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Asian Discrimination in the Coronavirus Era: Implications for Business Formation and Survival

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ABSTRACT

Asian Discrimination in the Coronavirus Era: Implications for Business Formation and Survival*

With the onset of the Covid-19 pandemic, Asians became the victims of a sudden increase in racial discrimination as public officials repeatedly referred to the virus as the “Chinese virus.” We document that Asian entrepreneurship has been disproportionately hurt after January 2020, particularly among Asian immigrants, declining by 17 percent when compared to non-Hispanic whites. Examining the dynamics of transitions into and out of self-employment, we find a substantial increase in Asian immigrants’ self-employment exits, increased necessity entries, and reductions in opportunity entries – patterns suggestive of customer and employer ‘taste discrimination’. The pandemic has also proven particularly harmful on businesses owned by recently arrived immigrants and by East Asian immigrants. While Asian enclaves help palliate the pandemic’s damaging impact, the latter has reached a broad spectrum of businesses. Gaining a better understanding of how the pandemic has impacted Asian businesses is crucial to inform about the emergence of discriminatory behaviors that widen inequities and endanger a fast recovery.

JEL Classification: J15, J61, J71, J78

Keywords: asian, discrimination, COVID-19, business ownership, business dynamics

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1. Introduction

The COVID-19 pandemic has had profound impacts on the world economy. Both fear of contagion and the social distancing restrictions imposed to contain the spread of the virus have either halted or effectively shut down large sectors of the economy (World Bank, 2020). A large number of studies have quickly emerged to understand the impacts of the pandemic on various aspects of our society, examining an array of outcomes such as job loss, health, and inequality, to name a few (*e.g.* Adams-Prassl *et al.*, 2020; Alon *et al.*, 2020; Brodeur *et al.*, 2021; Forsythe *et al.*, 2020). We contribute to this literature by focusing on how the COVID-19 pandemic has impacted business ownership, survival, and formation among Asians –a group scapegoated for the emergence and spread of the COVID-19 virus (Strochlic, 2020).

Since the start of the Covid-19 pandemic, news media has reported numerous incidents of anti-Asian harassments across the country. The *Stop AAPI Hate* website, which was launched in March of 2020 to track self-reported incidents, received 1,500 reports of coronavirus discrimination from Asians in just one month, including verbal abuse, physical attacks, and job discrimination. Crimes against Asians have risen by 150% during the pandemic,¹ and some states, like New York, have seen a disproportionate hike in unemployment insurance claims among Asians compared to other racial groups (CNN news, 2020). Amidst such a turbulent time, Asian-owned businesses have reported losing substantial number of customers, even prior to the adoption of safe-at-home policies (CNBC news, 2020).

Prejudice against Asians, stemming from either employers, employees, or customers, can have profound impacts on the formation and survival of Asian-owned businesses. The direction

¹ See, for example: [Hate Crimes Against Asian Americans Continue To Be On The Rise During Pandemic \(yahoo.com\)](#), or [First-Ever Tracker Of Hate Crimes Against Asian-Americans Launched | KPBS](#).

of such impacts on the overall self-employment rate of Asians is, however, unclear. On one hand, employer discrimination could reduce job opportunities for Asians, pushing them into self-employment. On the other hand, customer discrimination could negatively impact business formation, as well as business survival, reducing their self-employment rate. As such, it is unclear if and how the self-employment rate among Asians would change.

To provide a thorough examination of how the COVID-19 pandemic and the subsequent rise in anti-Asian discrimination have impacted Asian-owned businesses, we adopt a dynamic approach, using self-employment entries and exits to measure business formation and survival. Specifically, when examining entries into self-employment, we follow Fairlie and Fossen (2020) and differentiate between necessity entries (entering self-employment from unemployment) and opportunity entries (entering self-employment from wage sector or out of the labor force). The analysis of self-employment dynamics provides unique insights into the source of discrimination and mechanisms at play.

Using the basic monthly Current Population Survey (CPS) data from January 2014 to November 2020, we conduct several analyses. First, we analyze Asian self-employment propensity (a static measure) and show that Asian self-employment decreased substantially, when compared to the self-employment rate of non-Hispanic whites, with the onset of the COVID-19 pandemic in the United States. We find that the impact stems mainly from Asian immigrants. Subsequently, we examine self-employment dynamics, matching the basic monthly CPS data across any two months to measure both entries and exits. While overall entries among Asian immigrants do not appear to have changed, heterogenous analyses reveal an increase in *necessity* entries that is offset by a decrease in *opportunity* entries. At the same time, self-employment exits substantially increased, contributing to the decline in the self-employment rate of Asian

immigrants. Overall, the patterns are suggestive of employer and customer discrimination affecting the self-employment outcomes of Asian immigrants.

Our results prove robust to alternative measures of the severity of the pandemic at the state level and to various robustness and identification checks involving different model specifications, treatment groups, and dates for the onset of the pandemic, as well as placebo tests and event studies. We also address the concern that the differential impact of the COVID-19 pandemic on Asians could be due to distinct industry and/or occupational segregation patterns. For example, if Asians are more likely to work or start a business in occupations/industries less likely to qualify as *essential* or to allow for remote work, the differential impact in employment or business ownership rates might be attributable to their distinct concentration in certain sectors or types of jobs (Borjas and Cassidy, 2020; Fairlie, 2020). We show that our results are not driven by such differences in concentration –this is consistent with prior findings from Fairlie (2020), who shows that the business ownership gap between whites and Asians only widens when controlling for industries.

Further heterogeneity analyses also reveal that the distinct Asian self-employment dynamics are stronger among recent immigrant arrivals, more likely identifiable as foreigners, and among East Asian immigrants. Although the presence of larger Asian enclaves palliates some of the effect, the harmful impact of increased discrimination persists among both incorporated and unincorporated businesses, irrespective of their classification as essential or their ability to allow for remote work. Altogether, the results document that the COVID-19 pandemic has disproportionately impacted Asian entrepreneurship and potentially altered the composition of the pool of Asian-owned businesses.

This paper makes several important contributions to the literature. First, it contributes to a literature examining the short-term impact of the COVID-19 pandemic on the labor market

outcomes of minority groups such as Blacks, Latinos, immigrants, and Asians in the United Kingdom and the United States (*e.g.* Couch *et al.*, 2020; Crossley *et al.*, 2020). These studies consistently find that the labor market performance of minority groups (*e.g.* unemployment, employment, and work hours) has been disproportionately hurt by the pandemic, especially among Asians and immigrants.² In a similar vein, minority entrepreneurs and small business owners have been particularly hard hit by the pandemic, especially Asians. Fairlie (2020) provides descriptive evidence of a decline in the number of active business owners from February to May 2020 in the order of 26 percent for Blacks, 19 percent for Latinos, and 21 percent for Asians, compared to 5 percent for whites. Similarly, Fairlie (2020) documents that the number of active business owners declined over that period by 25 percent for immigrants, relative to 5 percent for natives. However, the impact of the COVID-19 pandemic on Asian-owned businesses and Asian business formation and survival dynamics are yet to be examined. Given that Asian-owned businesses have long been known to be more successful and to hire more workers than businesses owned by other racial groups (Fairlie and Robb, 2008; Pew Research Center, 2015), a thorough understanding of these impacts is warranted. After all, the rise of anti-Asian discrimination during this pandemic may not only mark a change in Asian-owned businesses' performance, but also have impacts on the economy that extend beyond those in the Asian community.

Second, this study also contributes to a literature examining emerging discriminatory behaviors against specific demographic groups after a sudden political, terrorist, or epidemic event, such as Arab men after 9/11 (*i.e.* Davila and Mora, 2005; Kaushal *et al.*, 2007; Wang, 2016),

² In the United States, Couch *et al.* (2020) document that, relative to whites, unemployment rose by 2.5 percentage points for Blacks, 3.5 percentage points for Latinos, and 4.5 percentage points for Asians. Similarly, relative to natives, job losses of immigrant men and women rose by 6.8 and 4.3 percentage points, respectively. In the United Kingdom, Crossley *et al.* (2020) find that Black, Asian, and minority ethnic groups experienced an employment drop 5 percentage-points larger than whites. Furthermore, even though hours worked dropped similarly for everyone, minority ethnic groups were 15 percentage-points less likely to be supported by furlough schemes.

Germans after World War II (Ferrara and Fishback, 2020), or gay men during the HIV/AIDS epidemic (Herek and Glunt, 1988; Herek and Capitanio, 1993). Our study adds to this literature by documenting the impact of emerging discriminatory behaviors against Asians after the COVID-19 pandemic.

Third, we contribute to the literature on business dynamics —as captured by entries into and exits from self-employment (*e.g.* Robb and Fairlie, 2009; Lofstrom and Wang, 2009; Levine and Rubinstein, 2016; Wang, 2019; Wang and Lofstrom, 2019). Prior studies have documented that some ethnic minorities display lower self-employment propensities, such as blacks and Hispanics (Borjas and Bronars, 1989; Lofstrom and Wang, 2009; Lofstrom and Bates, 2013; Fairlie and Woodruff, 2010), whereas others exhibit comparable or even higher self-employment rates than whites, such as Asians (Robb and Fairlie, 2009; Clark and Drinkwater, 2003). A variety of closely intertwined factors have been offered as likely responsible for such differences, including cultural norms, migrant selection, the existence of large enclaves, wealth, and education (Lofstrom and Wang, 2009; Clark, 2015; Lang and Lehman, 2012; Lang and Spitzer, 2020). Yet, to date, the role of discrimination remains unclear (Clark and Drinkwater, 2000; Fairlie and Fossen, 2020). By differentiating between necessity and opportunity entries into entrepreneurship, as well as exits from self-employment, we provide unique insights into the type of discrimination at work and how that affects business formation and survival.

2. Conceptual Framework

Observed racial disparities in earnings have traditionally been explained by models of statistical discrimination or by models of taste-based discrimination. Phelps' (1972) model of statistical discrimination is based on stereotyping in a limited-information rational-optimization framework in which agents minimize information costs by typecasting an individual based on

her/his group features. Becker's (1957) model of taste-based discrimination considers instead that agents are prejudiced against minorities and are willing to incur in a cost that reflects their dislike.

As emphasized by Charles and Guryan (2011, 2013), the literature has struggled to test these competing theories, mainly because the same outcome can often be supported by both frameworks. For instance, investments in human capital can help minimize statistical discrimination among minorities. Yet, educated individuals from minority groups might also face less taste-based discrimination. News media has reported numerous incidents of physical and verbal abuse towards Asians across the country during the coronavirus pandemic. Hence, the onset of the epidemic constitutes an exogenous change in prejudice against Asians that allows for unequivocally testing, in our case, the labor market implications of taste-based discrimination in a similar vein to prior studies examining discrimination against Arab men after 9/11 (*i.e.* Kaushal *et al.*, 2007; Wang, 2016) or against Germans in the United States during World War II (Ferrara and Fishback, 2020).

The unexpected nature and quick onset of the COVID-19 pandemic contradicts the notion of observed labor market discrimination stemming from long-term stereotyping based on Asian's work performance (statistical discrimination) (Bertrand and Duflo, 2017). Rather, it favors the view of the spike in Asian discrimination being driven by a sudden increased in 'taste discrimination.' In Becker's (1957) model, there are multiple sources of taste-based discrimination in the labor market: the employer, the employee, and the consumer. In our case, *employer discrimination* would involve employers who are prejudiced against Asians and, as such, have a lower demand for Asian labor than for equally productive workers from other racial groups. This may result in lower wages and increased unemployment among minority groups (Kaushal *et al.*, 2007). *Employee discrimination* would involve employees demanding a premium to work

alongside Asian co-workers –a practice that would basically result in workplace segregation (Lazear, 1999). Employers would hire whichever labor is cheaper and, therefore, it would lead to similar wages of Asians and non-Asians and have no significant impact on their employment rates. Finally, *customer discrimination* would involve customers asking for a lower price when buying from a minority Asian individual to compensate for the disutility of that transaction. This type of discrimination may lead to lower sales and profit margins and, in turn, alter the self-employment rates of minority groups (Borjas and Bronars 1989; Combes *et al.* 2016).

Increased taste-based discrimination may have uncertain impacts on Asians' business ownership rates, but more predictable impacts on business dynamics. *First*, employer discrimination may increase unemployment among Asians. Decreased labor market returns and options as an employee may constitute an important push factor encouraging entrepreneurship (Clark and Drinkwater, 2000). As a result, employer discrimination may increase what Fairlie and Fossen (2020) term *necessity entries* (from unemployment) into self-employment and, in turn, contribute to increased business ownership rates. *Second*, customer discrimination may negatively affect sales of Asian-owned businesses (Borjas and Bronars, 1989). The fall in sales may lead to increased *exits from self-employment*, lower *opportunity entries* (from wage employment) into self-employment –again, using Fairlie and Fossen (2020) terminology– and, in turn, contribute to lower business ownership rates among Asians.

Therefore, depending on the source of discrimination, we might observe changes in necessity entries, opportunity entries, and/or exits from self-employment among Asians following the onset of the pandemic. In addition, if customer discrimination is quantitatively more prevalent than employer discrimination, we would expect business ownership rates to decline among Asians. Moreover, we would expect to find larger impacts of taste discrimination among first-generation

Asian immigrants, particularly among recent migrants, since they would be less assimilated and more easily identifiable as foreigners and Asian, in this case (Kaushal *et al.*, 2007). The labeling of the coronavirus as the ‘Chinese virus’ by officials at the beginning of the pandemic might have also exacerbated xenophobic sentiments against specific groups of Asians, such as East Asians. Finally, we might expect anti-Asian sentiments to be stronger in areas where the virus has proven more deadly (Ferrara and Fishback, 2020).

3. Data

We rely on various data sets to conduct the analysis. Data on self-employment outcomes and demographic characteristics of business owners are gathered from the monthly Current Population Survey (CPS) from January 2014 to November 2020.³ We restrict our samples to individuals between the ages of 20 and 64, excluding those who live in group quarters or have missing labor force or employment status information.

The monthly CPS is ideal for various reasons. *First*, it is conducted monthly, providing us with timely information on the immediate impacts of the pandemic.⁴ *Second*, it can be used longitudinally to match individuals across any two consecutive months and identify labor market transitions, such as the self-employment entries and exits. These measures are informative of self-

³ An important concern with the March 2020 CPS sample was its lower response rate. In that regard, the Bureau of Labor Statistic states: “Although the response rate was adversely affected by pandemic-related issues, BLS was still able to obtain estimates that met our standards for accuracy and reliability.” (see: <https://www.bls.gov/cps/employment-situation-covid19-faq-april-2020.pdf>). More importantly, because of our difference-in-differences research design, the concern would be if Asians exhibit a disproportionate decline in their response rate when compared to the main control group –namely, whites. We can test this by matching samples across months. When we do so, we find that, while overall response rates have declined, the decline in Asians’ response rate is not significantly different from the one experienced by whites. This is true for March 2020 (0.004; $t=0.45$), as well as for April 2020 (0.000; $t=0.02$). Therefore, the research design should not be negatively affected.

⁴ Other surveys are conducted less frequently, either annually or once every few years. For example, the Survey of Business Owners and Self-Employed Persons are only conducted every 5 years (years ending in 2 and 7).

employment dynamics masked under the static self-employment rate measure.⁵ *Third*, the monthly CPS offers a large sample size. Alongside its nationally representative nature, this enables the study of low frequency labor market outcomes, such as self-employment among minority groups, as would be the case with Asians. *Fourth*, we can include a sample dating back to 2014, providing us with a reasonably long pre-COVID-19 period ideal to gauge the parallel trends assumption between the control group and Asians prior to the onset of the pandemic. *Finally*, the CPS started collecting detailed information on whether a business has paid employees since 2014. This information will enable us to evaluate the impact of COVID-19 on different types of businesses, especially those with employees to evaluate the implications of discriminatory behavior on job losses as Asian businesses suffer.

To construct the dynamic measures of self-employment entry and exit, we exploit the longitudinal nature of the monthly CPS data from its “rolling panel” design. In any month, there are eight rotation groups; each is in the sample for four consecutive months, leaves for eight months, and then back in the sample for four more consecutive months. The rotation group that is interviewed the fourth time leaves the sample temporarily, and the group that is interviewed the eighth time leaves permanently. This design allows six out of eight rotation groups of each month’s sample to be matched to the following month, allowing for the creation of self-employment entry and exit variables. We use the link variable provided in IPUMS CPS to match the data. In addition, we follow Madrian and Lefgren (2000) to check the sex, age, and race of the observations to ensure a correct match. Longitudinal weights are then used throughout the dynamic analysis to account for the loss of observations during the matching process.

⁵ Fairlie (2014) uses the same approach to develop the Kauffman Index of Entrepreneurship.

We also use information from two additional datasets, which we merge to the CPS data: (1) administrative state and county level data on daily COVID-19 cases and deaths from USAFacts (2020), and (2) data on the adoption of various non-pharmaceutical interventions (NPIs) by states and counties from the COVID-19 U.S. State Policy (CUSP) Database compiled by the Boston School of Public Health. The CUSP Database includes information on the exact date of the declaration of the state of emergency, school and non-essential business closures, mask wearing mandates, and safe-at-home/shelter-at-home policies more directly associated with work stoppages.⁶

Table 1 gives us a glance of the labor market statuses of individuals in the primary control and treatment groups, before and after the onset of the COVID-19 pandemic. In our main specifications, we use non-Hispanic native-born whites as the control group, and Asians (native and immigrants) as the treatment group. In alternative model specifications, we differentiate between native and immigrant Asians. Panel A of Table 1 shows sample statistics for static employment status measures –namely, self-employment, wage and salary work, unemployment and not in the labor force. The self-employment rates of non-Hispanic whites, which remained stable from before to after the onset of the COVID-19 pandemic, fluctuated around 7.7 percent. The self-employment rate of Asians has been somewhat lower and experienced an 8.5 percent reduction over the course of the pandemic, dropping from 6.6 to 6 percent. Table 1 also reveals the rise in unemployment over the pandemic from 2.7 to 5.3 percent among non-Hispanic whites, and from 2.6 to 6.8 percent among Asians.

⁶ Table A.1 in the Appendix provides basic descriptive statistics for COVID mortality rates and the NPIs measures used in the analysis.

Panel B of Table 1 examines the dynamic measures of self-employment –entries and exits. Self-employment entry rates were, on average, practically identical for non-Hispanic whites and Asians before and after the onset of the pandemic, with overall entries rising by 16 to 17 percent for both groups (from about 5.4-5.5 percent before the onset of the pandemic, to 6.3-6.4 percent afterwards). However, a closer look by type of entry uncovers interesting differential dynamics. The so-called *necessity entry rate* from unemployment to self-employment doubled for non-Hispanic whites, whereas it quintupled for Asians from before to after the onset of the pandemic. In contrast, the *opportunity entry rate* from out of the workforce or wage and salary work to self-employment stayed the same for non-Hispanic whites, while it dropped by 16 percent among Asians. Furthermore, self-employment *exit rates* behaved drastically differently for the two groups over the pandemic. Exit rates among non-Hispanic whites rose by 18 percent (from 7 to 8.5 percent), whereas those of Asians increased 4 times as much or 67 percent (from 8.4 to 14 percent).

In sum, the statistics uncover a differential response of non-Hispanic whites and Asian self-employment rates to the pandemic. Self-employment rates only dropped among Asians over the pandemic. That reduction stemmed from significant reductions in opportunity entry rates and large increases in exit rates, despite non-negligible hikes in necessity entry rates. In what follows, we use a quasi-experimental approach to further assess the impact of the pandemic on Asian entrepreneurship.⁷

⁷ Tables A.2 to A.4 shows the sample means for demographic characteristics for whites and Asians before and after COVID onset separately for the full sample, entry sample, and exit sample. The largest differences between the non-Hispanic whites and Asians are not with regards to their gender, age or educational attainment but, rather, with regards to their marital status, the inclusion of both immigrants and natives in our original Asian sample, and their residential choices. Asians are close to 10 percentage points more likely to be married and 15 percentage points more likely to reside in urban areas than non-Hispanic whites. Because of their concentration in urban areas, Asians reside in localities with a higher concentration of other immigrants when compared to non-Hispanic whites (26 percent vs. 13 percent). In addition, Asians are more likely to concentrate in areas with larger co-ethnics. As a result, the share of other Asians in Asians' localities is 13 percent, as opposed to 5 percent for non-Hispanic whites.

4. Methodology

We rely on the natural experiment created by the COVID-19 pandemic to explore how discrimination against Asians following the onset of the epidemic might have impacted their self-employment rates, as well as their transitions into and out of self-employment, when compared to other demographic groups. We estimate a difference-in-differences (DD) model as follows:

$$(1) \quad Y_{i,j,s,t} = \alpha + \beta_1 Asian_i * COVID_t + \beta_2 Asian_i + X_{i,s,t}\gamma + Z_{m,t}\delta + B_{s,t}\rho + \theta_j + \theta_s + \theta_t + \varepsilon_{i,j,s,t}$$

where $Y_{i,j,s,t}$ is one of three dependent variables: a *static* measure – a self-employed dummy equal to 1 if individual i in industry j and state s is self-employed at time t ; and two *dynamic* measures – self-employment entry and exit. Self-employment information is based on the class of worker question indicating if respondents worked for their own enterprise(s) or for someone else as employees.⁸ *Entry* equals 1 if the respondent was not self-employed in time t , but becomes self-employed at time $t+1$, and 0 otherwise. Hence, the sample used to examine entries into self-employment is composed of those not currently self-employed, including those unemployed, not in the labor force, or employed in the wage sector. Following Fairlie and Fossen (2020), we further differentiate between *necessity entries* (equals 1 if the respondent transitioned from unemployment to self-employment, and 0 for others in the entry sample) and *opportunity entries* (equals 1 if the respondent transitioned from wage sector or out of the labor force to self-employment, and 0 for others the entry sample). *Exit* is equal to 1 if individual i is self-employed in t , but not any more in $t+1$, and 0 otherwise. Therefore, the sample used to examine exits from self-employment is composed of those currently self-employed.

⁸ If a worker has multiple sources of employment, the type of employment in which s/he spent the most time during the reference week is used. This definition includes all types of businesses: incorporated and unincorporated, as well as businesses with or without employees.

The variable $Asian_i$ is a dummy variable equal to 1 if an individual reports being Asian (native or foreign-born), and 0 if s/he is in the control group.⁹ To evaluate the impact of the pandemic and the rise of anti-Asian discrimination, we use non-Hispanic native whites as the main control group. This group satisfies two important conditions. First, they do not experience any additional discrimination due to the pandemic. Secondly, as we shall show through placebo tests and event study analyses, they exhibited parallel self-employment trends to those of Asians prior to the onset of the pandemic. $COVID_t$ is a dummy variable equal to 1 for observations recorded after January 2020, when the pandemic was featured in international news and the first COVID-19 death was reported in Wuhan, China. It does not appear independently in the equation as it is subsumed in the year-month fixed effects.

The coefficient β_1 on the interaction term ($Asian_i * COVID_t$) is the DD estimator of main interest. In addition, equation (1) controls for demographic characteristics, $X_{i,s,t}$, such as gender, age, age squared, years of education, marital status, foreign-born status and, if so, years since migration and whether living in an urban area—all of which can affect entrepreneurial engagement. We also control for aggregate time varying MSA traits potentially influencing the self-employment rate of Asians included in the vector $Z_{m,t}$, such as the size of ethnic enclaves as measured by the proportion of Asians in the MSA and the proportion of immigrants in the MSA. Ethnic enclaves play a crucial role in an ethnic minority group's decision to become self-employed, as their businesses often cater to similar demographic groups. We also incorporate a control for business cycles, $B_{s,t}$, as captured by the unemployment rate in state s at time t . Importantly, equation (1) includes a set of industry fixed effects to rule out the possibility that the estimated impacts are

⁹ In our robustness checks, we also experiment with defining Asian by country of origin in the case of Asian immigrants. Results prove robust. This is also the case when using all Asians in the treatment group and we attribute natives whose parents are Asian immigrants an Asian dummy equal to 1, as well as to Asian immigrants.

driven by the distinct concentration of Asians in certain industries.¹⁰ In addition, state and temporal (year-month) fixed-effects are included to capture national trends common to all localities, such as nationwide changes in business startup policies or economic conditions, as well as time-invariant state level heterogeneity, such as the degree to which an area is business friendly. Standard errors are heteroskedasticity-robust and clustered at the state level to allow for arbitrary correlation within states in the error structure.

An important caveat in interpreting the effects captured by β_1 as causal resides in the potentially non-random onset of the pandemic, which could be influenced by state traits potentially correlated with the success of minorities in the locality. For instance, localities with a higher population density might offer better business opportunities and, at the same time, facilitate the spread of a pandemic when compared to areas with a lower population density. Part of this differential impact would be accounted for by the state fixed effects and, when the impact is time-varying, by choosing a control group that resides in the same locality. Nevertheless, in addition to those checks, we also conduct placebo tests and event study analyses to help gauge the exogeneity of the sudden increase in COVID-19 discrimination with respect to Asian self-employment trends, as well as the suitability of non-Hispanic whites as a control group.

5. Impacts of the COVID Pandemic on Asian Self-Employment and its Mechanisms

Our main goal is to learn how the onset of the COVID pandemic might have impacted differently Asian self-employment, as well as entries and exits into self-employment, when

¹⁰ There are a total of 15 industry categories: Agriculture, Utilities, Construction, Manufacturing, Wholesale Trade, Retail Trade, Transportation and Warehousing, Information, Finance/Insurance/Real Estate, Professional/Scientific/Management, Education/Health/Social Services, Entertainment and Recreational Services, Repair and Personal Services, Public Administration, and Other (including armed forces and missing industry information). The CPS provides industry for those who have worked in the past 5 years, even if they are currently unemployed or not in the labor force. Everyone lacking information on industry is flagged accordingly.

compared to other groups. Table 2 displays the estimated coefficients from the difference-in-differences model in equation (1), which uses January 2020 as the breakout point and non-Hispanic whites as the control group. Panel A uses all Asians as the treatment group, whereas Panels B and C distinguish between native-born Asians and Asian immigrants. We estimate various model specifications that progressively add controls to help us gauge the impact of any additional regressors on the estimated impact of the pandemic and, at the same time, address any concerns regarding the potential endogenous nature of some controls. All the models include year-month and state fixed effects.

Regardless of the controls included in the model, we show a significant negative impact of the pandemic on Asians' self-employment propensity relative to non-Hispanic white. The size of the estimates proves rather stable across model specifications. It is especially worth mentioning that when we add industry fixed effects (from Model 4 to Model 5), the DD estimate becomes slightly larger in magnitude. This suggests that the observed decrease in Asians' self-employment rate when compared to whites is not driven by differential industry concentrations between Asians and whites. This finding is consistent with Fairlie (2020), who shows that the business ownership gap between whites and Asians only widens when controlling for their industry distribution.

Based on the most complete specification in Model 5, Asian self-employment dropped by 13 percent relative non-Hispanic whites with the onset of the pandemic.¹¹ Table A.5 shows the complete estimation results, including all other control variables.¹² Differentiating between

¹¹ Percentages are computed using Asians' self-employment means before the COVID pandemic.

¹² Other traits have the expected signs. For instance, more educated, married, and older individuals are more likely to be self-employed. Immigrants are 35 percent less likely to be self-employed, although their propensity rises by 2 percent with each additional year of U.S. residency. Men are 65 percent more likely than women to be self-employed, and self-employment is 28 percent less likely to occur in urban, as opposed to rural, localities. The share of Asians and immigrants in the MSA also matter, although not drastically so. For instance, a 1 percentage point increase in the share of Asians in the MSA, raising it from an average of 13 to 14 percent, lowers the self-employment propensity by 1.3 percent. In contrast, a 1 percentage point increase in the share of immigrants in the MSA, from 25 to 26 percent,

natives and immigrants in Panels B and C reveals that these effects stem from Asian immigrants, whose self-employment propensity dropped 17 percent relative to that of whites after the pandemic, while native-born Asians do not experience any significant effects.

As noted earlier, learning about the underlying dynamics responsible for any reductions in self-employment is crucial to understanding the mechanisms at play. If the sudden increase in discrimination against Asians brought about by the onset of the COVID-19 pandemic were employer driven (maybe resulting from increased job losses in the wage and salary sector), we would expect an *increase in necessity entries* into self-employment from unemployment. If, however, the increase was driven by customer discrimination, we would expect *fewer opportunity entries* and *increased exits*. Finally, if discrimination rose from both sources –namely, employers and customers, we would expect to observe all the above.

Table 3 allows us to assess the aforementioned hypotheses. Model (1) displays the estimated impact of the pandemic on Asian self-employment *entries* when compared to those of non-Hispanic whites. As explained earlier, our dependent variable equals 1 if individual i is not self-employed in time t but becomes self-employed at time $t+1$; it is 0 otherwise. As such, the sample is conditional on not being self-employed in the current period, and includes those who are unemployed, not in the labor force, or employed in the wage sector. Based on the estimate from Model (1) in Panel A of Table 3, the onset of the pandemic does not appear to have significantly impacted the entry of Asians into self-employment any differently than that of the control group. This pattern is observed regardless of whether we focus on the impact on native or foreign-born Asians (see Model (1) in Panels B and C). However, it is possible for that estimate to hide

raises the self-employment propensity by 1.2 percent. Finally, a 1 percentage point increase in the unemployment rate, from its average of 4 to 5 percent, lowers the self-employment propensity by close to 2 percent.

troublesome dynamics, as would be the case with increases in *necessity entries* among individuals who have lost their jobs or with reductions in *opportunity entries*.

Hence, in Models (2) and (3) of Table 3, we differentiate between the two types of entries. As can be in Panel A, relative to non-Hispanic whites, the onset of the pandemic almost doubled necessity entries among Asians (Model (2) in Panel A) –an impact mostly driven by the effect of the pandemic among immigrant Asians (Model (2) in Panel C). Among them, necessity entry rates tripled and opportunity entries dropped by 14 percent (Model (3) in Panel C) with the onset of the pandemic when compared to those of non-Hispanic whites.

An even more concerning question regarding Asian-owned businesses, as is often mentioned in news media, is how the rise of discrimination affected their business survival. The estimates in Model (4) of Panels A through C in Table 4 answer this question by examining self-employment exits. Self-employment exit rates increased substantially among Asians with the onset of the pandemic, when compared to non-Hispanic whites, by 54.5 percent. This effect was in addition to self-employment exit rates being already 30 percent higher among Asians before the pandemic. Panels B and C explore if the increase in exit rates occurred primarily among native and/or immigrant Asians. While exits rose among both groups, the impact was noticeably larger for immigrants. Relative to non-Hispanic whites, Asian immigrants experienced an increase in self-employment exits of 62 percent with the onset of the pandemic (Model (4) in Panel C) –that increase averaged 32 percent among Asian natives (Model (4) in Panel B).

Necessity entry and opportunity entry in our main specifications are dummy variables defined using the full entry sample so that we can evaluate the total changes in such entries among all potential entrants. They can capture two effects: one is a *compositional effect* in which the size of the pool of those unemployed, in the wage and salary sector, or out of the labor force changed

in response to the pandemic; the other is a *behavioral change* conditional on their employment status. In Panel D of Table 3, we try to further gauge whether the effects are driven by compositional or behavioral changes. We first focus on necessity entries and examine if their growth among Asians is explained by the growth in unemployed pool and/or by a distinct behavioral response on the part of those unemployed. The first column of Panel D shows that Asian immigrants' unemployment rate increased by 63 percent compared to whites, suggesting that the pool of unemployed increased among Asians. The second column shows that among the unemployed, there is an increase in self-employment entries, suggesting that the unemployed changed their behavior and became more likely to enter self-employment after the pandemic. Both changes in the pool size and in the behavioral response of individuals in those pools are responsible for the observed patterns. Similarly, for opportunity entries (Columns 3 and 4), we show that their decline among Asians is driven by both a decrease in the pool of wage and salary workers and those out of the workforce, and a decline in self-employment entries in that pool.

Summarizing, the onset of the COVID-19 pandemic had a differential impact on the self-employment rate of Asians, when compared to non-Hispanic whites. The effect, mainly driven by the impact among Asian immigrants, stems from increased exit rates, diminished opportunity entry rates, and higher necessity entry rates. These results suggest that both employer and customer discrimination were at play.

6. Identification Checks

Identification when using a difference-in-differences approach relies on the assumption that self-employment, as well as the entry and exit dynamics exhibited by Asians and non-Hispanic whites, would have trended similarly in the absence of a pandemic. This identification assumption is ultimately untestable. However, we can test if the outcomes measured already differed across

treatment and control groups prior to the onset of the pandemic. If they did, the parallel trends assumption noted above would most likely be violated. We conduct two sets of identification checks to evaluate the parallel trend assumption—a set of placebo tests using artificial break points and event-study analyses. Hereafter, we focus on Asian immigrants, who are likely less assimilated than native Asians and who, based on the estimated impacts in Tables 2 and 3, appear to have been most severely impacted by the onset of the pandemic.

6.1. Placebo Tests

We first conduct a series of falsification tests by estimating the DD estimates of artificial break points using the sample period before the onset of the pandemic (from January 2014 to December 2019). There is a total of 72 months in the pre-COVID period. We use any month from the 12th to the 60th month as the artificial break point to obtain a DD estimate (a total of 49 falsification tests for each dependent variable—self-employment, necessity entry, opportunity entry, and exit). If there is no preexisting difference in the self-employment trends between Asians and non-Hispanic whites, placebo DD estimates should be small and statistically not different from zero. Placebo DD estimates are shown in Table A.7. Results are summarized by the graphs included under Figure 1, which plot histograms of p -values corresponding to the 49 placebo DD estimates for each of the four outcomes being examined. The vertical line represents a p -value of 0.10—smaller p -values are indicative of statistical significance. For self-employment (Figure 1A) and self-employment exits (Figure 1D), none of the 49 falsification tests generates statistically significant results. For necessity entry (Figure 1B), only 4 out of the 49 estimates (8 percent) are marginally different from zero at the 10 percent level, with all 4 estimates being negative—contrary to our finding of an increase in necessity entries with the onset of the pandemic. Only the results for opportunity entries (Figure 1C) reveal a decline in such event among Asian immigrants, when

compared to whites, prior to the onset of the pandemic, with 22 out of the 49 placebo DD estimates being negative and statistically different from zero at conventional levels. As a result, we caution against interpreting the opportunity entry results as causal.

In sum, the falsification tests provide evidence of no differential impacts in the self-employment, necessity entries into self-employment, or self-employment exits of Asian immigrants, when compared to whites, prior to the onset of the pandemic.

6.2. Event-Study Models

In addition to the placebo checks described above, we explore the validity of the no-differential trend assumption inherent in DD analyses by conducting an event study for each of the outcomes. To that end, we replace the $COVID_t$ indicator in equation (1) by single indicators for the periods preceding and following the onset of the pandemic in the United States, as follows:

$$(2) \quad Y_{i,j,s,t} = \alpha + \sum_{b=-6}^{-2} \delta_b D_b * Asian_i + \sum_{b=0}^1 \rho_b D_b * Asian_i + \beta Asian_i + X_{i,s,t} \gamma + Z_{s,t} \delta + \theta_j + \theta_s + \theta_t + \varepsilon_{i,j,s,t}$$

where D_b is a dummy for b years *before* and *after* the onset of the pandemic. Because self-employment entries and exits are low frequency events, they can exhibit high volatility at the monthly level, especially for minority groups with smaller sample size. To focus on the overall trends, we group the data in years. The year before the onset of the pandemic is used as reference. The event study in equation (2) provides two valuable pieces of information. First, it allows for the inspection of parallel trends in the pre-treatment period (that is, during periods prior to the onset of the pandemic), which enable us to gauge the suitability of the control group. Second, it allows us to see if there was a clear break in the trend in the self-employment outcomes examined following the onset of the pandemic.

Table 4 displays the results from conducting the event studies for the propensity to be self-employed, as well as for entries into and exits out of self-employment. We obtain strong evidence supporting the parallel trend assumption for two of the four outcomes –necessity entry and exit (columns 2 and 4). None of the lead year indicators are statistically different from zero in these two models. In addition, the onset of the COVID pandemic appears to have a similar impact to the one documented by the difference-in-differences estimates in Panel C of Table 3. For the static self-employment outcome (column 1), parallel trend is satisfied up to three years before 2020. The results for opportunity entry (column 3), like in the placebo test, do not hold up well; thus, we caution against its interpretation as a pandemic effect.¹³

Figure 2 displays the estimated coefficients for all four outcomes. Prior to the pandemic, necessity entry and exit rates (Figures 2B and 2D) among Asian immigrants were not statistically different from those of their non-Hispanic white counterparts. In addition, they remained quite stable in the six years prior to the pandemic. It is not until after the onset of the pandemic that we observe a significant increase. Altogether, the event studies provide strong evidence of the pandemic disproportionately impacting necessity entries and self-employment exits among Asian immigrants when compared to non-Hispanic whites.

6.3. Additional Robustness Checks

We conduct a series of additional robustness checks to assess the reliability of our findings. These are shown in Tables 5 and 6.¹⁴ In Table 5, we first conduct several specification checks. In Panel A, we include a state-specific time trend in the model. Results remain rather consistent, with

¹³ Opportunity entry was higher among Asian immigrants than whites in an early year (2014), and the decrease in 2020 is not statistically significant when compared to 2019.

¹⁴ Even though our identification checks reveal that the results for opportunity entry should be interpreted with caution, we still include them in all our tables to provide a complete picture.

the overall self-employment propensity dropping by 15 percent among Asian immigrants with the onset of the COVID pandemic, when compared to non-Hispanic whites. Similarly, their necessity entry rates practically triple, opportunity entry rates drop by 16 percent, and exit rates from self-employment rise by 62 percent. Next, in Panel B, we experiment with including state-year-month fixed-effects instead, and results remain rather similar. In Panel C, we interact all controls with the Asian dummy to allow for a differential response of each regressor by race. Results continue to be remarkably robust. In Panel D, we modify the date for the onset of the COVID pandemic, moving it to March, when economic activity in the United States started to pause due to COVID. Results also prove robust to the use of this alternative date. In Panel E, we consider the potential for ethnic attrition in our estimates. Although our treatment group is composed of immigrants, as opposed to U.S.-born individuals who might be more or less likely to self-identify as Asians despite having ancestors who were Asian immigrants (Duncan and Trejo, 2017), we consider using information on country of birth, as opposed to self-reported ethnicity, to identify Asian immigrants. Our findings prove robust to the use of this alternative Asian dummy. Finally, in Panel F, we conduct a placebo check using white immigrants as the treated group. As we would expect, we find no differential impact of the onset of the pandemic on this group when compared to non-Hispanic whites.

In Table 6, we gauge the robustness of our findings to the use of alternative measures reflective of the *intensity* of the pandemic, as opposed to its nationwide onset. While these measures are arguably less exogenous to the employment outcomes being examined, they are still informative and help us confirm or refute the patterns observed in Tables 2 through 5. We first repeat the analysis using information on COVID mortality at the state level.¹⁵ Panel A of Table 6

¹⁵ This helps preserve the sample size, given that 50 percent of county FIPS are missing in the CPS.

displays the results from this exercise. A one-standard-deviation increase in COVID mortality (equivalent to roughly 4 deaths per 10,000 inhabitants after January 2020) lowers Asian immigrants' self-employment by 11 percent, when compared to non-Hispanic whites.¹⁶ While we no longer find evidence of an increase in the necessity entry rate into self-employment, we do find that a one standard deviation increase in COVID mortality lowers opportunity entry into self-employment by 8 percent, and raises exits from self-employment by 41 percent.

Next, we consider yet another measure of the intensity of the pandemic –namely, an index equal to the number of non-pharmaceutical interventions (NPIs) in place statewide in any given month. As noted earlier, NPIs include stay-at-home orders; school and day-care closures; mask wearing mandates; as well as non-essential businesses, restaurants, bars, and gym closure policies more directly associated with work stoppages. Based on the estimates in Panel B of Table 6, the adoption of one additional NPI is associated with a 4 percent reduction in the self-employment of Asian immigrants, when compared to non-Hispanic whites, a 50 percent increase in necessity entries, and a 12 percent increase in exits from self-employment.

Finally, in Panel C of Table 6, we include both sets of measures. Results remain largely the same as those reported in Panels A and B. Overall, the estimates in Tables 5 and 6 confirm our main finding –namely, the COVID-19 pandemic differentially impacted the self-employment of Asian immigrants when compared to non-Hispanic whites. The consistent larger impact on self-employment exists is consistent with increased customer discrimination. In addition, there is some evidence of very large differential necessity entry rates in many instances. These are not only driven by a greater unemployment incidence, but also by a greater transition rate from unemployment to self-employment, which hints on the existence of employer discrimination.

¹⁶ Average COVID mortality after January 2020 is 3.8 per 10,000 inhabitants.

7. Heterogenous Impacts

To conclude, after gauging the differential impact of the pandemic onset on Asian immigrants' self-employment rates, identifying the channels through which discrimination might be impacting Asian entrepreneurship through the analysis of business dynamics, and ensuring the proper identification and robustness of our findings, we investigate potentially heterogeneous effects. First, we differentiate according to how recently immigrants arrived. Recent migrants might be less assimilated and more easily identified as Asian newcomers, enduring much of the discrimination brunt. Based on the estimates in Panel A of Table 7, that appears to have been the case, with the onset of the pandemic lowering self-employment among recent Asian arrivals by 37 percent, relative to 16 percent among non-recent Asian immigrants.¹⁷ Similarly, both necessity entries and exits from self-employment among recent migrants far exceeded those among non-recent migrants.¹⁸

Next, we distinguish according to migrants' origin. As predicted by others (*e.g.* Rogers, Jakes and Swanson, 2020), the reference to the coronavirus by President Donald Trump, Secretary of State Mike Pompeo, and House Minority Speaker Kevin McCarthy as the "Wuhan virus" or the "Chinese coronavirus" (*e.g.* Sandler, 2020) might have exacerbated xenophobic sentiments and resulted in greater discrimination towards East Asians.¹⁹ Therefore, in Panel B of Table 7, we distinguish between immigrants from East Asia and those from other Asian origins. While self-employment rates dropped among both East and non-East Asians relative to non-Hispanic whites

¹⁷ The dependent variable mean before the COVID-19 pandemic for recent Asian immigrants is 0.0221, relative to 0.0848 for non-recent Asian immigrants.

¹⁸ The dependent variable means before the COVID-19 pandemic for necessity entries are 0.0003 for recent Asian immigrants and 0.0005 for non-recent Asian immigrants. In the case of self-employment exits, the means are 0.1547 for recent Asian immigrants and 0.0741 for non-recent Asian immigrants.

¹⁹ Because most countries have a relatively small representation in the CPS, plus the fact that natives might not be able to differentiate Chinese from other non-Chinese East Asian immigrants, we distinguish between East and non-East Asians.

with the onset of the pandemic, the drop was more than twice as large among East Asian immigrants (27 percent) than among non-East Asians (12 percent). Similarly, exit rates from self-employment, emblematic of increased customer discrimination, were greater among East Asians (81 percent) than among non-East Asians (51 percent). Lastly, when compared to non-Hispanic whites, necessity rates into self-employment quintupled and opportunity entry rates dropped by 41 percent among East Asians; however, they did not significantly change among non-East Asians. In sum, discriminatory practices particularly targeted East Asian immigrants.

Next, in Panel C, we explore how the presence of a larger Asian enclave in the metropolitan statistical area (MSA) might have altered the negative impact of the onset of the pandemic on Asian immigrants' self-employment.²⁰ We find that a larger network of Asians helped palliate the negative impact of the pandemic on the self-employment rate, as well as its positive impact on necessity entry rates. These results are suggestive of discriminatory practices lessening in areas with larger Asian enclaves, as shown in Borjas (1986). However, the pandemic does not appear to have impacted any differently the relative opportunity entry and exit rates of Asian immigrants (when compared to whites) in MSAs with larger versus smaller Asian enclaves.

Finally, in Table 8, we investigate heterogeneous impacts by type of business. In Panel A, we explore if the observed patterns were only observed among one-person businesses and, therefore, had a smaller repercussion on the economy, or rather stemmed from businesses with employees. In addition, we examine if the pandemic had a differential impact on the performance of Asian-owned (vs. white-owned) incorporated and non-incorporated businesses. As can be seen in the first column of Panel A in Table 8, the differential impact of the pandemic on Asian business

²⁰ The evidence regarding the impact of enclave size on self-employment success is mixed. See, for instance, Fairlie and Woodruff (2005) for a discussion on its positive impact, and Clark and Drinkwater (2002) for a discussion on the negative impact.

ownership does not appear to have occurred among one-person businesses, suggesting it might have far reaching implications on employment. Furthermore, the pandemic harmed similarly both incorporated and unincorporated Asian businesses when compared to those owned by whites. Based on the estimates in columns (2) and (3), the onset of the COVID pandemic had a comparably large impact on the self-employment exit rate of Asian immigrants, when compared to non-Hispanic whites, regardless of their business structure (*i.e.* 68 percent among incorporated businesses, and 57 percent among non-incorporated businesses).

Next, we examine if the pandemic had a differential impact on Asian businesses based on whether they fell within the essential business category.²¹ As shown in Panel B of Table 8, we only find some evidence of that being the case for necessity entry and exit rates, although the effects are only marginally significant. Similarly, we fail to find much evidence of a differential impact of the pandemic on Asian businesses based on whether they allowed for remote work (see Panel C of Table 8).²² In both instances, we continue to find evidence of a statistically significant and differential impact of the onset of the pandemic on Asian immigrants' self-employment rates.

Overall, the results in Panels A, B and C point to few distinctions in the overall impact of the pandemic on Asian ownership, regardless of the firm structure, the classification of the business as essential or the suitability of the business for remote work.

²¹ We follow Fairlie (2020) and define essential industries using the classification provided by Delaware State for essential and nonessential businesses at: <https://business.delaware.gov/wp-content/uploads/sites/118/2020/04/DE-Industry-List-4.8.pdf>

²² We use Dingel and Neiman (2020) estimates on the share of jobs that can be done at home, by industry (Table 3). We define an industry as remote if the share of jobs that can be done remotely is larger than 70 percent. This ad-hoc cutoff is the approximate mode of the distribution of jobs in our sample.

8. Summary of Findings and Conclusions

Since the start of the Covid-19 pandemic, Asians have become the victims of a sudden spike in discrimination, especially after President Trump and other government officials repeatedly labelled the Covid-19 virus: the “Chinese virus” (*e.g.* Rogers, Jakes, and Swanson, 2020; Sandler, 2020). Exacerbated xenophobic sentiments have disproportionately harmed Asians’ lives (Stop AAPI Hate Press Release, 2020).

In this study, we explore how the onset of the COVID pandemic has impacted the self-employment rate and dynamics of the Asian community in the United States, when compared to non-Hispanic whites. Our results uncover a differential impact of the pandemic on the self-employment rate of Asian immigrants, which dropped by 17 percent when compared to the rate among non-Hispanic whites, after January 2020. These effects prove robust to using alternative measures of the pandemic capturing its intensity, such as COVID mortality rates or the number of NPIs adopted at the state level, as well as to various identification and robustness checks.

When we zoom in to explore any differential self-employment dynamics to learn about the mechanisms at play, we find evidence of: (1) *necessity self-employment entry rates tripling* – a pattern that could be explained by the disproportionate hike in unemployment insurance claims among Asians when compared to other racial groups (CNN news, 2020), and (2) *exit rates from self-employment rising by 62 percent among Asian immigrants*, when compared to non-Hispanic whites – a pattern that bodes well with discrimination against Asian-owned businesses (CNBC news, 2020). Overall, the findings are suggestive of increases in both employer and customer led ‘taste discrimination’.

Finally, heterogeneous analyses reveal an expected larger impact of the pandemic on businesses of recently arrived Asian immigrants, as well as among East Asian immigrants, which

primarily include Chinese immigrants. Additionally, even though the presence of larger Asian enclaves in the MSA palliated some of those impacts, the impact of the pandemic did not necessarily focus on one-person businesses –a result that points to its broader employment implications. Moreover, it disproportionately hurt both incorporated and unincorporated businesses, without much distinction based on whether they were deemed essential or could be performed remotely.

In sum, the COVID pandemic has had a differential negative impact on the self-employment of Asians in the United States. Given Asian-owned businesses' significant contributions to the U.S. economy and job creation in the past, the rise of anti-Asian discrimination during this pandemic may not only hurt Asians and their businesses, but can also have negative impacts on the economy that extend beyond those in the Asian community. Understanding how the pandemic has impacted Asian businesses in a timely manner is crucial to inform about the heterogeneous socio-economic disruptions created by the crisis, and about the prevalence of discriminatory behaviors. Such an understanding is key in curtailing discriminatory behaviors, reducing inequality and ensuring a fast recovery.

References

- Adams-Prassl, A., Boneva, T., Golin, M. and Rauh, C., 2020. "Inequality in the impact of the coronavirus shock: Evidence from real time surveys." *Journal of Public Economics*, 189.
- Alon, T.M., Doepke, M., Olmstead-Rumsey, J. and Tertilt, M., 2020. "The impact of COVID-19 on gender equality" (No. w26947). National Bureau of economic research.
- Bartik, Alexander W., Marianne Bertrand, Zoe Cullen, Edward L. Glaeser, Michael Luca, and Christopher Stanton. 2020. "The Impact of COVID-19 on Small Business Outcomes and Expectations." *Proceedings of the National Academy of Sciences* 117 (30).
- Becker, Gary. 1957. *The Economics of Discrimination*, University of Chicago Press, Chicago, IL.
- Bertrand, Marianne and Duflo, Esther. 2016. "Field experiments on discrimination" in *Handbook of Economic Field Experiments*, Vol. 1: 309-393.
- Blanchflower, David G., Phillip B. Levine, and David J. Zimmerman. 2003. "Discrimination in the Small-Business Credit Market." *The Review of Economics and Statistics*, 85(4), 930-943.
- Borjas, George. 1986. "The Self-Employment Experience of Immigrants" *Journal of Human Resources*, 21: 487-506.
- Borjas, George J. and Hugh Cassidy. 2020. "The Adverse Effect of the COVID-19 Labor Market Shock on Immigrant Employment," NBER Working Papers 27243, National Bureau of Economic Research, Inc.
- Borjas, George J., and Stephen G. Bronars 1989. "Consumer Discrimination and Self-Employment." *Journal of Political Economy* 97(5), 581–605
- Brodeur, A., Clark, A.E., Fleche, S. and Powdthavee, N., 2021. "COVID-19, lockdowns and well-being: Evidence from Google Trends." *Journal of Public Economics*, 193.
- Clark, Ken, and S. Drinkwater. 2000. "Pushed Out or Pulled In? Self-Employment Among Ethnic Minorities in England and Wales." *Labor Economics* 7 (5): 603–628.
- Clark, Ken. 2015. "Ethnic Minority Self-Employment." *IZA World of Labor*, no. 120.
- CNBC. 2020. "From stores to Chinatown restaurants, here's how the coronavirus is affecting small business owners in the US." March 4, 2020. Available at: <https://www.cnn.com/2020/03/04/heres-how-coronavirus-affects-small-businesses-in-the-united-states.html> [Accessed on May 18, 2020].
- CNN. 2020. "Unemployment claims from Asian Americans have spiked 6,900% in New York. Here's why." May 1, 2020. Available at: <https://www.cnn.com/2020/05/01/economy/unemployment-benefits-new-york-asian-americans/index.html> [Accessed on May 18, 2020].

Combes, Pierre-Philippe, Bruno Decreuse, Morgane Laouénan, and Alain Trannoy. 2016. “Customer Discrimination and Employment Outcomes: Theory and Evidence from the French Labor Market.” *Journal of Labor Economics*, 34, 107–160.

Couch, Kenneth A., Robert W. Fairlie, and Xu Huanan. 2020. “Early Evidence of the Impacts of COVID-19 on Minority Unemployment.” *Journal of Public Economics* 192, 104287.

Crossley Thomas F., Paul Fisher, and Hamish Low. 2021. “The Heterogeneous and Regressive Consequences of COVID-19: Evidence from High Quality Panel Data,” *Journal of Public Economics* 193 104334

Davila, Alberto and Marie T. Mora. 2005. “Changes in the Earnings of Arab Men in the U.S. between 2000 and 2002.” *Journal of Population Economics*, 18, 587–601.

Dingel, Jonathan I., Neiman, Brent, 2020. “How many jobs can be done at home?” *Journal of Public Economics* 189, 1–8.

Duncan, Brian and Stephen J. Trejo. 2017. “The Complexity of Immigrant Generations: Implications for Assessing the Socioeconomic Integration of Hispanics and Asians.” *ILR Review*, 70(5):1146-1175.

Fairlie, Robert 2020. “The Impact of COVID-19 on Small Business Owners: Evidence from the First Three Months after Widespread Social-Distancing Restrictions.” *Journal of Economics & Management Strategy*, 29(4), 727-740.

Fairlie, Robert W. 2014. *Kauffman Index of Entrepreneurial Activity, 1996-2013*. Available at: SSRN: <https://ssrn.com/abstract=2424834> or <http://dx.doi.org/10.2139/ssrn.2424834> [Accessed May 18, 2020.]

Fairlie, Robert W. and Frank M. Fossen 2020. “Defining Opportunity versus Necessity Entrepreneurship: Two Components of Business Creation”, Polachek, S.W. and Tatsiramos, K. (Ed.) *Change at Home, in the Labor Market, and On the Job (Research in Labor Economics*, Vol. 48), Emerald Publishing Limited, pp. 253-289.

Fairlie, Robert W., and Alicia M. Robb. 2008. *Race and Entrepreneurial Success: Black-, Asian-, and White-Owned Businesses in the United States*. Cambridge, Massachusetts; London, England: MIT Press, 2008. [Accessed May 18, 2020.]

Fairlie, Robert, and Bruce D. Meyer. 1996. “Ethnic and Racial Self-Employment Differences and Possible Explanations.” *Journal of Human Resources* 31(4), 757–793.

Fairlie, Robert and Christopher M. Woodruff. 2005. “Mexican entrepreneurship: a comparison of self-employment in Mexico and the United States” in *Mexican Immigration to the United States* (George J. Borjas, editor), University of Chicago Press, pp. 123-158.

Fairlie, Robert and Christopher M. Woodruff. 2010. “Mexican-American Entrepreneurship.” *The B.E. Journal of Economic Analysis & Policy*, 10(1). Article 10.

- Ferrara, Andreas and Price V. Fishback, 2020. "Discrimination, Migration, and Economic Outcomes: Evidence from World War I." NBER Working Papers 26936.
- Forsythe, E., Kahn, L.B., Lange, F. and Wiczer, D., 2020. "Labor demand in the time of COVID-19: Evidence from vacancy postings and UI claims." *Journal of Public Economics*, 189.
- Guryan, Jonathan and Charles, K. Kerwin (2013). "Taste-based or statistical discrimination: The economics of discrimination returns to its roots." *The Economic Journal*, 123(572), 417–432.
- Kaushal, Neeraj, Robert Kaestner, and Cordelia Reimers. 2007. "Labor market effects of September 11th on Arab and Muslim residents of the United States." *Journal of Human Resources*, 42, 275–308.
- Herek G.M. and E. K. Glunt. 1988. "An epidemic of stigma. Public reactions to AIDS." *The American Psychologist*, 43(11): 886-91.
- Herek, G.M. and J.P. Capitanio. 1993. "Public reactions to AIDS in the United States: A second decade of stigma." *American Journal of Public Health*, 83 (4), 574-577.
- Lang, Kevin, and Ariella Kahn-Lang Spitzer. 2020. "Race Discrimination: An Economic Perspective." *Journal of Economic Perspectives*, 34 (2): 68-89.
- Lang, Kevin, and Jee-Yeon K. Lehmann. 2012. "Racial Discrimination in the Labor Market: Theory and Empirics." *Journal of Economic Literature* 50 (4): 959–1006.
- Lazear, Edward. 1999. "Language and Culture." *Journal of Political Economy*, 107(6): 95–126.
- Levine, Ross and Yona Rubinstein. 2017. "Smart and Illicit: Who Becomes an Entrepreneur and Do They Earn More?" *The Quarterly Journal of Economics*, 132(2), 963–1018.
- Lofstrom, Magnus, and Timothy Bates. 2013. "African Americans' pursuit of self-employment." *Small Business Economics* 40, no. 1: 73-86.
- Lofstrom, Magnus, and Chunbei Wang. 2009. "Mexican-American self-employment: a dynamic analysis of business ownership." In *Ethnicity and Labor Market Outcomes, Research in Labor Economics*. Emerald Group Publishing Limited.
- Pew Research Center. 2015. "Three-in-Ten U.S. Jobs Are Held by the Self-Employed and the Workers They Hire." Available at: <https://www.pewsocialtrends.org/2015/10/22/three-in-ten-u-s-jobs-are-held-by-the-self-employed-and-the-workers-they-hire/> [Accessed on May 18, 2020].
- Phelps, Edmund S. 1972. "The Statistical Theory of Racism and Sexism." *American Economic Review* 62 (4): 659–61.
- Robb, Alicia M. and Robert W. Fairlie. 2009. "Determinants of Business Success: An Examination of Asian-Owned Businesses in the USA." *Journal of Population Economics* 22, 827-858.

Rogers, Katie, Lara Jakes and Ana Swanson. 2020. “Trump Defends Using ‘Chinese Virus’ Label, Ignoring Growing Criticism” *The New York Times*, March 18. Available at: Trump Defends Using ‘Chinese Virus’ Label, Ignoring Growing Criticism - The New York Times (nytimes.com). [Accessed on February 6, 2021].

Sandler, Rachel. 2020. “Trump Refers To The Coronavirus As A ‘Chinese Virus,’ While China Promotes U.S. Conspiracy,” *Forbes*, March 16. Available online at: Trump Refers To The Coronavirus As A ‘Chinese Virus,’ While China Promotes U.S. Conspiracy (forbes.com) [Accessed on February 6, 2021].

Stop AAPI Hate Press Release. April 23, 2020. Available at: http://www.asianpacificpolicyandplanningcouncil.org/wp-content/uploads/Press_Release_4_23_20.pdf [Accessed on May 18, 2020].

Strochlic, Nina. 2020. “America’s long history of scapegoating its Asian citizens,” *National Geographic*, September 2. Available at: <https://www.nationalgeographic.com/history/2020/09/asian-american-racism-covid/#close>. Last accessed on February 15, 2021.

Wang, Chunbei. 2016. “The Impact of 9/11 on the Self-Employment Outcomes of Arab and Muslim Immigrants.” *International Migration Review*, 52, 430–457.

Wang, Chunbei, 2019. Tightened immigration policies and the self-employment dynamics of Mexican immigrants.” *Journal of Policy Analysis and Management*, 38(4), pp.944-977.

Wang, Chunbei, and Magnus Lofstrom. 2020. “September 11 and the Rise of Necessity Self-Employment Among Mexican Immigrants.” *Eastern Economic Journal*, 46(1), pp.5-33.

Table 1: Summary Statistics

Control/Treatment Groups	Whites		Asian	
	Before COVID	After COVID	Before COVID	After COVID
Panel A: Static Employment Status				
Self Employed	0.0774 (0.267)	0.0776 (0.268)	0.0660 (0.248)	0.0604 (0.238)
Wage Earners	0.680 (0.467)	0.653 (0.476)	0.655 (0.476)	0.621 (0.485)
Unemployed	0.0274 (0.163)	0.0529 (0.224)	0.0255 (0.158)	0.0680 (0.252)
Not in Labor Force	0.215 (0.411)	0.217 (0.412)	0.254 (0.435)	0.251 (0.433)
N	3,430,977	376,423	296,287	35,507
Panel B: Dynamic Self-Employment Measures				
Entry Rate	0.0054 (0.0730)	0.0063 (0.0788)	0.0055 (0.0741)	0.0064 (0.0797)
Necessity Entry Rate	0.0007 (0.0268)	0.0016 (0.0397)	0.0004 (0.0203)	0.0021 (0.0463)
Opportunity Entry Rate	0.0046 (0.0679)	0.0047 (0.0682)	0.0051 (0.0713)	0.0043 (0.0651)
N	2,199,090	207,332	190,152	19,716
Exit Rate	0.0715 (0.258)	0.0847 (0.278)	0.0844 (0.278)	0.141 (0.348)
N	197,274	18,644	13,555	1,336

Table 2: DD Estimates on Self-employment

Specification	Model 1	Model 2	Model 3	Model 4	Model 5
Panel A: Treatment Group: Asians					
Asian*COVID Onset	-0.0070*** (0.0025)	-0.0087*** (0.0021)	-0.0081*** (0.0020)	-0.0070*** (0.0020)	-0.0087*** (0.0019)
Asian	-0.0160*** (0.0047)	-0.0148*** (0.0051)	-0.0141*** (0.0050)	-0.0142*** (0.0050)	-0.0031 (0.0047)
N	4139194	4139194	4139194	4139194	4139194
Panel B: Treatment Group: Native-born Asians					
Asian*COVID Onset	-0.0006 (0.0045)	-0.0035 (0.0049)	-0.0029 (0.0047)	-0.0017 (0.0046)	-0.0028 (0.0049)
Asian	-0.0336*** (0.0053)	-0.0173*** (0.0050)	-0.0169*** (0.0052)	-0.0171*** (0.0052)	-0.0058 (0.0046)
N	3906602	3906602	3906602	3906602	3906602
Panel C: Treatment Group: Asian Immigrants					
Asian*COVID Onset	-0.0084*** (0.0027)	-0.0109*** (0.0025)	-0.0104*** (0.0025)	-0.0095*** (0.0026)	-0.0115*** (0.0026)
Asian	-0.0107** (0.0043)	-0.0376*** (0.0016)	-0.0372*** (0.0017)	-0.0373*** (0.0018)	-0.0222*** (0.0021)
N	4039992	4039992	4039992	4039992	4039992
<i>Additional Regressors</i>					
State and Year-Month FE	Yes	Yes	Yes	Yes	Yes
Demographic Controls		Yes	Yes	Yes	Yes
Geographic Controls			Yes	Yes	Yes
Business Cycle Controls				Yes	Yes
Industry FE					Yes

Notes: All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Table 3: DD Estimates for Self-Employment Dynamics

Specification	Model 1	Model 2	Model 3	Model 4
Dependent Variable	Entry	Necessity Entry	Opportunity Entry	Exit
Panel A: Treatment Group: All Asians				
Asian*COVID Onset	-0.0000 (0.0006)	0.0007** (0.0003)	-0.0008 (0.0005)	0.0460*** (0.0116)
Asian	-0.0004 (0.0006)	-0.0005*** (0.0001)	0.0001 (0.0005)	0.0250*** (0.0052)
N	2616290	2616290	2616290	230809
Panel B: Treatment Group: Native-born Asians				
Asian*COVID Onset	-0.0009 (0.0015)	-0.0003 (0.0004)	-0.0006 (0.0013)	0.0271* (0.0156)
Asian	-0.0004 (0.0006)	-0.0004*** (0.0001)	0.0000 (0.0005)	0.0282*** (0.0058)
N	2468841	2468841	2468841	219521
Panel C: Treatment Group: Asian Immigrants				
Asian*COVID Onset	0.0003 (0.0006)	0.0012*** (0.0004)	-0.0008* (0.0004)	0.0527*** (0.0132)
Asian	-0.0025*** (0.0004)	-0.0001 (0.0001)	-0.0024*** (0.0004)	0.0373*** (0.0077)
N	2553871	2553871	2553871	227206
Panel D: Asian Immigrant Entries - Changes in Employment Composition vs. Behavior				
Dependent Variable	Unemployed	Entry	Wage-Employed or NILF	Entry
Sample	Full	Unemployed	Full	Wage-Employed or NILF
Asian*COVID Onset	0.0147*** (0.0038)	0.0144** (0.0059)	-0.0147*** (0.0038)	-0.0011** (0.0005)
DV Mean for Asian Immigrants Pre-COVID	0.0235	0.0168	0.906	0.0052
N	2553871	78592	2553871	2505282

Notes: All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Tale 4: Event Study for Self-Employment

Specification	Model 1	Model 2	Model 3	Model 4
Dependent Variable	Static Measure	Dynamic Measures		
	Self-Employment	Necessity Entry	Opportunity Entry	Exit
Asian*Six Years Prior	0.0056 (0.0044)	0.0003 (0.0002)	0.0011* (0.0006)	-0.0116 (0.0077)
Asian*Five Years Prior	0.0051 (0.0050)	0.0002 (0.0002)	-0.0003 (0.0007)	-0.0106 (0.0121)
Asian*Four Years Prior	0.0090** (0.0041)	0.0002 (0.0002)	-0.0000 (0.0008)	-0.0158 (0.0096)
Asian*Three Years Prior	0.0053 (0.0050)	0.0001 (0.0002)	0.0006 (0.0007)	-0.0103 (0.0117)
Asian*Two Years Prior	0.0014 (0.0033)	0.0001 (0.0001)	0.0006 (0.0008)	-0.0115 (0.0122)
Asian*COVID	-0.0072** (0.0034)	0.0013*** (0.0004)	-0.0005 (0.0006)	0.0429*** (0.0135)
Asian	-0.0265*** (0.0040)	-0.0003 (0.0002)	-0.0027*** (0.0006)	0.0471*** (0.0075)
Control Variables	All	All	All	All
N	4039992	2553871	2553871	227206

Note: 2019 and January 2020 are left out as the base group. All models use Asian immigrants as treatment group and native non-Hispanic whites as the control group. All models include the set of controls in the most complete model specification (model 5) in Table 2. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Table 5: Robustness Checks

Specification	Model 1	Model 2	Model 3	Model 4
Dependent Variable	Static Measure Self-Employment	Dynamic Measures		
		Necessity Entry	Opportunity Entry	Exit
Panel A: Control for State*Time Trend				
Asian*COVID Onset	-0.0101*** (0.0029)	0.0011*** (0.0004)	-0.0008* (0.0005)	0.0521*** (0.0159)
N	4039992	2553871	2553871	227206
Panel B: Control for State*Temporal FE				
Asian*COVID Onset	-0.0102*** (0.0034)	0.0009* (0.0005)	-0.0008* (0.0005)	0.0470*** (0.0171)
N	4039992	2553871	2553871	227206
Panel C: Control for Asian*All Control Variables				
Asian*COVID Onset	-0.0086* (0.0049)	0.0010* (0.0006)	-0.0016** (0.0007)	0.0478*** (0.0167)
N	4039992	2553871	2553871	227206
Panel D: March 2020 as Treatment Date				
Asian*COVID Onset	-0.0131*** (0.0025)	0.0010** (0.0005)	-0.0010* (0.0006)	0.0539*** (0.0161)
N	4039992	2553871	2553871	227206
Panel E: Asian Immigrant Based on Country of Birth				
Asian*COVID Onset	-0.0114*** (0.0026)	0.0011** (0.0004)	-0.0008* (0.0004)	0.0522*** (0.0137)
N	4033413	2549792	2549792	226897
Panel F: Placebo Test: White Immigrants as Treatment Group				
White Immigrant*COVID Onset	-0.0014 (0.0051)	0.0017 (0.0011)	-0.0015 (0.0010)	-0.0109 (0.0145)
N	3967131	2470396	2470396	223236

Notes: All models in Panels A through D use Asian immigrants as treatment group and native non-Hispanic whites as the control group. All models include the set of controls in the most complete model specification (model 5) in Table 2.

Table 6: Robustness Check - Using Alternative COVID Measures at the State Level

Specification	Model 1	Model 2	Model 3	Model 4
Dependent Variable	Static Measure	Dynamic Measures		
	Self-Employment	Necessity Entry	Opportunity Entry	Exit
Panel A: Using COVID Mortality as Treatment				
Asian*COVID Mortality	-0.0018*** (0.0002)	0.0000 (0.0001)	-0.0001* (0.0001)	0.0086*** (0.0018)
N	4039992	2553871	2553871	227206
Panel B: Using COVID Policies as Treatment				
Asian*COVID Policies	-0.0026*** (0.0005)	0.0002** (0.0001)	-0.0001 (0.0001)	0.0101*** (0.0024)
N	4039992	2553871	2553871	227206
Panel C: Using COVID Mortality and COVID Policies as Simultaneous Treatments				
Asian*COVID Mortality	-0.0011** (0.0004)	-0.0001 (0.0001)	-0.0001* (0.0001)	0.0054** (0.0025)
Asian*COVID Policies	-0.0017** (0.0007)	0.0003** (0.0001)	-0.0000 (0.0002)	0.0067** (0.0029)
N	4039992	2553871	2553871	227206

Notes: All control variables are included. Treatment Group: Asian Immigrants. All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Table 7: Heterogeneity Analysis - Type of Asian Immigrant and Ethnic Enclaves

Specification	Model 1	Model 2	Model 3	Model 4
	Static Measure	Dynamic Measures		
Dependent Variable	Self-Employment	Necessity Entry	Opportunity Entry	Exit
Panel A: Recent (YSM<=5) vs. Non-recent Arrivals				
Recent Asian Immigrants*COVID Onset	-0.0081* (0.0041)	0.0020** (0.0009)	-0.0015 (0.0009)	0.1986*** (0.0523)
Non-Recent Asian Immigrants*COVID Onset	-0.0124*** (0.0028)	0.0010** (0.0004)	-0.0006 (0.0006)	0.0400*** (0.0129)
N	4039992	2553871	2553871	227206
Panel B: East Asian vs. Non-East Asian Immigrants				
East Asian*COVID Onset	-0.0177*** (0.0058)	0.0020* (0.0010)	-0.0021*** (0.0007)	0.0682*** (0.0171)
Non-East Asian*COVID Onset	-0.0082** (0.0035)	0.0008 (0.0005)	-0.0004 (0.0006)	0.0429** (0.0174)
N	4039992	2553871	2553871	227206
Panel C: Ethnic Enclaves - Size of Asian Community				
Asian*COVID Onset	-0.0135*** (0.0032)	0.0013** (0.0006)	-0.0009 (0.0006)	0.0497*** (0.0170)
Asian*Proportion of Asians in MSA	-0.1424*** (0.0154)	-0.0013 (0.0008)	-0.0045** (0.0018)	0.0649*** (0.0213)
COVID Onset*Proportion of Asians in MSA	-0.0280 (0.0203)	0.0077*** (0.0014)	-0.0001 (0.0044)	0.1652*** (0.0484)
Asian*COVID Onset*Proportion of Asians in MSA	0.0561** (0.0221)	-0.0097** (0.0039)	0.0012 (0.0062)	-0.1259 (0.0884)
N	4039992	2553871	2553871	227206

Notes: All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Table 8: Heterogeneity Analysis - Industries and Type of Businesses

Models	Static Measure	Dynamic Measure		
Panel A. Firm Structure				
Dependent Variable	Non-Employee Firm	Exit	Exit	
Sample	Self-Employed	Incorporated	Non-Incorporated	
Asian*COVID Onset	-0.0056 (0.0053)	0.0576** (0.0215)	0.0477* (0.0274)	
N	332174	91574	135632	
Panel B. Essential Business vs. Non-Essential Business				
Dependent Variable	Self-Employed	Necessity Entry	Opportunity Entry	Exit
Sample	Full	Potential Entrants		Self-Employed
Asian*Essential Business	-0.0153*** (0.0051)	0.0003 (0.0002)	-0.0011 (0.0009)	0.0166*** (0.0052)
Asian*COVID Onset	-0.0199** (0.0096)	0.0048** (0.0023)	-0.0016* (0.0009)	0.0794*** (0.0217)
Essential Business*COVID Onset	-0.0026 (0.0025)	-0.0016*** (0.0003)	0.0008** (0.0003)	-0.0123** (0.0060)
Asian*Essential Bus.*COVID Onset	0.0108 (0.0095)	-0.0043* (0.0025)	0.0008 (0.0011)	-0.0436* (0.0250)
N	4039992	2553871	2553871	227206
Panel C. Remote Business vs. Non-Remote Business				
Dependent Variable	Self-Employed	Necessity Entry	Opportunity Entry	Exit
Sample	Full	Potential Entrants		Self-Employed
Asian*Remote Business	-0.0049 (0.0040)	0.0000 (0.0001)	-0.0013*** (0.0004)	0.0199*** (0.0066)
Asian*COVID Onset	-0.0129** (0.0050)	0.0007 (0.0009)	-0.0019** (0.0008)	0.0607*** (0.0172)
Remote Business*COVID Onset	0.0035* (0.0019)	-0.0003* (0.0002)	0.0006 (0.0003)	0.0002 (0.0055)
Asian*Remote Bus.*COVID Onset	0.0029 (0.0082)	0.0007 (0.0011)	0.0016 (0.0012)	-0.0178 (0.0220)
N	4039992	2553871	2553871	227206

Notes: All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Figure 1. Placebo Tests using Pre-COVID Periods

Figure 1A. Self-Employment

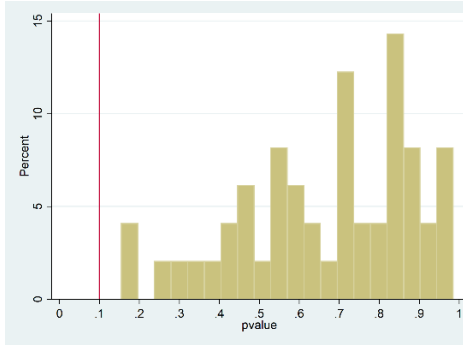


Figure 1B. Necessity Entry

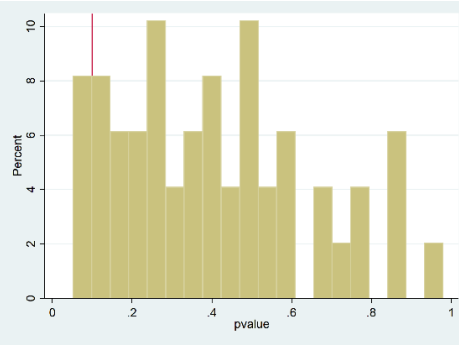


Figure 1C. Opportunity Entry

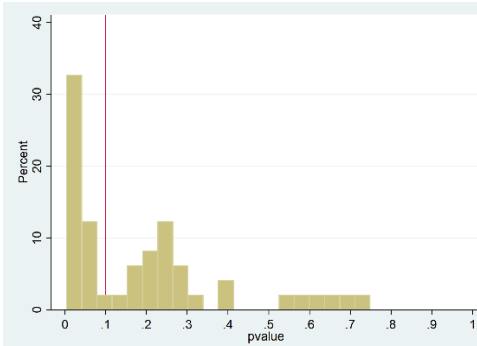
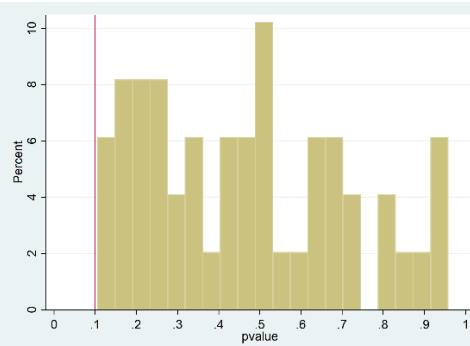


Figure 1D. Exit



Notes: Placebo tests use the 72 months in the pre-COVID period. We obtain placebo DD estimates using any month from month 12 (January 2015) to month 60 (December 2018) as artificial break point (a total of 49 estimates). The figure shows the histograms of the p -values of the placebo DD estimates from such an exercise.

Figure 2: Event Studies
(Treatment Group: Asian Immigrants)

Figure 2A: Self-Employment

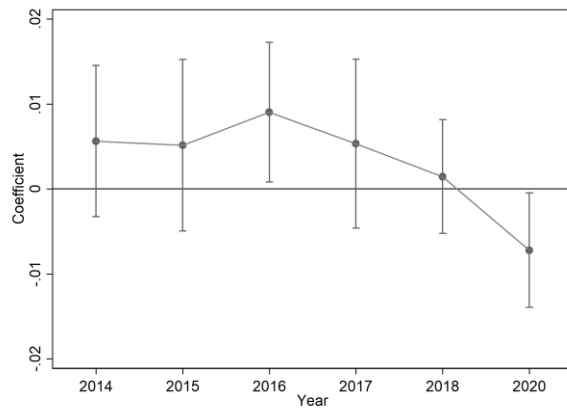


Figure 2B: Necessity Entry

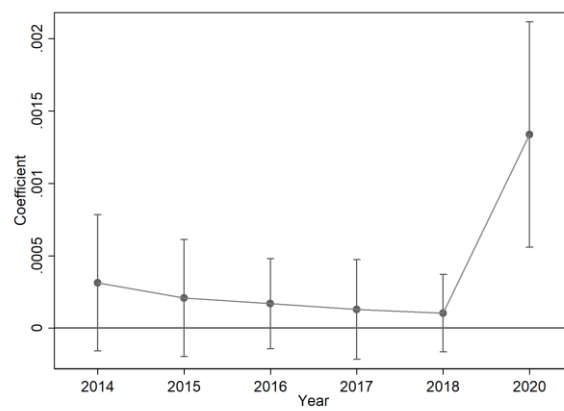


Figure 2C: Opportunity Entry

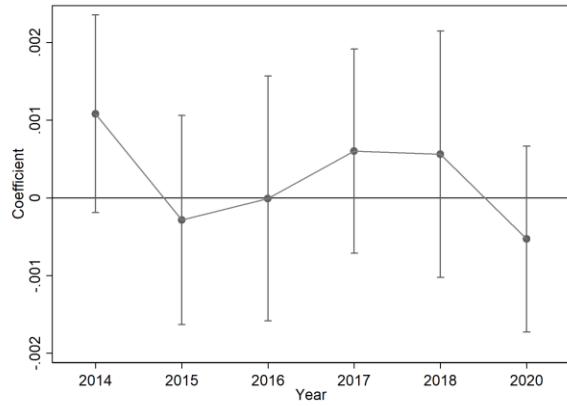
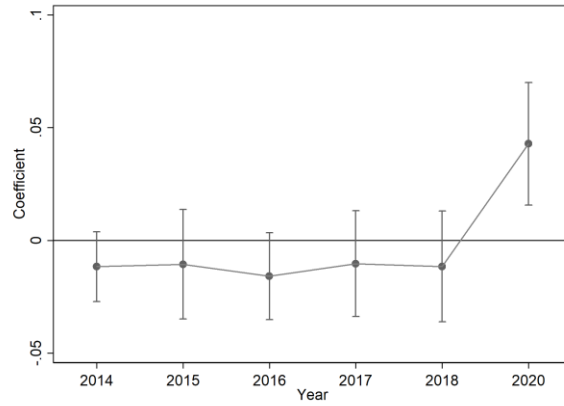


Figure 2D: Exit



Notes: The year 2019 and January 2020 are left out as reference. All models use native non-Hispanic whites as the control group, along with a full set of control variables.

APPENDIX

Table A.1: Summary Statistics for Alternative COVID-19 Measures

Period	Before COVID	After COVID	Overall
Average state mortality rate (per 10,000 inhabitants)	0 (0)	3.162 (3.943)	0.314 (1.560)
Shelter in place order in place	0 (0)	0.183 (0.387)	0.0181 (0.133)
School closure order in place	0 (0)	0.800 (0.400)	0.0794 (0.270)
Day-care closure order in place	0 (0)	0.0634 (0.244)	0.00629 (0.0791)
Non-essential business closure order in place	0 (0)	0.159 (0.366)	0.0157 (0.124)
Restaurant closure order in place	0 (0)	0.190 (0.393)	0.0189 (0.136)
Bar closure order in place	0 (0)	0.380 (0.486)	0.0377 (0.191)
Gym closure order in place	0 (0)	0.312 (0.464)	0.0310 (0.173)
Movie theatre closure order in place	0 (0)	0.383 (0.487)	0.0380 (0.191)
Mask wearing order in place	0 (0)	0.410 (0.492)	0.0406 (0.197)
Number of restriction orders in place	0 (0)	2.880 (2.500)	0.286 (1.166)
N	4,233	510	3,723

Table A.2: Summary Statistics for Full Sample

Control/Treatment Groups Time Period	Whites		Asian	
	Before COVID	After COVID	Before COVID	After COVID
Years of Education	14.22 (2.545)	14.43 (2.534)	14.98 (3.329)	15.36 (3.152)
Married	0.573 (0.495)	0.571 (0.495)	0.652 (0.476)	0.662 (0.473)
Age	43.03 (13.17)	42.96 (13.23)	40.45 (12.33)	40.62 (12.31)
Immigrant	0 -	0 -	0.733 (0.443)	0.692 (0.462)
Years Since Migration	0 -	0 -	12.33 (12.64)	12.09 (12.92)
Male	0.497 (0.500)	0.498 (0.500)	0.472 (0.499)	0.475 (0.499)
Urban	0.821 (0.383)	0.827 (0.378)	0.980 (0.142)	0.984 (0.127)
Proportion of Asians in MSA	0.0457 (0.0529)	0.0487 (0.0561)	0.130 (0.101)	0.138 (0.109)
Proportion of Immigrants in MSA	0.129 (0.107)	0.128 (0.107)	0.255 (0.114)	0.252 (0.114)
State Monthly Unemployment Rate	0.0465 (0.0113)	0.0875 (0.0428)	0.0480 (0.0117)	0.0991 (0.0460)
N	3,430,977	376,423	296,287	35,507

Table A.3: Summary Statistics for Potential Entrants Sample

Control/Treatment Groups	Whites		Asian	
	Before COVID	After COVID	Before COVID	After COVID
Years of Education	14.20 (2.522)	14.42 (2.515)	14.99 (3.329)	15.37 (3.165)
Married	0.56 (0.496)	0.56 (0.496)	0.644 (0.479)	0.655 (0.475)
Age	42.64 (13.25)	42.57 (13.31)	40.04 (12.34)	40.21 (12.32)
Immigrant	0 -	0 -	0.731 (0.443)	0.692 (0.462)
Years Since Migration	0 -	0 -	12.04 (12.54)	11.85 (12.80)
Male	0.486 (0.500)	0.489 (0.500)	0.463 (0.499)	0.469 (0.499)
Urban	0.823 (0.382)	0.829 (0.376)	0.981 (0.137)	0.985 (0.123)
Proportion of Asians in MSA	0.0454 (0.0524)	0.0485 (0.0559)	0.130 (0.102)	0.139 (0.109)
Proportion of Immigrants in MSA	0.128 (0.107)	0.127 (0.106)	0.255 (0.114)	0.253 (0.114)
State Monthly Unemployment Rate	0.0465 (0.0113)	0.0876 (0.0429)	0.0480 (0.0117)	0.0992 (0.0460)
N	2,199,090	207,332	190,152	19,716

Table A.4: Summary Statistics for the Self-Employed (Potential Exits) Sample

Control/Treatment Groups	Whites		Asian	
	Before COVID	After COVID	Before COVID	After COVID
Years of Education	14.52 (2.756)	14.65 (2.714)	15.05 (3.235)	15.49 (2.890)
Married	0.707 (0.455)	0.706 (0.455)	0.803 (0.398)	0.819 (0.385)
Age	47.45 (11.04)	47.16 (11.15)	46.14 (10.22)	46.61 (10.02)
Immigrant	0 -	0 -	0.791 (0.407)	0.733 (0.442)
Years Since Migration	0 -	0 -	17.28 (13.04)	16.23 (13.70)
Male	0.634 (0.482)	0.612 (0.487)	0.594 (0.491)	0.583 (0.493)
Urban	0.795 (0.404)	0.794 (0.404)	0.964 (0.185)	0.969 (0.172)
Proportion of Asians in MSA	0.0480 (0.0574)	0.0494 (0.0577)	0.125 (0.0979)	0.122 (0.0973)
Proportion of Immigrants in MSA	0.136 (0.113)	0.133 (0.112)	0.256 (0.118)	0.241 (0.113)
State Monthly Unemployment Rate	0.0461 (0.0115)	0.0859 (0.0414)	0.0483 (0.0118)	0.0960 (0.0454)
N	197,274	18,644	13,555	1,336

Table A.5: DD Estimates for Self-Employment Rate (Full Estimates)

Specification	Model 1	Model 2	Model 3	Model 4	Model 5
Asian*COVID Onset	-0.0070*** (0.0025)	-0.0087*** (0.0021)	-0.0081*** (0.0020)	-0.0070*** (0.0020)	-0.0087*** (0.0019)
Asian	-0.0160*** (0.0047)	-0.0148*** (0.0051)	-0.0141*** (0.0050)	-0.0142*** (0.0050)	-0.0031 (0.0047)
Years of Education		0.0021*** (0.0004)	0.0023*** (0.0004)	0.0023*** (0.0004)	0.0029*** (0.0003)
Married		0.0222*** (0.0014)	0.0220*** (0.0013)	0.0220*** (0.0013)	0.0205*** (0.0009)
Age		0.0072*** (0.0004)	0.0072*** (0.0004)	0.0072*** (0.0004)	0.0043*** (0.0002)
Age squared		-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0000*** (0.0000)
Immigrant		-0.0228*** (0.0051)	-0.0230*** (0.0050)	-0.0230*** (0.0050)	-0.0193*** (0.0043)
Years Since Migration		0.0014*** (0.0003)	0.0014*** (0.0003)	0.0014*** (0.0003)	0.0010*** (0.0002)
Male		0.0424*** (0.0012)	0.0425*** (0.0012)	0.0425*** (0.0012)	0.0137*** (0.0011)
Urban			-0.0180*** (0.0027)	-0.0180*** (0.0027)	-0.0164*** (0.0023)
Proportion of Asian in MSA			-0.0877*** (0.0112)	-0.0876*** (0.0111)	-0.1054*** (0.0110)
Proportion of Immigrants in MSA			0.0771*** (0.0111)	0.0770*** (0.0111)	0.0575*** (0.0133)
State Monthly Unemployment Rate				-0.1127*** (0.0327)	-0.1029*** (0.0302)
State and Year-Month FE	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	No	No	Yes
N	4,139,194	4,139,194	4,139,194	4,139,194	4,139,194

Notes: All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Table A.6: DD Estimates for Self-Employment Dynamics - Asian Immigrants

Outcome	Necessity Entry	Opportunity Entry	Exit
Asian*COVID Onset	0.0012*** (0.0004)	-0.0008* (0.0004)	0.0527*** (0.0132)
Asian	-0.0001 (0.0001)	-0.0024*** (0.0004)	0.0373*** (0.0077)
Years of Education	-0.0000*** (0.0000)	0.0002*** (0.0000)	-0.0048*** (0.0003)
Married	-0.0003*** (0.0001)	0.0007*** (0.0001)	-0.0214*** (0.0017)
Age	0.0000*** (0.0000)	0.0004*** (0.0000)	-0.0112*** (0.0006)
Age squared	-0.0000 (0.0000)	-0.0000*** (0.0000)	0.0001*** (0.0000)
Immigrant	-0.0000 (0.0000)	0.0001*** (0.0000)	-0.0012*** (0.0003)
Years Since Migration	0.0002*** (0.0000)	0.0016*** (0.0001)	-0.0284*** (0.0021)
Male	-0.0002*** (0.0001)	-0.0013*** (0.0002)	-0.0012 (0.0022)
Urban	-0.0006 (0.0015)	-0.0048*** (0.0014)	-0.0306 (0.0265)
Proportion of Asian in MSA	0.0012 (0.0008)	0.0059*** (0.0014)	0.0355** (0.0172)
Proportion of Immigrants in MSA	0.0151** (0.0061)	-0.0159** (0.0065)	0.0789 (0.1101)
State Monthly Unemployment Rate	0.0012*** (0.0004)	-0.0008* (0.0004)	0.0527*** (0.0132)
State and Year-Month FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
N	2,553,871	2,553,871	2,553,871

Notes: All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.

Table A.7 Placebo Tests – Artificial Breaks

Dependent Variable	Static Measure		Dynamic Measure					
	Self-Employment		Necessity Entry		Opportunity Entry		Exit	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Asian*PostM12	0.0009	(0.0042)	-0.0003	(0.0003)	-0.0019**	(0.0008)	0.0006	(0.0070)
Asian*PostM13	0.0009	(0.0039)	-0.0002	(0.0003)	-0.0018*	(0.0010)	-0.0045	(0.0085)
Asian*PostM14	0.0014	(0.0039)	-0.0002	(0.0003)	-0.0014	(0.0010)	-0.0010	(0.0084)
Asian*PostM15	0.0007	(0.0040)	-0.0002	(0.0003)	-0.0012	(0.0010)	-0.0047	(0.0069)
Asian*PostM16	0.0014	(0.0040)	-0.0004	(0.0003)	-0.0011	(0.0010)	-0.0018	(0.0075)
Asian*PostM17	0.0026	(0.0037)	-0.0004*	(0.0002)	-0.0008	(0.0009)	-0.0035	(0.0074)
Asian*PostM18	0.0035	(0.0034)	-0.0003*	(0.0002)	-0.0005	(0.0010)	-0.0015	(0.0064)
Asian*PostM19	0.0048	(0.0033)	-0.0003*	(0.0002)	-0.0006	(0.0007)	0.0003	(0.0060)
Asian*PostM20	0.0043	(0.0033)	-0.0003	(0.0002)	-0.0008	(0.0007)	-0.0050	(0.0051)
Asian*PostM21	0.0038	(0.0032)	-0.0002	(0.0002)	-0.0008	(0.0007)	-0.0058	(0.0050)
Asian*PostM22	0.0032	(0.0033)	-0.0002	(0.0002)	-0.0009	(0.0007)	-0.0044	(0.0055)
Asian*PostM23	0.0030	(0.0035)	-0.0002	(0.0002)	-0.0009	(0.0007)	-0.0039	(0.0055)
Asian*PostM24	0.0023	(0.0036)	-0.0002	(0.0002)	-0.0009	(0.0008)	-0.0010	(0.0057)
Asian*PostM25	0.0010	(0.0038)	-0.0001	(0.0002)	-0.0010	(0.0008)	0.0025	(0.0055)
Asian*PostM26	-0.0001	(0.0033)	-0.0001	(0.0002)	-0.0007	(0.0008)	0.0041	(0.0056)
Asian*PostM27	-0.0003	(0.0031)	-0.0002	(0.0001)	-0.0005	(0.0007)	0.0030	(0.0062)
Asian*PostM28	-0.0002	(0.0032)	-0.0002	(0.0001)	-0.0003	(0.0007)	0.0024	(0.0070)
Asian*PostM29	0.0007	(0.0038)	-0.0001	(0.0001)	-0.0002	(0.0007)	0.0006	(0.0072)
Asian*PostM30	0.0012	(0.0041)	-0.0001	(0.0001)	-0.0003	(0.0006)	0.0029	(0.0072)
Asian*PostM31	0.0015	(0.0040)	-0.0001	(0.0001)	-0.0003	(0.0006)	0.0029	(0.0070)
Asian*PostM32	0.0014	(0.0038)	-0.0000	(0.0001)	-0.0007	(0.0005)	0.0066	(0.0068)
Asian*PostM33	0.0006	(0.0032)	-0.0002	(0.0002)	-0.0007	(0.0006)	0.0091	(0.0067)
Asian*PostM34	-0.0004	(0.0029)	-0.0002	(0.0002)	-0.0006	(0.0006)	0.0084	(0.0071)
Asian*PostM35	-0.0012	(0.0031)	-0.0001	(0.0002)	-0.0007	(0.0006)	0.0089	(0.0065)
Asian*PostM36	-0.0020	(0.0033)	-0.0001	(0.0002)	-0.0007	(0.0006)	0.0086	(0.0062)
Asian*PostM37	-0.0019	(0.0034)	-0.0001	(0.0002)	-0.0008	(0.0006)	0.0101	(0.0067)
Asian*PostM38	-0.0018	(0.0034)	-0.0000	(0.0002)	-0.0008	(0.0006)	0.0102	(0.0066)
Asian*PostM39	-0.0020	(0.0035)	-0.0000	(0.0002)	-0.0006	(0.0005)	0.0102	(0.0062)
Asian*PostM40	-0.0028	(0.0034)	-0.0000	(0.0002)	-0.0009	(0.0006)	0.0080	(0.0073)
Asian*PostM41	-0.0028	(0.0034)	0.0000	(0.0002)	-0.0013**	(0.0006)	0.0095	(0.0073)
Asian*PostM42	-0.0021	(0.0034)	0.0000	(0.0002)	-0.0012*	(0.0007)	0.0098	(0.0077)
Asian*PostM43	-0.0018	(0.0032)	-0.0001	(0.0001)	-0.0012*	(0.0006)	0.0093	(0.0074)
Asian*PostM44	-0.0013	(0.0031)	-0.0001	(0.0001)	-0.0014**	(0.0005)	0.0091	(0.0073)
Asian*PostM45	-0.0019	(0.0030)	-0.0001	(0.0001)	-0.0013**	(0.0006)	0.0106	(0.0078)
Asian*PostM46	-0.0023	(0.0032)	-0.0001	(0.0002)	-0.0012**	(0.0006)	0.0099	(0.0085)
Asian*PostM47	-0.0025	(0.0034)	-0.0001	(0.0002)	-0.0014**	(0.0005)	0.0082	(0.0086)
Asian*PostM48	-0.0018	(0.0036)	-0.0001	(0.0002)	-0.0014**	(0.0005)	0.0062	(0.0088)
Asian*PostM49	-0.0008	(0.0037)	-0.0001	(0.0002)	-0.0013**	(0.0005)	0.0064	(0.0093)
Asian*PostM50	0.0001	(0.0039)	-0.0002	(0.0001)	-0.0011**	(0.0005)	0.0059	(0.0092)
Asian*PostM51	0.0005	(0.0040)	-0.0003*	(0.0001)	-0.0012**	(0.0006)	0.0035	(0.0094)

Table A.7 – Continued

Dependent Variable	Static Measure		Dynamic Measure					
	Self-Employment		Necessity Entry		Opportunity Entry		Exit	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Asian*PostM52	-0.0003	(0.0042)	-0.0002	(0.0001)	-0.0013**	(0.0006)	0.0085	(0.0096)
Asian*PostM53	-0.0013	(0.0041)	-0.0002	(0.0002)	-0.0017**	(0.0007)	0.0086	(0.0103)
Asian*PostM54	-0.0020	(0.0042)	-0.0002	(0.0002)	-0.0015**	(0.0007)	0.0071	(0.0105)
Asian*PostM55	-0.0015	(0.0043)	-0.0003	(0.0002)	-0.0018***	(0.0006)	0.0054	(0.0135)
Asian*PostM56	-0.0007	(0.0041)	-0.0003	(0.0002)	-0.0016**	(0.0007)	0.0097	(0.0143)
Asian*PostM57	-0.0008	(0.0041)	-0.0002	(0.0002)	-0.0015**	(0.0007)	0.0084	(0.0145)
Asian*PostM58	-0.0006	(0.0042)	-0.0002	(0.0002)	-0.0018**	(0.0008)	0.0118	(0.0151)
Asian*PostM59	-0.0001	(0.0038)	-0.0002	(0.0002)	-0.0020**	(0.0008)	0.0153	(0.0143)
Asian*PostM60	0.0009	(0.0037)	-0.0002	(0.0002)	-0.0020**	(0.0008)	0.0150	(0.0132)

Notes: Asian*PostM12 is obtained by using the 12th month of the 72-month-period prior to COVID as the artificial break point to obtain the DD estimate, Asian*PostM13 uses the 13th month, and so on. All models use native non-Hispanic whites as the control group. Standard errors are clustered at the state level. Significance level: * 0.10, ** 0.05, *** 0.01.