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Optimizing Small Business

Technical Assistance with Nudges

Abraham Song, PhD, Laura Leets, PhD, and Christopher Boudreaux, PhD

About the Milken Institute

The Milken Institute is a nonprofit, nonpartisan think tank focused on accelerating measurable progress on the path to a meaningful life. With a focus on financial, physical, mental, and environmental health, we bring together the best ideas and innovative resourcing to develop blueprints for tackling some of our most critical global issues through the lens of what's pressing now and what's coming next.

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SUMMARY

As federal funding flows at historic levels to communities to do place-based economic development, there is deep concern that thousands of under-served communities lack the capacity and capital to access federal grant and loan programs designed to lift them up. The Milken Institute conducted a pilot project exploring ways to improve the efficacy of small business technical assistance programs through the application of behavioral science intervention known as a "*nudge*" (Thaler and Sunstein 2008). Four nudges were applied to improve the learning, engagement, and productivity of small-business owners and therein their business operations and financing. A nine-month pilot study was executed across seven regional Small Business Development Center (SBDC) networks in California and Texas. The pilot study demonstrated that nudges are a light-touch, low-cost intervention easily integrated into existing SBDC processes without imposing a significant burden on SBDC advisors. The evidence from California supported that nudging is a powerful intervention toward accessing capital, but the evidence from Texas did not. Given importance of SBDCs given their scale and reach, the divergent findings for two states merits a more in-depth nationwide study on ways of identifying ways to optimize this small business technical assistance.

HIGHLIGHTS

- The pilot study provides suggestive evidence that nudges are associated with improved *client engagement*. The *type of a* nudge did not appear to matter as much as the *implementation*.
- Only the evidence from California supports that nudging is a powerful intervention toward accessing capital. In California, SBDC advisors' clients who had received a nudge intervention received, on average, *larger loan amounts* than clients who had not received the intervention. These results were consistent across gender and race categories; in other words, we observed that nudge interventions were equally effective for women-owned as well as male-owned businesses, for Black-owned as well as White-owned businesses. In Texas, however, SBDC advisors' clients who had received a nudge intervention received, on average, *smaller loan amounts* than clients who had not received the intervention. The divergent findings between two states are not necessarily a testament to one state's effectiveness over the other, but rather the inherent complexities of SBDCs and, subsequently, the challenges of assessing their performances.
- We found little evidence that a nudge intervention increases *start-up rates*, but part of the reason may be a result of the limited time frame of our pilot study (nine months).

INTRODUCTION

Small-business owners play an important role in America's economic growth and job creation. Thirty-three million small businesses are the backbone of the American economy employing about half of the workforce.[1] However, the small business landscape is risky and difficult. Start-ups have a high failure rate—only about two-thirds of businesses with employees survive at least two years and about half survive at least five years.[2]

Making matters worse, access to capital is a critical issue for small businesses (Cole and Sokolyk 2018). Without sufficient capital, small firms are unable to develop new products and services or grow to meet demand. Yet, small businesses typically do not have access to traditional capital markets (Ang 1991), and insufficient liquidity is a frequently cited cause of small business failure. Instead, small businesses are heavily dependent on other sources of credit like personal savings, trade credit, credit cards, home equity loans, and loans from family members and friends (Berger and Udell 1995; Binks and Ennew 1996; Boudreaux, Clarke, and Jha 2021).

Although a substantial amount of government funding is allocated to subsidizing entrepreneurship training and support in the United States, little research has examined the role of Small Business Development (SBDCs) in providing funding and training. In theory, there are good reasons for continued government funding for business support and training subsidies (Fairlie, Karlan, and Zinman 2012). First is the *credit constraint*. If training is valuable but small-business owners lack the financial resources to pay for it, offering low-cost training as opposed to subsidized lending may be a cost-effective way to improve access. Improving access may come through training but perhaps even more valuable may be the information and assistance in finding and securing capital. Second is *capital market discrimination*. Given that minorities might face discrimination in lending, subsidized training may offer a targeted, efficient way to help minorities overcome barriers to starting businesses or securing loans. Third is *human and managerial capital constraints*. Many small-business owners benefit from training and support of how to operate their business. Investing in the human capital of a local economy has positive spillover effects that benefit others in the region (Acs, Braunerhjelm, and Audretsch 2009).

The purpose of this report is to examine whether SBDCs can use nudges to help small businesses overcome these hurdles. Implementing light-touch, low-cost nudges is practical in the context of SBDCs because nudges do not require major restructuring, training, or fund reallocation. Nudges are inexpensive, easily implemented by advisors in their existing workflow to clients, and result in better client outcomes (e.g., secured capital).

SBDCs provide individualized business advising and technical assistance to an estimated 1 million small businesses and pre-venture entrepreneurs every year. Comprising nearly a thousand centers across the nation, the network has both reach and scale. Over the years, SBDCs have become a go-to resource and hence a major entrepreneurship-support organization and public infrastructure for small businesses.

In a nine-month pilot study, four nudges were applied across seven regional SBDCs located in California and Texas. SBDC advisors' clients who had received a nudge intervention acquired larger loan amounts compared to clients who had not received the intervention. We found no significant differences for women- or minority-owned businesses. The pilot study demonstrated that nudges optimize small business technical assistance as a light-touch, low-cost intervention easily integrated into existing SBDC processes without imposing a significant burden on SBDC advisors.

NUDGES

Traditional economic research assumed people were rational agents, making decisions that maximized the utility or value of their actions. Over the past decade, social science research has replaced the economic "rational agent-based" approach with an irrational agent-based approach to decision making. Social science research has demonstrated that most human decision-making relies on automatic processing that allows people to navigate the reality of limited time, available information, and attention. People tend not to be rational decision makers; rather, they tend to take cognitive shortcuts and are susceptible to contextual biases.

Social scientists have spent decades studying human irrationality and developing ways to improve choices. While nudging is not new, Thaler and Sunstein's (2008) book, *Nudge: Improving Decisions About Health, Wealth, and Happiness*, increased the popularity of this intervention. The field of nudging has since vastly grown in both the public and private sectors and spans areas such as economics, political science, public health, decision-making, and marketing.

Specifically, a nudge is an intervention that aims to change an individual's behavior by designing a "choice architecture" for a physical, social, or psychological environment where the individual will decide without losing their agency. The interventions guide people by creating environments that anticipate and integrate people's biased decision-making. Nudge interventions have been shown to successfully promote behavior across numerous domains, populations, and locations. However, few studies have applied nudging to small businesses (Leets et al. 2020; Stjepan et al. 2019).

SMALL BUSINESS DEVELOPMENT CENTERS

Although a substantial amount of government funding is allocated to subsidizing entrepreneurship training and support in the United States, we know very little about its effectiveness. In part, there is very little research done on SBDCs because they have not historically shared their data. Generally, it is accepted that entrepreneurship support organizations play an important role in local entrepreneurial ecosystems. Small businesses are often not optimally managed because business owners and the self-employed are rarely equipped with formal training in business skills.

What we know about SBDCs is primarily based on annual national studies of their economic impact (Chrisman 2019). The most recent report from 2018 analyzed changes in sales, employment, jobs and sales revenues, and financing of about 4,500 established businesses and about 2,500 pre-ventures that received five or more hours of counseling assistance. Using the response survey of about 7,000 clients (from 60,000 clients), they compared the performance improvements of clients with the weighted average changes in performance of all businesses in the United States. The main objective of their study was to estimate the long-term tax revenues generated for state and federal governments from SBDC counseling as a basis to justify continued funding of the programs.

Our study departs from assessing economic impacts or stays away from comparing SBDC clients' business performance to national averages. Instead of scrutinizing the viability of SBDCs based on the tax generation of advised small businesses, our study explores ways of improving or optimizing the current technical assistance program provided by SBDCs.

Small businesses have not been competing on a level playing field. There are recent and historical barriers to success. Historically, research has found racial differences in asset levels makes a difference in small-business success (Fairlie 1999). An extensive body of literature examines racial disparities in denials of loan applications. While most studies focus on mortgage loans, a growing amount of literature documents racial disparities in business lending (Cavalluzzo and Cavalluzzo 1998; Blanchflower, Levine, and Zimmerman 2003; Blanchard, Zhao, and Yinger 2008; Fairlie, Robb, and Robinson 2022).

More recently, the COVID-19 pandemic revealed that small businesses are financially fragile and disproportionately affected by super shocks (Bartik et al. 2020). Small businesses owned by minorities and underserved communities were hit especially hard by the pandemic (Fairlie 2020). What also became apparent is that small businesses with digital presence were not only more likely to survive but often outperformed their peers (Belitski et al. 2022). Digital skills are increasingly important for online participation and the lack of digital competency among many small businesses is a problem that needs more attention (Mossberger et al. 2022; Steininger 2019; Looze and Desai 2020; Mossberger, LaCombe et al. 2022).

The SBDC is a designated program of the federal Small Business Administration (SBA) meant to help even the playing field. SBDC is a cooperative effort of the private sector, educational community, federal, state, and local governments. SBDCs facilitate the creation, expansion, and retention of businesses. According to the Office of Small Business Development Centers, in FY 2017, the federal government allocated about $131 million, and hosts provided a matching $133 million.[3]

Each SBDC provides one-on-one private counseling, workshops, capital access assistance, start-up support, and advisory services to prospective and existing business owners. The SBDCs assist with financing, government contracting, business planning and management, marketing, international trade, energy efficiency and sustainability, online strategies, disaster preparedness, technology commercialization and other business issues. Given the nationwide network of SBDCs, small improvements to their business advisory services can make a major difference to the clients they serve and the local economies in which the clients operate.

TECHNICAL ASSISTANCE PROJECT

Building on the field of behavioral insight, this study examines whether behavioral nudges improve technical assistance (TA) services provided at SBDCs. Through the use of nudges, the TA pilot program is intended to promote improved client engagement with SBDCs, leading to improved business outcomes for clients.

A nine-month pilot program was implemented across networks in California and Texas to test the effectiveness of nudges. Following the conclusion of the program, we collected and analyzed the data. This paper reports the impact that nudges had on small business client outcomes.

RESEARCH QUESTIONS

While nudging was initially conceived as a one-size-fits-all approach (Thaler and Sunstein 2008), research demonstrates that nudging can be tailored to particular contexts; some of us may be more susceptible to specific nudges, and some nudges may be more effective in certain contexts than others. It often takes multiple iterations to finetune the timing and strength of nudges in a particular situation. Our objective in this pilot study is to explore which nudges are effective for the TA advisors serving small-business owners. Specifically, we posed the following research questions.

Research Question 1: Does nudging improve SBDC TA efforts to increase capital for small businesses? What are the differential effects of gender and race?

Mentoring generally involves an interpersonal relationship of support, communication, and learning, where a more experienced person shares knowledge and expertise to help a less experienced person acquire the competence needed to achieve a goal (Burke, McKenna, and McKenna 1994; Tedder and Lawy 2009). Specifically, entrepreneurial learning is defined as a process that facilitates the development of necessary knowledge to be effective in starting and managing new ventures (Politis 2005). The SBDC provides a relationship of support and guidance between an experienced businessperson (advisor) to the small-business owner (client).

Research Question 2: Does nudging improve SBDC TA efforts to increase start-up rates for nascent entrepreneurs? What are the differential effects of gender and race?

METHODOLOGY

Research Design

We conducted a pretest-posttest, quasi-experimental design from January through September 2022 to examine whether there was a statistically significant association between the nudge intervention and business success metrics. The independent variable was the nudge with four conditions ([A] progress visualization, [B] priming, [C] likeability, [D] reminder + motivation email), and the dependent variables were the capital secured and the business start-up rate. We examined the dependent variables before and after the nudge was implemented. Each business advisor served as their own control in each nudge condition.

The major weakness of this design is the lack of random assignment of *business advisors* and the ability to rule out rival explanations or control for important confounding variables. Yet quasi-experimental designs are appropriate for longitudinal research and when there are ethical, logistical, or political constraints make randomization difficult. Another limitation has to do with compounding effects of intersectional identities (e.g., Black *and* women-owned), which are important and relevant, but for the scope of our project, we examined these factors separately. The design can still permit causal interpretations of observed associations in a natural context. Our design does incorporate random assignment of *business clients*, nonetheless.

Materials

The Milken Institute held four group discussions in September 2021 with business advisors to understand business advisor–client procedures, objectives, best practices, and obstacles. These meetings resulted in several key elements for optimizing client engagement and in turn, their business success: (1) clearly demarcating next steps, (2) planning for timely completion of tasks, (3) building trust between advisor and client, and (4) reminding clients to follow through with tasks and meetings as well as staying motivated. To this end, four nudges that have been shown to improve learning engagement and productivity were selected for the pilot study. Each nudge or intervention strategy is described below and elaborated upon in Appendix B. Each SBDC business advisor chose the nudge intervention they felt most comfortable executing during the pilot study.

Nudge A: Progress Visualization. Visualizing an individual's progress on a task improves time performance, and people tend to work harder and faster to complete clear goals. Research (e.g., endowed progress effect) reveal that an individual's commitment to a goal will deepen as they strive to achieve it (Nunes and Dreze 2006). In this pilot, the progress visualization nudge consisted of a technical assistant plan with milestones. Business advisors implemented this nudge to break down complex tasks into smaller, more achievable ones and in turn, help reduce their clients' confusion or feelings of overwhelm as they pursued their goals.

Nudge B: Priming. A priming nudge prepares people for change and helps an individual visualize positive actions and outcomes. This type of nudge is designed to encourage people to intuitively pursue a predefined set of actions, which resemble people's best interests and goals (Kahneman 2011). The priming nudge was presented as a "next steps" planning exercise encouraging a client to consider, explore, and assess steps and strategies for accomplishing goals and moving

past obstacles. Business advisors employed this nudge to increase client motivation and responsiveness.

Nudge C: Likeability. People are likelier to engage and feel positively towards interventions associated with trusted, credible, and reputable leaders (Cialdini 1984). Simply put, people are much more likely to be influenced and persuaded by those that they like than those they do not (e.g., Neal et al. 2012). Business advisors who used this nudge sent a biography and introduction email to establish credibility, trustworthiness, and an emotional connection to help clients achieve their goals.

Nudge D: Reminder + Motivation Email. Sunstein (2014) argues that inertia, procrastination, and the presence of competing working memory demands can lead people to neglect important actions through simple forgetfulness. A large amount of literature shows the use of reminders as a nudge to achieve a specific outcome (DellaVigna 2009). In addition, the reminder email added a motivation question (e.g., How do you plan to overcome obstacles or barriers to complete your task?). The right motivation can boost morale and encourage an individual to achieve their goal. The business advisors applied this email nudge to help clients remember meeting dates and times, complete outstanding tasks, and proactively ask for support.

Procedure

Full-time SBDC business advisors from five California regional networks (Central California, Los Angeles, Northern California, Orange County/Inland Empire, and San Diego & Imperial) and two Texas regional networks (North Texas [Dallas] and Texas Gulf Coast [Houston]) were recruited to voluntarily participate in a nine-month, longitudinal field study that explored whether behavioral nudges could improve technical assistance provided to small business clients. Given the limited time and resources for the pilot, a national study was unrealistic. Therefore, we selected California and Texas to offer an adequate, nationally representative portrait of the US. They are the two largest states by population and therefore, in active count of small businesses and in the SBDC activity. California covers both urban and rural, and both cultural and industrially diverse profiles. We want to do the same with Texas, but ultimately, only two SBDC regional networks from major metros agreed to participate.

Prior to the start of the study, the SBDC business advisors participated in four one-hour training sessions, one per nudge condition. The sessions were recorded and made available for reference after the online tutorial. The advisors were also provided nudge templates to support both implementation consistency and flexibility to adapt the nudge to varying contexts. Participants were instructed to apply the nudges to all their clients (except in the likeability nudge condition which was only presented to new clients). After the initial training, the participants were provided a research point of contact for questions and support.

During the study, data were collected three times (Q1, Q2, Q3+Q4) and summarized into two annual performance metrics: (1) number of new start-ups and (2) amount of financing secured (e.g., bank loans, and venture capital).

Participants: Business Advisors

Participants were business advisors (n=54) from the SBDC. SBDCs are a partner program of the US SBA and consist of a nationwide network that helps small businesses start, grow, and succeed. Specifically, SBDC advisors provide professional, one-on-one technical and problem-solving assistance to small-business owners and entrepreneurs to access capital; develop and exchange new technologies; and improve business planning, strategy, operations, and financial management.

With an attrition rate of 37 percent (n=20), 34 business advisors (18 males, 16 females) completed the longitudinal study. The business advisors were recruited from California and Texas. Most (76 percent) business advisors were seasoned professionals with over 20 years of experience, and the rest (24 percent) were midcareer professionals with five to ten years of experience. In terms of ethnic identity, 53 percent were White, 18 percent were Black, 26 percent were Hispanic, and 3 percent were Asian.

Of the 34 participating business advisors, we had 26 from California and 8 from Texas. Table 1 lays out the selection of nudges by business advisors. Progression visualization (A) and likeability (C) were the most popular choices.

TABLE 1. The Selection of Nudges by Business Advisors

Nudge	California	Texas	Total
A	7	2	9
A, C	2	0	2
B	5	0	5
C	8	6	14
D	4	0	4
Total	**26**	**8**	**34**

Note: *Nudge A: progress visualization; Nudge B: priming; Nudge C: likeability; Nudge D: reminder + motivation email.*

Source: *Milken Institute (2023)*

Participants: Business Clients

Business clients are the small-business owners that received business advisory service and training from the SBDCs. Collectively, during the pilot study, the participating 34 business advisors (treatment group) in California and Texas implemented nudges on 2,064 unique business clients; concurrently, we had 49 business advisors (control group) in California and Texas who counseled 2,374 unique business clients without nudges. Table 2 shows the company status and demographic characteristics of business clients in the treatment and control groups. California's business clients were more likely to be women owned, though a larger proportion of them were in the control group than in the treatment group. Texas' business clients were balanced across gender, both across control and treatment groups. Both in California and Texas, Black-owned businesses composed a small fraction of all business clients with an average around 10 percent.

TABLE 2: Company Status and Demographic Characteristics of Business Clients in the Treatment and Control Groups: California and Texas

California				
	Control (1)	Treatment (2)	Difference (3)	Total (4)
Women-owned	0.752 [0.434]	0.636 [0.489]	0.116 (0.051)	0.67 [0.471]
Black-owned	0.142 [0.349]	0.095 [0.293]	0.047 (0.026)	0.109 [0.312]
In Business (>1 year)	0.323 [0.469]	0.404 [0.029]	-0.081 (0.051)	0.379 [0.024]
Sample Size	212	475		687
Texas				
	Control (5)	Treatment (6)	Difference (7)	Total (8)
Women-owned	0.463 [0.499]	0.52 [0.5]	-0.056 (0.034)	0.495 [0.5]
Black-owned	0.046 0.21	0.158 0.365	-0.111 (0.009)	0.094 [0.005]
In Business (>1 year)	0.378 0.486	0.53 [0.5]	-.0152 (0.034)	0.464 [0.499]
Sample Size	2,126	1,592		3,754

Note: *The table reports average characteristics for the treatment and control group of clients served by advisors during the pilot study from January to September 2022 based on data supplied by SBDCs in California and Texas. Business advisors in the treatment group implemented nudges to their business clients, and business advisors in the control group did not. Columns (1), (2), (5), and (6) show the average characteristics of the group of individuals specified by the column heading. Columns (4) and (8) show the total average characteristics of the combined groups. Columns (3) and (7) report the difference between the average characteristic of individuals in the control versus the treatment groups. Standard deviations appear in brackets, while standard errors are reported in parentheses.*

Source: *Milken Institute (2023)*

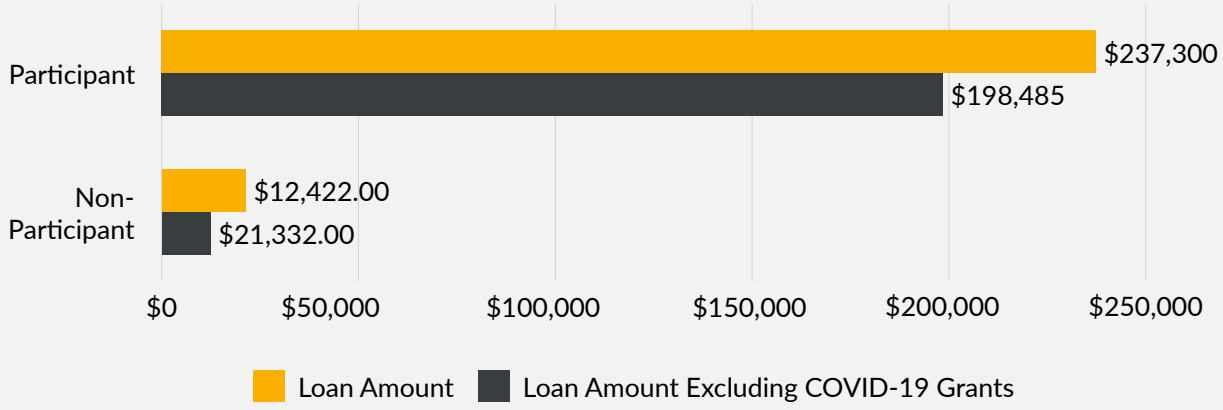
RESULTS ON CAPITAL ACCESS (CALIFORNIA)

Main Findings

To test the hypothesis that nudges help clients to secure loans (*see Research Question 1*), we examine clients' approved loan amounts using the data. We report main results separately for California and Texas because data collection and analysis were done separately. Data collected between the two states are somewhat different, and so harmonizing the data was difficult. Data for California was provided evenly across the state, with some rural and some urban. However, data from Texas came from two major metros: Houston and Dallas. So, it made more sense for us to report the results separately.

In this section, we report results on capital access for California. Because of our interest on the sources of external finance, we excluded all owner investments from this variable. This variable is *Loan Amount*. Furthermore, we also excluded all sources of COVID-19 grants from Loan Amount. This is *Loan Amounts Excluding COVID-19 Grants*. Figure 1 provides a comparison of participants (treated) and non-participants (control) during the pilot for these two measures of loan approval amounts. The participants used one of the nudges in their client interactions, and the non-participants did not.

FIGURE 1. Comparison of Participants and Non-Participants in the Pilot

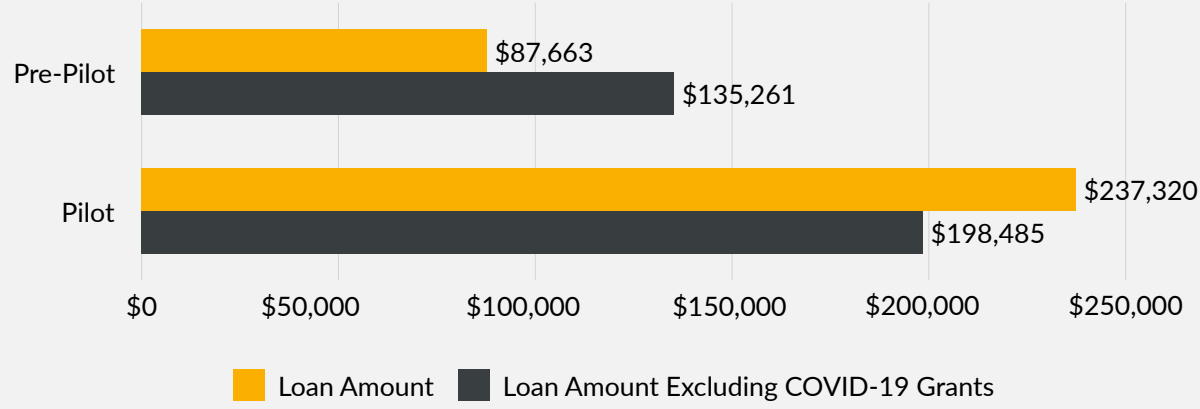


Source: *Milken Institute (2023)*

The results in Figure 1 reveal that clients receiving the treatment secured larger loans. The average loan amount for the treated and control group was $237,320 and $21,331, respectively. This translates to a difference of $215,989, which is statistically and significantly different from zero (p = 0.005) (henceforth, statistically significant). Similarly, the average loan amount excluding COVID-19 grants for the treated and control group was $198,485 and $12,422, respectively. This is a difference of $186,063, which is also statistically significant (p = 0.065).

The results in Figure 1 suggest clients received larger loan amounts when interacting with participants rather than non-participants. However, one potential problem is that participants are not randomly selected. Rather, they self-selected into the program. As a result, participants might perform differently than non-participants. For this reason, we also compared the loan amounts of participants before and after the pilot. Figure 2 reports these results.

FIGURE 2. Comparison of Loan Amounts During and Before Pilot for Participants



Source: *Milken Institute (2023)*

The results in Figure 2 reveal that, conditional on working with a participating advisor, clients' loan approval amounts were larger after the pilot than before. The average loan amount after and before the pilot was $237,320 and $87,663, respectively. This is a difference of $149,657, which is statistically significant (p = 0.053). The average loan amount excluding COVID-19 grants after and before the pilot was $198,485 and $135,261, respectively. This is a difference of $63,224 ($p$ = 0.558).

We have compared the differences in loan approval amounts (1) between participants (treatment group) and non-participants (control group) and (2) before and after the pilot. Another approach is to combine these two analyses to examine the differences in differences (DiD). This approach compares the differences between treatment and control groups both before and after the pilot. The DiD approach justifies a more causal interpretation behind the nudge treatment.

TABLE 3. Summary of Difference-in-Differences (DiD) in California

Panel A: Loan Amount	Treated	Control	Diff over Treatment
Post	$237,320	$21,331	$215,989
Pre	$87,663	$87,119	$544
Change over time	$149,657	$65,788	DiD = $215,445

Panel B: Loan Amount excluding COVID-19 grants	Treated	Control	Diff over Treatment
Post	$198,485	$12,422	$186,063
Pre	$135,261	$13,965	$121,026
Change over time	$63,224	$1,543	DiD = $64,767

***Source**: Milken Institute (2023)*

Table 3 summarizes the DiD results. The average difference in the loan amount between treatment and control groups was only $544 before the pilot. After the pilot, the difference increased to $215,989. Therefore, the DiD is $215,445 (i.e., $215,989 − $544). The average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $121,296 before the pilot. After the pilot, the difference increased to $186,063. Therefore, the DiD is $64,767 (i.e., $186,063 − $121,296).

In summary, the DiD for loan amounts and loan amounts excluding COVID-19 grants was $215,445 and $64,767, respectively. Despite excluding COVID-19 grants in the second measure, we still observe a positive DiD amount of $64,767. This indicates that not only did clients working in the treatment group receive larger loan approval amounts after the pilot compared with before, but they also received larger loan amounts relative to the control group.

Table 4 presents an empirical estimation of the DiD framework. While this estimation yields the same output as reported in Table 3, it helps provide an indication of statistical significance. The identification strategy behind DiD is to estimate a linear regression model of the following form:

$$L_i=\alpha+\beta_1 T+\beta_2 Post+\beta_3(T\times Post)+\varepsilon_i \qquad (1)$$

Where L_i is the loan approval amount, T is the treatment status (i.e., nudged used or not), *Post* is the pilot status (i.e., before or after the pilot), and $T \times Post$ is their interaction. α, β, and ε are the intercept, parameters to be estimated, and error term, respectively.

The results in Table 4 replicate our summary of DiD reported in Table 3 where the interaction term denotes the DiD estimate. This amounts to $215,445 and $64,767 for the loan amount and loan amount excluding COVID-19 grants, respectively. However, one difference is that only the loan amount measure that includes COVID-19 grants is statistically significant (t = 2.70). In contrast, the DiD for loan amounts excluding COVID-19 grants is $64,767, but it is not statistically significant (t = 0.60).

TABLE 4. DiD Analysis of California Results

Model: DV:	(1) Loan Amount	(2) Loan amounts excluding COVID-19 grants
Treatment	$544 (0.02)	$121,296** (3.17)
Post	-$65,788** (-3.09)	-$1,543 (-0.24)
Treatment x Post	$215,445** (2.70)	$64,767 (0.60)
Constant	$87,119** (4.30)	$13,965*** (4.96)
Number of observations	1,289	539

Note: *Loan Amount excludes owner investments. We also examine the loan amounts excluding COVID-19 grants and owner investments. t statistics in parentheses. Robust standard errors used. * p < 0.05, ** p < 0.01, *** p < 0.001*

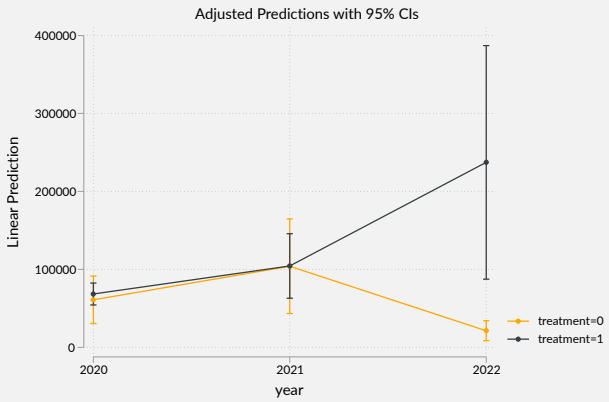
Source: *Milken Institute (2023)*

One requirement behind the use of DiD is that the treated and control groups should satisfy the common (or parallel) trends assumption—the two groups should have similar trends prior to or at the time of treatment. Only after the treatment should we observe differences between the groups. Violating this assumption casts doubt on the appropriateness of the DiD estimation strategy. In our case, the treated groups are the advisors who used nudges and their clients; the control group are the advisors who did not use nudges and their clients.

Figure 3 reports the parallel trends analysis for loan amount. There are few differences between treatment and control groups before the pilot study began on January 1, 2022. After the pilot study, however, we observed that the treated and control groups diverged—clients in the treated group experienced increases in loan approval amounts, while clients in the control group experienced decreases in the loan approval amounts. These findings reflect our results in Tables 3 and 4. More importantly, the figure shows the parallel trends assumption is not violated. This makes DiD a suitable estimation strategy.

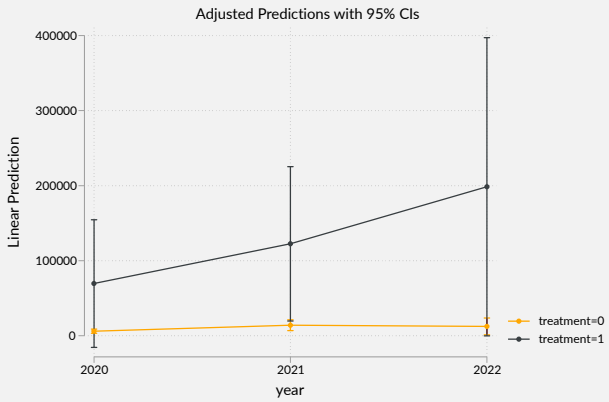
Figure 4 reports the parallel trends analysis for loan amounts excluding COVID-19 grants. Here, we observed greater differences between treatment and control groups before the pilot study. The difference between groups in Figure 4 is larger than in Figure 3, but this does not violate the parallel trends assumption. The parallel trends assumption requires only that the treated and control groups be parallel to each other. That is, the slopes should be the same.

FIGURE 3. DiD Analysis for Loan Amounts, California



Source: *Milken Institute (2023)*

FIGURE 4. DiD Analysis for Loan Amounts Excluding COVID-19 Grants, California



Source: *Milken Institute (2023)*

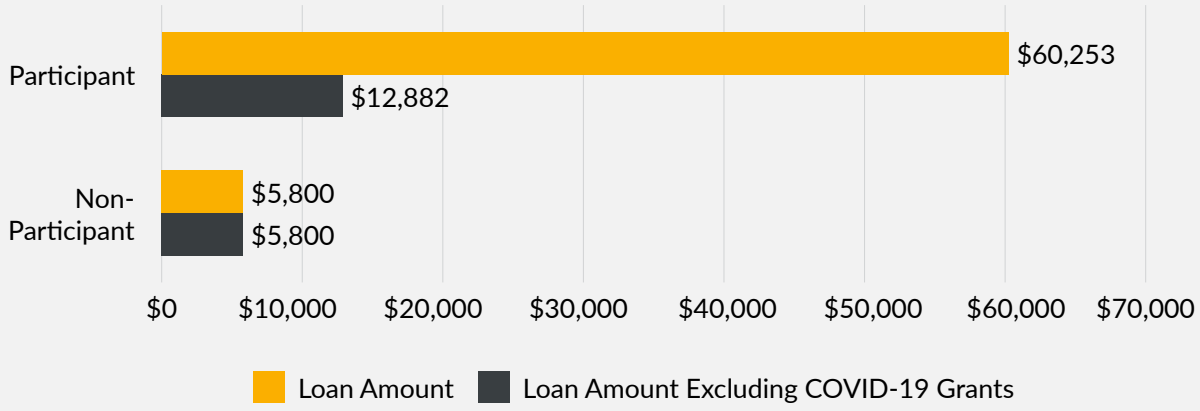
We observed a greater slope for the treated group than the control group prior to the pilot study in 2022, although the differences do not appear too severe. Like in Figure 3, the treated and control groups diverged after the pilot study began. That is, the treated group experienced increases in loan approval amounts while clients in the control group did not. These findings support our results in Tables 3 and 4, but the parallel trends assumption is not as strong as it is in Figure 3 for the loan amount. Nevertheless, the estimates suggest a positive though statistically insignificant DiD of $64,767 for the loan amount excluding COVID-19 grants.

Results by Race

The literature on minority entrepreneurship suggests there is discrimination and discouragement in capital markets for Black-owned businesses (BOBs) (Fairlie and Robb 2007; Fairlie et al. 2022). As such, BOBs might require more resources or assistance to secure financing; therefore, the technical assistance SBDCs provide might be especially beneficial for BOBs. We now replicate our analysis for the subsample of BOBs.

The results in Figure 5 reveal that BOBs receiving the treatment secured larger loans. The average amount for loan amount for the treated and control group was $60,253 and $5,800, respectively. This translates to a difference of $54,452 with rounding ($p$ = 0.276). Similarly, the average amount for loan amount excluding COVID-19 grants for the treated and control group was $12,882 and $5,800, respectively. This difference of $7,082 is also not statistically significant (p = 0.312). The key difference in the loan amounts between the participating group versus the non-participating group is the COVID-19 grants; the former group successfully secured large COVID-19 grants but the latter not so much.

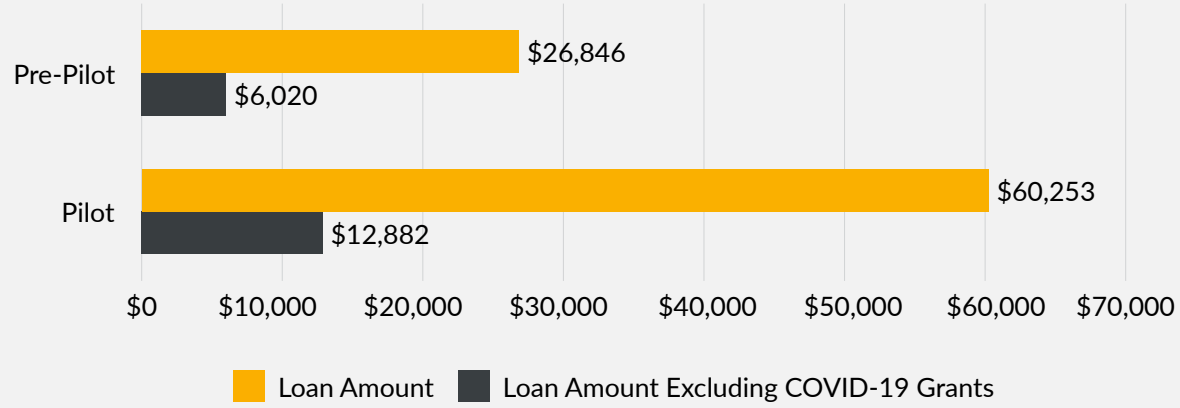
FIGURE 5. Comparison of Loan Amounts Between Participants and Non-Participants in the Pilot, Black-Owned Businesses, California



Source: *Milken Institute (2023)*

The results in Figure 6 reveal that, conditional on working with a participating advisor, BOBs' loan approval amounts were larger during the pilot than before. The average amount for loan amounts during and before the pilot was $60,253 and $26,846, respectively. This is a difference of $33,407 ($p$ = 0.506). The average amount for loan amounts excluding COVID-19 grants during and before the pilot was $12,882 and $6,020, respectively. This difference of $6,862 is not statistically significant (p = 0.340).

FIGURE 6. Comparison of Loan Amounts During and Before Pilot for Participants, Black-Owned Businesses, California



Source: *Milken Institute (2023)*

In summary, these results reveal BOBs received larger loan amounts when interacting with participating advisors rather than non-participating advisors. Moreover, when working with a participating advisor, BOBs' loan approval amounts were larger after the pilot compared than before. However, these differences were not statistically and significantly different from zero. Next, we turn to the DiD results.

Table A1 in the appendix summarizes the DiD results for the loan amount for BOBs. Panel A reports the results for BOBs and Panel B reports the results for non-BOBs. For BOBs, the average difference in loan amount between the participants and non-participants was -$192,154 before the pilot. After the pilot, the difference increased to $54,453. Therefore, the DiD is $246,607 (i.e., $54,453 – [-$192,154]). Panel B reports the results for non-BOBs. For non-BOBs, the average difference in loan amount between treatment and the control group was $4,094 before the pilot. After the pilot, the difference increased to $226,858. Therefore, the DiD is $222,764 (i.e., $226,858 -$4,094).

In summary, there is a positive DiD for BOBs ($246,607), which is larger compared to the DiD for non-BOBs ($222,764). This suggests the nudges were more successful for BOBs than to non-BOBs, although this difference is not statistically significant.

Table A2 in the appendix reports the DiD summary for loan amounts excluding COVID-19 grants. Panel A reports the results for BOBs. For BOBs, the average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $6,020 before the pilot. After the pilot, the difference increased to $7,082. However, no data is available for the control group of BOBs prior to the pilot. This does not permit a pre and posttest comparison.

The difference in loan amounts excluding COVID-19 grants from before to after the pilot was $6,862 for the participants. This suggests BOBs interacting with participants secured larger loan amounts (i) compared to non-participants and (ii) prior to the pilot. Panel B reports the results for non-BOBs. For non-BOBs, the average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $130,209 before the pilot. After the pilot, the difference increased to $201,326. Therefore, the DiD is $71,117 (i.e., $201,326 – $130,209).

Table A3 presents an empirical estimation of the DiD framework for BOBs and non-BOBs. The empirical estimation behind DiD is the same as before, and the interaction term (Treatment × Post) indicates the DiD estimate. For BOBs, this amounts to $246,607 for the loan amount (t =4.97). For BOBs, there is no estimate for the DiD for loan amounts excluding COVID-19 grants. For non-BOBs, the DiD is $222,764 for loan amount (t =2.62). Although we observe a DiD in the amount of $71,117 for non-BOBs for loan amounts excluding COVID-19 grants, it is not statistically significant (t =0.61).

Figures A1 and A2 in the appendix report the parallel trends analysis for the measure loan amount. Figure A1, which reports the parallel trends for BOBs, does not support the parallel trends assumption. In contrast, the results in Figure A2 do support the parallel trends assumption. These results are for non-BOBs. For the non-BOBs, we observed that the treated and control groups diverged after the pilot study—clients in the treated group experienced increases in loan approval amounts while clients in the control group experience decreases in the loan approval amounts. For BOBs, we observe a decrease in loan approval amounts after the pilot for the control group and an increase for the treated group.

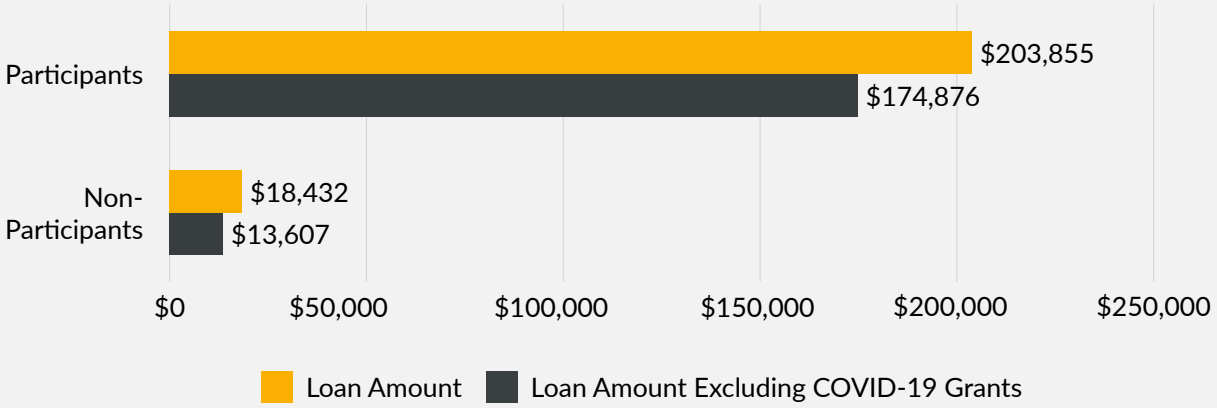
Figures A3 and A4 report the parallel trends analysis for the loan amounts excluding COVID-19 grants. Like before, the results in Figure A3 do not satisfy the parallel trends assumption for BOBs. In contrast, the results for non-BOBs reported in Figure A4 provide better support for the parallel trends assumption. These results are also more consistent with the overall sample. The results in Figure 10 for non-BOBs reveal that, although the treated and control groups had similar trends prior to the pilot in 2022, clients in the treated group experienced increases in loan approval amounts while clients in the control group did not.

Results by Gender

The early literature on gender and entrepreneurship found discrimination against female entrepreneurs in capital markets (Buttner and Rosen 1988; Fay and Williams 1993). However, later studies found less evidence of discrimination in lending and more evidence of discouragement in capital markets for female entrepreneurs (Wilson et al. 2007; Naegels et al. 2022). As such, women-owned businesses might require more resources or assistance to secure financing, and the technical assistance provided by SBDCs may be especially beneficial for them.

The results in Figure 7 reveal that women-owned businesses receiving the treatment secured larger loans. The average amount for Loan Amount for the treated and control group was $203,885 and $18,432, respectively. This translates to a difference of $185,453 ($p$ = 0.068). Similarly, the average amount for Loan Amounts Excluding COVID-19 Grants for the treated and control group was $174,876 and $13,607, respectively. This is a difference of $161,269 ($p$ = 0.199).

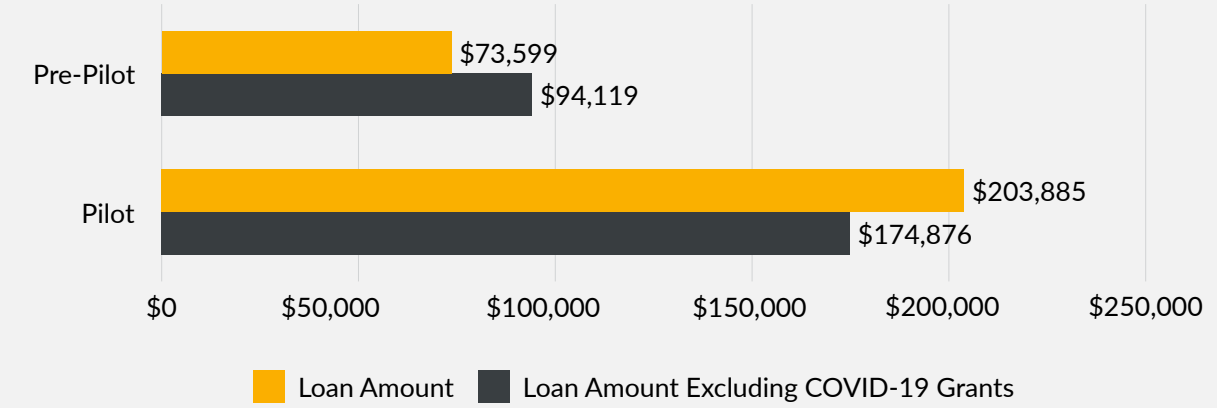
FIGURE 7. Comparison of Loan Amounts for Participants and Non-Participants in the Pilot, Women-owned Businesses, California



Source: *Milken Institute (2023)*

The results in Figure 8 reveal that, conditional on working with a participating advisor, women-owned business loan approval amounts were larger after the pilot compared than before. The average amount for Loan Amount after and before the pilot was $203,885 and $73,599, respectively. This is a difference of $130,286 ($p$ = 0.199). The average amount for loan amounts excluding COVID-19 grants after and before the pilot was $174,876 and $94,119, respectively. This is a difference of $80,757 ($p$ = 0.539). Thus, although women-owned businesses secured larger loan amounts after the pilot compared with before, the difference is not considered statistically different from zero. Next, we turn to the DiD results.

FIGURE 8. Loan Amounts During and Before the Pilot for Participants, Woman-owned Businesses, California



Source: *Milken Institute (2023)*

Table A4 summarizes the DiD Results for Loan Amount. Panel A reports the results for women-owned businesses. The average difference in loan amount between the participants and non-participants was -$11,272 before the pilot. After the pilot, the difference increased to $185,453. Therefore, the DiD is $196,725 (i.e., $185,453 – [-$11,272]). Panel B reports the results for non-women-owned businesses. The average difference in loan amount between the participants and non-participants was $7,008 before the pilot. After the pilot, the difference increased to $291,476. Therefore, the DiD is $284,468 (i.e., $291,476 -$7,008).

In summary, there is a positive DiD for women-owned businesses ($196,725). However, this amount is smaller relative to the DiD for non-women-owned businesses ($284,468). This suggests the nudges were less successful for women-owned businesses, although this difference is not statistically significant.

Table A5 reports the DiD summary for loan amounts excluding COVID-19 grants. Panel A of Table 15 reports the results for women-owned businesses. The average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $79,804 before the pilot. After the pilot, the difference increased to $161,269. Therefore, the DiD is $81,465 (i.e., $161,269 -$79,804). Panel B reports the results for non-women-owned businesses. The average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $194,066 before the pilot. After the pilot, the difference increased to $272,139. Therefore, the DiD is $78,073 (i.e., $272,139 -$194,066).

Table A6 presents an empirical estimation of the DiD framework for women-owned businesses and non-women-owned businesses. For women-owned businesses, the DiD is $196,725 for the loan amount, which is not statistically significant (t =1.90). For women-owned businesses, this amounts to $81,465 for loan amounts excluding COVID-19 grants (t =0.62). For non-women-owned businesses, the DiD is $284,469 for loan amount (t =2.83). Although we observe a DiD in the amount of $78,073 for non-women-owned businesses for loan amounts excluding COVID-19 grants (t =0.52).

Figures A5 and A6 report the parallel trends analysis for the loan amount. The results indicate that the participants secured larger loan amounts relative to the non-participants. This is especially true during the pilot study. Prior to the pilot study in 2022, there were few differences between the groups. However, these figures do not appear to support the parallel trends assumption. In both figures, the slopes of both groups cross prior to the pilot study.

Figures A7 and A8 report the parallel trends analysis for the measure loan amounts excluding COVID-19 grants. The results indicate that the participants secured larger loan amounts relative to the non-participants. This is especially true during the pilot study. However, like before, these figures do not support the parallel trends assumption.

Summary of Findings

Our analysis examined whether nudges helped improve SBDC technical assistance efforts to increase capital for small businesses. Some advisors participated in the pilot study and implemented the treatment—one of four nudges aimed at helping these small businesses. The results revealed that clients who worked with these participants (a) received larger loan amounts compared to clients working with non-participants, and (b) received larger loan amounts during the pilot relative to before the pilot. Specifically, the results revealed the treated group

received only $544 more in loans, on average, prior to the pilot. During the pilot, however, the treated group received $215,999 more in loans than the control group. The difference in these differences amounted to $215,445. These loan amounts include all sources of external finance but exclude owners' personal investments.

In an additional analysis, we excluded COVID-19 grants from this measure. In this analysis, we found similar results, although the loan amounts were smaller. The results revealed that, prior to the pilot, the treated group received $121,296 more in loans, on average, relative to the control group. During the pilot, the treated group received $186,063 more in loans, on average, relative to the control group. The difference in these differences amounted to $64,767.

The evidence that nudges helped small businesses increase their capital is stronger for the measure of loans that include COVID-19 grants. After excluding these grants, we observe positive but statistically insignificant effects of nudges on loan amounts.

We also examined whether nudges helped small businesses to increase capital for Black-owned and women-owned businesses. Our results revealed that, although both Black-owned businesses and women-owned businesses benefited from the nudge, there was no significant difference between these groups and the rest of the sample.

RESULTS ON CAPITAL ACCESS (TEXAS)

Main Findings

In addition to the results from California, we also examined clients' approved loan amounts using data from Texas. The results in Table A7 reveal that clients receiving the treatment secured smaller loans than those in the control group. The average loan amount for the treated and control group was $423,107 and $745,255, respectively. This translates to a difference of $322,147 ($p$ = 0.013). Similarly, the average amount for Loan amounts excluding COVID-19 grants for the treated and control group was $427,795 and $719,212, respectively. This is a difference of $291,417 ($p$ = 0.029).

Next, we compare the loan amounts of participants before and after the pilot in Table A8. Conditional on working with a participating advisor, clients' loan approval amounts were larger after the pilot than before. The average loan amount after and before the pilot was $423,107 and $375,959, respectively. This is a difference of -$47,149 after rounding ($p$ = 0.655). The average loan amount excluding COVID-19 grants after and before the pilot was $427,795 and $401,299, respectively. This is a difference of $26,497 ($p$ = 0.813).

In summary, these results reveal that clients in Texas received smaller loan amounts when interacting with business advisors in the treated group rather than the control group. However, when working with a participating advisor, clients' loan approval amounts were larger after the pilot, though these amounts were not statistically different.

Next, we analyze the DiD results in Table 5. The average difference in loan amount between the participants and non-participants was $65,106 before the pilot. However, the difference decreased to -$322,148 after the pilot. Therefore, the DiD is -$387,254 (i.e., -$322,148 – $65,106). Alternatively, the difference in loan amount from before to after the pilot was $47,148 for the participants. In addition, the difference was $434,402 for the non-participants.

TABLE 5. Summary of Difference-in-Differences (DiD) in Texas

Panel A: Loan Amount	Treated	Control	Diff over Treatment
Post	$423,107	$745,255	-$322,148
Pre	$375,959	$310,853	$65,106
Change over time	$47,148	$434,402	DiD = -$387,254

Panel B: Loan Amount Excluding COVID-19 Grants	Treated	Control	Diff over Treatment
Post	$427,795	$719,212	-$291,417
Pre	$401,299	$365,753	$35,546
Change over time	$26,496	$353,459	DiD = -$326,963

***Source**: Milken Institute (2023)*

The average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $35,546 before the pilot. After the pilot, the difference decreased to -$291,417. Therefore, the DiD is -$326,963 (i.e., -$291,417 – $35,546). Alternatively, the difference in loan amounts excluding COVID-19 grants from before to after the pilot was $26,496 for the participants, and the difference was -$353,459 for the non-participants.

In summary, the DiD for loan amount and loan amounts excluding COVID-19 grants for Texas was -$387,254 and -$326,963, respectively. Although we observed an increase in loan amounts for clients working with participating advisors during the pilot, loan amounts increase for the control group even more. This resulted in a negative DiD estimate.

The results in Table 6 replicate our summary of DiD reported in Table 5 where the interaction term denotes the DiD estimate. This amounts to $215,445 and $64,767 for loan amount and loan amounts excluding COVID-19 grants, respectively. However, one difference is that only loan amount is statistically significant (t = 2.70). In contrast, the DiD for the loan amount excluding COVID-19 grants is $64,767 ($t$ = 0.60).

TABLE 6. DiD Analysis of Texas Results Before and After Pilot

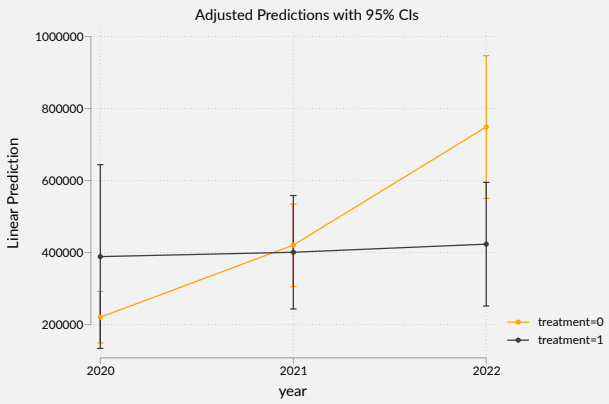
Model: DV:	(1) Loan Amount	(2) Loan amounts excluding COVID-19 grants
Treatment	65,106 (0.96)	35,545** (0.47)
Post	434,402*** (4.28)	353,459 (3.39)
Treatment x Post	387,254** (2.65)	-326,962** (2.14)
Constant	310,853** (9.99)	365,753*** (9.11)
Number of observations	1,100	931

Note: *Loan Amount excludes owner investments. We also examine the loan amounts excluding COVID-19 grants and owner investments. t statistics in parentheses. Robust standard errors used. * p < 0.05, ** p < 0.01, *** p < 0.001*

Source: *Milken Institute (2023)*

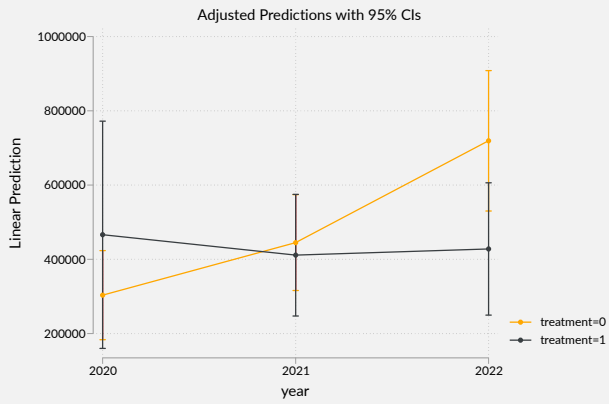
Figures 9 and 10 report the parallel trends analysis for the measures of loan amount and loan amounts excluding COVID-19 grants, respectively. We observe that the treated group had similar loan approval amounts before and after the pilot. However, the control group experienced a large increase in loan approval amounts after the pilot. More importantly, the figures show the parallel trends assumption does not hold.

FIGURE 9. DiD analysis. DV = Loan Amount



Source: *Milken Institute (2023)*

FIGURE 10. DiD Analysis. DV = Loan Amount w/o COVID-19



Source: *Milken Institute (2023)*

Results by Race

The sample size was too small to examine Black-owned businesses only in Texas.

Results by Gender

The results in Table A9 reveal that women-owned businesses receiving the treatment secured smaller loans. The average amount for loan amount for the treated and control group was $423,454 and $748,691, respectively. This translates to a difference of $325,236 ($p$ = 0.015). Similarly, the average amount for loan amounts excluding COVID-19 grants for the treated and control group was $430,376 and $719,919, respectively. This is a difference of $289,542 ($p$ = 0.034).

The results in Table A10 reveal that, conditional on working with a participating advisor, women-owned businesses in Texas had loan approval amounts that were larger after the pilot than before. The average loan amount after and before the pilot was $290,029 and $158,991, respectively. This is a difference of -$131,038 ($p$ = 0.073). The average loan amounts excluding COVID-19 grants after and before the pilot was $286,001 and $297,911, respectively. This is a difference of $11,910 ($p$ = 0.889). Thus, although women-owned businesses secured larger loan amounts after the pilot than before, the loan amounts are only considered statistically different from zero for the measure loan amount. Next, we turn to the DiD results.

Table 7 summarizes the DiD Results for Loan Amount. Panel A reports the results for women-owned businesses. The average difference in loan amount between the participants and non-participants was $63,949 before the pilot. After the pilot, the difference decreased to -$325,236. Therefore, the DiD is -$389,185 (i.e., -$325,236 – $63,949). Alternatively, the difference in loan amount from before to after the pilot was $47,762 for the participants. In contrast, the difference was $436,947 for the non-participants.

Panel B reports the results for non-women-owned businesses. The average difference in loan amounts between the participants (treated) and non-participants (control) was $319,325 before the pilot. After the pilot, the difference decreased to -$293,712. Therefore, the DiD is -$613,037 (i.e., -$293,712 – $319,325). Alternatively, the difference in loan amount from before to after the pilot was $5,675 for the participants. In contrast, the difference was $618,712 for the non-participants.

TABLE 7. Summary of Difference-in-Differences (DiD) in Texas; DV = Loan Amount

Panel A: Women-owned Businesses	Treated	Control	Diff over Treatment
Post	$423,455	$748,691	-$325,236
Pre	$375,693	$311,744	$63,949
Change over time	$47,762	$436,947	DiD = -$389,185
Panel B: Non-women-owned Businesses	**Treated**	**Control**	**Diff over Treatment**
Post	$400,000	$693,712	-$293,712
Pre	$394,325	$75,000	$319,325
Change over time	$5,675	$618,712	DiD = -$613,037

***Source**: Milken Institute (2023)*

In summary, there is a negative DiD for women-owned businesses (-$389,185) in Texas. There is also a negative DiD for non-women-owned businesses (-$613,037). This suggests the nudges were not successful for women-owned or non-women-owned businesses in Texas. This contrasts with the success in California.

Table 8 reports the DiD summary for the loan amounts excluding COVID-19 grants. Panel A of reports the results for women-owned businesses. The average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $34,197 before the pilot. After the pilot, the difference decreased to -$289,543. Therefore, the DiD is -$323,740 (i.e., -$289,543 – $34,197). Panel B reports the results for non-women-owned businesses. The average difference in loan amounts excluding COVID-19 grants between the participants and non-participants was $319,325 before the pilot. After the pilot, the difference increased to -$608,613. Therefore, the DiD is -$927,938 (i.e., -$608,613 – $319,325).

TABLE 8. Summary of Difference-in-Differences (DiD) in Texas; DV = Loan Amount Excluding COVID-19 Grants

Panel A: Women-owned Businesses	Treated	Control	Diff over Treatment
Post	$430,376	$719,919	-$289,543
Pre	$401,408	$367,211	$34,197
Change over time	$28,968	$352,708	DiD = -$323,740
Panel B: Non-women-owned Businesses	**Treated**	**Control**	**Diff over Treatment**
Post	$100,000	$708,613	-$608,613
Pre	$394,325	$75,000	$319,325
Change over time	-$294,325	$633,613	DiD = -$927,938

***Source**: Milken Institute (2023)*

Table 9 presents an empirical estimation of the DiD framework for women-owned businesses and non-women-owned businesses. For women-owned businesses, the DiD is -$389,184 for loan amount (*t* = -2.59). For women-owned businesses, this amounts to -$323,740 for loan amounts excluding COVID-19 grants (*t* = -2.08). For non-women-owned businesses, the DiD is -$613,037 for the loan amount (*t* = -1.11). We observe a DiD in the amount of -$927,938 for non-women-owned businesses for loan amounts excluding COVID-19 grants, which is statistically significant (*t* = -1.76).

TABLE 9: DiD Analysis of Texas Results

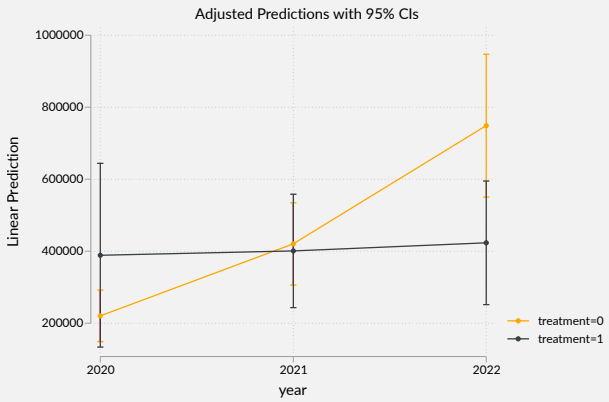
	Black-Owned Businesses		Non-Black-owned Businesses	
Model: DV:	(1) Loan Amount	(2) Loan Amount w/o COVID-19	(3) Loan Amount	(4) Loan Amount w/o COVID-19
Treatment	$63,948 (0.93)	$34,197 (0.44)	$319,325 (0.89)	-$319,325 (0.88)
Post	$436,947*** (4.13)	$352,708** (3.27)	$618,712+ (1.76)	-$633,613 (1.66)
Treatment x Post	-$389,184** (-2.59)	$323,740* (-2.08)	-$613,037 (-1.11)	$927,938+ (-1.76)
Constant	$311,744** (9.98)	$367,211*** (9.11)	$75,000*** (3.82)	$75,000*** (3.77)
Number o Observations	1,079	912	21	19

Note: *Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants. a omitted due to collinearity. t statistics in parentheses. Robust standard errors used. + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

Source: *Milken Institute (2023)*

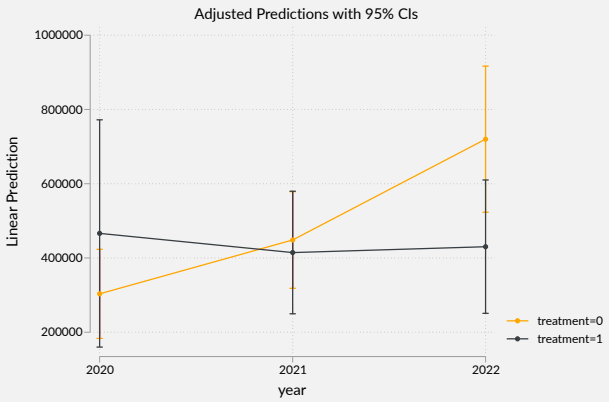
Figures 11 and 12 report the parallel trends analysis for the measure loan amount. The results indicate that the treatment group secured smaller loan amounts than the control after the pilot study. Prior to the pilot study in 2022, the treated group secured larger loans. However, these figures do not support the parallel trends assumption. In both figures, the slopes of both groups cross prior to the pilot study.

FIGURE 11. Women-owned Businesses in Texas, DV = Loan Amounts



Source: *Milken Institute (2023)*

FIGURE 12. Women-Owned Businesses in Texas, DV = Loan Amount w/o COVID-19



Source: *Milken Institute (2023)*

RESULTS ON START-UP RATES (CALIFORNIA AND TEXAS)

We also examined business transition rates from a nascent business to a start-up. A nascent business is a business in the process of being established (e.g., aspiring entrepreneur that has a business plan but has not yet officially set up a legal entity), while a start-up is a recently established business.

Table 10 reports these data. In the overall sample, we observed 45 start-up transitions (1.18 percent). This is driven by California businesses that comprise 44 of the 45 observations (97.78 percent). Only one business in Texas made the transition from nascent to start-up.

TABLE 10. Business Nascent–to–Start-Up Transition Frequency Pre- and Posttest

Full Sample	Frequency	Percent
No transition	37,000	98.82
Transitional nascent → start up	45	1.18
California		
No transition	3,081	98.56
Transitional nascent → start up	44	1.44
Texas		
No transition	742	99.87
Transitional nascent → start up	1	0.13

Source: *Milken Institute (2023)*

Table 11 reports the business transition rates for clients who worked with participating advisors and non-participating advisors. Of the clients who worked with non-participating advisors, 9.2 percent transitioned from a nascent to start-up business. In contrast, only 1.5 percent of clients who worked with participating advisors transitioned from nascent to start-up. These are large differences but our sample size for transitions is not that big, so we are cautious about these drawing too many conclusions from these numbers. Nonetheless, the findings do not suggest that the nudges helped businesses transition from nascent to start-up.

TABLE 11. Business Transition Rate by Treatment Pre- and Posttest

Business Transition	Observations	Mean	Std. Deviation
Non-participants	260	0.092	0.29
Participants	747	0.015	0.12

Note: *The sample only includes clients who received a nudge or who could have received a nudge but were in the non-participating group.*

Source: *Milken Institute (2023)*

DISCUSSION

Although substantial government funding is allocated to subsidizing entrepreneurship training and support in the United States, there has been very little research on SBDCs. The Growing America through Entrepreneurship (GATE) project, an evaluation designed and implemented by the US Department of Labor and the US Small Business Administration, is arguably the most comprehensive study on the matter to date. To the best of the authors' knowledge, the GATE experiment is the largest-ever randomized evaluation of a US government-run entrepreneurship training and assistance program with nearly 4,200 participants (both existing business owners and aspiring entrepreneurs).

At least in theory, there are good reasons for continued government funding for business support and training subsidies. Fairlie, Karlan, and Zinman (2012) offer a few concrete rationales for training subsidies. First is the *credit constraint*. If training is valuable but small-business owners lack the financial resources to pay for it, offering low-cost training as opposed to subsidized lending may be a cost-effective way to improve access. Improving access may come through training but perhaps even more valuable may be the information and assistance in finding capital. A second rationale for training subsidies is *labor market discrimination*. Given the abundant empirical evidence on the discrimination that minorities face, subsidized training may offer a targeted, efficient way to help minorities overcome barriers to starting businesses or securing loans. A third rationale is *human and managerial capital constraints*. Many small-business owners stand to benefit from training and support on how to run businesses. Investing in the human capital of a local economy has positive spillover effects that benefit everyone.

The GATE experiment investigated whether empirical analysis could justify government-subsidized training and support. Hence, the GATE experiment is the most comparable to our study in research design. GATE participants were nationally representative in demographic characteristics of America's self-employed population in race, nativity, gender, age, and education. The GATE experiment was administered for nearly two years between September 2003 and July 2005 in seven cities in three states (Bellotti 2006). A total of 14 different SBDCs and non-profit community-based organizations (CBOs) provided the GATE training. The treatment group received on average about 20 hours of training in the first six months. The major finding from the GATE project was that training programs increased short-run business ownership and employment but there was little evidence of broader long-term effects on business ownership or business performance. Training programs did not have a strong effect on businesses facing credit or human capital constraints, or labor market discrimination (Fairlie, Karlan, and Zinman 2012; Fairlie 2013).

Since the GATE experiment from nearly two decades ago, no substantive research has been done on SBDCs. Our study marks the first-of-its-kind study in which we had SBDC business advisors participate in a pilot study where we empirically examined ways to improve the current business advisory service through easily implemented behavioral nudges. Our study principally focused on capital access, whether behavioral nudges implemented by business advisors could help business clients secure bigger loans. Secondarily, we examined whether behavioral nudges implemented by business advisors could help improve start-up rates for aspiring entrepreneurs. We examined these two questions with a keen eye on the role that SBDCs can take in leveling the playing field in terms of minority-owned businesses. Additionally, the pilot made it clear that there is a lot of room for SBDCs to improve their training and support programs and that SBDCs provide an invaluable service that helps all businesses, including minority-owned businesses.

CONCLUSION

For many Americans, small businesses are an important means to achieving the American Dream and building wealth. These small-business owners also play an important role in America's economic growth and job creation. Thirty-three million small businesses are the backbone of the American economy employing about half of the workforce.[4] However, small businesses are a risky and difficult enterprise. Business start-ups have a high failure rate—only about two-thirds of businesses with employees survive at least two years and about half survive for at least five years.[5]

Access to capital is a critical issue for small businesses. Without sufficient capital, small firms are unable to develop new products and services or grow to meet demand. Insufficient liquidity is a frequently cited cause of small business failure. However, small businesses typically cannot access the traditional capital markets (Ang 1991). Instead, small firms depend heavily on bank loans, trade credit, and other sources of financing such as personal savings, credit cards, home equity loans, and loans from family and friends (Berger and Udell 1995; Binks and Ennew 1996).

Securing the necessary funding is often a major hurdle for small business entities, as it requires a significant investment in time, resources, and effort, and there are few resources available to guide business owners through the process. Moreover, the challenges of obtaining such financing are sometimes learned only through experience. The SBDC business advisors serve as an important bridge to securing financing for small businesses.

This effort aligns with the current administration's emphasis on proactive engagement with communities that have experienced marginalization, exclusion, and discrimination in the past (e.g., Executive Order No. 13985, 2021). Proactive engagement meets the community members where they are and uses communication methods that connect with the community. Along this line, JPMorgan Chase launched a special initiative, the Special Purpose Credit Program, to improve access to credit for small-business owners in historically underserved areas. However, increasing access to funds may not be enough (Mester 1997) without the coaching and nudging to teach small-business owners how to think about resources and to close a loan.

Small businesses constitute a major force in the US economy and a portal through which many people enter the economic mainstream. They provide opportunities for many people, including underrepresented populations, to achieve financial success and independence. SBDC business advisors are a critical resource to help these small-business owners launch and grow their businesses. Making even small improvements to SBDC business advisors' efficacy can result in a ripple effect, creating a cascading wave of more capital to small businesses.

As this pilot demonstrates, investing in SBDC business advisors is a strategic and efficient way to support small businesses. Nudging appears to be an intervention that can support the practical steps of obtaining a loan and removing obstacles to accessing capital. Nudging is a low-cost, light touch tool with the potential to increase SBDC advisors' impact. However, the authors argue that the TA pilot program merits further investigation. The divergent findings between two states are not necessarily a testament to one state's effectiveness over the other, but rather the inherent complexities of SBDCs and subsequently, the challenges of assessing their performances.

APPENDIX A: SUPPLEMENTARY GRAPHS AND TABLES

Results for Black-owned Businesses in California

TABLE A1: Summary of Difference-in-Differences (DiD) in California; DV = Loan Amount

Panel A: Black-owned Businesses	Treated	Control	Diff over Treatment
Post	$60,253	$5,800	$54,453
Pre	$26,846	$219,000	-$192,154
Change over time	$33,407	213,200	DiD = $246,607
Panel B: Non-Black-owned Businesses	**Treated**	**Control**	**Diff over Treatment**
Post	$249,968	$23,110	$226,858
Pre	$90,183	$86,089	$4,094
Change over time	$159,785	$62,979	DiD = $222,764

Source: *Milken Institute (2023)*

TABLE A2: Summary of Difference-in-Differences (DiD) in California; DV = Loan Amount Excluding COVID-19 Grants

Panel A: Black-owned Businesses	Treated	Control	Diff over Treatment
Post	$12,882	$5,800	$7,082
Pre	$6,020	--	$6,020
Change over time	$6,862	$5,800	DiD = N/A
Panel B: Non-Black-owned Businesses	**Treated**	**Control**	**Diff over Treatment**
Post	$214,583	$13,257	$201,326
Pre	$144,174	$13,965	$130,209
Change over time	$70,409	-$708	DiD = $71,117

Source: *Milken Institute (2023)*

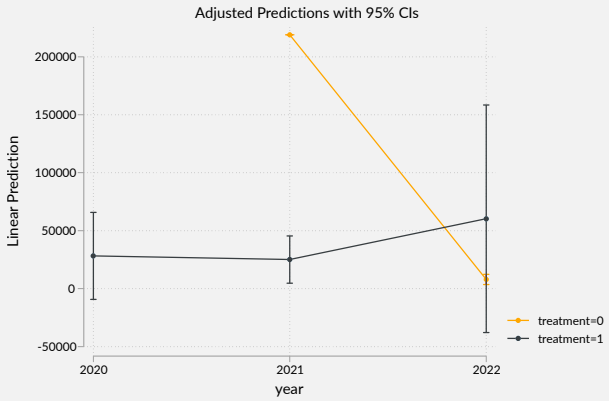
TABLE A3: DiD Analysis of California Results

	Black-owned Businesses		Non-Black-owned Businesses	
Model: DV:	(1) Loan Amount	(2) Loan Amount w/o COVID-19	(3) Loan Amount	(4) Loan Amount w/o COVID-19
Treatment	-$192,154*** (-20.90)	-$7,082 (1.04)	-$4,094 (0.18)	-$130,209** (3.19)
Post	-$213,200** (-464.7)	-$6862 (0.98)	-$62,980 (-2.91)	-$708 (-0.10)
Treatment x Post	$246,607*** (4.97)	N/A[a]	-$222,764** (2.62)	$71,117 (0.61)
Constant	$219,000*** (14016000)	-$1,062*** (-0.15)	-$86,089* (4.22)	$13,965*** (4.95)
Number of Observations	64	42	1225	497

Note: *Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants. a omitted due to collinearity. t statistics in parentheses. Robust standard errors used. + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

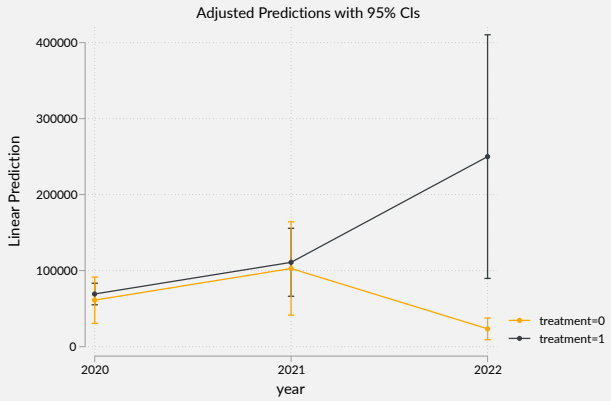
Source: *Milken Institute (2023)*

FIGURE A1: DiD Results for Loan Amount, Black-owned Businesses



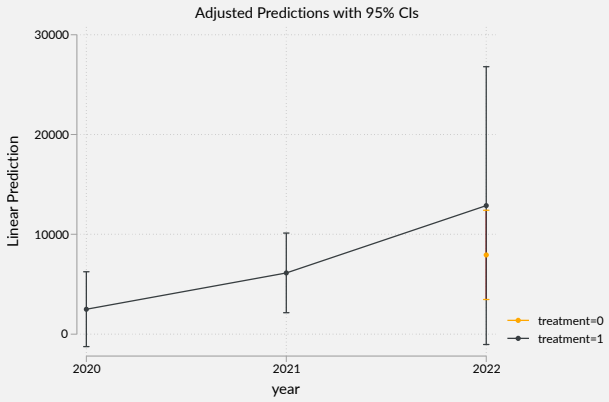
Source: *Milken Institute (2023)*

FIGURE A2: DiD Results for Loan Amount, Non-Black-owned Businesses



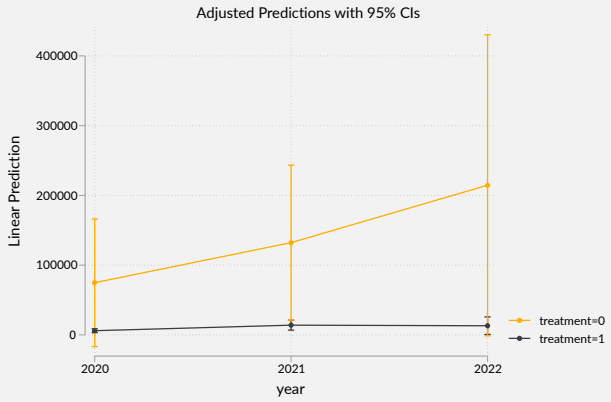
Source: *Milken Institute (2023)*

FIGURE A3: DiD Results for Loan Amount Excluding COVID-19 Grants, Black-owned Businesses



Source: *Milken Institute (2023)*

FIGURE A4: DiD Results for Loan Amount Excluding COVID-19 Grants, Non-Black-owned Businesses



Source: *Milken Institute (2023)*

Results for Women-owned Businesses in California

TABLE A4: Summary of Difference-in-Differences (DiD) in California; DV = Loan Amount

Panel A: Women-owned Businesses	Treated	Control	Diff over Treatment
Post	$203,885	$18,432	$185,453
Pre	$73,599	$84,871	-$11,272
Change over time	$130,286	-$66,439	DiD = $196,725
Panel B: Non-women-owned Businesses	**Treated**	**Control**	**Diff over Treatment**
Post	$324,504	$33,028	$291,476
Pre	$124,106	$117,098	$7,008
Change over time	$200,398	-$84,070	DiD = $284,468

Source: *Milken Institute (2023)*

TABLE A5: Summary of Difference-in-Differences (DiD) in California; DV = Loan Amount Excluding COVID-19 Grants

Panel A: Women-owned Businesses	Treated	Control	Diff over Treatment
Post	$174,876	$13,607	$161,269
Pre	$94,119	$14,315	$79,804
Change over time	$80,757	-$708	DiD = $81,465
Panel B: Non-women-owned Businesses	**Treated**	**Control**	**Diff over Treatment**
Post	$279,639	$7,500	$272,139
Pre	$204,066	$10,000	$194,066
Change over time	$75,573	-$2500	DiD = $78,073

***Source**: Milken Institute (2023)*

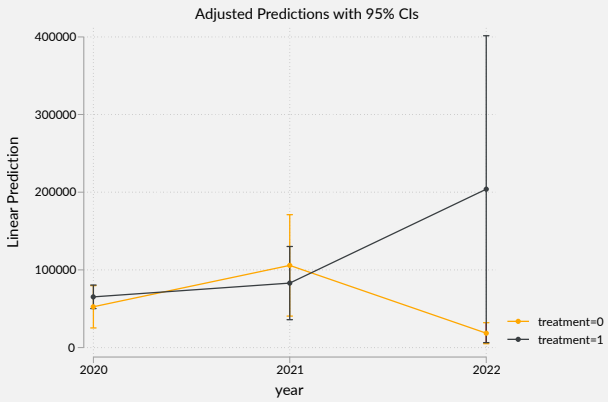
TABLE A6: DiD Analysis in California

	Women-owned Businesses		Non-women-owned Businesses	
Model: DV:	(1) Loan Amount	(2) Loan Amount w/o COVID-19	(3) Loan Amount	(4) Loan Amount w/o COVID-19
Treatment	-$11,272 (-0.48)	-$79,804+ (1.94)	$7,008 (0.13)	$194,066* (2.56)
Post	-$66,439** (-2.95)	-$708 (-0.09)	-$84,071 (-1.66)	-$2,500 (-1.02)
Treatment x Post	$196,725+ (1.90)	$81,465 (0.62)	$248,469** (2.83)	$78,073 (0.52)
Constant	$84,871** (3.95)	$14,315*** (4.68)	$117,098* (2.46)	$10,000*** (4.18)
Number of Observations	969	404	320	135

***Note:** Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants. a omitted due to collinearity. t statistics in parentheses. Robust standard errors used. + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

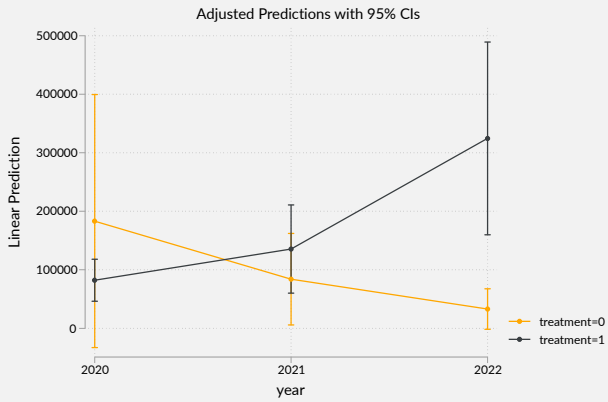
***Source:** Milken Institute (2023)*

FIGURE A5: Women-owned Businesses, DV = Loan Amount



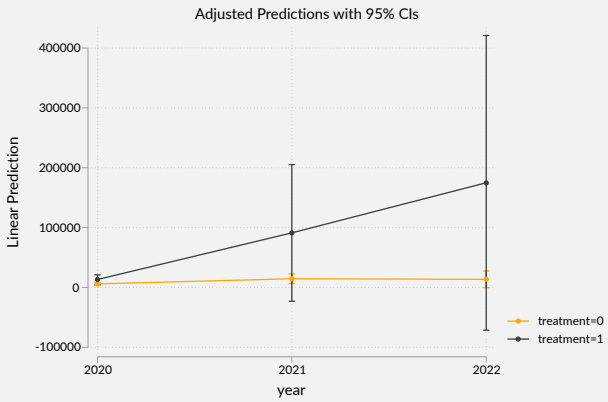
Source: *Milken Institute (2023)*

FIGURE A6: Non-women-owned Businesses, DV = Loan Amount



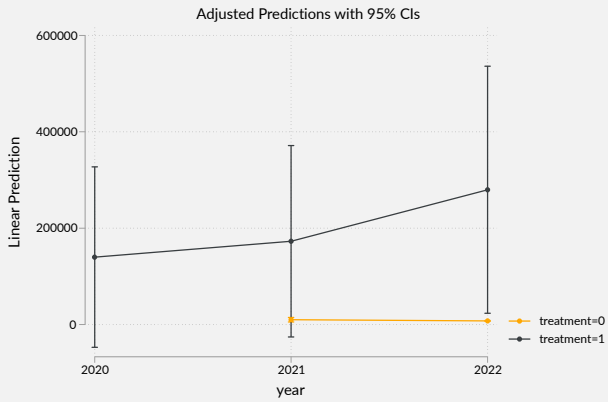
Source: *Milken Institute (2023)*

FIGURE A7: Women-owned Businesses, DV = Loan Amount w/o COVID-19 Grants



Source: *Milken Institute (2023)*

FIGURE A8: Non-women owned Businesses, DV = Loan Amount w/o COVID-19 Grants



Source: *Milken Institute (2023)*

Results on Capital Access (Texas)

TABLE A7: Comparison of Participants Vs Non-participants, Conditional on Being in the Pilot

	N Non-part	N Part	Mean Non-part	Mean Part	Dif	Sr Err	t value	p value
Loan Amount	224	135	$745,255	$423,107	$322,147	$129,674	2.5	0.013
Loan Amount w/o COVID-19	208	128	$719,212	$427,795	$291,417	$132,355	2.2	0.029

Note: *Two-sample t test with unequal variances. Non-part = non-participant; Part = participant. This subset only examines loan outcomes during the pilot. Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants.*

Source: *Milken Institute (2023)*

TABLE A8: Comparison of Before and After the Pilot, Conditional on Being a Participant

	N Before	N After	Mean Before	Mean After	Dif	Sr Err	t value	p value
Loan Amount	210	135	$375,959	$423,107	-$47,149	$105,386	-0.46	0.655
Loan Amount w/o COVID-19	194	128	$401,299	$427,795	-$26,497	$111,756	-0.25	0.813

Note: *Two-sample t test with unequal variances. Treatment = being in the pilot; Control = before the pilot. This subset only examines loan outcomes for participants only. Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants.*

Source: *Milken Institute (2023)*

Results for Women-owned Businesses in Texas

TABLE A9: Comparison of Participants vs Non-participants, Conditional on Being in the Pilot. Women-owned only.

	N Non-part	N Part	Mean Non-part	Mean Part	Dif	Sr Err	t value	p value
Loan Amount	210	133	$748,691	$423,454	$325,236	$133,718	2.45	0.015
Loan Amount w/o COVID-19	195	127	$719,919	$430,376	$289,542	$135,678	2.15	0.034

Note: *Two-sample t test with unequal variances. Non-part = non-participant; Part = participant. This subset only examines loan outcomes during the pilot. Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants.*

Source: *Milken Institute (2023)*

TABLE A10: Comparison of Before and After the Pilot, Conditional on Being a Participant. Women-owned only.

	N Before	N After	Mean Before	Mean After	Dif	Sr Err	t value	p value
Loan Amount	737	339	$158,991	$290,029	-$131,038	$72,842	-1.8	0.073
Loan Amount w/o COVID-19	288	292	$297,911	$286,001	$11,910	$135,678	0.15	0.899

Note: *Two-sample t test with unequal variances. This subset only examines loan outcomes for participants. Loan Amount excludes owner investments. Loan Amount w/o COVID-19 excludes owner investments and COVID-19 grants.*

Source: *Milken Institute (2023)*

APPENDIX B: NUDGE INTERVENTIONS

Nudge A: Progress Visualization

Description: Following each meeting with a client (or the client's achievement of an important step if meetings are infrequent), send the client by email an updated Scope of Work Progress Tracker that has either crossed off or changed the font/coloring of completed milestones as of the time the email is sent.

Outcome Targeted: Reduce the number of clients overwhelmed or confused by the steps required to reach their identified goal.

TECHNICAL ASSISTANCE PLAN: ABC STORE
Date: 01/01/2021

- [x] Milestone 1: Complete Financial Document Review
  - [x] Review and Update Financial Documents
  - [x] Provide Updated Documentation to Advisor

- [ ] Milestone 2: Complete Bank Application Documents
  - [x] Meet with Advisor to Discuss Questions
  - [ ] Complete Bank Applications Forms
  - [ ] Review Forms with Advisor

- [ ] Milestone 3: Bank Approval
  - [ ] Gather Supplementary Materials
  - [ ] Follow-up with Bank

Nudge B: Priming

Description: At the end of every meeting after discussing the set of tasks or homework the client will complete, talk through completion of the provided implementation-related questions with the client. Specifically, (1) ensure that five minutes are set aside at the end of a client meeting to complete the provided nudge template; (2) before starting to complete the nudge template, ensure that you have discussed the set of tasks or homework the client will complete after the meeting; (3) share the nudge template with the client either by email ahead of or during the meeting, or you can simply share the nudge template by screenshare during the meeting for discussion purposes; (4) for the last five minutes of the meeting, talk through the responses to the nudge template prompts, with either you or the client also filling in the responses; and (5) if you fill in the responses, make sure to share a completed copy with the client.

Outcome Targeted: Reduce the number of clients which do not follow through on the timely completion of the tasks required to reach their identified goal.

NEXT STEPS PLANNING EXERCISE

My next meeting will occur on:

1	By the next meeting I will:
2	My first step will be to: And then I will:
3	I'll work on the first step at the following time: In the following place:
4	I might encounter an obstacle when: If I do, I will:
5	The following people support me in completing these next steps:

Nudge C: Likability

Description: Email redesigned advisor biography and introductory email to your new client prior to first meeting. Specifically, draft a new biography and introductory email to client including the following four components: demonstrate competence and credentials, provide social proof or testimonial, highlight the value of the technical assistance services, and establish in emotional connection.

Outcome Targeted: Increase client trust in advisor by sharing advisor's skills and accomplishments in a way designed to engage client's interest.

> *"Before we meet, let me tell you a little about myself. I have an MBA from Duke University and prior to becoming a business advisor, I founded and ran my own company for 15 years. I understand and can help navigate the complexities of starting and running a business.*
>
> *I have facilitated small businesses in filing administrative documents, acquiring business licenses, and other challenging elements of getting started. I'm most proud of having helped over 100 local entrepreneurs access capital to grow their business.*
>
> *One of my former clients wrote that "Knowing the right things to do seemed overwhelming but trusting the process and working with (advisor name) gave me the guidance I needed.*
>
> *Technical assitance programs like this one could easily cost a small business thousands of dollars. The SBA, however, makes my services available to you at no cost through SBDCs.*
>
> *I benefited from a lot of helpful advice as I was getting started and want to provide that to you as well. I'll give you the tools to navigate this process independently, but I'll also be there to provide personal support when you need it."*

Nudge D: Reminder + Motivation Email

Description: Send a reminder email to the client ahead of each meeting including a motivation-related question.

Outcome Targeted: Both (1) reduce the number of clients that forget to attend or prepare for meetings as well as increase the frequency of rescheduling before a meeting is missed and (2) promote personal conversations around the client's motivations.

> *"I'm looking forward to speaking with you at our upcoming meeting on Monday, January 1st at 12:00pm.*
>
> *We'd discussed that you would have completed the application form and compiled the requested documentation before this upcoming meeting. Let me know if you're having any trouble completing these items.*
>
> *Let me know how motivated you're feeling today about continuing to work towards the goals you've identified, and if you don't mind, what might be driving that motivation. It'll help me better prepare for our next meeting."*

ENDNOTES

1. See more here: https://cdn.advocacy.sba.gov/wp-content/uploads/2022/08/30121338/Small-Business-Economic-Profile-US.pdf.

2. See more here: https://cdn.advocacy.sba.gov/wp-content/uploads/2021/12/06095731/Small-Business-FAQ-Revised-December-2021.pdf. From 1994-2019, an average of 67.6 percent of new employer establishments survived at least two years and the five year survival rate was 48.9 percent.

3. See more here: https://www.sba.gov/document/support--2018-project-officer-training-materials.

4. See more here: https://cdn.advocacy.sba.gov/wp-content/uploads/2022/08/30121338/Small-Business-Economic-Profile-US.pdf.

5. See more here: https://cdn.advocacy.sba.gov/wp-content/uploads/2021/12/06095731/Small-Business-FAQ-Revised-December-2021.pdf. From 1994-2019, an average of 67.6 percent of new employer establishments survived at least two years and the five year survival rate was 48.9 percent.

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ABOUT THE AUTHORS

Abraham Song, PhD, is a senior associate at the Center for Financial Markets at the Milken Institute and is concurrently the assistant professor of public policy at Pepperdine University's Graduate School of Education and Psychology. Prior to joining the Milken Institute, Song worked at the DC Policy Center in Washington, DC, and at the Center for Regional Analysis at George Mason University. Song was also a postdoctoral researcher at the Kelley School of Business at Indiana University and a visiting scholar at the Robert H. Smith School of Business at University of Maryland. Song has published three peer-reviewed articles in the *Small Business Economics* journal on entrepreneurship and two white papers on the District's tax incentives. Song has also contributed to policy analysis and research at the Kauffman Foundation, the Small Business Administration, and the Korea Trade Investment and Promotion Agency. His research was awarded the Provost's Office Dissertation Fellowship, Wilkes Fellowship (DC Policy Center), Best Paper Award at the Association of Collegiate Schools of Planning, and the Vernon E. Jordan, Jr. Doctoral Fellowship (Economic Club of Washington, DC). He holds a BS in business administration from the University of Illinois at Urbana-Champaign, an MA in political science from the Middle East Technical University, and a PhD in public policy from Schar School of Policy and Government, George Mason University.

Laura Leets, PhD, currently serves as an adjunct professor at Georgetown University's Communication, Culture, and Technology Program and previously spent a decade as a professor of communication at Stanford University. She has been recognized with several top paper and teaching awards throughout her academic career. She earned a PhD in communication from the University of California, Santa Barbara.

Christopher J. Boudreaux, PhD, is an associate professor of economics at Florida Atlantic University (FAU) and a research fellow for the Phil Smith Center for Free Enterprise. He earned his PhD from Florida State University and taught at Texas A&M International University prior to FAU. His teaching and research interests are primarily related to entrepreneurship and innovation. Boudreaux is the author of 40 articles in referred journals appearing in such outlets as *Entrepreneurship Theory and Practice*, *Journal of Business Venturing*, *Journal of International Business Studies*, *Research Policy*, and *Small Business Economics*. Boudreaux is among the most frequently published authors in ISI-ranked journals in the area of institutions and entrepreneurship (among 204 authors who have published in this area). Additional accomplishments include the FAU College of Business Scholar of the Year Award (2022) and best reviewer award for the *Journal of Business Venturing* (2020) and for *International Journal of Managerial Finance* (2020).

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