted from a small increase in the self-employment rate of minorities and women and a far more substantial fall in the self-employment rate of White men. The White male rate fell from 17.0% to 15.2%.

A similar pattern played out in the rest of the USA as well. Self-employment of minorities and women

increased by a modest amount (and was essentially unchanged), and the self-employment rate of White men fell noticeably (from 13.5% to 12.3%). Like in California, the gap between the self-employment rate of White men and that of minorities and women fell in the pre-1998 period to the post-1998 period in the rest of the USA as well, however it narrowed at a slower rate. Taken together, the self-employment rate grew 0.65 percentage points faster for minority men and women in California than for minorities and women in the rest of the USA. This represents an increase of less than 10% in the self-employment rate.

Panel B of Table 1 presents similar estimates for Washington. While the White male self-employment rate in California is noticeably higher than that for the USA, the self-employment rate of working-age White men in Washington closely resembled that for the rest of the USA prior to Washington's elimination of affirmative action in 1999. The gap between White self-employment and minority/female self-employment is correspondingly much lower in Washington than in California. The gap is 6.1 percentage points pre 1999 and is actually narrower than the 8.0 percentage

**Table 2** Business ownership trends in states eliminating affirmative action versus rest of US minority men versus White men: CPS (1990–2006)

|  |  | Before 1998 | After 1998 |  |  | Before 1999 | After 1999 |
|---|---|---|---|---|---|---|---|
| Panel A: California versus rest of USA (except WA) |  |  |  | Panel B: Washington versus rest of USA (except CA) |  |  |  |
| California |  |  |  | Washington |  |  |  |
| White men |  | 0.1695 | 0.1520 | White men |  | 0.1324 | 0.1135 |
| Minority men |  | 0.0773 | 0.0798 | Minority men |  | 0.0727 | 0.0666 |
| Diff |  | −0.0921 | −0.0722 | Diff |  | −0.0597 | −0.0469 |
|  |  | (0.0023) | (0.0023) |  |  | (0.0071) | (0.0056) |
|  | DD | 0.0199 |  |  | DD | 0.0128 |  |
|  |  | (0.0033) |  |  |  | (0.0090) |  |
| USA |  |  |  | USA |  |  |  |
| White men |  | 0.1345 | 0.1233 | White men |  | 0.1339 | 0.1226 |
| Minority men |  | 0.0616 | 0.0657 | Minority men |  | 0.0616 | 0.0661 |
| Diff |  | −0.0729 | −0.0576 | Diff |  | −0.0723 | −0.0565 |
|  |  | (0.0036) | (0.0028) |  |  | (0.0035) | (0.0027) |
|  | DD | 0.0154 |  |  | DD | 0.0157 |  |
|  |  | (0.0018) |  |  |  | (0.0017) |  |
|  | DDD | 0.0046 |  |  | DDD | −0.0029 |  |
|  |  | (0.0018) |  |  |  | (0.0017) |  |

The sample includes all individuals aged 20–64 years

US estimates exclude California and Washington

**Table 3** Business ownership trends in states eliminating affirmative action versus rest of US women versus White men: CPS (1990–2006)

|  |  | Before 1998 | After 1998 |  |  | Before 1999 | After 1999 |
|---|---|---|---|---|---|---|---|
| Panel A: California versus rest of USA (except WA) |  |  |  | Panel B: Washington versus rest of USA (except CA) |  |  |  |
| California |  |  |  | Washington |  |  |  |
| White men |  | 0.1695 | 0.1520 | White men |  | 0.1324 | 0.1135 |
| Women |  | 0.0635 | 0.0641 | Women |  | 0.0716 | 0.0690 |
| Diff |  | −0.1060 | −0.0879 | Diff |  | −0.0608 | −0.0445 |
|  |  | (0.0020) | (0.0020) |  |  | (0.0037) | (0.0035) |
|  | DD | 0.0181 |  |  | DD | 0.0162 |  |
|  |  | (0.0029) |  |  |  | (0.0050) |  |
| USA |  |  |  | USA |  |  |  |
| White men |  | 0.1345 | 0.1233 | White men |  | 0.1339 | 0.1226 |
| Women |  | 0.0526 | 0.0527 | Women |  | 0.0529 | 0.0524 |
| Diff |  | −0.0819 | −0.0705 | Diff |  | −0.0810 | −0.0702 |
|  |  | (0.0030) | (0.0025) |  |  | (0.0029) | (0.0025) |
|  | DD | 0.0114 |  |  | DD | 0.0108 |  |
|  |  | (0.0012) |  |  |  | (0.0012) |  |
|  | DDD | 0.0067 |  |  | DDD | 0.0054 |  |
|  |  | (0.0012) |  |  |  | (0.0012) |  |

The sample includes all individuals aged 20–64 years

US estimates exclude California and Washington

point gap in the USA. The Washington gap shrinks further in the post-affirmative-action period to 4.5 percentage points, faster than the 1.2 percentage point decline in the rest of the USA. The effect of eliminating affirmative action on the self-employment rate of minorities and women in Washington is therefore estimated to be 0.4 percentage points.

The results shown in Table 1 present a similar narrative for California and Washington. Both of these states experienced a decline in self-employment in the post-affirmative-action period relative to the rest of the USA. The decline in self-employment among minorities and women was smaller. This may be due to the positive effects of eliminating affirmative action on self-employment outweighing the negative effects.

We next divide the treatment group between men and women. This is potentially instructive if men and women are affected differentially by affirmative action. The results considering the change in self-employment rates for minority men relative to White men are shown in Table 2, while the results for women relative to White men are shown in Table 3. For California, the results are similar for women and treated men. Self-employment rates rose in the post-affirmative-action period by 0.46 percentage points for minority men relative to White men in California relative to the rest of the USA. For women, self-employment rates rose by 0.67 percentage points relative to White women in California relative to the rest of the USA.

The story is somewhat different in Washington. Panel B of Table 2 shows the results of comparing minority men specifically with White men. This treatment group displays falling self-employment rates relative to White men after affirmative action, in Washington relative to the rest of the USA. The estimated effect of eliminating affirmative action on the self-employment rates of women in Washington is positive, similar to the effect for women in California. One drawback to this basic DDD specification is that it does not allow for different time trends in self-employment for minorities and women. In the following sections, we build on the preceding results using regression analysis, which will allow us to better control for such possible confounding factors. This will turn out to account for the differing effects for minority men in Washington.

## 4.2 Regression results from full sample of states

In Table 4 we present the results of estimating Eqs. 1 and 2 for the full sample of states. In column (1), the estimates of $\gamma_7$ are presented for California and Washington without detailed controls. Because this is virtually equivalent to the exercise shown in Tables 1, 2, and 3, we do not discuss these results in detail. The estimates indicate that minority/female self-employment rates were slightly higher in California and Washington post affirmative action. In the specifications shown in subsequent columns, we gradually add demographic controls, state and year fixed effects, race/gender-specific year effects, and race/gender-specific time trends for California and Washington. We estimate all specifications using ordinary least squares (OLS) and report robust standard errors that adjust for clustering at the state level. Marginal effect estimates are similar for probit and logit models.

In the specification shown in column (2), we add demographic controls, state fixed effects, and year effects, and in the specification displayed in column (3) we further add race/gender year effects. Appendix 2 reports means for the demographic controls. These additional controls have little effect on the estimated coefficients. For both California and Washington, the effect of eliminating affirmative action is estimated to be of the same sign and virtually the same magnitude as the specification without controls shown in column (1).

One concern with a triple-difference estimator is that there might exist a preexisting trend specific to the treatment group. To address this concern, we estimate a specification including California and Washington time trends that are allowed to differ for minority and women versus White men.[11] These state- and race-specific time trends are meant to capture pre-existing trends affecting minorities and women in the treatment states. Without these controls, the presence of unobserved factors that influence self-employment over time specifically for

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[11] Specifically, we introduce terms into the specification described by Eq. 2 capturing linear state-specific time trends for California and Washington, $t*I_{CA}$ and $t*I_{WA}$, and linear time trends specific to the treatment group in those states, $t*I_{CA}*D$ and $t*I_{WA}*D$. The linear time trend is not included on its own since we estimate year effects.

**Table 4** Linear probability regressions for business ownership: US sample [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| D*California*post 1998 | 0.006521 | 0.005572 | 0.005502 | 0.01297 |
|  | (0.00122) | (0.00125) | (0.00125) | (0.00130) |
| D*Washington*post 1999 | 0.003551 | 0.004102 | 0.004267 | 0.015104 |
|  | (0.00117) | (0.00117) | (0.00116) | (0.00152) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Race/gender year fixed effects | No | No | Yes | Yes |
| Race/gender CA and WA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.089043 | 0.089043 | 0.089043 | 0.089043 |
| Sample size | 4,267,176 | 4,267,176 | 4,267,176 | 4,267,176 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after elimination of affirmative action for minorities and women, represented by the treatment variable $D$, relative to White males in the treatment state versus the rest of the USA

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

minorities living in California or Washington will lead to biased estimates of the DDD coefficient. For instance, if the self-employment rate for Blacks in California was rising prior to the implementation of Proposition 209, one would worry that the self-employment rate would have continued to rise even without the elimination of affirmative action, and we would mistakenly attribute that increase to Proposition 209. We display the results of this estimation in column (4). While the estimates of $\gamma_7$ are somewhat larger in this specification, including these time trends does not qualitatively change the results. Relative self-employment rates rose for minorities and women after eliminating affirmative action in California and Washington.

### 4.2.1 Additional estimates

We estimate a few additional specifications to check the robustness of these results. Appendix 3 reports estimates. First, we examine whether the estimates are sensitive to including years around the initiatives. There might be anticipation effects and implementation delays that could create ambiguity over when affirmative action ended. We exclude the initiative years 1998 and 1999 to examine this question (specification 1). We find that the estimates do not

differ substantially when these are excluded. Second, we are concerned about including years that are either much earlier or much later than the initiatives. We limit the sample period to 1992–2004 to address this concern (specification 2). We find that focusing in on the initiative dates also does not change the main results. Finally, we limit the sample to ages 20–54 years (specification 3). We are concerned that individuals close to retirement age may behave differently. The results do not change substantially. Overall, the estimates are not overly sensitive to alternative time periods and age groups.

### 4.3 Minority male estimates

The decision to enter self-employment is likely to differ significantly between men and women, and affirmative action may differentially affect men and women. Men and women differ in the types of businesses they start and in the labor market opportunities that they face (US Census Bureau 2006). They also are likely to differ in their elasticity with respect to changes in business or employment opportunities. In Table 5, we display estimates of a model that considers only the male self-employment rate. In this case, we compare minority men to White men. Interestingly, the focus on men somewhat

**Table 5** Linear probability regressions for business ownership: only men [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| D*California*post 1998 | 0.004655 | 0.001217 | 0.001257 | 0.010873 |
| | (0.00178) | (0.00168) | (0.00168) | (0.00232) |
| D*Washington*post 1999 | 0.002743 | 0.004778 | 0.004775 | 0.003332 |
| | (0.00166) | (0.00151) | (0.00148) | (0.00195) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Minority/female year fixed effects | No | No | Yes | Yes |
| Minority/female CA and WA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.1225 | 0.1225 | 0.1225 | 0.1225 |
| Sample size | 2,045,890 | 2,045,890 | 2,045,890 | 2,045,890 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minority men, represented by the treatment variable $D$, relative to White males in the treatment state versus the rest of the USA

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

changes the conclusions regarding the effect of affirmative action. We see that the estimated effect of ending affirmative action is much smaller for men than was estimated for the sample as a whole. In California, once covariates, state effects, and year effects are added to the model, the triple-difference coefficient is very small and statistically insignificant [see column (3)]. Only upon inclusion of minority time trends specific to California does the estimated coefficient become statistically significant, and it is still slightly smaller than that estimated using the entire sample. While the estimated effect of ending affirmative action is estimated to be merely smaller for men in California, we estimate that in Washington the effect of ending affirmative action actually has a negative impact on the self-employment rate of minority men. We find that the self-employment rate of minority men in Washington fell between 0.3 and 0.5 percentage points, depending on the included controls, relative to White men in Washington, as compared with the rest of the USA.

## 4.4 Alternative definitions for self-employment

The previous subsections examine the self-employment rates of minorities and women, categorizing as self-employed those who listed self-employment as

their primary occupation in the CPS. We do not impose restrictions on working. One criticism of this measure is that it may overstate true self-employment if some individuals who are in fact unemployed list self-employment as their occupation. To address this, we restrict our definition of self-employment to include only those individuals reporting themselves as self-employed who worked a significant number of hours. We will first consider self-employed only those individuals working at least 15 h in the past week, and in a second robustness check we will categorize only those working more than 30 h worked as self-employed.

The results are presented in Table 6. In column (1), we reproduce the estimates from the specification including the full set of controls as shown in the last column of Table 4. In column (2), we present the results where only those with greater than 15 h worked in the past survey week are counted as self-employed. We see that the results are qualitatively similar between the two specifications. The estimated coefficients are also generally of similar magnitude as in the base specification using the broader measure of self-employment. Column (3) presents the results of further narrowing the definition of self-employment to those reporting working 30 or more hours of work in the past week. Again, the results are similar to

**Table 6** Linear probability regressions for business ownership with alternative self-employment definitions: CPS (1990–2006)

|  | (1) | (2) | (3) |
|---|---|---|---|
| Definition of self-employment | Main | >15 h | >30 h |
| D*California*post 1998 | 0.01297 | 0.009543 | 0.009946 |
|  | (0.00130) | (0.00134) | (0.00142) |
| D*Washington*post 1998 | 0.015104 | 0.017218 | 0.018237 |
|  | (0.00152) | (0.00146) | (0.00151) |
| Demographic controls | Yes | Yes | Yes |
| State fixed effects | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes |
| Race/gender year fixed effects | Yes | Yes | Yes |
| Race/gender CA and WA time trends | Yes | Yes | Yes |
| Mean of dependent variable | 0.0890 | 0.0781 | 0.0684 |
| Sample size | 4,267,176 | 4,267,176 | 4,267,176 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minorities and women, represented by the treatment variable $D$, relative to White males in the treatment state versus the rest of the USA

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

In the main specification, an individual is listed as self-employed if this was his or her primary form of employment. Two alternative definitions for self-employment are considered. In column (2), the definition of self-employment is restricted to those with self-employment as their primary form of employment, and who worked at least 15 h in this primary job. In column (3), we increase this restriction to 30 h

those using the broader self-employment measure. Our main results are thus not sensitive to the definition of self-employment used.

## 4.5 By race/gender group

We next examine how elimination of affirmative action affected the self-employment rates of specific race/gender groups. In Table 7 we present the results of estimating Eqs. 1 and 2 for the full sample of states, where $\gamma_7$ is allowed to vary for each race and gender. The previous results combine all groups, which may mask heterogeneity in the response of self-employment across race/gender groups. However, by disaggregating into relatively narrow treatment groups, we may become subject to the multiple inference problem.

In column (1), we present basic results with no demographic controls. In California, we find statistically significant increases in self-employment post 1998 for White women, Latino men and women, other minority men and women, and Black women. We estimate a statistically significant decline for

Black men. For Washington, we estimate statistically significant increases in the self-employment rate post 1999 for Black and Latino men, and White, Black, and Latino women. We also find a statistically significant decline in self-employment among other minority men, and a statistically insignificant change in the self-employment rate of other minority women.

In the specification shown in column (2), we add demographic controls, state fixed effects, and year effects, and in the specification displayed in column (3) we further add race/gender year effects. These additional controls have little effect on the estimated coefficients. For each race/gender group in both California and Washington, the effect of eliminating affirmative action is estimated to be of the same sign and virtually the same magnitude as the specification without controls shown in column (1).

In column (4), we present estimates of a similar specification including time trends that are allowed to vary for each race and gender category separately for California and Washington. Including these controls does not change the results for most race and gender groups, though the estimates are larger in many cases.

**Table 7** Linear probability regressions for business ownership with detailed race/gender groups: US sample [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Black men California post 1998 | −0.00555 | −0.00591 | −0.00590 | 0.00807 |
| | (0.00148) | (0.00160) | (0.00158) | (0.00357) |
| Latino men California post 1998 | 0.01208 | 0.00718 | 0.00737 | 0.00619 |
| | (0.00454) | (0.00387) | (0.00396) | (0.00304) |
| Oth. min. men California post 1998 | 0.00782 | 0.00640 | 0.00661 | 0.02292 |
| | (0.00284) | (0.00291) | (0.00293) | (0.00431) |
| White women California post 1998 | 0.00767 | 0.00802 | 0.00782 | 0.01009 |
| | (0.00123) | (0.00122) | (0.00121) | (0.00136) |
| Black women California post 1998 | 0.00973 | 0.00853 | 0.00841 | 0.01358 |
| | (0.00167) | (0.00166) | (0.00167) | (0.00208) |
| Latino women California post 1998 | 0.00971 | 0.00708 | 0.00692 | 0.01542 |
| | (0.00216) | (0.00162) | (0.00166) | (0.00271) |
| Oth. min. women California post 1998 | 0.00654 | 0.00451 | 0.00452 | 0.01239 |
| | (0.00292) | (0.00298) | (0.00299) | (0.00506) |
| Black men Washington post 2000 | 0.02279 | 0.02137 | 0.02156 | −0.00202 |
| | (0.00158) | (0.00165) | (0.00168) | (0.00237) |
| Latino men Washington post 2000 | 0.00883 | 0.00907 | 0.00951 | 0.01788 |
| | (0.00399) | (0.00337) | (0.00337) | (0.00442) |
| Oth. min. men Washington post 2000 | −0.01079 | −0.01341 | −0.01358 | −0.02544 |
| | (0.00279) | (0.00288) | (0.00294) | (0.00384) |
| White women Washington post 2000 | 0.00274 | 0.00331 | 0.00353 | 0.00708 |
| | (0.00107) | (0.00106) | (0.00105) | (0.00122) |
| Black women Washington post 2000 | 0.03572 | 0.03379 | 0.03385 | 0.03425 |
| | (0.00154) | (0.00140) | (0.00142) | (0.00165) |
| Latino women Washington post 2000 | 0.01894 | 0.02120 | 0.02132 | 0.02393 |
| | (0.00204) | (0.00158) | (0.00152) | (0.00197) |
| Oth. min. women Washington post 2000 | 0.00066 | −0.00319 | −0.00306 | −0.00126 |
| | (0.00252) | (0.00252) | (0.00250) | (0.00347) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Race/gender year fixed effects | No | No | Yes | Yes |
| Race/gender CA and WA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.08904 | 0.08904 | 0.08904 | 0.08904 |
| Sample size | 4,267,176 | 4,267,176 | 4,267,176 | 4,267,176 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination affirmative action for the stated minority group relative to White males in the treatment state versus the rest of the USA

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Importantly, the inclusion of race- and state-specific time trends has a noticeable effect on the DDD estimates for Black men in both California and Washington. As the prior results showed, self-employment among Black men was lower after affirmative action in California. However, relative to their trend, Black men in California are estimated to be 0.8 percentage points more likely to be self-employed post Proposition 209. This implies that the self-employment rate of Black men in California was

trending downward even prior to the elimination of affirmative action. The opposite conclusion can be drawn for Black men in Washington. Adding the race- and Washington-specific time trend turns the coefficient for Black men from strongly positive to statistically indistinguishable from zero, indicating that self-employment among Blacks in Washington was trending upward prior to Initiative 200.

### 4.6 Restricting the comparison group states

The estimates reported above indicate that the likelihood of self-employment for minorities and women was higher in California and Washington than it would have been had these states kept affirmative action. The estimation strategy leading to this conclusion assumes that the change in self-employment rates for minorities and women relative to White men in California and Washington would mimic the change observed in the rest of the USA had affirmative action not been eliminated. Individuals in other states are treated as a counterfactual for individuals in California and Washington. However, the pattern observed in other states may not always provide an accurate counterfactual, as some states differ dramatically from California and Washington.

The racial composition of a state's population is one characteristic likely to affect outcomes for minority- and women-owned firms. In this section, we use only states with similar demographic characteristics to California and Washington, where we select comparison states based on the minority share of the population. This comparison group may provide a more accurate representation of how the likelihood of self-employment would have changed had California and Washington kept affirmative action.

#### 4.6.1 California comparison group

We begin by restricting the sample of states to California and the 15 states whose minority population share is closest to that of California (see Appendix 1). We present the results of estimating Eqs. 1 and 2 for this sample in Table 8. For the first three specifications, restricting the sample in this manner does not have a large impact on the results. We still see a modest increase in the self-employment rate for minorities and women relative to White men in California versus the comparison group of other

states. These results are robust to the inclusion of state effects, year effects, demographic controls, and race/gender year effects, which we include in the specifications shown in columns (2) and (3). The estimates, however, become much smaller when we include a minority/female time trend specific to California [column (4)]. In this specification, the coefficient estimate is very small and statistically insignificant. When focusing on this alternative control group of states, we do not find evidence in this specification of an increase in minority/female self-employment after eliminating affirmative action.

#### 4.6.2 Washington comparison group

We next perform a similar exercise of identifying a more demographically similar set of control states for Washington State. In Table 9 we present the results from restricting the sample to Washington and the 15 states most closely matching its minority population share. Unlike the specification using the full sample of states, the estimates in columns (1)–(3) indicate a negative effect of eliminating affirmative action. However, this seems to be due to pre-existing trends. Once a Washington-specific time trend for minorities and women is included, the estimated DDD coefficient is positive, although relatively small and statistically insignificant at conventional levels ($p$-value of 0.10). Using the more restricted sample of comparison states and controlling for specific time trends results in a much smaller estimate of the effect of removing affirmative action on self-employment in Washington. This result is similar to what we find for California.

#### 4.6.3 Race/gender-specific estimates

In Tables 10 and 11, we examine how elimination of affirmative action affected the self-employment rates of specific race/gender groups using the more narrowly defined sets of comparison states. For California, we find statistically significant increases in self-employment post 1998 for Black women and Latino women (Table 10). The coefficient estimates for Black men, Latino men, and White women are all very small and close to zero in specification 4, which includes race- and state-specific time trends. These results differ from the main estimates in which several groups showed positive effects, including Black men, Latino men, and White women in

**Table 8** Linear probability regressions for business ownership: CA sample based on minority share [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| D*California*post 1998 | 0.0056 | 0.0043 | 0.0043 | 0.0025 |
| | (0.0013) | (0.0013) | (0.0013) | (0.0019) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Minority/female year fixed effects | No | No | Yes | Yes |
| Minority/female CA and WA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.0839 | 0.0839 | 0.0839 | 0.0839 |
| Sample size | 1,858,112 | 1,858,112 | 1,858,112 | 1,858,112 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minorities and women, represented by the treatment variable D, relative to White males in the treatment state versus the 15 states with minority population share most similar to California

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

**Table 9** Linear probability regressions for business ownership: WA sample based on minority share [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| D*Washington*post 1999 | −0.0035 | −0.0021 | −0.0020 | 0.0023 |
| | (0.0010) | (0.0010) | (0.0010) | (0.0014) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Minority/female year fixed effects | No | No | Yes | Yes |
| Minority/female CA and WA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.0839 | 0.0839 | 0.0839 | 0.0839 |
| Sample size | 1,277,061 | 1,277,061 | 1,277,061 | 1,277,061 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minorities and women, represented by the treatment variable D, relative to White males in the treatment state versus the 15 states with minority population share most similar to Washington

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

California. These results also indicate that the lack of finding a significant positive effect for all groups combined is due to the lack of significance for most individual race/gender groups.

For Washington, we estimate statistically significant increases in the self-employment rate post 1999 for White women, Black women, and Latino women when focusing on specification 4. We find negative and significant decreases for Black men and other minority men. The estimates for specific racial/gender groups generally follow the same pattern as

found when using the full US sample as the comparison group.

## 5 Conclusions

In this paper, the self-employment response of individuals in California and Washington to elimination of affirmative action is documented. Eliminating affirmative action appears to have resulted in a modest increase in self-employment among minorities and

**Table 10** Linear probability regressions for business ownership: CA sample based on minority share [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Black men California post 1998 | −0.0040 | −0.0046 | −0.0045 | −0.0010 |
| | (0.0016) | (0.0020) | (0.0020) | (0.0053) |
| Latino men California post 1998 | 0.0122 | 0.0080 | 0.0082 | −0.0033 |
| | (0.0052) | (0.0044) | (0.0045) | (0.0035) |
| Oth. min. men California post 1998 | 0.0124 | 0.0108 | 0.0110 | 0.0108 |
| | (0.0032) | (0.0032) | (0.0031) | (0.0058) |
| White women California post 1998 | 0.0064 | 0.0064 | 0.0062 | −0.0010 |
| | (0.0014) | (0.0013) | (0.0013) | (0.0025) |
| Black women California post 1998 | 0.0097 | 0.0084 | 0.0084 | 0.0065 |
| | (0.0017) | (0.0018) | (0.0018) | (0.0023) |
| Latino women California post 1998 | 0.0104 | 0.0080 | 0.0078 | 0.0070 |
| | (0.0024) | (0.0016) | (0.0016) | (0.0025) |
| Oth. min. women California post 1998 | 0.0100 | 0.0082 | 0.0082 | 0.0087 |
| | (0.0034) | (0.0031) | (0.0032) | (0.0064) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Race/gender year fixed effects | No | No | Yes | Yes |
| Race/gender CA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.08385 | 0.08385 | 0.08385 | 0.08385 |
| Sample size | 1,858,112 | 1,858,112 | 1,858,112 | 1,858,112 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minorities and women, represented by the treatment variable $D$, relative to White males in the treatment state versus the 15 states with minority population share most similar to California

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

women based on our DDD results that include a comparison group of all states. These results are not sensitive to the inclusion of controls for race/state time trends, alternative definitions of self-employment, restricting the age range of the sample, and allowing for the possibility of delayed implementation of the elimination of affirmative action. However, not all of the results that we present indicate an increase in minority/female self-employment following elimination of affirmative action. Most notably, when we create more similar sets of comparison states for California and Washington we do not find evidence of positive effects following removal of affirmative action. We find very small and statistically insignificant estimates, and negative estimates in some cases. A weakening of the overall conclusions also occurs when we focus the analysis on minority and White men, and

we find some negative estimates for specific race/gender groups. Although it is difficult to pinpoint the causes of these divergent results, it leaves open the possibility that the potentially negative effects of eliminating affirmative action on public contracting opportunities outweigh the potentially positive effects on self-employment through restricted government employment opportunities for some groups.

The increase in self-employment we document in some of our specifications may have occurred because the elimination of broadly based affirmative action programs reduced the employment opportunities of minorities and women, forcing them to turn to self-employment. Previous research indicates large negative employment effects following the elimination of affirmative action in California (Myers 2007; Discrimination Research Center and Equal Rights

**Table 11** Linear probability regressions for business ownership: WA sample based on minority share [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Black men Washington post 1999 | 0 0103 | 0 0067 | 0 0069 | −0 0344 |
| | (0.0024) | (0.0027) | (0.0027) | (0.0029) |
| Latino men Washington post 1999 | 0.0018 | −0.0010 | −0.0016 | 0.0156 |
| | (0.0055) | (0.0061) | (0.0061) | (0.0078) |
| Oth. min. men Washington post 1999 | −0.0260 | −0.0282 | −0.0285 | −0.0351 |
| | (0.0055) | (0.0060) | (0.0057) | (0.0057) |
| White women Washington post 1999 | −0.0023 | −0.0007 | −0.0005 | 0.0040 |
| | (0.0009) | (0.0008) | (0.0008) | (0.0014) |
| Black women Washington post 1999 | 0.0387 | 0.0339 | 0.0341 | 0.0523 |
| | (0.0020) | (0.0021) | (0.0021) | (0.0027) |
| Latino women Washington post 1999 | 0.0227 | 0.0233 | 0.0232 | 0.0375 |
| | (0.0040) | (0.0044) | (0.0046) | (0.0061) |
| Oth. min. women Washington post 1999 | −0.0031 | −0.0067 | −0.0070 | −0.0011 |
| | (0.0062) | (0.0068) | (0.0068) | (0.0082) |
| Demographic controls | No | Yes | Yes | Yes |
| State fixed effects | No | Yes | Yes | Yes |
| Year fixed effects | No | Yes | Yes | Yes |
| Race/gender year fixed effects | No | No | Yes | Yes |
| Race/gender CA time trends | No | No | No | Yes |
| Mean of dependent variable | 0.08387 | 0.08387 | 0.08387 | 0.08387 |
| Sample size | 1,277,061 | 1,277,061 | 1,277,061 | 1,277,061 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minorities and women, represented by the treatment variable $D$, relative to White males in the treatment state versus the 15 states with minority population share most similar to Washington

The sample consists of individuals (aged 20–64 years)

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

Advocates 2004). Further research on the impacts of eliminating broader state affirmative action programs could investigate this channel by distinguishing between different types of self-employed business ownership. Elimination of affirmative action in California and Washington may have resulted in an increase in low-income self-employment for many minorities, but it may have also resulted in a decrease in high-income self-employment for minorities. Unfortunately, the CPS ORG files do not provide information on the earnings or number of employees of self-employed business owners allowing one to identify potentially divergent patterns. One possibility for future research is to use confidential and restricted-access data from the Census Bureau on minority-owned businesses. The Census Bureau is working on methods of matching the Survey of Business Owners (SBO) data which have information

on the race of the owner with longitudinal business-level data which have information on revenues and employment.

One limitation of the research design employed is that it is unable to uncover longer-run effects of eliminating affirmative action on self-employment. The businesses owned by individuals drawn into self-employment as a result of elimination of affirmative action may have different survival probabilities than the broader pool of businesses. Furthermore, the lack of affirmative action may alter investment incentives for businesses and individuals, thereby affecting wages of minorities and women and the profitability of minority- and female-owned firms. These long-run effects are difficult to sign theoretically, and would be a challenge to uncover empirically. Although future research is needed on this important topic, this study represents the first step towards understanding the

effects of broadly based affirmative action programs on minority and female self-employment.

## Appendix 1

See Table 12.

**Table 12** Comparison states by minority share of population census 2000

| State | Total population | Minority percent | Black percent | Latino percent | Min. share states |
|---|---|---|---|---|---|
| Alabama | 4,447,100 | 29.7 | 26.0 | 1.7 | |
| Alaska | 626,932 | 32.4 | 3.5 | 4.1 | CA |
| Arizona | 5,130,632 | 36.2 | 3.1 | 25.3 | CA |
| Arkansas | 2,673,400 | 21.4 | 15.7 | 3.2 | WA |
| California | 33,871,648 | 53.3 | 6.7 | 32.4 | CA |
| Colorado | 4,301,261 | 25.5 | 3.8 | 17.1 | WA |
| Connecticut | 3,405,565 | 22.5 | 9.1 | 9.4 | WA |
| Delaware | 783,600 | 27.5 | 19.2 | 4.8 | WA |
| District of Columbia | 572,059 | 72.2 | 60.0 | 7.9 | |
| Florida | 15,982,378 | 34.6 | 14.6 | 16.8 | CA |
| Georgia | 8,186,453 | 37.4 | 28.7 | 5.3 | CA |
| Hawaii | 1,211,537 | 77.1 | 1.8 | 7.2 | |
| Idaho | 1,293,953 | 12.0 | 0.4 | 7.9 | |
| Illinois | 12,419,293 | 32.2 | 15.1 | 12.3 | CA |
| Indiana | 6,080,485 | 14.2 | 8.4 | 3.5 | |
| Iowa | 2,926,324 | 7.4 | 2.1 | 2.8 | |
| Kansas | 2,688,418 | 16.9 | 5.7 | 7.0 | WA |
| Kentucky | 4,041,769 | 10.7 | 7.3 | 1.5 | |
| Louisiana | 4,468,976 | 37.5 | 32.5 | 2.4 | CA |
| Maine | 1,274,923 | 3.5 | 0.5 | 0.7 | |
| Maryland | 5,296,486 | 37.9 | 27.9 | 4.3 | CA |
| Massachusetts | 6,349,097 | 18.1 | 5.4 | 6.8 | WA |
| Michigan | 9,938,444 | 21.4 | 14.2 | 3.3 | WA |
| Minnesota | 4,919,479 | 11.8 | 3.5 | 2.9 | |
| Mississippi | 2,844,658 | 39.3 | 36.3 | 1.4 | CA |
| Missouri | 5,595,211 | 16.2 | 11.2 | 2.1 | WA |
| Montana | 902,195 | 10.5 | 0.3 | 2.0 | |
| Nebraska | 1,711,263 | 12.7 | 4.0 | 5.5 | |
| Nevada | 1,998,257 | 34.8 | 6.8 | 19.7 | CA |
| New Hampshire | 1,235,786 | 4.9 | 0.7 | 1.7 | |
| New Jersey | 8,414,350 | 34.0 | 13.6 | 13.3 | CA |
| New Mexico | 1,819,046 | 55.3 | 1.9 | 42.1 | CA |
| New York | 18,976,457 | 38.0 | 15.9 | 15.1 | CA |
| North Carolina | 8,049,313 | 29.8 | 21.6 | 4.7 | |
| North Dakota | 642,200 | 8.3 | 0.6 | 1.2 | |
| Ohio | 11,353,140 | 16.0 | 11.5 | 1.9 | WA |

**Table 12** continued

| State | Total population | Minority percent | Black percent | Latino percent | Min. share states |
|---|---|---|---|---|---|
| Oklahoma | 3,450,654 | 25.9 | 7.6 | 5.2 | WA |
| Oregon | 3,421,399 | 16.5 | 1.6 | 8.0 | WA |
| Pennsylvania | 12,281,054 | 15.9 | 10.0 | 3.2 | WA |
| Rhode Island | 1,048,319 | 18.1 | 4.5 | 8.7 | WA |
| South Carolina | 4,012,012 | 33.9 | 29.5 | 2.4 | CA |
| South Dakota | 754,844 | 12.0 | 0.6 | 1.4 | |
| Tennessee | 5,689,283 | 20.8 | 16.4 | 2.2 | WA |
| Texas | 20,851,820 | 47.6 | 11.5 | 32.0 | CA |
| Utah | 2,233,169 | 14.7 | 0.8 | 9.0 | WA |
| Vermont | 608,827 | 3.8 | 0.5 | 0.9 | |
| Virginia | 7,078,515 | 29.8 | 19.6 | 4.7 | CA |
| Washington | 5,894,121 | 21.1 | 3.2 | 7.5 | WA |
| West Virginia | 1,808,344 | 5.4 | 3.2 | 0.7 | |
| Wisconsin | 5,363,675 | 12.7 | 5.7 | 3.6 | |
| Wyoming | 493,782 | 11.1 | 0.8 | 6.4 | |

Estimates of minority share of the total population are from the 2000 Census

See text for more details on selection of minority share and affirmative action program comparison states for California and Washington

## Appendix 2

See Table 13.

**Table 13** Means of analysis variables: CPS (1990–2006)

| | Total | California | Washington |
|---|---|---|---|
| Self-employment rate | 8.4% | 9.2% | 9.3% |
| Age (years) | 39.9 | 39.2 | 40.0 |
| Age squared/100 | 17.4 | 16.8 | 17.4 |
| High-school graduate | 33.5% | 25.1% | 29.9% |
| Some college | 27.5% | 29.9% | 33.8% |
| College graduate | 25.1% | 26.5% | 27.6% |
| Married | 59.8% | 56.8% | 60.1% |
| Previously married | 16.4% | 16.3% | 17.6% |
| Non-central city | 41.0% | 52.8% | 40.6% |
| Rural | 18.4% | 2.0% | 17.9% |
| Not identified central city status | 15.8% | 7.7% | 20.0% |
| Male Black | 5.4% | 3.0% | 1.5% |
| Male Latino | 5.6% | 14.6% | 2.5% |
| Male other minority | 2.4% | 6.3% | 3.8% |
| Female White | 36.5% | 26.1% | 42.5% |
| Female Black | 6.6% | 3.4% | 1.4% |
| Female Latino | 5.3% | 13.7% | 2.2% |
| Female other minority | 2.6% | 6.9% | 4.3% |
| Sample size | 4,267,176 | 335,955 | 60,814 |

*Note*: The sample consists of individuals (aged 20–64 years)

## Appendix 3

See Table 14.

**Table 14** Additional linear probability regressions for business ownership with alternative samples: US sample [CPS (1990–2006)]

| Explanatory variables | (1) | (2) | (3) |
|---|---|---|---|
| D*California*post 1998 | 0.0148 | 0.0116 | 0.0109 |
|  | (0.0016) | (0.0015) | (0.0014) |
| D*Washington*post 1999 | 0.0131 | 0.0221 | 0.0172 |
|  | (0.0016) | (0.0021) | (0.0015) |
| Demographic controls | Yes | Yes | Yes |
| State fixed effects | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes |
| Minority/female year fixed effects | Yes | Yes | Yes |
| Minority/female CA and WA time trends | Yes | Yes | Yes |
| Mean of dependent variable | 0.0835 | 0.0832 | 0.0797 |
| Sample size | 3,840,798 | 2,767,779 | 3,597,866 |

Displayed are triple-difference coefficients representing the change in the self-employment rate after the elimination of affirmative action for minorities and women, represented by the treatment variable $D$, relative to White males in the treatment state versus the rest of the USA

The sample consists of individuals (aged 20–64 years) in specifications 1 and 2, and individuals (aged 20–54 years) in specification 3. Years 1998 and 1999 are excluded from specification 1, and years 1990, 1991, 2005, and 2006 are excluded from specification 2

Demographic controls include age, education, marital status, and urban status

Standard errors are adjusted for clustering at the state level

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