



Asian entrepreneurship in the coronavirus era

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Received: 1 September 2022 / Accepted: 5 January 2024
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Abstract

The COVID-19 pandemic has had a deleterious impact on the world economy. Studies have documented the disproportional impact of the pandemic on minorities, immigrants, and business owners in the USA. In this study, we use Current Population Survey monthly data spanning from January 2014 through December 2021 to examine how the COVID-19 pandemic affected Asian entrepreneurship. We show that the pandemic disproportionately hurt Asian entrepreneurship, particularly among immigrants, up until the end of 2020. A detailed analysis of Asian business dynamics reveals a substantial increase in self-employment exits during the first year of the pandemic. We fail to find convincing evidence of differential industry/job-type concentration, individual preferences, majority-minority disparities, narrower clientele, or differential access to government support as primary drivers for such patterns. Instead, we find suggestive evidence of discrimination playing a non-negligible role that subsided in 2021, coinciding with the rollout of vaccines.

Keywords Asian · COVID · Self-employment · Business dynamics · Entry · Exit · Discrimination

JEL Classification J15 · J61 · J71 · J78

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Responsible editor: Alfonso Flores-Lagunes.

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1 Introduction

The COVID-19 pandemic has had far-reaching effects on the global economy, prompting numerous studies to investigate its impact on various societal outcomes, including job loss, business ownership, sales, health, and inequality, among others (e.g., Adams-Prassl et al. 2020; Alon et al. 2020; Borjas and Cassidy 2020; Brodeur et al. 2021; Couch et al. 2020; Fairlie 2020; Fairlie and Fossen 2022b; Forsythe et al. 2020). Notably, studies have uncovered a disproportionately large negative impact of the pandemic on the employment outcomes of Asian Americans. Couch et al. (2020) show that Asians' unemployment rate increased much more than that of Whites in the USA. Even more surprisingly, the gap continued to widen during the recovery in stark contrast to the narrowing unemployment gaps between Whites and other disadvantaged minority groups, such as Blacks and Hispanics. This pattern is unprecedented. Unlike Blacks and Hispanics, who tend to be severely hit by economic downturns, Asians typically fare better during recessions, resembling the performance of Whites partially due to their higher educational attainment (Cunningham 2018; Xu 2018).

The pandemic's disproportionate impact on Asians extended beyond the wage and salary sector to include Asian-owned businesses. Fairlie (2020) documented a 26% reduction in the number of Asian active business owners in the first 3 months of the pandemic, a figure much larger than the 17% reduction among Whites. Even after the economy started to rebound in May and June of 2020, the number of Asian active business owners was 10% lower than in February of that year, compared to 5% in the case of Whites. Similarly, the Bureau of Labor Statistics (2021) documented how Asian self-employment dropped almost three times as much as overall self-employment during the 12-month period following the onset of the pandemic relative to the 12-month period preceding it. This is in addition to the pandemic's already significant impact on the self-employment sector. As Graeber et al. (2021) show, self-employed individuals were more likely to experience income loss during the pandemic than those in the wage sector. While previous studies revealed a disparate impact on Asian-owned businesses in the first few months of the pandemic, the message was overshadowed by the discussions of other typically disadvantaged minority groups, such as Blacks and Hispanics. Hence, many questions remain unanswered.

Our research contributes to the literature by offering the first comprehensive analysis of the impact of the COVID-19 pandemic on business ownership among Asians in the USA, delving into the underlying dynamics of formation and survival to provide a thorough understanding of this phenomenon.¹ Additionally, we investigate likely mechanisms responsible for the disproportionate negative

¹ At this point, it is worth noticing that the analysis focuses on self-employment as defined in by the Bureau of Labor Statistics. Many self-employed individuals may be in business by themselves, whereas others may manage employees. When the business is created by the person is question, s/he is referred as an entrepreneur. This is also the person who would usually bear most of the risks and rewards from the business. Given the close linkages among self-employment, business ownership, and entrepreneurship, we use these three terms interchangeably in the paper.

effects experienced by Asians, including industry concentration, limited access to government resources, clientele constraints, supply chain disruptions, risk preferences, and discrimination. To conclude, we examine how Asian entrepreneurship evolved as employment fully recovered, shedding some light on the dynamic nature of the pandemic's effects.

Gaining a better understanding of how Asian entrepreneurship was impacted during the recent pandemic is of relevance for various reasons. First, Asians are the third largest race group in the USA, following Whites and Blacks, with approximately 24 million people comprising 7.2% of the population in 2020 (Jones et al. 2021). Asians are known to have high business ownership rates and remarkable business performance (Bates and Dunham 1993; Borjas 1986). Studies repeatedly find that, compared to whites, Asian-owned businesses have higher annual sales, are more likely to have high profit levels, and more likely to hire employees (Fairlie and Robb 2008; Robb and Fairlie 2009; Pew Research Center 2015). Asian immigrant entrepreneurs have also been known to play a crucial role in contributing to high-tech sectors, such as the Silicon Valley and technology and engineering industries (Azoulay et al. 2022; Saxenian 1999, 2000; Wadhwa et al. 2007). Second, given the hiring rates (Kochhar 2015), understanding how Asian entrepreneurship was impacted by the pandemic can shed light on the unprecedented unemployment patterns among Asians during this period. Third, the pandemic might have impacted minority-owned businesses through mechanisms that may have differed from those affecting minority wage and salary workers. Identifying the mechanisms at play could inform policies that help alleviate the unduly negative impacts of similar events on minority groups (Bowler and Harris 2022).

We explore various mechanisms that could be potentially contributing to the disparate impact Asian-owned businesses. First, during the pandemic, Asians, especially Asian immigrants, as a minority group, may have encountered a range of additional challenges that threatened their businesses' performance. One such constraint was their reliance on a narrower customer base, often composed of co-ethnics, which can result in a smaller customer pool compared relative to White-owned businesses. Relatedly, Asian-owned businesses may have experienced a more restrictive access to government support due to their immigration status. Both aspects might have hampered these minority-owned businesses' survival during the pandemic. Additionally, Asian businesses often rely on sourcing inputs from Asia. Because the pandemic interrupted international trade of goods and people from countries like China, it might have interrupted Asian-owned businesses due to the lack of much needed inputs.

Second, the concentration of Asian businesses in certain industries could have contributed to the disparate impact that the pandemic had on them. For example, Asian immigrants often concentrate in industries that were more negatively affected by the pandemic, such as restaurants, nail salons, or other businesses that involve in-person services. Additionally, Asian businesses are less prone to qualify as essential and, in turn, less likely to have been sheltered from forced shutdowns.

Third, Asians may have had a more cautious attitude toward the virus. If that was the case, it is hypothetically possible for some to have exited self-employment and closed their business to avoid getting sick.

Fourth, the violence and harassment against Asians during the pandemic could have negatively impacted their business performance. Anti-Asian violence, harassment, and hate crimes increased markedly after the onset of the pandemic (Human Rights Watch 2020; CBS News 2020; The Guardian 2020; NPR 2021; Stop AAPI Hate Press Release 2020; The City, NYC 2022). This pattern was in stark contrast to the low levels of harassment experienced by Asians prior to the pandemic (Ramakrishnan et al. 2017). Several academic studies have also confirmed a significant increase in prejudice against Asians among the general population (Nguyen et al. 2020; Darling-Hammond et al. 2020; Hswen et al. 2021; Lu et al. 2021). In the self-employment context, prejudice against Asian-owned businesses could stem from customers, banks, and suppliers, impacting business survival rates (Becker 1957; Borjas and Bronars 1989; Blanchflower et al. 2003; Alden and Hammarstedt, 2016; Cavalluzzo and Cavalluzzo 1998; Alden and Hammarstedt, 2016). In addition to taste discrimination, statistical discrimination may have occurred.² Customers, banks, and suppliers might believe they were at a higher risk of contracting the virus in Asian communities given its origin in China. As a result, they might avoid interactions with Asian-owned businesses altogether. Regardless of whether discrimination was taste- or statistically based, it could have significantly risen operational costs, lower revenues, and threaten business survival.

Using monthly data from the Current Population Survey (CPS) (January 2014 to December 2021) and a difference-in-differences approach, we first identify the additional impact of the initial pandemic shock on Asian-owned businesses, *vis-à-vis* businesses owned by non-Hispanic Whites – an impact that lasted until December 2020, when the first COVID vaccine started to be administered. Specifically, self-employment dropped by 13% more among Asian immigrants, when compared to non-Hispanic Whites, following the onset of the pandemic.

Next, we exploit the possibility to link the monthly CPS to examine transitions into and out of self-employment to provide insights into the underlying dynamics. We document a twofold increase (by 129%) in self-employment exits among Asian immigrants — a finding that proves robust to numerous identification tests and model specifications.

Subsequently, we delve into explanations for our findings. As noted earlier, we consider the four sets of explanations that encompass most rationalizations for the distinct business performance; although the list may not be exhaustive. We fail to find consistent empirical evidence for most explanations, except for discrimination, which appeared greater for Asian immigrant subgroups more prone to discrimination based on their recent arrival and, therefore, partial integration, immigrant subgroups originating from East Asia, where the virus was first detected, and Asian immigrants in states with higher internet search volumes on terms associated to anti-Asian sentiments (Hswen et al. 2021).

² 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. The same outcome can often be supported by both frameworks (Guryan and Charles 2013).

Finally, we extend our data period to December 2021 to examine if the negative impacts of the pandemic on Asian-owned businesses persisted in the longer run, as employment fully recovered. We find that the differential impact of the pandemic on Asian entrepreneurship dissipated by the beginning of 2021, coinciding with the rollout of vaccines.

Overall, the study makes several contributions to the literature. First, it adds to a growing literature examining the impact of the COVID-19 pandemic on the labor market outcomes of minority or disadvantaged groups compared to Whites (e.g., Couch et al. 2020; Crossley et al. 2021; Graeber et al. 2021; Honoré and Hu 2022; Mar and Ong 2020). Specifically, we provide a thorough documentation of the additional impact of the COVID-19 pandemic on Asian-owned businesses, their formation, and their survival dynamics up to two years since the onset of the pandemic. Second, we contribute to the discrimination literature, which has examined the emergence of such practices against different demographic groups after sudden political, terrorist, or epidemic events, as in the case of Arab men after 9/11 (i.e., Davila and Mora 2005; Kaushal et al. 2007; Wang 2016), 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). We add to this literature by providing suggestive evidence of the impact of discriminatory behaviors against Asians following the onset of the COVID-19 pandemic. Additionally, we inform the literature on customer and credit market discrimination and self-employment outcomes (e.g., Blanchflower et al. 2003; Borjas and Bronars 1989; Alden and Hammaarstedt, 2016; Cavalluzzo and Cavalluzzo 1998). Finally, we contribute to the literature of understanding self-employment trends (e.g., Robb and Fairlie 2009; Lofstrom and Wang 2009; Levine and Rubinstein 2017; Wang 2019; Wang and Lofstrom 2020) by delving into the underlying dynamics of transitions into and out of self-employment. This allows us to show how the decrease in the self-employment rate among Asians is mainly driven by increased exits rather than deterred entries.

2 Data

We rely on various datasets to conduct the analysis. Data on self-employment outcomes and demographic characteristics of business owners are gathered from the January 2014 through December 2021 monthly Current Population Surveys (CPS) (Flood et al. 2021).³ We restrict our samples to individuals between the ages of 20

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" (<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 if that was the case by matching samples across months. When we do so, we find that, while overall response rates have declined, the reduction in Asians' response rate is not significantly different from the reduction in the response rate among Whites. This is true for March 2020 (0.004; $t=0.45$) and April 2020 (0.000; $t=0.02$). Therefore, the research design should not be negatively affected.

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, because of its high frequency, it provides timely information on the impacts of the pandemic. Second, its rotational design allows for six out of eight rotation groups in each month's sample to be longitudinally matched to the following month. In this manner, we can distinguish entries and exits,⁴ which are informative of self-employment dynamics masked under a static self-employment rate measure.⁵ Third, the monthly CPS offers a large sample size. Alongside its nationally representative nature, this allows for the study of low frequency labor market outcomes, such as self-employment of minority groups, as would be the case with Asians.

Table A.1 provides a glance of the labor market statuses of individuals in the primary control group (non-Hispanic native-born Whites) and treatment groups (Asians and Asian immigrants) from well before the onset of the COVID-19 pandemic (i.e., from January 2014) until December 2020, when vaccinations became available in the USA. During that period, the self-employment rate of non-Hispanic Whites remained stable, whereas that of Asians and Asian immigrants dropped, respectively, by 10.6% and 12.9% after the onset of the pandemic. Asians' unemployment rate increased threefold from 2.5 to 7.4%,⁶ almost twice as much as the rise among non-Hispanic Whites.⁷ Panel B of Table A.1 informs about self-employment entries and exits. Self-employment entry rates changed similarly for non-Hispanic Whites and Asians from before to after the onset of the pandemic. However, self-employment exit rates rose by 67% among Asians (and 78% among Asian immigrants) — practically four times the 18% increase in exits experienced by non-Hispanic Whites.

We conduct further analyses using information from four 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), which we use as an alternative measure of the COVID treatment variable; (2) data from the COVID-19 U.S. State Policy (CUSP) Database on the adoption of various non-pharmaceutical interventions (NPIs) by states and counties, which we also employ as yet another measure of the COVID treatment variable⁸; (3) data on the seasonally adjusted state trends in

⁴ We use the link variable provided in IPUMS CPS to match the data across months and 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 analyses 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.

⁶ Asian immigrants experienced a similar increase in unemployment, from 2.4% to 7.5%.

⁷ The unemployment rates reported here seem lower than those published by the Bureau of Labor Statistics. This is because of our sample restrictions to the ages between 20 and 64.

⁸ CUSP data are compiled by the Boston School of Public Health, providing 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.

outpatient care visits to healthcare providers from the Outpatient Influenza-like Illness Surveillance Network (ILINet), as an additional measure of COVID intensity;⁹ and (4) following Stephens-Davidowitz (2014), Google Trends data on search queries on the following terms: “Yellow People”, as well as various anti-China phrases, including “Hate China”, “Back to China”, “China die”, and “No China” in each state during our sample period.¹⁰ We choose terms related to anti-Asian sentiments, while trying to optimize the number of states for which information is available.¹¹ Google Trends reports a normalized index of search activity computed by geography and time period that ranges from 0 to 100, allowing for comparisons across locations and over time. Table A.2 in Appendix A provides summary statistics of these measures. As shown therein, there was a drastic increase in Google searches of anti-Asian terms following the onset of the pandemic. Figures A.1A through A.1C in Appendix A also show substantial increase in the use of these Google search terms in 2020.

In sum, summary statistics uncover a differential response of non-Hispanic Whites and Asian self-employment rates to the pandemic. In what follows, we use a quasi-experimental approach to better assess the impact of the pandemic on Asian entrepreneurship.¹²

3 Methodology

To explore whether and how the onset of the COVID-19 pandemic excessively impacted Asians’ self-employment rates, as well as their transitions into and out of self-employment compared to Whites, we estimate a difference-in-differences (DD) model. Since everyone, including the control group we use here, was affected by the pandemic, we show in Appendix B.1 that the DD model identifies the additional causal impact of the pandemic on Asians.¹³

⁹ We follow Chatterji and Li (2020) and compute the seasonally adjusted reduction in the number of non-influenza visits to healthcare providers by state each month.

¹⁰ Prior research using Google search intensity data to measure racial animus include the works by Chetty et al. (2020) and Anderson et al. (2020). Prior work has also used Google trends data to predict consumer behavior (Choi and Varian 2012), fertility (Kearney and Levine 2015), wellbeing (Askatas and Zimmerman 2015), and different impacts of the COVID-19 pandemic (Goldsmith-Pinkham and Sojourner 2020, Brodeur et al. 2021).

¹¹ Google has an unreported privacy threshold and reports a zero if total searches fall below that threshold.

¹² Appendix Tables A.3 through A.5 show the sample means for demographic characteristics for Whites and Asians before and after COVID onset separately for the full sample, the entry sample, and the exit sample. The largest differences between 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. We control for all these variables in our main specification.

¹³ The same approach is used in Kaushal et al. (2007), Orrenius and Zavodny (2009), and Wang (2019) to examine how 9/11, an event with a national impact, differentially affected Arab and Muslim immigrants or Latin American immigrants’ labor market outcomes when compared to natives.

The DD model is as follows:

$$Y_{i,j,s,t} = \alpha + \beta_1 Asian_i * COVID_t + \beta_2 Asian_i + \beta_3 COVID_t + X_{i,s,t} \gamma + Z_{m,t} \delta + B_{s,t} \rho + \theta_j + \theta_s + \theta_t + \varepsilon_{i,j,s,t} \quad (1)$$

where $Y_{i,j,s,t}$ is one of three dependent variables we examine: a static measure of self-employment — a dummy equal to 1 if individual i in industry j and state s is self-employed at time t ; and two dynamic measures of self-employment — entry and exit. Self-employment information is based on the class of worker question, which indicates if respondents worked for their own enterprise(s) or for someone else as employees.¹⁴ *Entry* equals 1 if the respondent is not self-employed in time t , but becomes self-employed at time $t + I$, and 0 otherwise. Hence, the sample used to examine entries is composed of those not currently self-employed, including those unemployed, not in the labor force, or employed in the wage sector. The dependent variable *Exit* equals 1 if individual i is self-employed at time t , but not any more in $t + I$; otherwise, it equals 0. Therefore, the sample used to examine exits is composed of those currently self-employed.

The variable $Asian_i$ is a dichotomous variable that equals 1 if an individual reports being Asian (native or foreign-born), and 0 otherwise. To evaluate any differential impact of the pandemic on Asian entrepreneurship, we use non-Hispanic native-born Whites as the main comparison group. This group satisfies two important conditions. First, while everyone was affected by the pandemic, Whites did not experience the extra hurdles or discrimination that Asians faced, allowing us to evaluate any excess impacts. Second, as we shall show through placebo tests and event study analyses, Whites exhibited self-employment trends parallel to those of Asians for a very long period prior to the onset of the pandemic, allowing us to evaluate how much the trends have diverged due to the pandemic.

$COVID_t$ is a dummy variable equal to 1 for observations recorded from March 2020 onwards, after the Center for Disease Control and Prevention announced the first confirmed death from COVID-19 in the USA.¹⁵ Note its coefficient is not reported in the results as it is collinear with the year-month fixed effects. In posterior robustness checks, we show that our results are robust to using, instead, February 2020 or April 2020 as the pandemic's onset dates.

The coefficient β_1 on the interaction term ($Asian_i * COVID_t$) is the estimate of main interest. In addition, Eq. (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

¹⁴ 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.

¹⁵ See: <https://www.cdc.gov/media/releases/2020/s0229-COVID-19-first-death.html>.

self-employed, as their businesses often cater to a similar demographic. We also account for the unemployment rate in state s at time t as a control for local business cycles, $B_{s,t}$. Importantly, we include a set of industry fixed effects to control for differences in industry concentration between the two groups.¹⁶ 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). Finally, we include interaction terms of $COVID_t$ with all control variables to allow for temporal changes in their impact. Standard errors are heteroskedasticity-robust and clustered at the state level to allow for arbitrary correlation within states in the error structure.¹⁷

4 The impact of the COVID pandemic on Asian self-employment and its dynamics

4.1 Main findings

Our main goal is to first establish the excess impact of the COVID pandemic on Asian self-employment compared to that of Whites, as well as on its underlying entry and exit dynamics to understand the mechanisms likely at play. Asians are known to be the fastest growing race groups in recent years, largely driven by increase in the number of Asian immigrants (Budiman and Ruiz 2021). Because immigrants and natives may face different obstacles when running their businesses, Table 1 displays the estimated coefficients from the difference-in-differences model in Eq. (1) for all Asians, as well as by nativity. We estimate various model specifications that progressively add controls to help us gauge the impact of additional regressors on the estimated impact of the pandemic and address concerns regarding the potential endogenous nature of some controls. All the models include year-month and state fixed effects.

Overall, the estimates in Table 1 show that Asian immigrant businesses were particularly hard hit by the pandemic. Regardless of the controls included in the model, the estimates in Table 1 provide empirical evidence of a significant negative impact of the pandemic on Asian immigrants' self-employment propensity relative to non-Hispanic Whites (Panel A). The estimated impact is rather stable across the

¹⁶ There are a total of 15 industry categories: Agriculture, Utilities, Construction, Manufacturing, Wholesale Trade, Retail Trade, Transportation and Warehousing, Information, Finance/Insurance and 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.

¹⁷ Due to the outgoing rotation group design of the CPS data, some individuals are observed more than once. As recommended by Cameron and Miller (2015), in the presence of individual and a higher level of correlation, we cluster standard errors at the higher level of correlation, *i.e.*, state level. Nevertheless, in the Appendix, we show that the results prove robust to clustering at the individual level.

Table 1 Difference-in-differences estimates

Specification	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Treatment group:	All Asians			Asian immigrants			Native-born Asians		
Panel A: self-employment									
Asian*COVID onset	-0.007*** (0.003)	-0.009*** (0.002)	-0.001 (0.004)	-0.009*** (0.003)	-0.012*** (0.002)	-0.010* (0.005)	-0.000 (0.005)	-0.003 (0.005)	0.000 (0.004)
Asian	-0.016*** (0.005)	-0.003 (0.005)	-0.004 (0.004)	-0.011** (0.004)	-0.022*** (0.002)	-0.023*** (0.002)	-0.034*** (0.005)	-0.006 (0.005)	-0.006 (0.005)
Mean DV	0.066			0.071			0.052		
N	4,139,194			4,039,992			3,906,602		
Panel B: self-employment dynamics — entry									
Asian*COVID onset	0.000 (0.001)	-0.000 (0.001)	-0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Asian	-0.001* (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.001** (0.000)	-0.003*** (0.000)	-0.002*** (0.000)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Mean DV	0.006			0.006			0.005		
N	2,616,290			2,553,871			2,468,841		
Panel C: self-employment dynamics — exit									
Asian*COVID onset	0.043*** (0.011)	0.044*** (0.012)	0.008 (0.018)	0.048*** (0.013)	0.052*** (0.013)	0.102*** (0.027)	0.025 (0.015)	0.024 (0.016)	0.007 (0.018)
Asian	0.009* (0.005)	0.024*** (0.005)	0.029*** (0.005)	0.004 (0.006)	0.037*** (0.008)	0.032*** (0.008)	0.029*** (0.006)	0.027*** (0.005)	0.029*** (0.005)
Mean DV	0.084			0.079			0.102		
N	230,809			227,206			219,521		
Control variables									
State and year-month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 1 (continued)

Specification	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Treatment group:	All Asians			Asian immigrants			Native-born Asians		
All other control variables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
COVID onset*All controls	No	No	Yes	No	No	Yes	No	No	Yes

All models use native-born non-Hispanic Whites as the control group. Mean DV represents the mean of the dependent variable. Standard errors are clustered at the state level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

three model specifications, despite the inclusion of an exhaustive list of interactions involving the *COVID onset* dummy and each regressor in the model to account for their changing impact on Asians' self-employment exits over the pandemic. According to that saturated model (Model 3), Asian immigrant self-employment dropped by 13 percent, when compared to that of non-Hispanic Whites, following the onset of the pandemic.¹⁸

Next, we examine the underlying entry and exit dynamics responsible for the reductions in self-employment (Panels B and C, respectively). The onset of the pandemic did not significantly impact Asians' self-employment entries any differently than entries of the control group. However, when compared to those of non-Hispanic Whites, Asian immigrants' self-employment exit rates more than doubled (Table A.1.). After controlling for all control variables, Asian immigrants' self-employment exit rose by 129% more than Whites following the pandemic's onset (Model 6 of Panel C).

In sum, the onset of the COVID-19 pandemic had a differential impact on the self-employment rate of Asian immigrant entrepreneurs when compared to non-Hispanic Whites — an impact that primarily stemmed from increased exit rates.^{19,20}

4.2 Robustness checks

We conduct several identification and robustness checks to gauge the causal nature and reliability of our key finding — namely, the disproportionate impact of the pandemic on Asian immigrants' self-employment exit rates. First, in Appendix B, we show the results from conducting two sets of identification checks used to evaluate the parallel trend assumption: a set of placebo tests using artificial break points (Table and Figure B.1) and event-study analyses (Table and Figure B.2) spanning up to 6 years prior to the pandemic. The results from those checks confirm our findings are not spurious or driven by pre-existing differential trends.

Next, we conduct a series of robustness checks aimed at assessing the reliability of our findings to alternative model specifications (Table 2). In Panel A, we control for additional sets of variables to evaluate if our estimate is confounded by other factors. In column (1), we include state-specific linear trends. In column (2), we experiment with including (state, month-year) fixed effects. These additional controls

¹⁸ Percentages are computed using the dependent variable mean, i.e., 0.071.

¹⁹ We show that the main results are consistent when clustering the standard errors at the individual level (see Appendix Table A.6). In addition, in Appendix Table A.7, we evaluate incorporated and non-incorporated businesses separately, as suggested by the large difference found in Levine and Rubinstein (2017). We find evidence of a similar pattern for both incorporated and non-incorporated businesses.

²⁰ In Appendix Table A.8, we explore if the onset of the pandemic had a differential impact in other labor force statuses held by Asians, including wage and salary employment, unemployment, and not in the labor force. As shown therein, the pandemic led to a higher unemployment rate among Asian immigrants compared to non-Hispanic Whites — a finding that is consistent with the literature. We also evaluate the impact of the pandemic at the intensive margin, i.e., work hours, as well as family income (this is the only income information we have in the monthly CPS dataset) for all self-employed, as well as on other labor force statuses, including wage employment. As we show therein, we do not find any significant impact of the pandemic on either outcome.

Table 2 Robustness checks of increased self-employment exits among Asian immigrants

Panel A: additional control variables		State*Temporal FE		Asian*All control variables	
Controlling for:	State*Time trend	0.099***	(0.029)	0.089***	(0.026)
Asian*COVID onset	0.102***	227,206	227,206	227,206	227,206
N	227,206				
Panel B: alternative treatment, control groups, and sample period		Apr 2020 as treatment date		White European immigrants as control group	
Asian*COVID onset	0.089***	0.108***	(0.028)	0.072***	(0.021)
N	227,206	227,206		18,883	
Panel C: COVID intensity measures at the state level as treatment		State COVID mortality as treatment		State drop in non-influenza-like illness outpatient visits as treatment	
Asian*COVID intensity	0.009***	0.010***	(0.002)	0.070*	(0.036)
N	227,206	227,206		219,613	
					Shorter pre-period (2017 +)
					0.110*** (0.024)
					119,122

The dependent variable is self-employment exit for all models. All models use Asian immigrants as the treatment group and native non-Hispanic Whites as the control group unless otherwise specified. All models include the set of controls in the most complete model specification in Table 1. Standard errors are clustered at the state level. * $p < 0.10$, ** $p < 0.05$; *** $p < 0.01$

enable us to evaluate if the found impact is driven by Asians concentrating in states that were hit harder by the pandemic. Subsequently, in column (3), we experiment with interacting all controls with the Asian dummy to account for differential effects of the regressors by race. Regardless of the model alterations, results either remain the same or strengthen.

In Panel B, we experiment with using alternative treatment dates, control group, and sample period. In columns (1) and (2), we modify the date for the onset of the COVID pandemic, moving it one month earlier (February) and one month later (April). In column (3), we experiment with using White immigrants as the control group. Lastly, in column (4), we shorten the time window of our analysis, shortening the pre-pandemic period to include only 2017 onwards. As in Panel A, results prove robust to these additional model specifications.

To conclude, in Panel C, we gauge the robustness of our findings to the use of alternative measures reflective of the intensity of the pandemic at the state level, as opposed to its nationwide onset.²¹ We use three different measures of the treatment variable at the state and year-month level: COVID mortality (Column 1, Panel C), an index equal to the number of non-pharmaceutical interventions (NPIs) in place statewide (Column 2, Panel C), and drop in non-influenza-like illness outpatient visits. The qualitative conclusion remains the same — namely, Asian immigrants' self-employment exits were disproportionately higher than those of non-Hispanic Whites in states more severely hit by the pandemic.²²

Overall, we consistently find robust evidence of a disproportionate increase in Asian immigrants' self-employment exits, relative to those endured by non-Hispanic Whites, following the onset of the pandemic.

5 Potential mechanisms

Thus far, we have provided evidence of a disproportionately negative impact of the COVID pandemic on Asian self-employment due to a substantial increase in self-employment exits when compared to those endured by non-Hispanic Whites. There could be various explanations for this pattern. We contemplate four prominent ones. First, as a minority group, Asian immigrant-owned businesses may have experienced more negative impacts of the pandemic due to (1) lack of government support experienced too by other minority groups, such as Blacks, Hispanics, and non-Asian

²¹ In Appendix Table B.3, we show that states with higher COVID intensity levels, as captured by various measures, exhibited similar self-employment exit trends for Asian immigrants and non-Hispanic Whites prior to the onset of the pandemic, alleviating identification concerns when using continuous intensity treatment variables, as we explain in Appendix Section B.4.

²² In Appendix Table A.9, we replicate the analysis using, instead, county-level measures of NPIs. The sample is cut down significantly due to the limited number of observations with county identifiers in the CPS. The first column replicates our main findings in Panel C of Table 1 (Model 3) — this time controlling for the number of county-level COVID policies. The second column uses that control as a proxy for the intensity of the pandemic. As shown therein, we continue to find evidence of a disproportionate increase in Asian immigrants' self-employment exits, when compared to non-Hispanic Whites, as the pandemic intensified.

immigrants; (2) supply chain constraints; or (3) their narrower clientele. Second, Asian immigrants may be concentrated in jobs or industries that were particularly hurt by the pandemic and the non-pharmaceutical interventions that followed, such as non-essential business closures. Third, Asian immigrants might have exited self-employment voluntarily, reflecting a particularly cautious attitude toward the virus. Fourth, the rise of anti-Asian discrimination may have negatively impacted the survival of Asian-owned businesses.

5.1 Asian immigrant-owned businesses facing extra hurdles

5.1.1 Is it an immigrant-native effect?

Research has shown that the pandemic had a more negative impact on minority groups than Whites (i.e., Fairlie 2020; Montenovio et al. 2020). Minority and immigrant business owners often have restricted access to government support, such as the Paycheck Protection Program (PPP) loans offered during the pandemic (Fairlie and Fossen 2022a). To assess if this is the explanation for the differential impact of the pandemic on Asian immigrants' self-employment exits when compared to non-Hispanic Whites, we extend our analysis to include other minority and immigrant groups. In Panel A of Table 3, we use non-Asian immigrant groups as our treatment groups. In column (1), we use all non-Asian immigrants, whereas in column (2), we focus on Hispanic immigrants. None of these immigrant groups experienced a disproportionate increase in self-employment exits when compared to non-Hispanic Whites, suggesting our finding for Asian immigrants is not likely driven by diminished access to public assistance by immigrants.

5.1.2 Is it a majority-minority effect?

We assess if the disproportionate impact of the pandemic on Asian self-employment exit rates when compared to those endured by non-Hispanic White entrepreneurs were simply capturing a majority-minority effect. To that end, we repeat our estimations using two disadvantaged minority groups — Blacks and Hispanics — as alternative treatment groups (columns (3) and (4) of Panel A, Table 3). Once more, we fail to find evidence of a disproportionate impact of the pandemic on the self-employment exit rates of these two minority groups. This finding is consistent with prior studies documenting how Blacks and Hispanics experienced a quick recovery within the first couple of months that followed the onset of the pandemic (Fairlie 2020).

In sum, the results in Panel A of Table 3 do not support the hypothesis that the disproportionate impact of the pandemic on Asian self-employment exit rates is due to a majority-minority impact common to other minority groups or to a native-immigrant impact common to other immigrant groups.

5.1.3 Was it driven by supply chain issues?

As noted in the Introduction, Asian businesses may source more of their inputs from Asia than White native-born business owners catering to White native-born

Table 3 Mechanisms #1 for increased exits: are Asian immigrants facing extra hurdles?

Panel A: other immigrant or minority groups experiencing the same effects?		Panel B: Asians suffer more from supply chains disruptions during COVID?		Panel C: Asian or immigrant customers reducing consumption?	
Other treatment groups:	Immigrants	High vs. low state imports from China	High vs. low supply chain disruptions in state	Heterogeneous effects in Asian enclaves	Heterogeneous effects in Asian immigrant enclaves
Subgroup:	All non-Asian immigrants		Hispanic immigrants		
Group*COVID onset	-0.025 (0.017)		-0.026 (0.017)		
N	252,412		236,851		
Model specification:	Asian*COVID onset	0.087** (0.038)	0.082** (0.033)	Retail trade and entertainment industries	All other industries
	Asian*High imp disrupt*COVID onset	0.022 (0.033)	0.035 (0.029)	0.124** (0.050)	0.096** (0.038)
	Asian*High imports disruptions	0.015* (0.008)	0.002 (0.010)		
	High imports disruptions*COVID onset	0.020*** (0.003)	-0.016*** (0.004)		
N	227,206		227,206	34,371	192,835
Model specification:	Asian*COVID onset				
	Asian*% Asian in MSA*COVID onset				
				Asian*COVID onset	0.049*** (0.017)
				Asian*% Asian imm. in MSA*COVID onset	-0.184 (0.140)

Table 3 (continued)

Asian*% Asian in MSA	0.054** (0.022)	Asian*% Asian imm. MSA	0.071** (0.030)
% Asian in MSA*COVID onset	0.162*** (0.047)	% Asian imm. in MSA *COVID onset	0.245*** (0.081)
N	227,206		227,206

The dependent variable is self-employment exit for all models. All models use Asian immigrants as the treatment group and native non-Hispanic Whites as the control group unless otherwise specified in the model. All models include the set of controls in the most complete model specification in Table 1. “% Asian in MSA” and “% Asian Immigrant in MSA” variables are de-meaned. Standard errors are clustered at the state level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

customers. The pandemic interrupted international trade of goods and services from China, as well as people flows due to imposed travel bans. The inability to access much-needed inputs may have placed Asian businesses at a particular disadvantage, as in the case of a Chinese grocery store selling specialized goods from China, or Chinese restaurants sourcing their supplies from China. To evaluate if supply chain issues were the main drivers for the found impacts, we first gather information on Chinese imports at the state level. Then, we create a dummy indicative of the states having a ‘high’ level of Chinese imports, which we interact in the model to gauge if the exit rate of Asian immigrant businesses after the COVID onset significantly differed across states based on their Chinese imports.²³ In addition, we gather state-level data on the share of firms indicating their exposure to supply chain disruptions.²⁴ As shown in Columns 1 and 2 of Panel B in Table 3, we find no evidence of Asian businesses exiting at a differential rate following the onset of the pandemic based on either the state’s imports from China or the extent of supply chain disruptions reported by businesses in the state, suggesting that, while relevant, trade disruptions may not have been the primary reason for the differential rate of Asian business exits.

Finally, we evaluate the impact of the pandemic on Asian businesses across industries that may heavily rely on imported materials, including the retail trade industry and the arts, entertainment, recreation, accommodations, and food services industry (that encompass businesses such as Asian grocery stores and Asian restaurants). In Columns 3 and 4 of Panel B, Table 3, we show that the effect on Asian businesses is slightly larger in the industries in Column 3 when compared to the impact on businesses in other industries. However, the effect remains large even after the exclusion of the industries in Column 3, suggesting supply chain issues alone are unlikely to be responsible for excess exits among Asian businesses.

5.1.4 Was it driven by having a narrower Asian clientele?

If Asian immigrant businesses catered primarily to co-ethnics, and Asian customers were more fearful of the virus and less likely to go out, then Asian immigrant businesses may have particularly suffered. To assess this hypothesis, we examine if exit rates differed based on the share of Asians residing in the MSA where the business

²³ A state is defined as one with a ‘high’ level of imports from China if the weight Chinese imports on its GDP is above the sample median based on data from USA Trade Online (<https://usatrade.census.gov>). States with a ‘high’ level of Chinese imports include Arkansas, California, Georgia, Illinois, Indiana, Kentucky, Michigan, Minnesota, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Washington, and Wisconsin.

²⁴ We use the answers to the question: ‘In the last week, did this business have disruptions in its supply chain?’ in the Small Business Pulse Survey, week 04/26/2020–05/02/2020 (<https://portal.census.gov/pulse/data>). A state is defined as one with a ‘high’ level of supply-chain disruptions if the proportion of businesses answering positively is above the sample median. States with a ‘high’ level of supply chain disruptions include Alabama, Arkansas, California, Idaho, Louisiana, Maine, Maryland, Michigan, Mississippi, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Washington, and Wisconsin. There are a few similarities with the prior list of states with high level of imports from China.

was located. Other things equal, we would expect Asian-owned businesses to suffer more in areas with a higher concentration of Asians if the attitudes of Asian customers play a major role in contributing to a higher exit rate. We evaluate the heterogeneity across MSAs by adding the triple interaction of Asian, COVID Onset, and percent of Asians in MSA. As shown in the first column of Panel C in Table 3, the exit rate of Asian immigrant businesses following the onset of the pandemic did not significantly differ across MSAs based on the concentration of co-ethnics.

Because one might be concerned that the relevant measure is the share of Asian immigrants in the MSA, we repeat the exercise using that concentration as an alternative measure of the co-ethnic clientele in the second column of Panel C in Table 3. We still fail to find supporting evidence of a fearful co-ethnic clientele likely explaining the differential exit rate of Asian immigrant businesses following the onset of the pandemic.

5.2 The role of industrial and occupational distribution

Over the course of the pandemic, states adopted various non-pharmaceutical interventions to curb its spread. The pandemic and these follow-up interventions had a negative impact on industries and occupations involving in-person services, as well as on non-essential businesses. An alternative explanation for the disproportionate impact of the pandemic on Asian self-employment exits is the potentially greater concentration of Asian entrepreneurship in those industries and occupations.

Our models already include industry fixed effects. Nevertheless, to capture differences more accurately in the type of businesses held by entrepreneurs, we first experiment with including two additional control variables: a dummy indicative of an essential business, and a dummy variable signaling an occupation that allows for remote work.²⁵ Our finding, shown in column (1) of Panel A in Table 4, proves robust to the inclusion of these additional controls. Next, we consider including more disaggregated 3-digit industry fixed effects in the estimation as well as their interactions with the *COVID onset* dummies. As shown in column (2) of that same panel, our finding remains unchanged. In sum, industry or occupational segregation does not seem to drive the disproportionate impact of the pandemic on the survival of Asian immigrant businesses — a finding consistent with Couch et al.'s (2020) analysis of minority unemployment.

Next, we examine whether Asians in non-essential businesses or occupations that do not allow for remote work experienced larger negative impacts than their counterparts in essential businesses or occupations that allowed for remote work. To that end, we include pairwise interaction terms of these dummy variables with the *Asian*

²⁵ We follow Fairlie (2020) and define essential industries using the classification provided by Delaware State for essential and nonessential businesses (<https://business.delaware.gov/wp-content/uploads/sites/118/2020/04/DE-Industry-List-4.8.pdf>). We use Dingel and Neiman (2020, Table 3) estimates on the share of jobs that can be done at home by industry. An industry is classified as allowing for remote work if the share of jobs that can be done remotely exceeds 70 percent. This ad-hoc cutoff is the approximate mode of the distribution of jobs in our sample.

and *COVID onset* dummies. Based on the results in Panel B of Table 4, the pandemic did not have a differentiated impact on the Asian self-employment exit rate based on whether the business was considered essential. 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. In both instances, the pandemic continued to disproportionately hurt the survival of Asian immigrant businesses regardless of the added controls.

5.3 The role of voluntary exits and fear of contagion

As documented earlier, the disproportionate impact of the pandemic on Asian self-employment rates was driven by its damaging impact on Asian immigrant entrepreneurship survival rates when compared to those of non-Hispanic Whites. One could speculate that the increased exit rate among Asian immigrant entrepreneurs was a voluntary choice. Asian countries, especially those in East Asia, had a differential attitude towards the pandemic, implementing strict public health measures from the beginning of the outbreak, including stringent mask requirements, rapid contact tracing, isolation testing of all cases, quarantines, and border closings (Navarro 2021). Even though the evidence on whether Asians differed from non-Hispanic Whites with respect to COVID-19-related perceived threats and risks is inconclusive (e.g., Niño et al. 2021; Kumar and Encinosa 2023), the possibility exists that Asian immigrants may have been more vigilant and, potentially, more prone to closing their businesses to avoid exposure to the virus.

To assess this hypothesis, we first look at both work hours and family income among those self-employed who are identified as exiting self-employment the following month. If fear of contagion was the main driver behind the differential exit rate of Asian immigrants' businesses, we would expect to find a reduction in work hours and no differential impact on family income prior to exiting self-employment. Yet, the estimates in Panel A of Table 5 reveal that work hours among those exiting self-employment were, if anything, slightly higher for Asian immigrants than for non-Hispanic Whites. In addition, self-employed Asian immigrants were experiencing large reductions in family income prior to exiting self-employment when compared to non-Hispanic Whites. While we can only interpret family income as a proxy for business income, the large drop in income suggests their business closure was probably involuntary.

Next, we examine the transitions of self-employed Asian immigrants from self-employment into different labor force statuses following the onset of the pandemic. As noted earlier, if fear of contagion was the main driver behind the differential exit rate of Asian immigrants' businesses, we would expect most business closures to result in transitions out of the workforce, as opposed to unemployment. We estimate a multinomial logit model of self-employment exits (to unemployment, to out of the labor force, and to wage-employment), where remaining self-employed is the base or reference category. Panel B of Table 5 reports the relative risk ratios from that estimation. Self-employed Asian immigrants were twice as likely than non-Hispanic Whites to exit the workforce. These transitions

Table 4 Mechanisms #2 for increased exits: is it due to Asian immigrants' occupations or industries?

Panel A: effects driven by Asians' concentration in different types of businesses?			
Model specification:	Control for essential and remote occupations	Control for (detailed industry FE x Covid onset)	
Asian*COVID onset	0.103*** (0.027)	0.102*** (0.029)	
<i>N</i>	227,206	227,206	
Panel B: Asians experience more negative effects in non-essential or non-remote businesses?			
Model specification:	Heterogeneous effects in essential vs. non-essential	Heterogeneous effects in remote vs. non-remote	
Asian*COVID onset	0.120*** (0.026)	Asian*COVID onset	0.110*** (0.029)
Asian*Essential bus. *COVID onset	-0.032 (0.028)	Asian*Remote bus. *COVID onset	-0.016 (0.023)
Asian*Essential bus	0.015*** (0.005)	Asian*Remote bus	0.020*** (0.006)
Essential bus.*COVID onset	-0.008 (0.010)	Remote bus.*COVID onset	-0.014 (0.021)
<i>N</i>	227,206	227,206	

The dependent variable is self-employment exit for all models. All models use Asian immigrants as the treatment group and native non-Hispanic Whites as the control group unless otherwise specified in the model. All models include the set of controls in the most complete model specification in Table 1. Standard errors are clustered at the state level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

could reflect fear of contagion, but also a lack of search activity when becoming unemployed in the midst of the pandemic. Therefore, it is helpful to also look at transition patterns from self-employment into other labor force statuses to further uncover information on what such transitions may be masking. To that end, we first look at transitions from self-employment into unemployment. Self-employed Asian immigrants were 2.6 times more likely to become unemployed than self-employed non-Hispanic Whites following the onset of the pandemic. Because one needs to be actively searching for work to be considered unemployed, this finding reveals that Asians exiting self-employment were more likely than their non-Hispanic White counterparts to be actively searching for employment, as opposed to evading work for fear of contagion. In addition, self-employed Asian immigrants and non-Hispanic Whites did not differ in their exit patterns to other wage and salary work, suggesting once more that fear of contagion was not inhibiting them from working.

To further investigate the potential voluntary nature of Asian immigrant self-employment exits during the pandemic, we examine how those transitions varied based on whether the spouse was employed as a wage and salary worker (Panel C

Table 5 Mechanisms #3 for increased exits: are Asian immigrants exiting for fear of contagion?

Panel A: Asian immigrants' work hours and family income right before exiting self-employment			
Outcome:	Work hours	Family income	
Asian*COVID onset	4.237* (2.457)	-1.362*** (0.415)	
<i>N</i>	13,135	14,834	
Panel B: Asian immigrant-owned businesses exit voluntarily?			
MNL of exit choice	Exit to unemployment	Exit to NILF	Exit to wage-employment
Asian*COVID onset	2.602*** (0.560)	2.165*** (0.425)	1.249 (0.180)
<i>N</i>		227,206	
Log-likelihood		-1.78E+08	
Panel C: Differential exit patterns by spousal wage and salary employment status			
With wage/salary spouse:	Exit to unemployment	Exit to NILF	Exit to wage-employment
Asian*COVID onset	1.527 (0.528)	2.144** (0.794)	1.182 (0.269)
<i>N</i>		95,228	
Log likelihood		-6.62E+07	
Without wage/salary spouse:	Exit to unemployment	Exit to NILF	Exit to wage-employment
Asian*COVID onset	3.372*** (0.826)	2.078*** (0.431)	1.307 (0.248)
<i>N</i>		131,978	
Log-likelihood		-1.09E+08	
Panel D: excluding those nearing retirement (i.e., 60+)			
MNL of exit choice	Exit to unemployment	Exit to NILF	Exit to wage-employment
Asian*COVID onset	2.372*** (0.507)	2.290*** (0.501)	1.344* (0.208)

Table 5 (continued)

<i>N</i>		198,786	
Log likelihood		- 1.55E+08	
Panel E: Labor market transitions among Asian immigrants who are wage and salary workers			
Multinomial logit model of leaving wage-employment			
	Exit to unemployment	Exit to NILF	Job quitter
Asian*COVID onset	1.627*** (0.145)	1.130 (0.089)	Sample: Wage-employed who exited to unemployment -0.113** (0.048)
<i>N</i>	1,873,198		17,436
Log-likelihood	- 7.88E+08	0.532*** (0.115)	Exit to self-employment

All models use Asian immigrants as the treatment group and native non-Hispanic Whites as the control group. All models include the set of controls in the most complete model specification in Table 1. Standard errors are clustered at the state level. Workhours and family income in Panel A are transformed using inverse hyperbolic sine to deal with negative or zero values. MNL models include all control variables except the interaction terms of Covid onset and control variables, and the base group is those who remain self-employed in the next period. Reported MNL results are relative risk ratios (rrr), which is transformed using formula e^{β} . Standard errors (se) of rrr are calculated as $e^{\beta} * se(\beta)$. Significance levels are based on values of β and $se(\beta)$. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

in Table 5). Other things equal, we would expect self-employed respondents with a spouse employed as a wage and salary worker to be more likely to voluntarily exit self-employment since they would have another source of income to rely upon. Yet, we do not observe that to be the case. Respondents exhibited the same likelihood of exiting from self-employment to out of the workforce. Furthermore, as we would expect from involuntary exits, respondents without a wage and salary spouse (i.e., an alternative source of income) were significantly more likely to exit self-employment, especially to unemployment, suggesting such exits were not likely to be voluntary.

Exits from self-employment could have been driven by older working-age individuals considering an early retirement. In Panel D of Table 5, we evaluate this possibility. As shown therein, self-employed Asians who were not close to retirement age exited to unemployment and wage and salary work at higher rates than White non-Hispanics following the pandemic onset, signaling they were interested in working. These results contradict the notion that Asian immigrants were mainly exiting self-employment at higher rates than non-Hispanic Whites voluntarily to avoid contagion. In addition, removing those close to retirement, who would have been more willing to voluntarily quit their businesses, did not lower the higher transition rate from self-employment into out of the workforce of Asian immigrants after the pandemic started.

Finally, in Panel E of Table 5, we look at exits from wage and salary work into other labor force statuses, including self-employment. If we are willing to assume that: (1) Asians were, in general, more concerned about fear of contagion, and (2) contagion fear was intense enough for someone to give up their livelihood, we would expect to observe Asians employed as wage and salary workers quitting their jobs voluntarily. Yet, we observe that wage and salary Asian immigrant workers were more likely to become unemployed (column 1), but less likely to be job quitters (column 4),²⁶ signaling they were more likely to be involuntarily unemployed. Furthermore, these employees were not more likely to leave the labor force (column 2) and, possibly related to how self-employed counterparts were doing, less likely to go into self-employment (column 3).

Overall, the results in Table 5 do not support the notion that the excess Asian immigrant self-employment exits, when compared to non-Hispanic Whites, following the onset of the pandemic were primarily voluntarily driven by business owners' fear of contagion.

5.4 The role of prejudice

Prejudice against Asians increased substantially since the onset of the pandemic and exacerbated over time — a fact supported by anecdotal and academic evidence. For instance, Nguyen et al. (2020) analyzed 3,377,295 US race-related tweets and showed that the proportion of negative tweets referring to Asians increased by 68.4

²⁶ Job quitters are defined as those reporting quitting their jobs when asked about the reason for being unemployed.

percent from November 2019 to March 2020, whereas those referring to Blacks or Latinx remained stable during that period. Similarly, using data from 2007 through 2020, Darling-Hammond et al. (2020) show that the Implicit Americanness Bias index (a measure of the subconscious belief that European Americans are more “American” than Asian Americans) reversed its 13-year steady declining trend and began to increase on March 8, 2020, as the use of terms such as “Chinese virus” became widely adopted by media. Astoundingly, the authors show that, from March 8 to March 31, 2020, Implicit Americanness Bias increased enough to offset more than three years of prior reductions. In a different setting, Lu et al. (2021) use a nationally representative survey dataset collected in August 2020 with an embedded vignette experiment concerning roommate selection. They find that priming COVID-19 salience has an immediate and statistically significant impact on the treatment group — they exhibited increased prejudice and discriminatory intent against East Asian hypothetical room-seekers. The authors conclude that “incidents of anti-Asian hostility reported in the media are not isolated acts but signal-amplified racism against East Asians.”

Prejudice against Asian-owned business can originate from customers, banks, and suppliers, which can have profound impacts on their survival rate (Becker 1957; Borjas and Bronars 1989). Customers may reduce their interactions with these businesses, leading to a substantial decline in business revenues. In that vein, Huang et al. (2023) show a substantial decrease in foot traffic to Asian restaurants, the magnitude of which is larger in areas with higher levels of support for President Trump. In addition, customers may also disrupt business operations. For example, news media has reported that Asian-owned restaurants received an increasing number of prank calls and fake orders (PBS 2020), as well as vandalisms (NBC News 2020a, b). Additionally, Asian-owned businesses may encounter bank discrimination during this period. An extensive literature has documented that minority groups are more likely to experience credit market discrimination, e.g., being denied a loan or receiving a loan with higher interest rates than Whites (Blanchflower et al. 2003; Alden and Hammarstedt, 2016; Cavalluzzo and Cavalluzzo 1998). Lastly, Asian-owned businesses may have been discriminated against by suppliers, restricting their access to important production materials (Alden and Hammarstedt, 2016). In addition to taste-based discrimination, the initial detection of the virus in China could have led to increased statistically based discrimination against Asian-owned businesses for fear of contracting the virus.

Measuring discrimination is challenging, as one must rely on unexplained and disparate outcomes. However, in addition to the unexplained and disparate self-employment exits experienced by Asian immigrants vis-à-vis non-Hispanic Whites, we first examine if the onset of the pandemic proved particularly more harmful for Asian immigrant groups more likely to experience discrimination. Next, we evaluate if there is empirical evidence of a direct link between prejudice measures against Asians and Asian immigrants’ self-employment exit rates.

5.4.1 Differential impacts across Asian immigrant subgroups

To evaluate if certain Asian immigrant subgroups more likely to experience discrimination were, accordingly, more severely hurt by the onset of the pandemic, we

assess the heterogeneous impact of the pandemic onset by migrants' recent arrival and country of origin. The results from these exercises are shown in Panel A of Table 6.

Recent migrants might be less assimilated and more easily identified as newcomers, enduring much of the potential discrimination brunt, both taste-based and statistical-based.²⁷ Based on the estimates in column (1), that appears to have been the case. The onset of the pandemic lowered self-employment among recent Asian arrivals by 38%, relative to 15% among non-recent Asian immigrants.²⁸ Another explanation consistent with this pattern may be that recent migrants had limited access to networks and informal lending sources, both of which may have contributed to their higher failure rate. Yet, our difference-in-differences modeling, which compares Asian immigrants' self-employment exit rates before and after the pandemic *vis-à-vis* those of non-Hispanic Whites, should address such differences in network and financing sources. Furthermore, Asian-owned businesses in Asian enclaves (with more possibility for networks and lending sources) were not shielded from the impact of the pandemic, suggesting limited access to networks and informal lending sources may not have been the main driving source.²⁹

Similarly, we distinguish according to Asian immigrants' origin. The fact that the new coronavirus was first identified in a cluster of pneumonia cases in Wuhan, China, might have exacerbated xenophobic sentiments and resulted in greater discrimination towards East Asians (WHO 2020).³⁰ In addition, statistical discrimination could also be stronger against East Asians because of their resemblance to Chinese migrants or upfront knowledge about the business owner's origin. Therefore, in column (2) of Panel A in Table 6, we distinguish between immigrants from East Asia and those from other Asian origins. As expected, self-employment exit rates were larger among East Asians (129%) than among non-East Asians (54%).³¹

Overall, the results in Panel A of Table 6 are suggestive of discrimination — which would have been greater for more recent, less assimilated, migrants, as well as from those originating from East Asia, including China — being a likely cause of the disproportionate impact of the pandemic on Asian immigrants' survival rates.³²

²⁷ For instance, Becker's (1957) customer discrimination may also affect self-employed individuals if discriminating customers are bothered by who is serving or assisting them during the sale and prefer not to purchase from those establishments.

²⁸ The dependent variable mean before the COVID-19 pandemic for recent Asian immigrants is 0.022, relative to 0.085 for non-recent Asian immigrants.

²⁹ It is worth noting that, if recent Asian immigrants were more educated than their non-recent counterparts, our estimates would be downward biased. Nevertheless, we checked if both groups significantly differed based in their educational attainment when controlling for other basic demographic traits, including age, and did not find evidence of a statistically significant difference in our sample.

³⁰ 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.

³¹ The dependent variable means before the COVID-19 pandemic self-employment exits are 0.154 for East Asian immigrants and 0.074 for non-East Asian immigrants.

³² While we have already shown that voluntary exits were not the primary driver of the disproportionate self-employment exit rate among Asians when compared to non-Hispanic Whites, we cannot fully rule out the possibility that some self-employment exits among recent Asian immigrants may be influenced by their home countries' attitudes towards the virus.

5.4.2 Relationship to measures of prejudice

Next, we evaluate if there is a direct link between prejudice measures against Asians and Asian immigrants' business outcomes. To do so, we gather information on Google searches involving the use of racially charged terms at the state level. Then, in the spirit of Stephens-Davidowitz (2014), we examine how their usage might have been correlated to the observed Asian business dynamics. We use two different sets of Google search keywords to measure prejudice: (1) "Yellow People"; and (2) Anti-China terms including "Hate China", "Back to China", "No China", or "China Die". As shown in Panel B of Table 6, increased searches of these terms were all positively and significantly related to a disproportionate rise in self-employment exits among Asian immigrants, when compared to non-Hispanic Whites.

Summarizing, the results in Tables 3, 4, and 5 failed to provide support for some of the explanations for the disproportionate impact of the pandemic onset on Asian entrepreneurship survival rates, when compared to those of non-Hispanic Whites. First, we fail to find evidence that the substantial increase in self-employment exits among Asian immigrants were the byproduct of a majority-minority differential due to a minority or immigrant group lacking sufficient government support during the pandemic. Afterall, other immigrant and minority groups did not experience alike impacts. In addition, we fail to find evidence that the observed disproportionate rate of self-employment exits among Asian immigrant businesses were driven by supply chain issues, since there is no difference in self-employment exit rate across states with a higher volume of Chinese imports following the onset of the pandemic. Second, we do not find support that the disproportionate impact of the pandemic onset on Asian

Table 6 Mechanisms #4 for increased exits: could it be related to prejudice against Asians?

Panel A: heterogeneous analyses by Asian subgroups			
Recent (YSM <= 5) vs. non-recent arrivals		East Asian vs. non-East Asian immigrants	
Recent Asian immigrants*COVID onset	0.199*** (0.052)	East Asian*COVID onset	0.068*** (0.017)
Non-recent Asian immigrants*COVID onset	0.040*** (0.013)	Non-East Asian*COVID onset	0.043** (0.017)
<i>N</i>	227,206		227,206
Panel B: using Google trends (GT) indices as treatment			
	Search for "yellow people"	Search for anti-China terms	
Asian*GT index	0.000** (0.000)	0.001** (0.000)	
<i>N</i>	200,161	190,302	

The dependent variable is self-employment exit for all models. All models use native non-Hispanic Whites as the control group. Panel B drops observations from Alaska, Montana, North Dakota, Vermont, and Wyoming with no valid Google data for "Yellow People" and additionally South Dakota with no valid Google data for anti-China terms. Anti-China terms include "Hate China" + "Back to China" + "No China" + "China Die." Standard errors are clustered at the state level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

immigrant businesses might have been driven by their concentration in specific industries or occupations hard hit by the pandemic. A detailed accounting of their specific industries and occupations does not significantly alter our findings. Third, we show patterns that are inconsistent with the hypothesis that the observed differential impact of the pandemic on Asian entrepreneurship was all voluntary, possibly driven by deliberate closures to evade the virus for fear of contagion. Instead, we find empirical evidence suggestive of prejudice against Asians likely playing a role in the disproportionately negative impact of the pandemic on Asian entrepreneurship.

6 Longer run impacts

Thus far, we have shown how the onset of the COVID pandemic disproportionately hurt Asian businesses until December 2020 — an impact consistent with both increased taste-based and statistical discrimination. A remaining question is whether such an impact persisted thereafter as vaccines became available and policies to fight anti-Asian discrimination, such as the COVID-19 Hate Crimes Act in 2021, were adopted.

To gauge the evolution of Asian self-employment and its dynamics after the onset of the pandemic, we conduct a series of event-study analyses at a yearly (left) and in 3-month intervals (right) to provide a more nuanced view of existing trends.³³ Panels A and B in Fig. 1 illustrate the event-study coefficients for self-employment entry when grouping the data in years and in 3-month periods respectively.³⁴ Panels C and D show those for self-employment exits, and Panels E and F show those for unemployment trends. The year 2019 is used as reference. Estimates are shown in Tables A.10 and A.11 in Appendix A.

Overall, the graphs show that self-employment entries between Asian immigrants and non-Hispanic Whites exhibit similar trends before and after the onset of the pandemic. In addition, Asian and non-Hispanic White self-employment exits moved in a parallel fashion for a long period dating back to 2014 up until the pandemic hit. They spiked during the first year of the pandemic and returned to their pre-pandemic level later in 2021. A similar pattern is found for unemployment rates (Panels E and F in Fig. 1). This pattern suggests that Asian immigrant entrepreneurship and employment, while disproportionately fell during the brunt of the pandemic, quickly rebounded in 2021.

Overall, the waning impact conforms with the notion that, as vaccines became available, customers felt safer and less fearful about visiting businesses owned by Asian immigrants and discrimination waned.³⁵ Such an interpretation is supported by the event studies in Figure A.2, where we use Google search indices proxying for the intensity of discrimination at the state level, as opposed to the onset of the

³³ We conduct this analysis grouping the data in years or 3-month intervals due to the high volatility of self-employment dynamics at the monthly level.

³⁴ In the 3-month periods analysis, the pre-COVID coefficients span from the 3-month period of January–March of 2017 (noted as Pre8) through October–December of 2018 (Pre1). Post-COVID coefficients span from March to May of 2020 (noted as Post1) through September–December of 2021 (Post7). More distant years, including 2016 and earlier, are binned up and included in the estimation, but not reported.

³⁵ Alternatively, Asian businesses vulnerable to discrimination may have already exited at the onset of the COVID pandemic, with the remaining businesses returning to a normal exit rate.

pandemic. Our findings mirror those in Fig. 1 and, together with the evidence in Tables 3, 4, 5, and 6, suggest that discrimination against Asians cannot be ruled out as a driver for Asian business ownership dynamics following the pandemic onset.

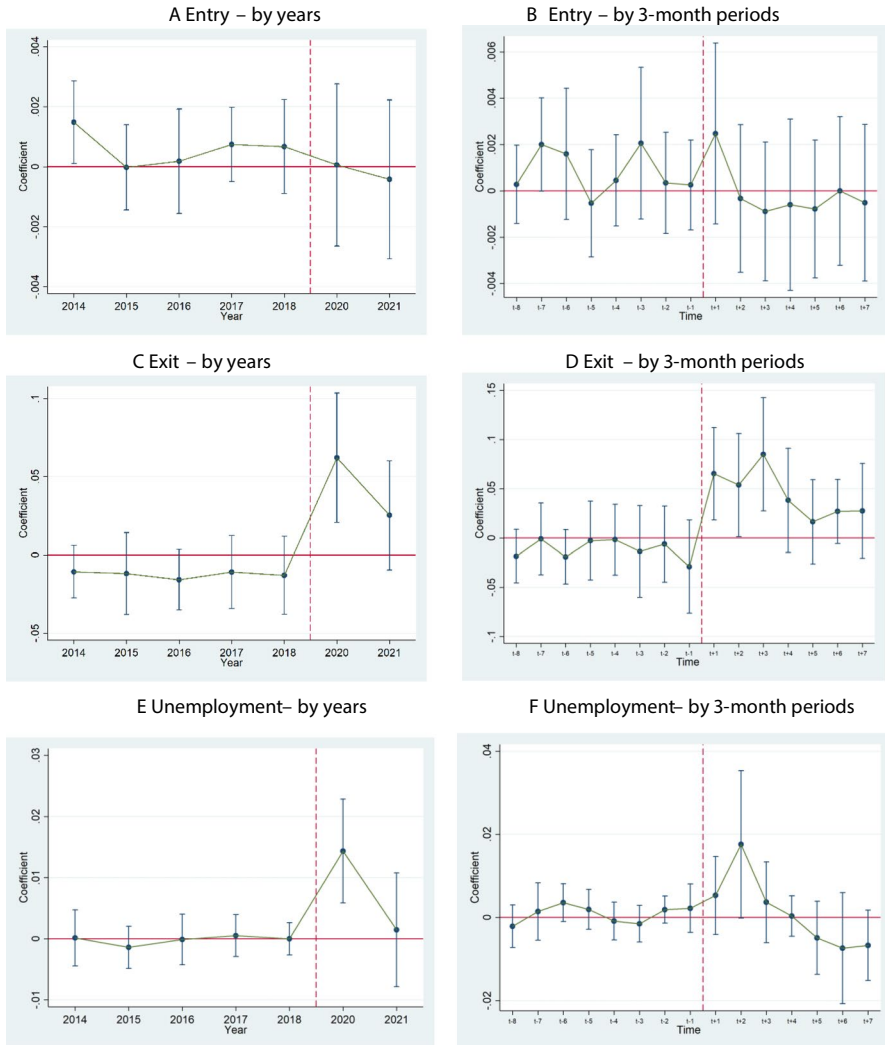


Fig. 1 Event study — long-term effects. Panel **A**: Entry — by years. Panel **B**: Entry — by 3-month periods. Panel **C**: Exit — by years. Panel **D**: Exit — by 3-month periods. Panel **E**: Unemployment — by years. Panel **F**: Unemployment — by 3-month periods. Notes: All models use native non-Hispanic Whites as the control group, along with a full set of control variables. Data are grouped in years in Panels **A**, **C**, and **E**, and in 3-month periods in Panels **B**, **D**, and **F**. The year 2019 is excluded and used as reference. In Panels **B**, **D**, and **F**, $t - 1$ represents Oct–Dec 2018, $t - 2$ represents Jul–Sept 2018, so on and so forth. Data for the year 2016 or earlier is binned up and not reported. $t + 1$ represents Feb–Apr 2020, $t + 2$ represents May–Jul 2020, $t + 3$ represents Aug–Oct 2020, etc. The figures include 95% confidence intervals for the estimated coefficients

7 Summary of findings and conclusions

We explore how the onset of the COVID pandemic impacted the self-employment rate and business dynamics of Asian entrepreneurs in the USA, when compared to non-Hispanic Whites. The results uncover a disproportionately negative impact of the pandemic on the self-employment rate of Asian immigrants, which dropped by 13% when compared to the rate among non-Hispanic Whites, from March 2020 through the end of that first pandemic year. An analysis of self-employment dynamics reveals that the decrease in Asian entrepreneurship was mainly driven by Asian immigrants' exit rate from self-employment being twice as high (an increase of 129%) as that of non-Hispanic Whites after the pandemic. The differential impact proves robust to the use of alternative measures of the pandemic capturing its intensity, treatment and control groups, sample periods, model specifications, and an array of identification checks.

We then consider alternative explanations for our findings. Specifically, we show that the differential impact of the pandemic on Asian immigrant business survival was unlikely to be driven by the lack of government support or by a co-ethnic customer base resulting in majority-minority effect, by supply chain constraints from China, or by Asians' distinct concentration in industries or jobs especially vulnerable to the pandemic. In fact, while some Asian self-employment exits may have been driven by fear of contagion, the latter would fail to explain: (1) why, before exiting, self-employed Asian immigrants work longer hours and suffer a drop in family income; (2) why only the self-employed are fearful of contagion at work, but not those holding wage and salary jobs; (3) why Asian immigrants with wage and salary jobs are more likely to enter self-employment; (4) why self-employed Asians who are not close to retirement age exit to both unemployment and wage and salary employment, suggesting they want to work; or (5) why transitions from self-employment to unemployment occurred among Asian self-employed individuals without a spouse in the wage and salary sector (i.e., an alternative source of income). Meanwhile, the pandemic had a larger disruptive impact on Asian subgroups more likely exposed to discrimination, such as recently arrived Asian immigrants (less assimilated and more identifiable as foreigners) and East Asian immigrants (most of whom were Chinese). In addition, we document a direct link between measures of prejudice against Asians and Asian immigrants' business exits. Examining the longer-run effects, we show that these effects dissipated in 2021, as vaccines became available and measures of statistical and taste discrimination waned.

In sum, the COVID pandemic has had a disproportionately negative impact on the self-employment of Asians in the USA — an impact that does not appear to have been primarily driven by a majority-minority effect, supply chain constraints, having a narrower clientele, their concentration in jobs or industries hard hit by the pandemic, nor voluntary exits due to a cautious attitude towards the virus. Instead, we find empirical evidence suggestive of prejudice against Asians potentially playing a role in the disproportionate negative impact of the pandemic on Asian entrepreneurship. Given Asian-owned businesses' significant contributions to the US economy and job creation in the past, the likely 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 is crucial to inform about heterogeneous socio-economic disruptions created by the pandemic, and about the main drivers of these heterogeneous impacts. Such an understanding is key in curtailing such practices, reducing inequality, and ensuring a fast recovery.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00148-024-00985-1>.

Acknowledgement We are grateful for the feedback received from Jose Manuel Fernandez, Steve Trejo, Frank Fossen, Kenneth Couch, Huanan Xu, and Le Wang and from participants at the 2021 Allied Social Sciences Association meetings, the IX Demographic Economics Workshop at Universidad de Sevilla, the 2021 Southern Economic Association meetings, and the Economics Department Seminar at Western Michigan University. We also thank editor Alfonso Flores-Lagunes and three reviewers for their helpful comments.

Funding Funding for open access publishing: Universidad de Sevilla/CBUA

Data availability The data that support the findings of this study are available from the corresponding author upon request.

Declarations

Competing interests The authors have no relevant financial or non-financial interests to disclose.

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