NBER WORKING PAPER SERIES

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Working Paper 28151
http://www.nber.org/papers/w28151

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 2020, Revised March 2025

For useful discussions, we thank Diana Farrell, Peter Ganong, Fiona Greig, Michaela Pagel, Chris Wheat, as well as participants at presentations at HBS, MIT, and the 2022Winter Meetings of the American Economic Association. Sarwari Das provided outstanding research assistance. This research was made possible by a data-use agreement between the authors and the JPMorgan Chase Institute (JPMCI), which has created deidentified data assets that are selectively available to be used for academic research. All statistics from JPMCI data, including medians, reflect cells with multiple observations. The opinions expressed are those of the authors alone and do not represent the views of JPMorgan Chase & Co. The Kauffman Foundation provided support for this research through the Knowledge Challenge Research Grant. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 28151
November 2020, Revised March 2025
JEL No. D12, D15, D25, E2, E63, E65, G32, G5

ABSTRACT

Using financial account data linking small businesses to their owner households, we examine how business owners' consumption responded to changes in business revenues during the COVID-19 crisis. In the first two months following the National Emergency, business revenues declined by 40 percent, largely driven by national factors rather than local infection rates or policies. However, the pass-through of revenue losses to owner consumption was limited: each dollar of revenue loss resulted in only a 1.6-cent decline in consumption. This muted pass-through persisted through 2021, even after the introduction of COVID-19 vaccines. Our findings suggest that federal subsidies and pandemic-induced reductions in spending opportunities explain the limited impact.

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A data appendix is available at http://www.nber.org/data-appendix/w28151

The small business sector is a critical driver of the U.S. economy, contributing two-thirds of net job growth and 44 percent of U.S. economic activity (SBA, 2019). But unlike most large firms, small businesses are typically not owned by diversified shareholders but by a few individuals whose standards of living are often closely tied to their businesses (FRBNY, 2019). Small businesses are also riskier, typically contracting earlier and more severely than large firms during economic downturns, partly because they operate with lower overhead and fixed costs (Davis et al., 1996). Thus, the Covid-19 pandemic presented unprecedented challenges for small businesses and their owners. This economic strain, stemming from demand collapses, supply chain disruptions, and production slowdowns due to unsafe work environments was a major concern during the pandemic and a driving force behind the enactment of the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020. In this paper, we measure the declines in small business revenues, costs, and profits during the pandemic, and measure how exposed the consumption spending of small business owners was to these declines in their businesses.

Using de-identified data on the checking, credit-, and debit-card accounts of small businesses and households from JPMorgan Chase (JPMC) bank account records, we document that local infection rates and Non-Pharmaceutical Interventions (NPI) caused only modest declines in revenues for most small businesses and that these revenue losses had limited impact on the consumption of the owners of these small business during the first eighteen months of the pandemic. We use transaction-level information to construct a monthly panel dataset on the revenues, expenses, and profits of small businesses linked with the consumption of their owners from January 2019 to the end of September 2021. We categorize spending using the counterparty of financial account transactions, and use these components of spending to shed light on *how* and *why* businesses and their owner households adjusted spending patterns. Unlike other datasets covering small businesses, our sample of businesses has significant coverage of non-employer businesses and closely mirrors the national distribution of the small business sector.

We first document the enormous impact that COVID-19 pandemic had on small businesses and their owners. Average revenues fell by over forty percent in the first three

months following the declaration of a national emergency on March 13, 2020, consistent with other studies reporting steep declines in small business employment (Bartik et al., 2020a; Chetty et al., 2024) and finances (Farrell et al., 2020b). After this initial drop, average revenues rebounded steadily until March 2021, with a sharp increase following the widespread availability of COVID-19 vaccines in April 2021. Average expenses tracked revenues closely, indicating that businesses quickly downsized in response to the sudden revenue drop and scaled back up as revenues recovered. Similarly, consumption spending of small business owners declined by more than forty percent on average in the first quarter of the pandemic, rebounded to pre-pandemic levels within five months, and surged significantly after the vaccine rollout.

The large declines in business performance and owner consumption during the first two months following the national emergency were similar across businesses with different liquidity buffers and employer versus non-employer status. However, we find a greater divergence in revenue and consumption patterns based on business size and industry. Larger businesses and those in non-essential industries experienced more pronounced revenue declines than smaller businesses or those in essential industries.[1] These differences persisted through the recovery period until September 2021. Small or essential businesses began recovering as early as three months into the pandemic, while larger or non-essential businesses continued to see revenue declines until the end of 2020.[2] After the vaccine rollout, businesses in non-essential industries saw a stronger rebound in average revenues compared to essential industries.

Second, we show that the collapse of small business revenues and the consumption of their owners was predominantly explained by nationwide factors, and that only a small part of the collapse was related to county-level variation in new infection rates or state-level variation in policies such as Shelter-in-Place (SIP) orders. Following the declaration of the national emergency, both new infection rates and state-level policies differed significantly across counties and states and had low correlation with each other. Regressing outcomes

[1] Essential businesses are classified according to the CISA guideline and verified via news searches.

[2] This finding is consistent with Bartlett and Morse (2021), who find that microbusinesses show greater revenue resiliency relative to bigger small businesses.

onto infection rates and SIP orders and including weekly time fixed effects to control for national factors, we find that local infections and SIP orders have only modest direct effects on small businesses and their owners. Specifically, a one standard deviation increase in new infections leads to a 0.5 percent decline in business revenues. The introduction of a SIP order leads to an 11 percent incremental decline in business revenues and a 5.4 percent decline in owner consumption.

One possibility for the relatively moderate direct effects of SIP orders is that states adopted a variety NPI policies, so focusing solely on SIP effects may underestimate the broader impact of NPIs. However, our results hold when using an alternative summary measure of "NPI strictness" that captures the intensity of state-specific packaged NPI policies, with a standard deviation increase in NPI strictness reducing business revenues, expenses, and owners' consumption by less than 5 percentage points.[3] Our finding that NPIs had modest effects where they were imposed is consistent with Correia et al. (2022), which finds that cities with stricter NPI policies did not perform worse than those with less stringent policies during the 1918 flu pandemic. Compared to Correia et al. (2022), which attributes the main source of economic disruption to the pandemic itself, we find more modest effects of local disease incidence.

Our final and most novel result is that the decline in a small business's revenues only had a small direct effect on the consumption spending of its owner. The challenge in identifying the magnitude of the consumption response to revenue declines – particularly in the first couple of months of the pandemic – is that the pandemic affected household consumption decisions not only through the drop in business revenues but also directly through the local prevalence of the disease and the restrictions on mobility and consumer-facing businesses. For example, business owners in hard-hit areas might experience a revenue drop but also reduce spending due to the infection risk when leaving the house. Indeed, for wage-earning households, Cox et al. (2020) finds a reduction in spending on average in the initial months of the pandemic, indicating that the drop in household spending extended even to those whose income was not directly affected by the pandemic.

[3]Specifically, we construct a composite measure of NPI strictness that reflects a state's NPI strictness relative to other states using principal component analysis.

We estimate the propensity of owners to reduce consumption in response to revenue declines using a two-stage least squares (2SLS) strategy that compares businesses in the same county and month, which experience varying degrees of revenue losses due to local infections and SIP orders, because they are in different industries. Our identification strategy relies on the idea that the direct effect of local factors on the consumption of business owners is driven by local conditions that affect households independently of their own business revenues. To control for this endogenous variation in consumption, we include county x time effects in our regression. Furthermore, because consumption and revenues are co-determined for any given business, we use the interactions between 4-digit NAICS industry indicators and local infections and SIP orders to generate revenue changes that are plausibly orthogonal to any remaining endogenous variation in consumption. The changes in revenues for the five least affected industries since the onset of the national emergency range from zero to a 20 percent increase, while the changes in revenues for the five most affected industries are as large as a 90 percent decline.

Our estimates show that for every dollar decline in business revenues or expenses, the owner of that business decreases consumption spending by only 1.6 and 2.6 cents, respectively. To put these estimates in perspective, the average monthly drop in revenues during the lockdown period, relative to its pre-pandemic average, was -$2,400. Therefore, the implied consumption drop due to revenue losses is roughly $36. This decline accounts for less than 10 percent of the average monthly change in consumption during the lockdown period, which was $396. We find little heterogeneity in the pass-through response from business revenue to owner consumption based on employer status and ex-ante liquidity. However, owners of smaller businesses or pass-through entities exhibit greater sensitivity to revenue losses than owners of larger or incorporated businesses.

Our findings are consistent with federal fiscal support providing liquidity to stabilize owners' consumption and the pandemic limiting spending opportunities, especially in the early phase. Consistent with the important role of the CARES Act, cash balances in both business and personal accounts rose sharply in April and May of 2020 when the Economic Impact Payment (EIP) and Paycheck Protection Program (PPP) grants were disbursed and

remained high until the end of our sample period. The pandemic imposed significant restrictions on consumers' ability to spend, particularly in its early months, which could make consumption relatively insensitive to revenue declines.[4] Consistent with this, the magnitude of revenue-to-consumption pass-through more than doubled after the vaccine rollout relative to the onset of the pandemic.

In sum, the large average drop in the consumption of small business owners appears to be largely divorced from the specific performance of their individual businesses and mainly driven by the national crisis. The low direct effects of business revenues on consumption seem to be due both to pandemic-related restrictions on consumption (at least in the early stages of the pandemic) and to the government's large fiscal responses. Thus although the common view is that the standard of living of a small business owner is closely tied to the success of their business, this was not the case during the pandemic. And while businesses and their owners' cash balances remained elevated until the end of our sample period, the pass-through of business losses into owners' consumption may rise over time as government funds are exhausted.

Related literature Our study complements a number of studies of the impact of the pandemic on small businesses by providing well-identified estimates of the effect of local infections and NPIs on small business revenues and expenses and by quantifying the extent to which disruptions to business revenues impacted the living standards of their owners. Several papers conducted surveys of small businesses and their owners in the early phases of the pandemic and find mass layoffs, temporary closures, and downsizing of businesses.[5] Bartik et al. (2020a) finds that 43 percent of businesses were temporarily closed by the end of March, 2020, and estimates from the U.S. Census Small Business Pulse Survey show that only 25 percent of firms had enough cash on hand to cover 3 months of operations at the end of May (U.S. Census, 2020). Bartlett and Morse (2021) finds that larger small businesses experienced 14 percent higher revenue declines than smaller small

[4] We find disproportionate declines in spending on goods and services that are luxuries or that require close personal contact, such as travel, eating out, or personal services in the first three months of the pandemic.

[5] Despite the negative impact on businesses, Wang et al. (2022) finds that small business bankruptcy filings remained low, partly due to the availability of generous unemployment insurance programs.

businesses, and Humphries et al. (2020) reports that 60 percent of small businesses had laid off at least one worker by the end of April (see, also, Bartik et al. (2020b), Balla-Elliott et al. (2022), and Fairlie et al. (2023)). Alekseev et al. (2022) documents that increased household responsibilities, such as taking care of children and self-isolating household members, affected business owners' ability to focus on work during the crisis. Studies that make use of administrative data document a sudden 12.7 percent drop in median business cash balances at the onset of the pandemic (Farrell et al., 2020b) and substantial heterogeneity in the speed of recovery by owner's race or by income profiles of the neighborhood in which businesses operate. African-American businesses recovered at a slower rate than White-owned businesses (Fairlie, 2020) and business located in less affluent areas experienced smaller revenue losses than those located in more affluent areas (Chetty et al., 2024).[6]

Although our focus on small business income and owners is novel and highlights the risks associated with small business ownership, our work also contributes to the extensive literature estimating the marginal propensity to consume (MPC) out of transitory income shocks. This literature typically examines the extent to which households smooth transitory income fluctuations generated by factors such as the randomized timing of economic stimulus disbursements (Parker et al., 2013; Broda and Parker, 2014), the timing and amount of tax refunds (Baugh et al., 2021), variations in income losses due to unemployment insurance (Ganong and Noel, 2019), or changes in income net of installment debt payments (Stephens, 2008; Di Maggio et al., 2017).[7] In the context of the pandemic, we examined an income shock that was both more unusual and less predictable than those previously studied. For example, while the existing literature shows that households (mainly wage earners) saved a significant fraction of Federal economic impact payments (Parker et al., 2022), those experiencing greater income declines exhibited stronger MPC responses (Baker et al.,

[6] Fairlie (2020) documents that African-American business owners experienced a drop of 26 percent in business activity from pre-COVID-19 levels compared to only an 11 percent drop for White business owners by May, 2020. Farrell et al. (2020a) similarly finds that cash balances of White-owned restaurants doubled in May compared to only 38 percent increase for Black-owned restaurants.

[7] In addition to income shocks, there is a substantial literature measuring spending responses to changes in non-labor wealth (e.g., lottery winnings (Golosov et al., 2024; Kotsogiannis and Sakellaris, 2024) or stock market wealth (Di Maggio et al., 2020)) and in debt capacity (e.g., credit card limits (Gross and Souleles, 2002; Aydin, 2022) or mortgage values (Ganong and Noel, 2023)).

2023) and faster spending rebounds during recovery (Cox et al., 2020) (see Yannelis and Amato (2023) for a comprehensive overview). Given that business owners' incomes were more severely affected than those of wage earners, coupled with substantial uncertainty surrounding the timing of recovery in the small business sector, one might expect higher MPC responses compared to prior studies. However, this variation occurred within a context in which income fluctuations were associated with reduced spending capacity and significant public assistance. As a result, the predicted magnitude of pass-through remains ambiguous and presents an open question.[8]

The remainder of the paper proceeds as follows. We describe the data used in this study in Section 1, including our sample construction procedures and the definition of primary outcomes considered in the study. Section 2 presents descriptive evidence of how small businesses performed and owners' consumption evolved in the early months of the pandemic. We present our main findings on the effect of infections and NPIs in Section 3. In Section 4, we describe our estimation strategy for quantifying the causal effect of revenue losses on owners' consumption and present the pass-through estimates. Section 5 discusses potential explanations behind the modest average pass-through effect of business revenue losses. Section 6 concludes.

1 Data

Our analysis makes use of de-identified financial account data provided by JPMorgan Chase Institute (JPMCI). We use transaction-level data from both small business accounts and personal accounts to construct a panel dataset on the revenues, expenses, and net income of small businesses linked with the consumption of their owners. Our final dataset provides monthly business outcomes and household consumption for 380,532 businesses and 333,128 business owners between September 2019 and September 2021.

[8] While our proxy for owners' consumption captures comprehensive spending patterns, it reflects spending responses rather than pure consumption responses, as durable expenses are excluded.

1.1 Samples

We start by constructing a dataset of the universe of small business checking accounts. We define a small business as a collection of small business checking accounts linked to the same signer of the account.

The *all businesses* sample. We apply several screening criteria to identify active businesses that primarily use financial accounts provided by JPMC to manage their business finances. First, we exclude businesses with more than two business checking accounts and those with multiple locations or industry assignments.[9] We next apply several account activity filters to ensure that the set of firms we consider are actively operating businesses prior to the pandemic. We limit the sample to firms with "open" business checking account status for at least twelve consecutive calendar months. We also require that a checking account has at least three transactions per month for at least ten months in 2019 (i.e., our baseline period). Finally, we require a business to have an "open" account status for at least one month in 2020. This reduces our sample of 3.44 million small businesses to 2.4 million businesses with active accounts as of the beginning of 2020. This sample is henceforth referred to as the *all businesses* sample.

The *business owners* sample. From this all businesses sample, we next create a subsample of accounts for which we can match at least one of the owners of the small business to a personal account at the same large financial institution. We construct a *business owners* sample of paired small-business accounts and personal accounts where each observation represents a small business matched with the personal accounts of one of its owners. Specifically, we start from the all businesses sample and apply several additional screening criteria to ensure that the set of owner households we consider also use financial services provided by JPMC to manage their personal finances. We also require that a business owner has an active personal checking account (or accounts) that is "open" for at least twelve consecutive months and has at least three transactions during *all* months in 2019. Relative

[9] Firms with more than two business checking accounts are rare. We drop these firms as they are more likely to have multiple industry and location assignments.

to the business account activity filter that we impose – i.e., at least three transactions for ten months in 2019– we require personal accounts to have activity in all months. This is because business account activity tends to be more volatile due to variations in cash flows and seasonality, whereas personal accounts are not subject to the same concern. This procedure leads to a sample of 363,682 small business-owner pairs.

Further subsamples We categorize observations in the business owners sample by type of business along the following dimensions: employer versus non-employer, essential versus non-essential, small versus big, and low versus high liquidity.

A business is categorized as employer if it has payroll expenses for at least 6 months in 2019. In our sample, 11 percent are employer firms. We next identify essential and non-essential businesses based on their 4-digit North American Industry Classification System (NAICS) sub-sector. Specifically, we categorize businesses that operate in sectors classified as "critical workforce" by the Department of Homeland Security (HLS)'s advisory list as *essential* businesses. We make a few exceptions to this list.[10] Namely, we categorize several sub-sectors in the food and agriculture industry, such as bakeries, caterers, or full-service restaurants, as *non-essential* because they are heavily affected by stay-at-home restrictions even if food and agriculture sectors were considered to be essential and technically not closed. According to this measure, roughly 60% are essential businesses.

We use two measures of firm size. In our descriptive statistics, we define firm size based on its average monthly revenues during 2019. Businesses with average monthly revenue below the first tercile are classified as *smaller*, and those with weekly revenues greater than the third tercile are classified as *larger*. For later estimation (in section 4), we define firm size based on the within-industry distribution of annual revenue in 2019. Since our estimation exploits differential industry exposure to local NPIs and infection rates, using the within-industry distribution provides a better measure of relative size. Businesses with 2019 revenue below the median for their industry are classified as *small*, and those above

[10]This list is intended to help local officials make informed decisions, so individual jurisdictions may differ in their own requirements of essential versus non-essential distinctions. It is nonetheless a good proxy for whether a business is considered to be essential at the local level.

the median for their industry are classified as *large*.

Business liquidity is computed as the ratio of average cash balances at the end of each month in 2019 to average monthly expenses in 2019. We then multiply this figure by thirty to express liquidity as the number of days of operating expenses that a business could pay out of its cash balances were its revenues to stop. Businesses are classified based on the within-industry distribution. Businesses in the bottom quarter of the distribution of cash buffer days within its NAICS4 sub-sector are classified as *low liquidity*, those in the top quarter are classified as *high liquidity*.

Supplemental Data. We supplement this administrative financial accounts data with county-level infections data from the New York Times (New York Times, 2020) and state-level non-pharmaceutical interventions from Keystone Strategy (Keystone, 2020) and the U.S. Department of Health and Human Services.

1.2 Measurement of Business and Owner Outcomes

Our dataset captures businesses and their owners' financial activity on their personal and business credit cards, debit cards, and checking accounts. We construct monthly business revenues, expenses, profits, and household consumption from this dataset.

Business outcomes of firms To construct operating revenues for each small business, we first compute total credit transactions (i.e., inflows) into business checking accounts for each firm and month. We next identify financial transactions or non-business income that are unlikely to represent operating revenues received from providing goods and services, and subtract these amounts from total inflows.

$$\textit{Operating Revenue} = \text{Total Inflows} - \text{Financial Inflows} - \text{Non-business income} \quad (1)$$

Financial inflows include any inter-personal transfers, fee reversals, or miscellaneous account activities such as SWEEP inflows or loans from financial institutions. Non-business

income includes government transfers, such as unemployment insurance, tax refunds, veterans benefits, income from gig platforms, or other interest income.

To construct operating expenses, we categorize all debit transactions (i.e., outflows) on business checking, debit card, and credit card accounts for each firm and week.[11]

$$\begin{aligned} \textit{Operating Expense} = \text{Fuel} + \text{Equipment} + \text{Groceries} + \text{Materials} + \text{Retail} + \\ \text{Retail Durable} + \text{Wholesale} + \text{Entertainment} + \text{Food} + \text{Insurance} + \text{MiscBizExpense} + \\ \text{Services} + \text{Travel} + \text{Payroll} + \text{Tax} + \text{Debt Payment} + \text{Utilities} + \\ \text{Cash Withdrawal} + \text{Check} + \text{Uncategorized} \end{aligned} \tag{2}$$

Spending categories are identified using a combination of transaction tags provided by JPMCI, such as the Merchant Category Code (for spending on cards), the identity of a transaction counterparty, or the channel of payment. We are able to classify detailed categories of business expenses but not of operating revenues because counterparty identity for credit transactions is often redacted to preserve the anonymity of the business.

We code both operating revenues and expenses as continuing zeros following account closures. This approach eliminates a possible survivorship bias that could spuriously make business outcomes appear better by dropping exiting firms that have performed the worst through the pandemic. We define *Profit* as the difference between revenues and expenses and *Profit Margin* as profit divided by average operating revenue in 2019.

Finally, we infer business exit from a closure of business checking accounts or from its inactivity. Specifically, if a business is inactive (near zero revenues, expenses, or balances) from t until the end of the sample period, we consider this firm as having exited even if the business account is not officially closed out. *Exit* is defined as a binary variable that equals one if the small business closed and zero otherwise. If a business has two deposit accounts, both accounts must be closed to be coded as having exited.

[11] Deposit account transactions refer to non-debit checking account transactions, while debit transactions refer to those using debit cards.

Household consumption of owners We construct business owner households' consumption by categorizing all debit transactions on the owners' personal deposit accounts, debit card, and credit card accounts:

$$\begin{aligned} \textit{Consumption} = \text{Fuel} + \text{Groceries} + \text{Pharmacy} + \text{Retail} + \text{Retail Durable} + \\ \text{Auto Repair} + \text{Insurance} + \text{Medical} + \text{Entertainment} + \text{FoodAway} + \text{Personal Svcs} + \\ \text{Professional Svcs} + \text{Other Svcs} + \text{Travel} + \text{Rent} + \text{Gov't} + \text{Utilities} + \\ \text{Cash Withdrawal} + \text{Check} + \text{Uncategorized} \end{aligned} \tag{3}$$

For credit card spending, we follow Ganong and Noel (2019) and measure spending as of the time when the goods and services are purchased rather than when the card bill is paid. In addition to household consumption, we categorize and track household debt payments as they are major household expenses. We supplement business and household outcomes with demographic information about businesses and their owners, such as the owner's gender and age, business industry, incorporation type, and location.

Relative to other account-level analyses, one advantage of our use of linked small-business and personal accounts is that we observe some business expenses in personal accounts and some personal expenses in business accounts and can re-classify them. That is, there are instances where it appears that the business owner uses their business accounts for transactions that are clearly for personal use (e.g., child care, medical expenses, hair salon, etc). We exclude these transactions from operating expenses and re-categorize them as household spending. Similarly, when we observe business spending (e.g., payroll, business insurance, etc) from personal accounts, we re-categorize them as operating expenses.

One disadvantage of account-level data, in general, is that we cannot capture business activities or household spending patterns if a business or household has financial accounts with another financial services company. However, given that the sample of households we study have both their business and personal checking accounts provided by JPMC to manage their finances, combined with our activity filters, we believe that the account activity that we can track in our data captures the majority, if not all, of their business and

personal finances.

Our dataset does not provide information beyond financial activity on credit cards, debit cards, and checking accounts. For example, we do not observe firms' balance sheets or households' brokerage or investment accounts. Thus, our dataset primarily captures cash flows and short-term liquidity of businesses and their owners rather than their total wealth, including illiquid assets (e.g., housing, land, physical capital, retirement accounts).

Scaled outcome variables To compare businesses of different sizes, we normalize our outcome variables (except profits) using two alternative scaling factors. The first scaling factor is the monthly average of the outcome in 2019. We denote variables scaled with this factor by the superscript *avg* (for 2019 average). Thus, for business-owner pair i in month t:

$$Y_{i,t}^{avg} = \frac{Y_{i,t}}{\overline{Y}_{i,2019}} \tag{4}$$

where $\overline{Y}_{i,2019} = \frac{1}{12}\sum_{s\in 2019} Y_{i,s}$ and $Y_{i,s}$ represents operating revenue, expenses, or consumption. This normalization allows us to capture changes in outcome relative to a firm-household pair-specific constant baseline.

The second scaling factor is the centered 3-month average of the same outcome a year ago. We denote variables scaled with this factor by the superscript *sa* (for seasonal adjustment):

$$Y_{i,t}^{sa} = \frac{Y_{i,t}}{\overline{Y}_{i,(t-13,t-11)}} \tag{5}$$

where $\overline{Y}_{i,(t-13,t-11)} = \frac{1}{3}\sum_{s=t-13}^{s=t-11} Y_{i,s}$. The second normalization factor has the advantage of adjusting for seasonal fluctuations so that one is comparing the firm-household outcome to a similar period in the previous year. We take the 3-month average so that the scaling factor does not add month-to-month volatility.

Unlike revenues, expenses, or consumption, each scaled by its own monthly average in 2019, we transform profits (i.e., $Revenue_{i,t} - Expense_{i,t}$) into a profit margin measure, or percentage of sales turned into profits, by normalizing profits by monthly average or

centered-3 month average of operating revenue a year ago. All of the scaled and unscaled outcome variables are winsorized at the 2*nd* and 98*th* percentile.

1.3 Descriptive Statistics

Businesses in the business owners sample are smaller – both on average and across the distribution – relative to those in the all businesses sample, as shown in Panels A (all businesses sample) and F (business owners sample) of Table 1. Panels B through E show the distributions of revenues, expenses, and profits for subsamples of all businesses sample. Average revenues and expenses track each other closely for all types of businesses, with the exception of smaller small businesses (Panel D), which have higher average monthly expenses than revenues. Employer businesses (Panel C) tend to be larger and are similar in size to large small businesses (those in the top tercile of monthly revenues in 2019, Panel E). Across all business types, a median firm does not break even (median profits are negative). Consumption represents about 23% of business revenues and expenses (Table 1 Panel F).

At the bottom of Table 1, we show that businesses in the all businesses sample are concentrated in 5 industries, in which more than half of all businesses in the sample operate. A large share of businesses (more than 76%) are pass-through entities, and roughly 30% of all businesses are female-owned.

How do the characteristics of the small businesses that use our financial institution compare to the national distribution? Table 2 compares our data to external benchmarks. Roughly 85% of businesses sampled in our data are nonemployer businesses, similar to 81% in the U.S. overall. Thus, a key advantage of our data is better coverage of nonemployer businesses relative to traditional data sources. However, relative to the benchmark, our sample under-represents businesses that have existed for more than ten years and over-represents businesses that operate in professional services, real estate, and transportation sectors. Among nonemployer businesses, our sample of firms tends to be bigger in terms of annual receipts relative to the nationwide distribution.

1.4 Measurement of Infections and NPIs

To estimate the effect of local disease prevalence on business performance and owner's consumption, we obtain measures of new infections from New York Times (2020). We aggregate new cases in every county from the daily to the monthly level and divide by ex-ante population to obtain the monthly rate of new infections per 1,000 residents at the county level:

$$LIR_{c(i),t} = \frac{\text{New Cases}_{c,t}}{\text{Population}_c} \times 1000 \tag{6}$$

where LIR denotes local infection rate, c indexes counties and $c(i)$ denotes the county in which business i is located. For studying exit rates, we cumulate this variable across weeks: $LIR^{Cum}_{c(i),t} = \sum_{s=0}^{t} LIR_{c(i),t}$. It is important to note that the infection rates that we use may underestimate the true infection rates due to limited testing capability or efforts. However, these rates reflect the available public information about the prevalence of the disease. We obtain measures of NPI policies at the state level from Keystone (2020) and the U.S. Department of Health and Human Services.

2 Average business and owner outcomes

This section shows that the performance of small businesses and the consumption of their owners declined dramatically in the early months of the pandemic. Following this analysis, Section 3 studies the relative roles of national vs. local infection rates and state-level policies in these severe declines. Section 4 then measures the extent to which owners' living standards are affected by their own business' revenue losses and how this differs across businesses.

Our data shows sharp declines in all measures of economic activity following the declaration of the COVID-19 national emergency on March 13, 2020. Figure 1 presents the average monthly dollar amounts (unscaled) of business revenue, expenses, profit, and owner's consumption for our sample of business owners. Figure 2 illustrates the

average percent change in seasonally adjusted outcomes for this same sample, relative to the six-month average preceding the national emergency. In the first month, revenues, expenses, and consumption decline by over 40 percent, before rebounding to pre-pandemic levels about three months later as shelter-in-place (SIP) orders are lifted. These outcomes experience a sharp increase in May 2021, following the nationwide expansion of COVID-19 vaccine eligibility to all residents aged 16 and older on April 19, 2021.[12]

Figure 3 shows the average changes in business revenues across different types of small businesses. Panel A shows that essential businesses experienced a 40% decline in revenues one month into a national emergency, whereas non-essential businesses saw a significantly larger drop. This discrepancy is likely due to non-essential businesses being more affected by consumer and worker responses to the pandemic and facing stricter operational restrictions imposed by local governments. The performance gap between essential and non-essential businesses remains relatively stable until March 2021, after which non-essential businesses experience a substantial revenue increase of 200% following the vaccine rollout. Panel B indicates that larger small businesses faced greater revenue declines compared to their smaller counterparts. However, the differences in revenue changes between employer and nonemployer businesses (Panel C), as well as between businesses with high and low liquidity levels (Panel D), are relatively minor.

The initial collapse in business revenues, expenses, and profits is unlikely to be driven by business exits, as exit rates remained low during the first year of the pandemic. Figure 4 shows the monthly survival rates of businesses. We define a firm as having exited if it closed its business checking account or remained inactive from a specific time point until the end of our sample period. At the start of 2020, nearly 99 percent of firms had not exited. However, exit rates began to increase in March 2021, and by the end of our sample period, approximately 7 percent of firms had fully exited. A potential reason for the delayed exits could be federal stimulus programs, such as the Paycheck Protection Program (PPP), which provided ample liquidity to help businesses weather the economic downturn in 2020.

[12]While the set of businesses in the business owners sample tend to be smaller than those in our all businesses sample, we find that the experiences in the two samples are very similar. Appendix Figures A.1 and A.2 repeat Figures 1 and 2 for a random subset of all businesses and show a very similar pattern to that of our business owners sample in the early stages of the pandemic.

3 The Effects of Infections and State-level Policies

This section demonstrates that both business outcomes and owner consumption declined sharply as local infection rates rose and states implemented policies to curb the spread of the virus. However, the direct effects of infections and state policy responses on business and consumption outcomes appear modest when comparing businesses across counties with differing levels of exposure to infections and policy interventions.

3.1 Effects of Covid-19 Infections and Shelter in Place Orders

We estimate the impact of infection rates and SIP orders by comparing businesses across geographic areas with varying infection rates and NPI policies. There was considerable heterogeneity in the incidence of infection rates and NPI policies across regions. Figure 5 shows the share of states with NPI orders by month, illustrating the variation in the timing and imposition of these measures across states. Infection rates also varied significantly across counties. Figure 6 shows the evolution of infection rates per 1,000 residents in three counties representing low, medium, and high-growth regions. Panel A displays new cases, and panel B shows cumulative cases per $1,000$ residents. The counties with low and medium infection rates (Glenn and Nowata) experience an order of magnitude lower infection rates than those of New York, the county with the highest caseload.

We quantify the impact of infections and shelter-in-place (SIP) orders on businesses and their owners' consumption by estimating variants of the following regression model:

$$Y_{i,t} = \alpha_i + \beta_1 LIR_{c(i),t} + \beta_2 1[\text{SIP}_{s(i),t}] + \mathbb{X}_{i,t} + \epsilon_{i,t} \tag{7}$$

where $Y_{i,t}$ denotes our outcomes of interest (as defined in Section 1.2), and our main explanatory variables, $LIR_{c(i),t}$ and $1[\text{SIP}_{s(i),t}]$, represent local infection rates per 1,000 residents and an indicator for whether a state has a SIP order in effect, respectively. We include firm fixed effects, α_i, in all specifications to account for time-invariant, unobserved differences across firms. We also include different sets of fixed effects, denoted by $\mathbb{X}_{i,t}$, to compare firms within the same month, industry, and/or size category. While states

implemented a variety of NPIs in response to rising infection rates, we focus on the effects of shelter-in-place (SIP) orders, which were among the most common and stringent measures. SIP orders imposed direct restrictions on both the ability of many businesses to operate and the ability of individuals to consume various goods and services.

Local infection rates and SIP orders together explain the majority of the decline in business outcomes and owners' consumption in a naive regression that does not account for nationwide factors. These results are reported in Table 3. The first four columns report the estimates with dependent variables normalized by the prior-year average, $Y_{i,t}^{avg}$, while the last four columns report estimates using seasonally adjusted dependent variables, normalized by the centered three-month average of the respective outcomes from the previous year, $Y_{i,t}^{sa}$. The reported coefficients capture percentage point change relative to the mean of the previous year. Columns 1 and 5 of Table 3 shows that each new case per $1,000$ residents is associated with a 0.3 or 0.4 percentage point decline in monthly business revenues while the imposition of a SIP order leads to a 27 percent decline in revenues.

Local infection rates and SIP orders account for only a small portion of the significant decline in business revenues once nationwide (i.e., time) effects, as well as sectoral and size differences, are controlled for. Columns 2 and 6 of Table 3 include time (month-year) fixed effects in $\mathbb{X}_{i,t}$. Each new case per $1,000$ residents in a week leads to a 9 percent decline in revenues in that month, and an SIP order leads up to an 11 percent decline in revenues. The infection effect is economically small in magnitude: a standard deviation increase in infection rates leads to a 0.5 percent decline in revenues (≈ 6.16 cases per thousand $\times 0.08$). The remaining columns show that the estimated effects remain stable and robust across different specifications that include time $\times$ industry or time $\times$ size bin fixed effects.

We similarly observe modest effects on business expenses, profits, exit rates, and the consumption of small business owners. Panel B shows that the impact of infections and SIP orders on business expenses was comparable to their effect on revenues, suggesting that businesses immediately scaled down, potentially by depleting inventory, postponing bill payments, or "eating" into capital. Panel C shows that while SIP policies had a small negative impact on profits (up to a 2 percent decline), infections had a small positive effect

on profits. Panel D shows that consumption declined by 0.13 percent per new case per thousand residents. Similarly, state-level SIPs reduced consumption by 1.7 or 5.6 percent, depending on the specification. Panel E shows that local infections and SIP had little effect on exit rates.[13]

Overall, comparing businesses in different geographic regions exposed to varying levels of infection rates and SIP orders shows that infection rates and SIP orders had minimal direct effects on business performance once nationwide factors are controlled for. However, SIP orders represent only one of many policies states implemented to limit the spread of the virus. Given that many states adopted multiple NPI policies, focusing solely on SIP effects may underestimate the broader impact of NPIs. We next explore the broader impact of NPIs.

3.2 Effects of Infections and NPI tightness

We construct a summary measure of NPIs and show that the conclusions of the previous subsection – that both local infections and NPIs had modest effects – still hold for this alternative measure of state policies. Figure 5 shows that many states adopted multiple NPI policies at the same time. Since packaged policies can reinforce and complement one another, correlated policies and heterogeneity in policy duration across states complicate the measurement of NPI effects. We address this challenge by conducting Principal-Component analysis (PCA) and constructing a simple "NPI strictness" measure that captures the intensity of state-specific packaged NPI policies relative to other states.

We perform PCA on the NPIs listed in Figure 5 during the period after the national emergency is declared. Appendix Table A.1 reports the detailed PCA results. We focus on the first principal component (denoted *Strictness*), which explains 58 percent of variance and weighs positively on all restrictions.[14] We estimate the impact of infections and NPI

[13]Figure A.3 helps to visualize this result by showing that the majority of early declines in business performance are explained by nationwide factors and that these effects are not persistent.

[14]The first principal component explains up to 65 percent of variance in the first 6 months of the pandemic.

tightness on business outcomes and owner consumption using the following specification

$$Y_{i,t} = \alpha + \alpha_i + \beta_1 LIR_{c(i),t} + \beta_2 \text{Strictness}_{s(i),t} + \mathbb{X}_{i,t} + \epsilon_{i,t} \tag{8}$$

which is analogous to equation (7).

We find that NPI strictness has effects on business and owner outcomes that are very similar to the modest effects that we found for SIP orders. And the use of NPI strictness in place of SIP does not alter any of our conclusions about the modest effect of infections. Table 4 reports the effect of infection rates on outcomes (simply the estimated β_1) and the effect of NPI strictness per standard deviation increase in NPI strictness (the estimated β_2 times the standard deviation of the first NPI factor). A one standard deviation increase in NPI strictness reduces business revenues, expenses, and owner's consumption by less than two percentage points when we account for time effects.

In sum, we find only modest effects of local infection rates and SIP policies on business revenues and owner consumption, suggesting that the primary drivers of business disruptions were national factors rather than local infections. Moreover, the low correlation between county-level infections and state-level policies allows us to reasonably estimate the contribution of each separately. Our finding of a weak effect of SIP policies aligns with Correia et al. (2022), who report that cities with stricter NPI measures did not perform worse than those with less stringent measures, indicating that the main source of economic disruption was the pandemic itself rather than NPIs during the 1918 Flu pandemic.

4 The Effect of Revenue Losses on Owner Consumption

This section investigates the causal impact of declines in individual business revenues on the consumption of business owners. While local infection rates and state-level policies had modest direct effects on business performance and owner consumption, we observe substantial heterogeneity in business performance across industries. We analyze how these variations in business outcomes pass through to the living standards of business owners.

4.1 The Effect of Business Revenues on Owner Consumption

Small businesses experienced substantial variation in performance across industries, but the consumption of their owners remained strikingly similar across industries. Figure 7 plots changes in average revenues and owner consumption for the least and most affected NAICS 4-digit industries. In the first two months of the pandemic, average revenues for the least affected industries (solid blue line) remained stable, whereas those for the most affected industries (dashed blue line) plummeted by nearly 90 percent. Despite this sharp decline, the consumption patterns of business owners showed minimal variation across sectors, and this trend persisted even after the vaccine rollout in April 2021.[15]

The stark disconnect between the severity of revenue shocks and adjustments in owner consumption motivates the causal analysis of how well owners could insulate their spending from firm-specific revenue losses. While the earlier figure hints at owners' self-insurance capabilities, geographic differences in infection rates and NPIs could obscure the direct effect of business performance on consumption. If, for instance, the least affected industries are concentrated were high-infection areas and the most affected ones were in low-infection areas.[16] To address this, we conduct a regression analysis that accounts for local conditions.

To estimate the decline in owner consumption *caused* by their business's revenue drop, we compare owners of businesses within the same county but in industries differentially impacted by local infection rates and SIP orders. The key assumption is that industry-specific exposure to these local shocks does not directly influence owner consumption except through its impact on business performance. For example, restaurants are more affected by local conditions than chemical manufacturing, creating revenue differences

[15] Appendix Figure A.4 also plots average revenues and consumption for the bottom and the middle three industry performance deciles and show similar patterns in the early stages of the pandemic. Appendix Figures A.5 and A.6 plot changes in revenues and consumption for each individual sector.

[16] For example, if some of the least affected industries are located in areas with high infection rates (e.g., finance in Boston), where consumption dropped the most, while some of the most affected industries are concentrated in regions with low infection rates and minimal NPIs (e.g., potato farmers), we might observe a negative relationship between industry revenue declines and owner consumption. In this scenario, the consumption of owners in the least affected industries would be more heavily influenced by high local infection rates and stringent NPIs, reducing their consumption. This negative correlation would counterbalance the direct impact of revenue declines on owner consumption, making it appear as though changes in business performance have little effect on owner spending.

driven by industry exposure rather than the owner's personal consumption behavior.

We instrument for business revenues, expenses, and profits using industry-specific exposure to local infection rates and state-level NPIs. The exclusion restriction is that the differential effects of infections and NPIs on owner consumption operate solely through their impact on the owner's business industry. This leads us to estimate the following two-stage least squares (2SLS) regression model:

$$Y_{i,t} = \alpha_i + \sum_j \beta_j^{FS} 1_{[j=j(i)]} NPI_{s(i),t} + \sum_j \delta_j^{FS} 1_{[j=j(i)]} LIR_{c(i),t} + \gamma_{c(i),t} + \epsilon_{i,t} \tag{9}$$

$$C_{i,t} = \alpha_i + \beta^{IV} \widehat{Y_{i,t}} + \gamma_{c(i),t} + \eta_{i,t} \tag{10}$$

where the two key variables in equation (9) are interactions of NAICS 4 industry indicators with state-level NPIs and with county-level infection rates, respectively. These terms measure the industry-specific effect of local infections and state-level policies on business outcomes. The term $\gamma_{c(i),t}$ represents month $\times$ county fixed effects, which control for differences in the average effect of infections and NPI on revenues through all channels, as well as for location-specific industry effects. In the second-stage equation (10), we use the same fixed effects to isolate the causal effect of revenue declines on owner consumption based solely on industry-level differences in revenue responses to local infection rates and state-level policies within a given county and time period.

Table 5 shows the results from estimating equation (9) and (10) with $Y_{i,t}$ and $C_{i,t}$ measured in levels (dollars) to directly assess the marginal propensity to adjust consumption in response to business losses. In this table, the odd columns use variation in industry exposure to SIP or NPI strictness, while the even columns use both industry exposure to infections and SIP/NPI strictness as instruments. Panel A includes county $\times$ time fixed effects, and Panel B includes state $\times$ time fixed effects. All specifications control for firm-household pair fixed effects.

Our main finding is that the marginal propensity to cut consumption in response to business losses was modest. Table 5 shows that for each dollar reduction in business revenues and expenses, consumption declined by between 1.6 and 2.6 cents, respectively.

The third row shows that a dollar reduction in profits leads to a 3.3 cent decrease in consumption.[17] To put these estimates in perspective, the average monthly drop in revenues in the lockdown period relative to its pre-pandemic average was about $-\$2,400$. Therefore, the implied consumption drop due to revenue losses is $2,400\times$ (roughly) $0.016 \approx \$38$ per month. This decline is modest relative to an average monthly decline in consumption of roughly $396 during the lockdown period.

4.2 The Consumption Sensitivity to Revenues Across Business Types

In this section, we investigate whether some business owners are less able to insure against revenue losses by conducting a subsample heterogeneity analysis based on four business characteristics: employer status, ex-ante liquidity, business size, and ownership structure. Ex-ante liquidity is measured by the ratio of 2019 average account balances to typical spending, or "cash buffer days." Firm size is proxied by 2019 average monthly revenues. We define subgroups based on the within-industry distribution of liquidity and size due to significant variation across industries in business size and liquidity levels.

We find little heterogeneity in the pass-through response from business revenues to owner consumption based on employer status and ex-ante liquidity. Table 6 reports β^{IV} from equations (9) and (10) by subgroup. Panels A and B show that for every dollar reduction in revenue, owners of businesses with employees reduce their consumption by 1.3 cents, which is similar to the 1.7-cent reduction for owners of non-employer businesses. Similarly, Panels C and D show that the pass-through of businesses with low vs. high ex-ante liquidity are 1.2 cents and 1 cent, respectively, suggesting that both low and high liquidity businesses experience similar consumption adjustments.

Owners of smaller or pass-through businesses exhibit greater sensitivity to revenue losses than larger or incorporated businesses. Panels E and F of Table 6 show that smaller businesses reduce consumption by 2.9 cents per dollar revenue decline, whereas the pass-through sensitivity is half this size (1.4 cents per dollar decline) for owners of larger small

[17] These results are robust to using scaled measures of business outcomes, which accounts for potential differences in consumption effects by business size. These analyses are shown in Appendix Table A.2 for the first few weeks of the pandemic.

businesses. Table 7 shows that the living standards of owners of pass-through entities are more sensitive to business losses relative to C-corporations. A dollar reduction in revenue leads consumption to drop by 2.3 cents for pass-through entities (i.e., sole proprietors and S-corporations) but only by 0.8 cents for C-corporations.

5 Explanations for the Modest Impact of Revenue Losses on Business Owners' Consumption

The limited pass-through of revenue losses to the living standards of business owner households is consistent with two explanations: (1) pandemic-induced restrictions on the ability to spend and (2) generous federal fiscal support.

First, the pandemic imposed significant restrictions on everyone's ability to spend, which reduced the sensitivity of owner consumption to individual business revenue declines, especially during the early phase of the pandemic before the vaccine rollout. Figures 8 and 9 show the average monthly dollar amounts spent on various categories for both businesses and their owners and confirm that business and household spending was depressed throughout the pandemic until the vaccine rollout. While spending on some categories (e.g., fuel and groceries) increased, mirroring the household stocking-up behavior observed in Baker et al. (2020), expenditures on travel, food services (e.g., restaurants, bars, bakeries), entertainment, and personal services were sharply reduced during the lockdown period (March to May 2020) and remained depressed until the vaccine rollout in April 2021.

To further validate that pandemic-induced spending restrictions contributed to the limited pass-through, we conduct two event studies and re-estimate our marginal propensity to consume (MPC) by focusing on two distinct periods: the six months surrounding March 2020 ("early-phase") and the six months around March 2021 ("vaccine-phase"). MPC more than doubles in the vaccine period (2.4 cents) relative to the early phase (1.1 cents), consistent with the pandemic limiting everyone's ability to spend in the early phase of the pandemic. Tables A.3 and A.4 further confirm that the pass-through is larger for "discretionary" spending than for "committed" spending categories that were difficult to

adjust during the pandemic, such as groceries, utilities, insurance payments, etc. Further decomposing consumption types into early vs. vaccine periods shows that MPC was muted for both "committed" and "discretionary" consumption and that the pass-through rises for both consumption types after the vaccine rollout (see Table A.5). Overall, these results suggest that pandemic-induced restrictions on the ability to spend contributed to the limited pass-through in the early phase of the pandemic.

Second, businesses and households' liquid cash balances increased significantly at the onset of COVID-19 and remained elevated throughout our sample period, suggesting that federal fiscal support may have helped stabilize consumption for hard-hit business owners. The Coronavirus Aid, Relief, and Economic Security Act (CARES Act), which included Economic Impact Payments (EIP) and Federal Pandemic Unemployment Compensation (FPUC) for households,[18] as well as the Paycheck Protection Program (PPP) and expanded Economic Injury Disaster Loans for small businesses, played a key role. Figure 10 illustrates the sharp rise in financial buffers: business and personal checking account balances began to grow significantly when the first EIP payments were distributed (April 15) and during the rollout of the first (April 3) and second (April 27) rounds of PPP. By the end of May, median business and owner account balances were 60 percent and 50 percent higher, respectively, compared to the six months preceding the COVID-19 crisis.

Business and household liquid balances showed similar trends for both the most and least affected industries, which helps explain why owner consumption remained stable despite significant volatility in business revenues. Figure 11 illustrates median changes in business and personal account balances of business owners, compared to levels from six months before the crisis, for firms in both the most and least affected industries. Business account balances surged by over 60 percent within three months of the pandemic onset across both groups and remained elevated until the vaccine rollout. Similarly, the personal account balances of the owners trended in parallel across sectors, indicating a consistent buildup of financial buffers irrespective of industry impact. The generous fiscal support during the sample period helps to explain the minimal variation in pass-through across

[18] In addition to increasing UI generosity, the FPUC expanded UI eligibility criteria to include business owners and self-employed individuals who would traditionally not be eligible to receive UI benefits.

households with low versus high ex-ante liquidity.

6 Conclusion

This paper documents that small businesses and their owners experienced unprecedented disruptions, with monthly revenues, expenses, and consumption dropping by up to 40 percent in the early phases of the pandemic. However, most of this decline was driven by nationwide factors, while local infections and state-level policies, such as shelter-in-place orders and NPI strictness, had only moderate additional direct effects on business outcomes and owner consumption. A one standard deviation increase in the new infection rate resulted in a 0.5 percentage point decline in business revenues, and the imposition of a shelter-in-place order led to an 11 percentage point decline in business revenues.

Using differential industry exposure to NPIs and infection rates, we find that small business losses had only a modest impact on their owners' consumption. Despite significant variation in small business performance across industries, owner consumption remained strikingly similar. For every dollar reduction in business revenues, consumption declined by 1.6 cents, which translates to an economically small effect of a -$38 monthly decline in consumption. This represents less than 10 percent of the average monthly consumption decline of $396 during the lockdown period.

We find corroborating evidence that the limited pass-through of business losses to owner consumption can be attributed to widespread access to federal support programs and reduced spending opportunities during the pandemic. Although the pass-through increased over time, it remained small even after the vaccine rollout, when spending opportunities expanded significantly. Additionally, the elevated liquid cash balances throughout the first 18 months of the pandemic indicate that federal stimulus provided a sufficient financial buffer for business owners to weather disruptions. Whether business owners' living standards will continue to be insulated from revenue losses once these cash buffers are depleted remains an open question.

References

ALEKSEEV, G., S. AMER, M. GOPAL, KUCHLER, J. STROEBEL, AND N. WERNERFELT (2022): "The Effects of COVID-19 on U.S. Small Businesses: Evidence from Owners, Managers, and Employees," *Management Science*, 69, 7–24.

AYDIN, D. (2022): "Consumption Response to Credit Expansions: Evidence from Experimental Assignment of 45,307 Credit Lines," *American Economic Review*, 112, 1–40.

BAKER, S., R. FARROKHNIA, S. MEYER, M. PAGEL, AND C. YANNELIS (2020): "How Does Household Spending Respond to an Epidemic? Consumption During the 2020 COVID-19 Pandemic," *Review of Asset Pricing Studies*, 10, 834–862.

BAKER, S. R., R. A. FARROKHNIA, S. MEYER, M. PAGEL, AND C. YANNELIS (2023): "Income, Liquidity, and the Consumption Response to the 2020 Economic Stimulus Payments," *Review of Finance*, 27, 2271–2304.

BALLA-ELLIOTT, D., Z. B. CULLEN, E. L. GLAESER, M. LUCA, AND C. STANTON (2022): "Determinants of Small Business Reopening Decisions After Covid Restrictions Were Lifted," *Journal of Policy Analysis and Management*, 41, 278–317.

BARTIK, A. W., M. BERTRAND, Z. CULLEN, E. GLAESER, M. LUCA, AND C. T. STANTON (2020a): "How Are Small Businesses Adjusting to COVID-19? Early Evidence from a Survey," *Proceedings of the Natural Academy of Sciences*, 117, 17656–17666.

BARTIK, A. W., M. BERTRAND, Z. B. CULLEN, E. L. GLAESER, M. LUCA, AND C. T. STANTON (2020b): "The Impact of COVID-19 on Small Business Outcomes and Expectations," *Proceedings of the National Academy of Sciences*, 117, 17656–17666.

BARTLETT, R. P. AND A. MORSE (2021): "Small-Business Survival Capabilities and Fiscal Programs: Evidence from Oakland," *Journal of Financial and Quantitative Analysis*, 56, 2500–2544.

BAUGH, B., I. BEN-DAVID, H. PARK, AND J. A. PARKER (2021): "Asymmetric Consumption Smoothing," *American Economic Review*, 111, 192–230.

BDS (2016): "Business Dynamics Statistics," U.S. Census Bureau.

BRODA, C. AND J. A. PARKER (2014): "The Economic Stimulus Payments of 2008 and the Aggregate Demand for Consumption," *Journal of Monetary Economics*, 68, S20–S36.

CHETTY, R., J. N. FRIEDMAN, M. STEPNER, AND O. I. TEAM (2024): "The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data," *The Quarterly Journal of Economics*, 139, 829–889.

CORREIA, S., S. LUCK, AND E. VERNER (2022): "Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu," *The Journal of Economic History*, 82, 917–957.

COX, N., P. GANONG, P. NOEL, J. VAVRA, A. WONG, D. FARRELL, AND F. GREIG (2020): "Initial Impacts of the Pandemic on Consumer Behavior: Evidence from Linked Income, Spending, and Savings Data," *Brookings Papers on Economic Activity*.

DAVIS, S. J., J. HALTIWANGER, AND S. SCHUH (1996): "Small business and job creation: Dissecting the myth and reassessing the facts," *Small Business Economics*.

DI MAGGIO, M., A. KERMANI, B. J. KEYS, T. PISKORSKI, R. RAMCHARAN, A. SERU, AND V. YAO (2017): "Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging," *American Economic Review*, 107, 3550–88.

DI MAGGIO, M., A. KERMANI, AND K. MAJLESI (2020): "Stock Market Returns and Consumption," *Journal of Finance*, 75, 3175–3219.

FAIRLIE, R. W. (2020): "The Impact of COVID-19 on Small Business Owners: Evidence of Early-Stage Losses from the April 2020 Current Population Survey," *National Bureau of Economic Research Working Paper*.

FAIRLIE, R. W., F. M. FOSSEN, R. JOHNSEN, AND G. DROBONIKU (2023): "Were Small Businesses More Likely to Permanently Close in the Pandemic?" *Small Business Economics*, 60, 1613–1629.

FARRELL, D., C. WHEAT, AND C. MAC (2020a): "Small Business Financial Outcomes during the COVID-19 Pandemic," *JP Morgan Chase Institute*.

——— (2020b): "Small Business Financial Outcomes during the Onset of COVID-19," *JP Morgan Chase Institute*.

FRBNY (2019): "Report on Nonemployer Firms: Small Business Credit Survey," Tech. rep., Federal Reserve Bank of New York.

GANONG, P. AND P. NOEL (2019): "Consumer Spending During Unemployment: Positive and Normative Implications," *American Economic Review*, 109, 2383–2424.

——— (2023): "Why do Borrowers Default on Mortgages?" *The Quarterly Journal of Economics*, 138, 1001–1065.

GOLOSOV, M., M. GRABER, M. MOGSTAD, AND D. NOVGORODSKY (2024): "How Americans Respond to Idiosyncratic and Exogenous Changes in Household Wealth and Unearned Income," *The Quarterly Journal of Economics*, 139, 1321–1395.

GROSS, D. B. AND N. S. SOULELES (2002): "Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data," *Quarterly Journal of Economics*, 117, 149–185.

HUMPHRIES, J. E., C. NEILSON, AND G. ULYSSEA (2020): "The Evolving Impacts of COVID-19 on Small Businesses Since the CARES Act," *Cowles Foundation Discussion Paper*.

KEYSTONE (2020): "Coronavirus City and County Non-pharmaceutical Intervention Rollout Date Dataset," Keystone Strategy.

KOTSOGIANNIS, C. AND P. SAKELLARIS (2024): "MPCs Estimated from Tax Lottery, Survey and Administrative Data," *Manuscript*.

NES (2018): "Nonemployer Statistics," U.S. Census Bureau.

NEW YORK TIMES (2020): "Coronavirus (Covid-19) Data in the United States," The New York Times.

PARKER, J., N. SOULELES, D. S. JOHNSON, AND R. MCCLELLAND (2013): "Consumer Spending and the Economic Stimulus Payments of 2008," *American Economic Review*, 103, 2530–2553.

PARKER, J. A., J. SCHILD, L. ERHARD, AND D. S. JOHNSON (2022): "Economic Impact Payments and Household Spending during the Pandemic," *Brookings Papers on Economic Activity*, 53, 81–156.

SBA (2019): "Small Businesses Generate 44 Percent Of U.S. Economic Activity," Tech. rep., Small Business Administration, Office of Advocacy.

STEPHENS, M. (2008): "The Consumption Response to Predictable Changes in Discretionary Income: Evidence from the Repayment of Vehicle Loans," *The Review of Economics and Statistics*, 90, 241–252.

SUSB (2017): "Statistics of U.S. Businesses," U.S. Census Bureau.

U.S. CENSUS (2020): "Small Business Pulse Survey: Tracking Changes During The Coronavirus Pandemic," U.S. Census Bureau.

WANG, J., J. YANG, B. IVERSON, AND R. JIANG (2022): "Bankruptcy and the COVID-19 Crisis," *Working Paper*.

YANNELIS, C. AND L. AMATO (2023): "Household Behavior (Consumption, Credit, and Investments) During the COVID-19 Pandemic," *Annual Review of Financial Economics*, 15, 91–113.

Table 1: Descriptive statistics of monthly outcomes in 2019 ($)

Notes: This table reports monthly business and household outcomes in 2019 in dollars. Outcomes are winsorized at the 2^{nd} and 98^{th} percentile. Columns 1 and 2 report the sample mean and standard deviation. Columns 3 to 5 report the pseudo-distribution presented as means of 10 observations in the p^{th} percentiles. Columns 6 and 7 report the number of firms and households in the sample. Panel A reports statistics using the all businesses sample. Panels B and C report those using only non-employer and employer samples. A firm is considered to be an employer firm if a business had payroll expenses for at least 6 months in 2019. Panels D and E sample small and large firms. Firm size is determined by 2019 average monthly revenues– firms with less than the first tercile of average revenue ($1,434) are "small," and those with greater than the third tercile ($10,034) are "large." Panel F uses the business owners' sample, which serves as the main analysis. Business and owner characteristics are reported below Panel F and use the all businesses sample.

	Mean	SD	p20	p50	p80	N firms	N HHs
	Winsorized						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				A. All Sample			
Revenue	21,914	52,199	0	3,056	22,631	2,420,484	—
Expense	22,018	46,399	600	5,121	25,253	2,420,484	—
Profit	-283	20,440	-5,217	-304	2,987	2,420,484	—
				B. Nonemployer			
Revenue	14,798	39,611	0	2,092	14,692	2,150,414	—
Expense	15,137	34,885	440	3,894	16,983	2,150,414	—
Profit	-535	17,273	-4,420	-300	2,156	2,150,414	—
				C. Employer			
Revenue	71,723	89,326	6,067	33,026	122,794	270,070	—
Expense	70,186	77,797	11,516	37,419	119,485	270,070	—
Profit	1,481	35,358	-16,979	-501	17,053	270,070	—
				D. Small			
Revenue	426	1,079	0	0	592	800,194	—
Expense	3,353	12,740	32	715	3,260	800,194	—
Profit	-2,542	7,722	-2,751	-377	0	800,194	—
				E. Large			
Revenue	56,289	75,575	9,344	25,639	81,648	810,145	—
Expense	51,813	65,674	9,380	25,480	76,455	810,145	—
Profit	3,359	31,639	-11,289	495	15,892	810,145	—
				F. Owner Subsample			
Revenue	17,780	39,526	0	2,796	20,363	363,682	333,434
Expense	18,217	36,437	220	4,408	22,550	363,682	333,434
Profit	-416	15,171	-4,287	-26	2,799	363,682	333,434
Consumption	4,185	5,565	601	2,359	6,009	363,682	333,434
				G. Business and Owner Characteristics			
Business Age	7.5	7.0	2.3	5.7	11.1	2,420,484	–
Owner Age	47.8	13.3	36.0	47.0	60.0	–	333,434

Industry	N Firms	Sh (%)	Business Location	N Firms	Sh (%)
Professional Services	400,483	16.5	California	486,338	20.1
Real Estate and Leasing	325,614	13.5	New York	438,619	18.1
Other Services	283,167	11.7	Texas	316,259	13.1
Construction	220,798	9.1	Florida	243,979	10.1
Health Care and Social Asst.	172,052	7.1	Illinois	205,574	8.5

Business Ownership	N Firms	Sh (%)	Owner Gender	N HHs	Sh (%)
S-Corp	589,712	24.4	M	158,112	47.4
Sole Prop	498,030	20.6	F	99,309	29.8
LLC - Member Managed	485,926	20.1	Missing	76,013	22.8
C-Corp	298,892	12.3			
LLC - Manager Managed	273,236	11.3			

Table 2: Sample Representativeness

Notes: This table compares the representativeness of the sample used in this study to various U.S. Census external benchmarks. Column 1 reports nationwide shares. Columns 2 and 3 report the same statistics using the 2019 all businesses and the business owners samples. See section 1.1 for details on the construction of the all businesses and the business owners samples. Panel A compares the share of employer and nonemployer firms. The population statistic is from 2017 Statistics of U.S. Business (SUSB, 2017). We classify establishments with less than 5 employees in the SUSB data or those with no payroll expenses in our data to be nonemployer firm. Panel B compares the share of firms by firm age. We exclude new firms (age =0) to make the population statistic more aligned with our sample criteria because we require firms to have existed for at least a year to be included in our sample. The population statistic for firm age is from 2016 Business Dynamics Statistics (BDS, 2016). Panel C compares annual receipts in dollars for nonemployer firms using 2018 Nonemployer Statistics (NES, 2018). To make our sample comparable to NES, we also restrict our sample to nonemployer firms. Panel D compares industry shares using 2017 SUSB.

	Population	Sample	
	Nationwide Share (%)	All Business Share (%)	Owner Sample Share (%)
	(1)	(2)	(3)
A. Employer vs. Nonemployer			
Nonemployer	81.00	85.11	85.82
Employer	19.00	14.89	14.18
B. Firm age (excluding new firms)			
1	7.36	15.09	16.09
2	6.34	11.75	12.61
3	5.63	9.37	9.89
4	5.16	7.95	8.24
5	4.63	7.30	7.45
6 ~ 10	20.17	29.50	31.05
11 ~ 15	50.70	19.04	14.66
C. Annual Receipts in dollars (nonemployer only)			
< $5,000	24.48	11.32	14.28
$5,000-$9,999	15.54	5.12	5.80
$10,000 - $24,999	23.70	11.90	12.42
$25,000 - $49,999	14.30	14.04	13.97
$50,000 - $99,999	10.36	17.09	16.88
$100,000 - $249,999	7.81	20.13	19.19
$250,000 - $499,999	2.52	9.81	8.78
> $500,000	1.29	10.60	8.68
D. Industry			
Agriculture, Forestry, Fishing/Hunting	0.37	0.62	0.52
Mining, Quarrying, and Oil/Gas Extraction	0.31	0.28	0.23
Utilities	0.10	0.11	0.10
Construction	11.57	10.76	10.79
Manufacturing	4.09	3.10	2.87
Wholesale Trade	4.92	3.69	3.37
Retail Trade	10.68	7.78	8.10
Transportation and Warehousing	3.05	5.62	6.20
Information	1.31	2.26	2.65
Finance and Insurance	3.93	2.06	1.90
Real Estate and Rental and Leasing	5.10	13.26	10.99
Professional, Scientific, and Technical Svcs	13.38	15.81	16.39
Management of Companies and Enterprises	0.44	0.51	0.34
Administrative and Waste Manag.	5.74	6.02	6.47
Educational Services	1.54	1.81	1.95
Health Care and Social Assistance	10.80	7.58	7.47
Arts, Entertainment, and Recreation	2.15	2.84	3.43
Accommodation and Food Services	8.90	4.01	4.22
Other Services (excl. Public Administration)	11.49	11.78	11.96
Industries not classified	0.13	0.13	0.11

Table 3: Effects of Shelter in Place (SIP) controlling for Infections (%)

Notes: This table reports estimates of local infections and shelter in place (SIP) on business outcomes and consumption of the owners. For panels A through D, the first row of each panel reports the effect of each new case per 1,000 residents, and the second row reports the effect of SIP. The first row of panel E reports the effect of cumulative infections per 1,000 and that of the cumulative number of weeks that SIP has been in effect. Columns 1 through 4 report estimates using outcomes normalized 2019 monthly average, and the estimated coefficients can be interpreted as change as a percent of the 2019 monthly average. Columns 5 through 8 report estimates using seasonally-adjusted outcomes, and the coefficients can be interpreted as change as a percent of the centered 3-month average from 2019. All regressions include firm and household pair fixed effects. Columns 2 and 6 include time effects, columns 3 and 7 include time $\times$ NAICS 2-digit industry effects, and columns 4 and 8 include time $\times$ size bin effects to flexibly control for time-varying factors related to industry and firm size. Size bins are as defined in Table 1. Coefficients are multiplied by 100 and represented in a percent unit. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Increase as percent of 2019 monthly average				Increase as percent of 3-month centered average			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				A. Revenues				
New cases	-0.401 ***	-0.055 ***	-0.063 ***	-0.068 ***	-0.253 ***	-0.087 ***	-0.069 ***	-0.092 ***
	(0.007)	(0.01)	(0.01)	(0.01)	(0.014)	(0.019)	(0.019)	(0.019)
Shelter in place	6.372 ***	-4.851 ***	-4.586 ***	-4.854 ***	-27.03 ***	-11.43 ***	-10.52 ***	-11.40 ***
	(0.176)	(0.292)	(0.293)	(0.289)	(0.338)	(0.563)	(0.565)	(0.563)
				B. Expenses				
New cases	-0.351 ***	-0.101 ***	-0.103 ***	-0.109 ***	0.009	-0.131 ***	-0.115 ***	-0.131 ***
	(0.005)	(0.007)	(0.007)	(0.007)	(0.009)	(0.012)	(0.012)	(0.012)
Shelter in place	11.163 ***	-3.885 ***	-3.626 ***	-3.908 ***	-20.09 ***	-6.298 ***	-5.899 ***	-6.285 ***
	(0.134)	(0.222)	(0.222)	(0.219)	(0.211)	(0.351)	(0.352)	(0.351)
				C. Profit				
New cases	-0.021 ***	0.055 ***	0.053 ***	0.054 ***	-0.088 ***	0.064 ***	0.062 ***	0.065 ***
	(0.006)	(0.009)	(0.009)	(0.009)	(0.008)	(0.011)	(0.012)	(0.011)
Shelter in place	-9.049 ***	-1.337 ***	-1.271 ***	-1.320 ***	-5.618 ***	-1.933 ***	-1.789 ***	-1.956 ***
	(0.16)	(0.266)	(0.267)	(0.266)	(0.208)	(0.348)	(0.349)	(0.348)
				D. Consumption				
New cases	-0.054 ***	-0.130 ***	-0.126 ***	-0.130 ***	0.073 ***	-0.137 ***	-0.130 ***	-0.137 ***
	(0.005)	(0.007)	(0.007)	(0.007)	(0.011)	(0.014)	(0.014)	(0.014)
Shelter in place	-1.895 ***	-1.678 ***	-1.591 ***	-1.669 ***	-25.63 ***	-5.635 ***	-5.485 ***	-5.597 ***
	(0.133)	(0.221)	(0.221)	(0.22)	(0.257)	(0.43)	(0.432)	(0.43)
				E. Exit				
Cumulative cases	0.012 ***	-0.001 ***	-0.001 ***	0.000	0.012 ***	-0.001 ***	-0.001 ***	0.000
	(0.000)	(0.0001)	(0.0001)	(0.0001)	(0.000)	(0.0001)	(0.0001)	(0.0001)
Shelter in place	0.048 ***	0.003	0.0001	0.001	0.048 ***	0.003	0.0001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of Obs	5,854,504	5,854,504	5,854,504	5,854,504	5,461,485	5,461,485	5,461,485	5,461,485
Firm-Household FE	X	X	X	X	X	X	X	X
Time FE		X				X		
Time x Industry FE			X				X	
Time x Size Bin FE				X				X

Table 4: Effects of Non-Pharmaceutical Intervention (NPI) Strictness and Infections (%)

Notes: This table reports estimates of infections and NPI strictness on business outcomes and consumption of the owners. The first rows of panels A through D report the effect of each new case per 1,000 residents, and the first row of panel E reports the effect of cumulative infections per 1,000 residents. The second row of each panel reports the effect of NPI strictness per standard deviation increase in NPI strictness. NPI strictness is the first principal component in a principal component analysis of state-level NPIs and captures the intensity of state-specific packaged NPI policies relative to other states. The first component explains 76% of the variance and weighs positively on all restrictions. Columns 1 through 4 report estimates using outcomes normalized 2019 monthly average, and the estimated coefficients can be interpreted as change as a percent of the 2019 monthly average. Columns 5 through 8 report estimates using seasonally-adjusted outcomes, and the coefficients can be interpreted as change as a percent of the centered 3-month average from 2019. All regressions include firm and household pair fixed effects. Columns 2 and 6 include time effects, columns 3 and 7 include time $\times$ NAICS 2-digit industry effects, and columns 4 and 8 include time $\times$ firm size bin effects to flexibly control for time-varying factors related to industry and firm size. Size bins are as defined in Table 1. Coefficients are multiplied by 100 and represented in a percent unit. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Increase as percent of 2019 monthly average								Increase as percent of 3-month centered average							
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
							A. Revenues									
New cases	-0.397	***	-0.065	***	-0.073	***	-0.079	***	-0.267	***	-0.109	***	-0.090	***	-0.114	***
	(0.007)		(0.01)		(0.01)		(0.01)		(0.014)		(0.019)		(0.019)		(0.019)	
NPI Strictness	3.013	***	-0.575	***	-0.478	***	-0.547	***	-10.38	***	-1.906	***	-1.662	***	-1.889	***
	(0.067)		(0.067)		(0.067)		(0.066)		(0.13)		(0.13)		(0.129)		(0.129)	
							B. Expenses									
New cases	-0.343	***	-0.109	***	-0.111	***	-0.117	***	-0.001		-0.141	***	-0.125	***	-0.142	***
	(0.005)		(0.007)		(0.007)		(0.007)		(0.009)		(0.012)		(0.012)		(0.012)	
NPI Strictness	5.266	***	-0.544	***	-0.464	***	-0.523	***	-7.722	***	-1.493	***	-1.367	***	-1.486	***
	(0.051)		(0.051)		(0.051)		(0.05)		(0.081)		(0.081)		(0.081)		(0.081)	
							C. Profit									
New cases	-0.027	***	0.052	***	0.049	***	0.051	***	-0.092	***	0.060	***	0.058	***	0.061	***
	(0.006)		(0.009)		(0.009)		(0.009)		(0.008)		(0.011)		(0.012)		(0.011)	
NPI Strictness	-4.059	***	-0.109	.	-0.081		-0.113	.	-2.605	***	-0.281	***	-0.229	**	-0.284	***
	(0.061)		(0.061)		(0.061)		(0.061)		(0.08)		(0.08)		(0.08)		(0.08)	
							D. Consumption									
New cases	-0.053	***	-0.133	***	-0.128	***	-0.132	***	0.064	***	-0.150	***	-0.142	***	-0.149	***
	(0.005)		(0.007)		(0.007)		(0.007)		(0.011)		(0.014)		(0.014)		(0.014)	
NPI Strictness	-0.346	***	-0.407	***	-0.393	***	-0.403	***	-9.216	***	-0.450	***	-0.424	***	-0.452	***
	(0.051)		(0.051)		(0.051)		(0.051)		(0.098)		(0.099)		(0.099)		(0.099)	
							E. Exit									
Cumulative cases	0.010	***	-0.001	***	-0.001	***	0.000		0.010	***	-0.001	***	-0.001	***	0.000	
	(0.000)		(0.0001)		(0.0001)		(0.0001)		(0.000)		(0.0001)		(0.0001)		(0.0001)	
NPI Strictness	-0.280	***	0.021	***	0.021	***	0.021	***	-0.280	***	0.021	***	0.021	***	0.021	***
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
Number of Obs	5,854,504		5,854,504		5,854,504		5,854,504		5,461,485		5,461,485		5,461,485		5,461,485	
Firm-Household FE	X		X		X		X		X		X		X		X	
Time FE			X								X					
Time x Industry FE					X								X			
Time x Size Bin FE							X								X	

Table 5: Marginal Propensity to Consume out of Business Outcomes

Notes: This table reports 2SLS-IV estimates of the owner households' consumption response per dollar change in business revenue, expense, and profit margin using equation (10). Columns 1 and 2 use variation by industry due to SIP or SIP and infections and Columns 3 and 4 use that due to NPI strictness or NPI strictness and infections as the excluded instruments. NPI strictness is as defined in Table 4. Outcomes are in dollars (level), and all regressions include firm and household pair fixed effects and time × county fixed effects. Therefore, the estimated coefficients can be interpreted as consumption declines (in dollar unit) per each dollar reduction in business outcomes. Firms that operate in sub-industries with less than 30 firms are dropped from the estimation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Variation by industry due to			
Endogenous Variable	SIP (1)	SIP and infections (2)	NPI strictness (3)	NPI strictness and infections (4)
Revenue	0.013***	0.016***	0.014***	0.016***
	(.002)	(.002)	(.002)	(.002)
Expense	0.018***	0.025***	0.022***	0.026***
	(.003)	(.002)	(.003)	(.003)
Net Income	0.033***	0.024***	0.022***	0.017***
	(.007)	(.005)	(.006)	(.005)
Number of Obs	5,119,324	5,119,324	5,119,324	5,119,324
Firm-Household FE	x	x	x	x
Time x County FE	x	x	x	x

Table 6: Marginal Propensity to Consume out of Business by Subgroup

Notes: This table reports 2SLS-IV estimates of the owner households' consumption response per dollar change in business revenue, expense, and profit margin using equation (10) by business type. Odd numbered columns in each panel use variation by industry due to SIP or NPI strictness and even numbered columns in each panel use that due to SIP and infections or NPI strictness and infections as the excluded instruments. NPI strictness is as defined in Table 4. Outcomes are in dollars (level), and all regressions include firm and household pair fixed effects and time × county fixed effects. Therefore, the estimated coefficients can be interpreted as consumption declines (in dollar unit) per each dollar reduction in business outcomes. Panels A and B reports estimates using subsamples of nonemployer and employer firms. Panels C and D reports estimates using subsamples of low and high liquidity firms. Panels E and F report estimates using subsamples of small and large firms. Liquidity is computed as the ratio of 2019 average monthly cash balances to expenses multiplied by 30 and can be interpreted as a firm's average cash buffer days, or the number of days of operating expenses that a business could pay out of its cash balances were its revenues to stop. "Low (high) liquidity" sample includes firms with lower (higher) than the first (third) quartile of cash buffer days within its sub-industry (NAICS 4-digit). "Small" ("Large") firms includes those with lower (higher) than median annual sales in 2019 within its sub-industry. Firms that operate in sub-industries with less than 30 firms are dropped from the estimation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Variation by industry due to				Variation by industry due to			
	SIP	SIP and infections	NPI strictness	NPI strictness and infections	SIP	SIP and infections	NPI strictness	NPI strictness and infections
Endogenous variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	A. Non-employer				B. Employer			
Revenue	0.009 **	0.017 ***	0.008 **	0.015 ***	0.013 ***	0.013 ***	0.013 ***	0.013 ***
	(.003)	(.003)	(.003)	(.003)	(.003)	(.002)	(.002)	(.002)
Expense	0.011 *	0.025 ***	0.014 ***	0.026 ***	0.021 ***	0.020 ***	0.021 ***	0.021 ***
	(.004)	(.004)	(.004)	(.003)	(.003)	(.003)	(.003)	(.003)
Net Income	0.026 **	0.025 ***	0.008	0.013 .	0.008	0.008	0.001	0.003
	(.009)	(.007)	(.009)	(.007)	(.007)	(.006)	(.007)	(.005)
Number of Obs	4,296,538	4,296,538	4,296,538		762,095	762,095	762,095	762,095
	C. Low-liquidity				D. High Liquidity			
Revenue	0.006 .	0.009 ***	0.010 ***	0.012 ***	0.010 *	0.010 *	0.007	0.007 .
	(.003)	(.003)	(.003)	(.003)	(.005)	(.004)	(.005)	(.004)
Expense	0.012 **	0.015 ***	0.015 ***	0.017 ***	0.018 *	0.023 **	0.017 *	0.021 **
	(.005)	(.003)	(.004)	(.003)	(.008)	(.007)	(.008)	(.007)
Net Income	0.003	0.003	0.000	0.001	0.018 .	0.010	0.010	0.006
	(.011)	(.008)	(.011)	(.008)	(.010)	(.008)	(.009)	(.008)
Number of Obs	1,300,907	1,300,907	1,300,907	1,300,907	1,222,284	1,222,284	1,222,284	1,222,284
	E. Small				F. Big			
Revenue	0.014	0.029 ***	0.016 .	0.028 ***	0.013 ***	0.014 ***	0.014 ***	0.014 ***
	(.009)	(.008)	(.009)	(.008)	(.002)	(.002)	(.002)	(.001)
Expense	0.008	0.032 ***	0.021 *	0.041 ***	0.020 ***	0.022 ***	0.021 ***	0.023 ***
	(.010)	(.009)	(.009)	(.008)	(.002)	(.002)	(.002)	(.002)
Net Income	0.060 *	0.025	0.020	0.002	0.026 ***	0.017 ***	0.020 ***	0.014 **
	(.025)	(.019)	(.023)	(.019)	(.006)	(.005)	(.005)	(.004)
Number of Obs	2,483,924	2,483,924	2,483,924	2,483,924	2,633,915	2,633,915	2,718,773	2,718,773
Firm-Household FE	x	x	x	x	x	x	x	x
Time x County FE	x	x	x	x	x	x	x	x

Table 7: Marginal Propensity to Consume out of Business by Incorporation Status

Notes: This table reports 2SLS-IV estimates of the owner households' consumption response per dollar change in business revenue, expense, and profit margin using equation (10) by business incorporation status. Panel A reports estimates using a sample of pass-through (sole proprietors and S-corporations) entities and panel B reports estimates using a sample of C-corporations. Columns 1 and 3 use variation by industry due to SIP and Columns 3 and 4 use that due to SIP and infections. Outcomes are in dollars (level), and all regressions include firm and household pair fixed effects and time × county fixed effects. Therefore, the estimated coefficients can be interpreted as consumption declines (in dollar unit) per each dollar reduction in business outcomes. Firms that operate in sub-industries with less than 30 firms are dropped from the estimation. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Variation by industry due to			
Endogenous Variable	SIP (1)	SIP and infections (2)	SIP (3)	SIP and infections (4)
	A. C-corp		B. Pass-through	
Revenue	0.006	0.008 *	0.018 ***	0.023 ***
	(.004)	(.004)	(.003)	(.003)
Expense	0.004	0.011 *	0.026 ***	0.035 ***
	(.006)	(.005)	(.004)	(.004)
Profit Margin	0.033 **	0.012	0.042 ***	0.035 ***
	(.011)	(.008)	(.009)	(.007)
Number of Obs	607,890	607,890	2,322,113	2,322,113
Firm-Household FE	x	x	x	x
Time x County FE	x	x	x	x

Figure 1: Average business and household outcomes

Notes: This figure shows the average monthly dollar levels of business revenues, expenses, profits, and household consumption from September 2019 to September 2021. The dotted vertical lines mark two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the national emergency. The blue horizontal lines represent the average levels of these outcomes during the six months prior to the national emergency.

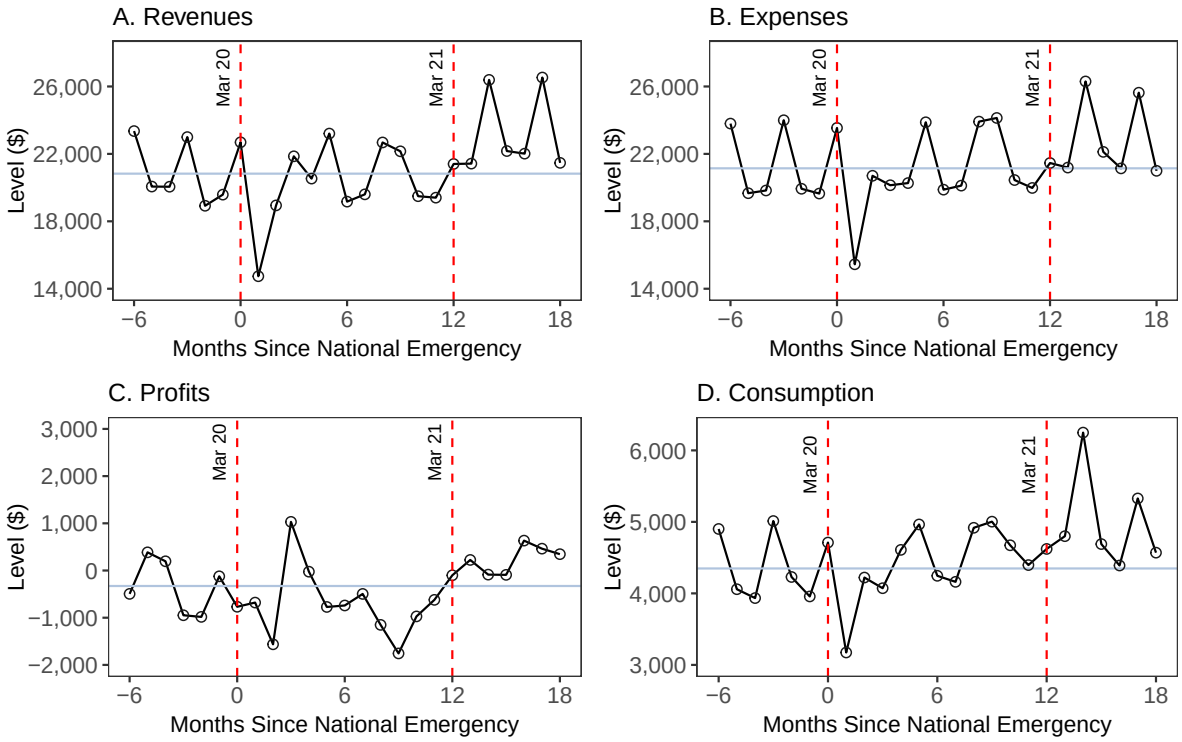

Figure 2: Average percent change in business and owner outcomes relative to 2019

Notes: This figure shows the average monthly percent change in business revenues, expenses, profits, and household consumption from September 2019 to September 2021. The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration. Outcomes are normalized based on the centered 3-month average from the previous year, with changes defined as percent deviations from their averages between September 2019 and March 2020 (i.e., the six months prior to the national emergency).

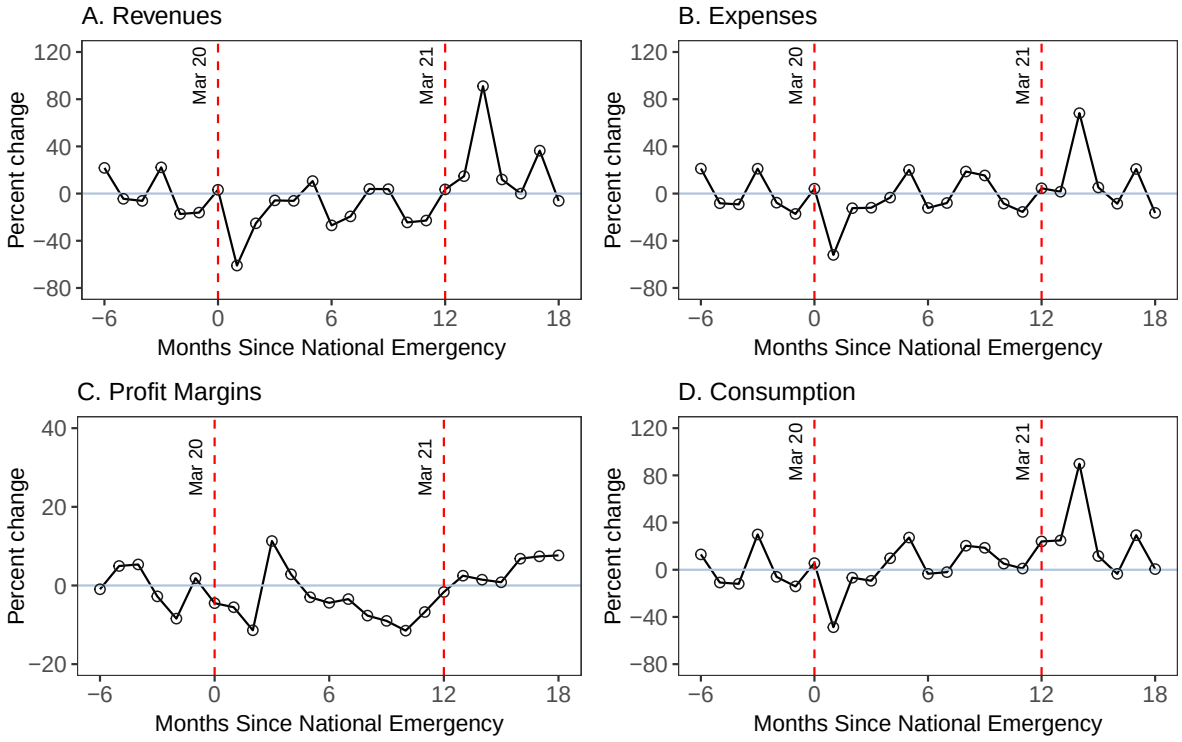

Figure 3: Average changes in business revenues in 2020 by subgroup

Notes: This figure shows the average monthly percent change in business revenues, expenses, profits, and household consumption from September 2019 to September 2021. The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration. Outcomes are normalized based on the centered 3-month average from the previous year, with changes defined as percent deviations from their averages between September 2019 and March 2020 (i.e., the six months prior to the national emergency). Panel A plots monthly changes in revenues for essential and non-essential businesses; Panel B for small and large businesses; Panel C by employer and non-employer firms; and panel D by low vs. high liquidity firms. Essential industry categorization based on the advisory list provided by the Department of Homeland Security (HLS). "Small" ("Large") firms includes those with lower (higher) than median annual sales in 2019 within its NAICS 4-digit sub-industry. A firm is considered to be an employer firm if a business had payroll expenses for at least 6 months in 2019. Low (high) liquidity sample includes firms with lower (higher) than the first (third) quartile of cash buffer days within its sub-industry.

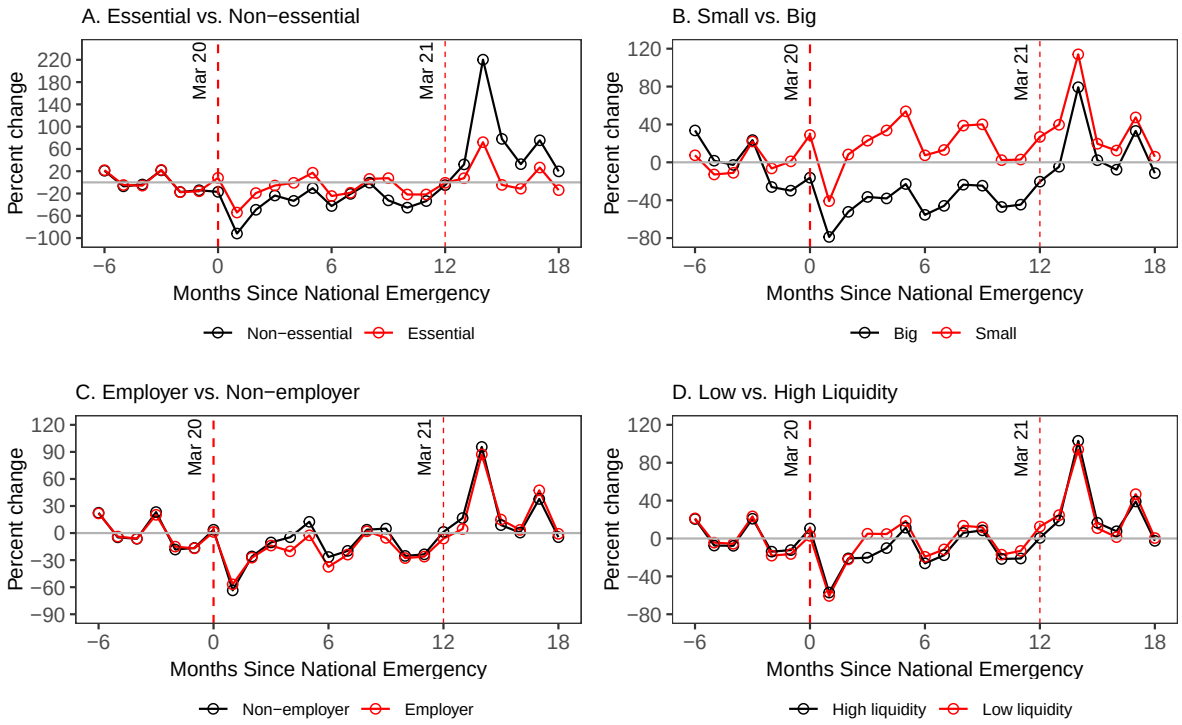

Figure 4: Business survival

Notes: This figure shows the number of business survival by month. This sample includes 1.8mil businesses that were active in 2019 and have an open account for at least one month in 2020. Exit is defined as the closure of a business checking account or inactivity until the end of the sample period. If a business has two business checking accounts, both accounts must be closed to be coded as exit.

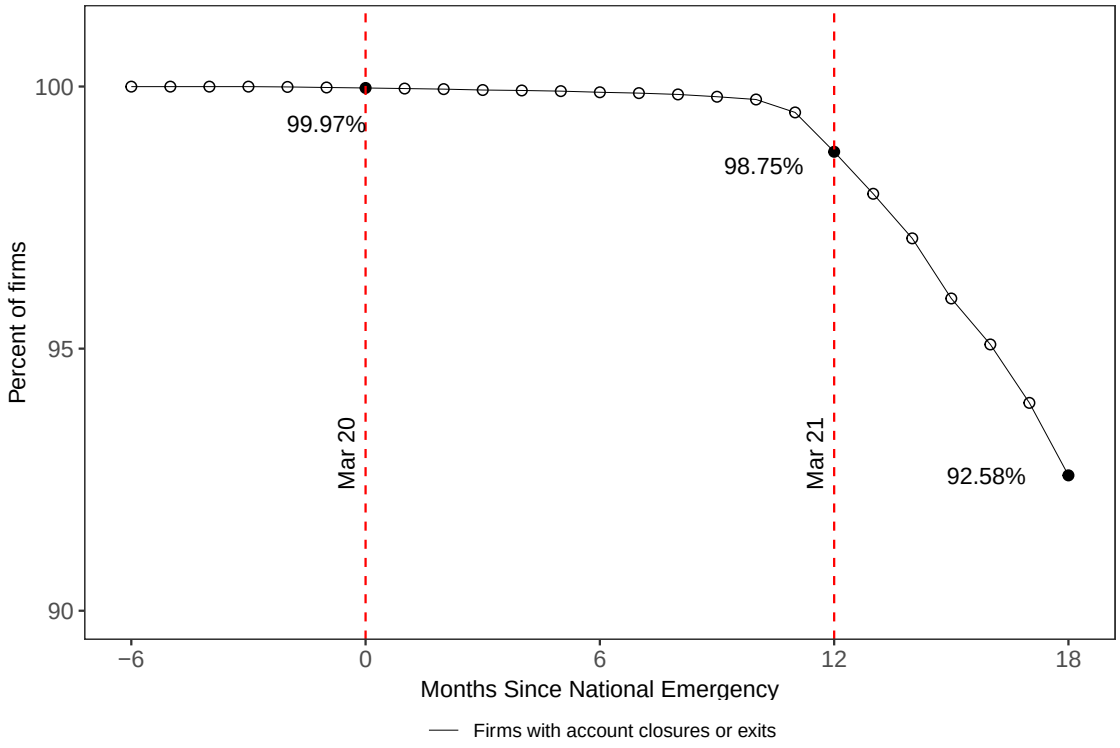

Figure 5: Share of states with NPI policies in effect

Notes: This figure shows the share of states that have respective NPIs enacted over time. The dotted vertical lines indicate the month of the national emergency declaration (March 2020). For example, panel A shows that more than 80% of the states in our sample imposed shelter-in-place restrictions five weeks into the national emergency. "Nonessential," "Public venue," "Religious gathering," and "School" refer to closures or restrictions on the said activities. The numbers in parenthesis for "Gathering limit" restrictions refer to gathering limits (e.g., a limit of 10 people). Source: State-level NPI data are obtained from Keystone Strategy and U.S. Department of Health and Human Services.

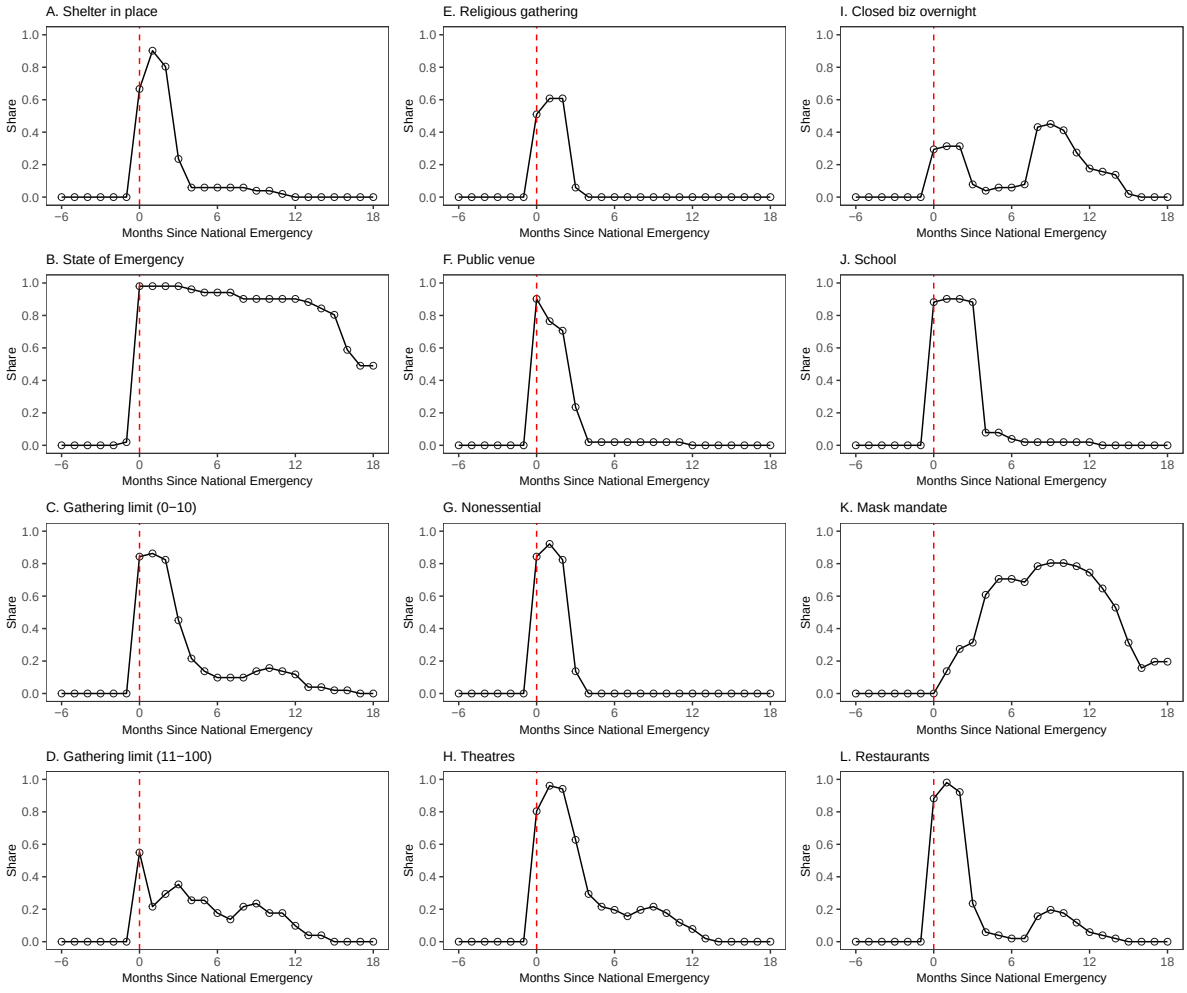

Figure 6: County-level infections per capita

Notes: This figure displays county-level infections per 1,000 residents for three counties representing low, medium, and high-risk areas for disease growth, determined by terciles of cumulative infection rates. Counties with cumulative infection rates below the first tercile (1.01) are classified as "low-risk"; those between the first and third terciles (up to 2.94) are "medium-risk"; and counties above the third tercile are classified as "high-risk." The counties illustrated have the highest cumulative infections per 1,000 residents within each risk category. Panel A plots new cases, using the left axis, for example, counties with low (Glenn, CA) and medium (Nowata, OK) caseloads, while the right axis represents the high-risk county (New York, NY). Panel B plots cumulative cases per 1,000 residents. County-level population estimates are based on total population data as of July 1, 2019. The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration. Source: Population data from the U.S. Census Bureau and coronavirus data from The New York Times, based on reports from state and local health agencies.

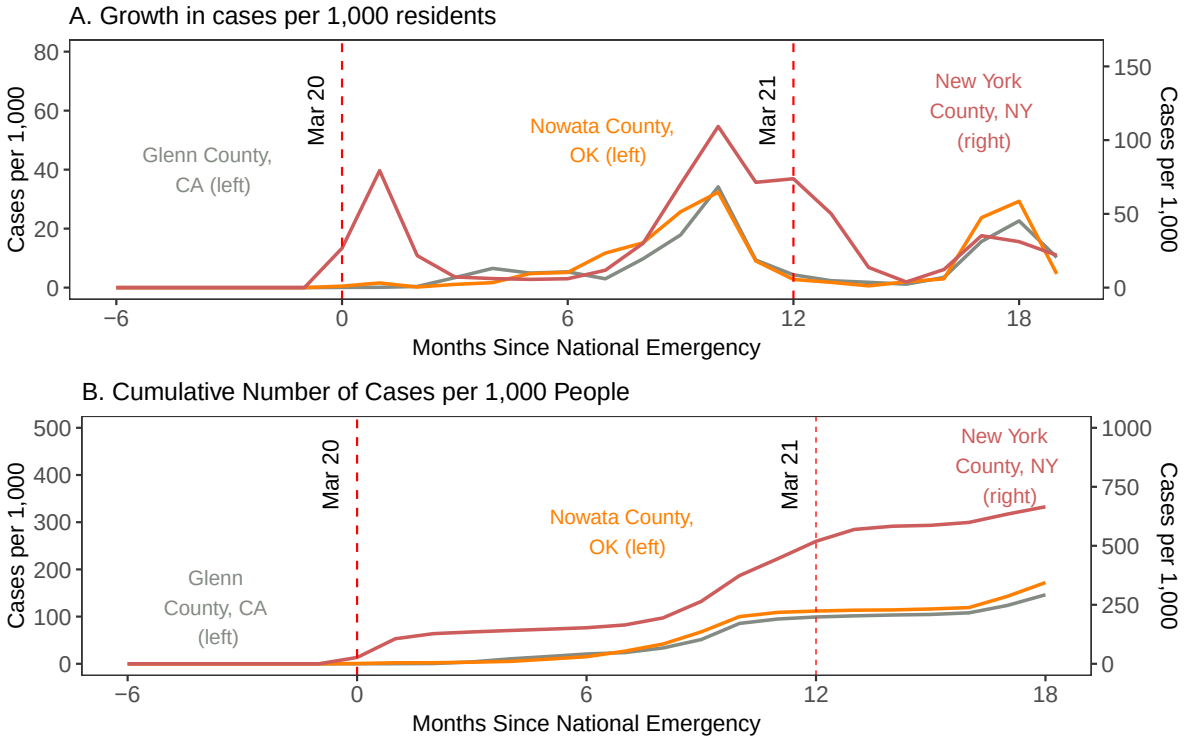

Figure 7: Average changes in business revenues and owners' consumption by industry performance

Notes: This figure shows average monthly changes in business revenues (blue) and owners' consumption (red) for businesses in the most and the least affected industries. Outcomes are normalized based on the centered 3-month average from the previous year, with changes defined as percent deviations from their averages between September 2019 and March 2020 (i.e., the six months prior to the national emergency). The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration. Solid lines show the average change in outcomes for the top 5% best performing (i.e., least affected) NAICS 4-digit industries in terms of their average drop in revenues since the onset of the national emergency, and dashed lines show the average change in outcomes for the bottom 5% worst performing industries. For this analysis, we restrict the sample to industries with at least 100 businesses. The least affected industries include beer, wine, and liquor stores; nursing care facilities; funeral homes and cemeteries; toilet preparation and detergent manufacturing; and chemical product manufacturing firms. The most affected industries include vending machine operators, taxi or limo services, consumer goods rentals, travel/tour agencies, and drinking places.

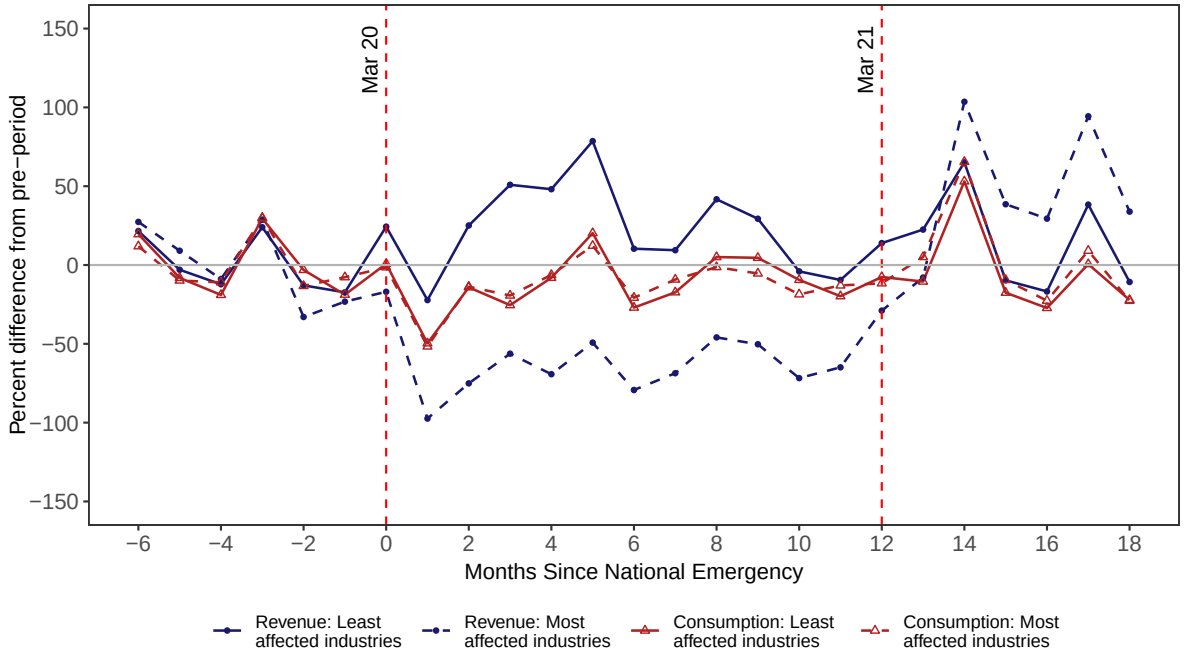

Figure 8: Average business expenses across spending categories

Notes: This figure plots the average monthly dollar levels of detailed business expense categories from September 2019 to September 2021. See section 1.2 for details on the categorization of business expenses. "Goods" expenses are plotted in black. "Services" are plotted in blue. "Other major expenses" are plotted in red. Uncategorizable cash, check, or wire transfer expenses are plotted in green. The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration.

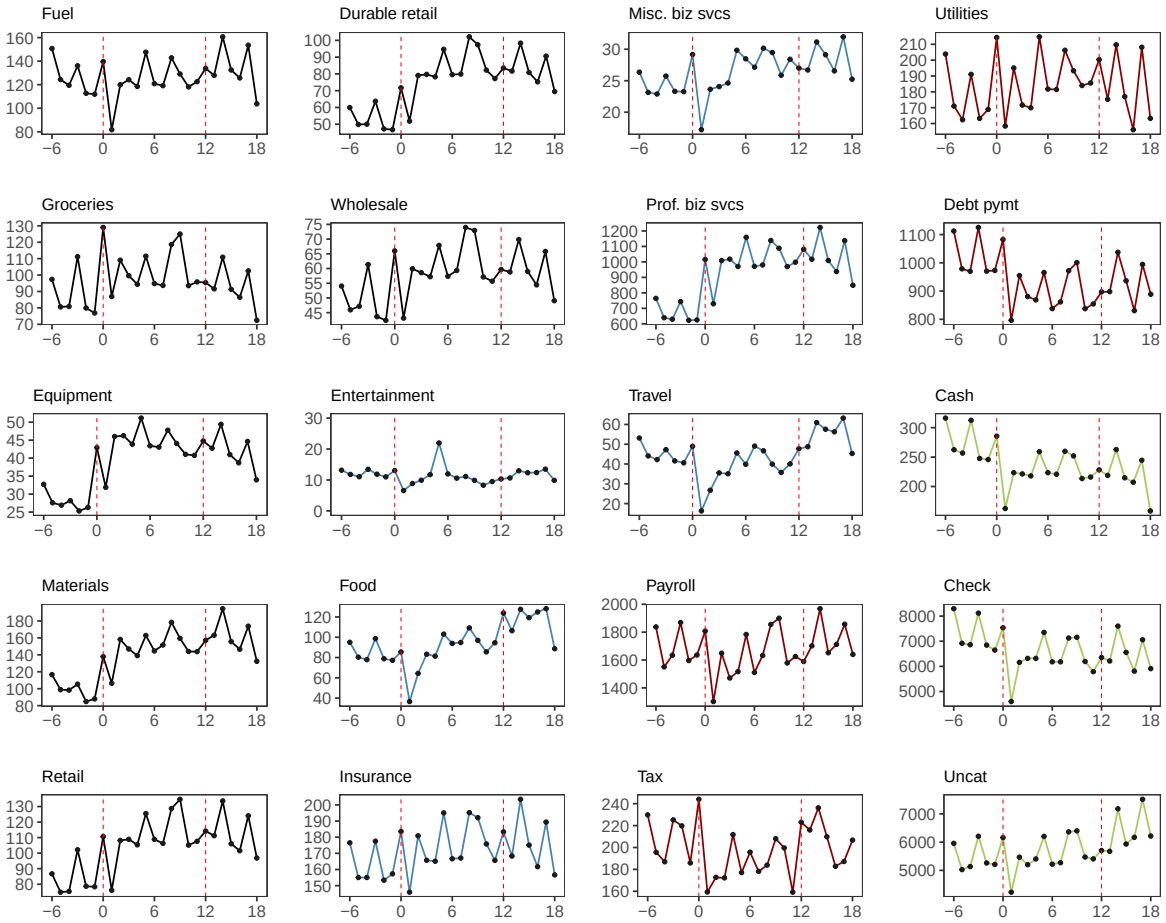

Figure 9: Average household expenses across spending categories

Notes: This figure plots the average monthly dollar levels of detailed categories of business owners' household expenses from September 2019 to September 2021. See section 1.2 for details on the categorization of household expenses. "Goods" expenses are plotted in black. "Services" are plotted in blue. "Other major expenses" are plotted in red. Uncategorizable cash, check, or wire transfer expenses are plotted in green. The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration.

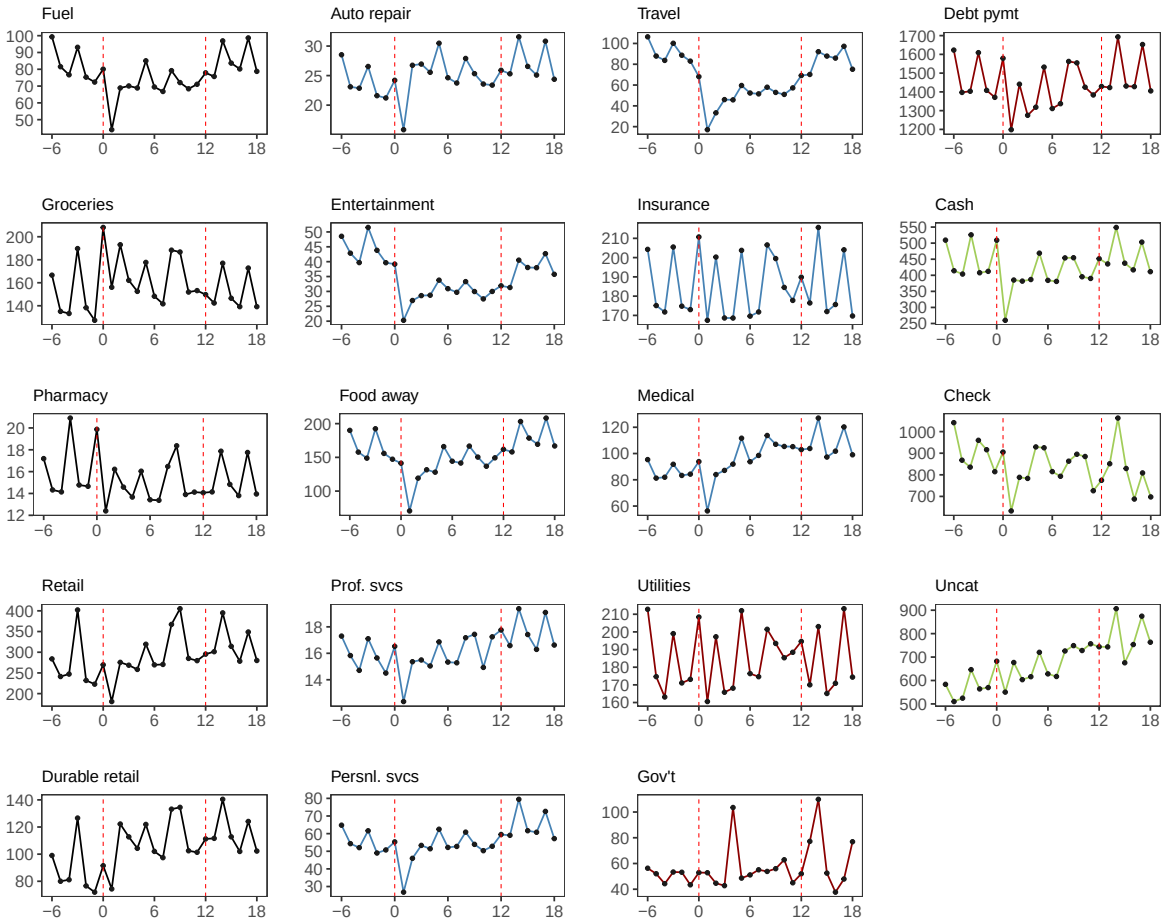

Figure 10: Median business and owner's checking account balances from January

Notes: This figure shows median end-of-month business (blue) and owner's personal (red) checking account balances. Panel A shows the median dollar levels of account balances, and Panel B shows the median percent change in account balances since September 2019. For panel A, the owner's personal checking account balances use the left axis, and business checking account balances use the right axis. Green lines indicate the months when Economic Impact Payments and Paycheck Protection Program funds were disbursed.

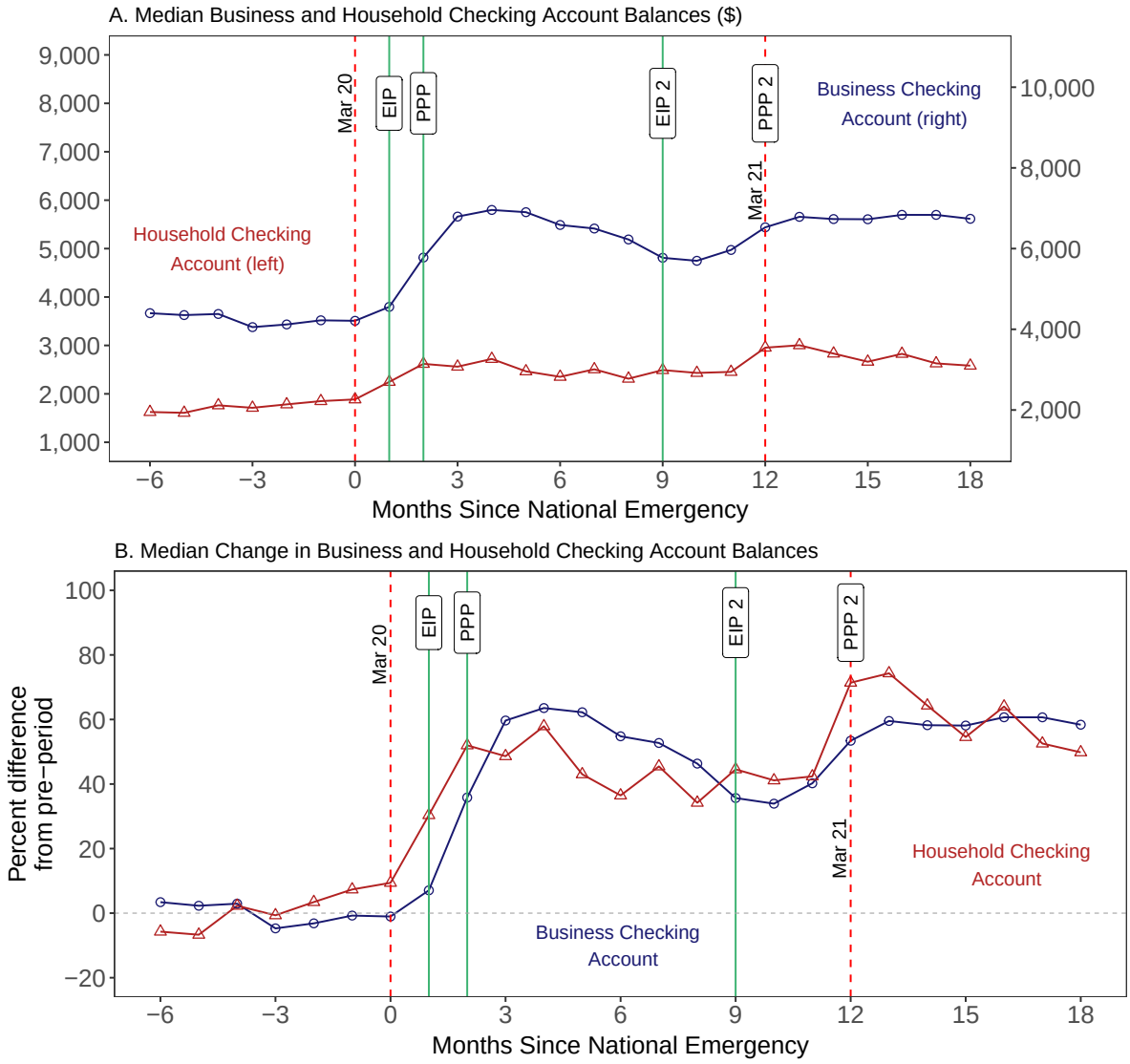

Figure 11: Median changes in checking account balance by industry performance

Notes: This figure shows median changes in the end-of-month business (blue) and owner's personal (red) checking account balances from September 2019 by industry performance. Solid lines show the top 10% of best-performing NAICS 4-digit industries in terms of their average drop in revenues since the onset of the national emergency, and dashed lines show the average change in outcomes for the bottom 10% of worst-performing industries. For this analysis, we restrict the sample to industries with at least 100 businesses. Green lines indicate the months when Economic Impact Payments and Paycheck Protection Program funds were disbursed.

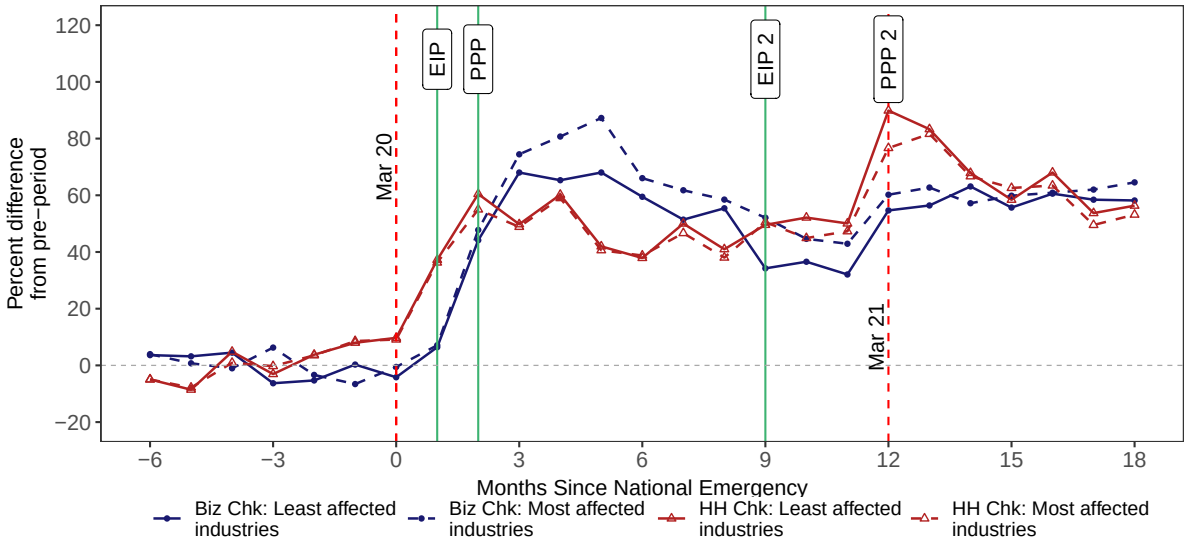

Table A.1: Principal Component Analysis of State-level NPIs

Notes: This table reports results from the principal component analysis using state-level NPI data obtained from Keystone Strategy. Panel A reports the standard deviation, proportion of variance, and cumulative proportion of each component. Panel B reports factor loadings. Gathering restriction indicators are transformed such that less restrictive measures are automatically considered to be in effect if more restrictive measures are in place. For example, if a state has a gathering limit of 10 people, then less restrictive gathering restrictions (limit of 25, 100, or 500 people) are assumed to be in effect. We use the first component (PC 1) as the primary measure of NPI strictness.

	PC 1 (1)	PC 2 (2)	PC 3 (3)	PC 4 (4)	PC 5 (5)	PC 6 (6)	PC 7 (7)	PC 8 (8)	PC 9 (9)	PC 10 (10)	PC 11 (10)	PC 12 (10)	PC 13 (10)
A. Importance of Components													
Standard Deviation	2.762	1.102	0.905	0.868	0.831	0.639	0.586	0.537	0.526	0.431	0.410	0.347	0.316
Proportion of Variance	0.587	0.093	0.063	0.058	0.053	0.031	0.026	0.022	0.021	0.014	0.013	0.009	0.008
Cumulative Proportion	0.587	0.680	0.743	0.801	0.855	0.886	0.912	0.935	0.956	0.970	0.983	0.992	1.000
B. Factor Loadings (Rotated and Scaled)													
	Shelter in place	State of emergency	Closed gyms	Closed theater	Closed bars	Biz. closed overnight	Public venues	Closed schools	Closed restaurants	Religious gathering	Non essential biz.	Gathering 100	Gathering 10
Shelter in place	0.301	0.141	-0.096	-0.020	0.093	0.333	0.600	-0.183	0.522	-0.270	-0.085	0.120	-0.005
State of emergency	0.137	-0.550	0.360	0.376	0.627	0.096	0.008	-0.041	-0.024	0.045	-0.031	-0.019	0.005
Closed gyms	0.319	0.019	0.043	-0.357	0.142	0.032	0.093	0.291	-0.285	-0.154	0.044	-0.116	0.730
Closed theater	0.309	-0.086	0.088	-0.416	0.057	0.079	0.143	0.297	-0.376	-0.128	-0.112	0.045	-0.652
Closed bars	0.280	-0.240	0.088	-0.394	-0.048	-0.180	-0.552	-0.261	0.425	-0.238	-0.229	-0.059	-0.002
Biz. closed overnight	0.111	-0.540	-0.808	0.092	-0.093	-0.002	0.042	0.108	-0.035	0.057	-0.089	-0.023	0.028
Public venues	0.296	0.234	-0.163	0.279	0.098	-0.265	-0.098	-0.417	-0.419	-0.327	-0.081	0.448	0.026
Closed schools	0.292	0.153	0.013	0.206	0.079	-0.642	0.071	0.517	0.342	0.142	0.029	0.133	-0.051
Closed restaurants	0.315	0.061	-0.098	-0.285	0.163	0.054	-0.038	-0.308	0.020	0.682	0.419	0.196	-0.022
Religious gathering	0.272	0.270	-0.101	0.295	0.007	0.583	-0.517	0.358	0.087	-0.006	0.025	0.105	-0.033
Non essential biz.	0.318	0.253	-0.114	0.202	0.069	-0.096	0.010	-0.207	-0.095	0.023	0.020	-0.834	-0.135
Gathering 100	0.264	-0.308	0.242	0.192	-0.537	0.005	0.056	-0.019	-0.016	-0.239	0.625	-0.006	-0.018
Gathering 10	0.291	-0.088	0.272	0.167	-0.477	0.075	0.129	-0.071	-0.112	0.419	-0.586	0.048	0.129

Table A.2: Transmission of Business Shocks to Owner's Consumption (Elasticity)

Notes: This table reports elasticities of owner households' consumption with respect to changes in business revenues, expenses, and profit margins using equations (10). The first four columns use outcomes normalized by 2019 weekly average and the last four columns use seasonally-adjusted outcomes that are normalized by 2019 9-week centered average. Columns 1, 2, 5 and 6 use variation by industry due to SIP or SIP and infections as the excluded instruments. Columns 3, 4, 7, and 8 use variation by industry due to NPI strictness or NPI strictness and infections as the excluded instruments. NPI strictness is as defined in Table 4. All regressions include firm and household pair fixed effects. Panel A reports estimates including county × time fixed effects and panel B reports estimates controlling for state × time effects. Firms that operate in sub-industries with less than 30 firms are dropped from the estimation. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Increase as percent of 2019 weekly average Variation by industry due to				Increase as percent of 2019 9-week centered average Variation by industry due to			
Endogenous Variable	SIP (1)	SIP & Infections (2)	NPI Strictness (3)	NPI Strictness & Infections (4)	SIP (5)	SIP & Infections (6)	NPI Strictness (7)	NPI Strictness & Infections (8)
				A. County x time fixed effects				
Revenue	.149 ***	.119 ***	.156 ***	.127 ***	.163 ***	.099 ***	.173 ***	.108 ***
	(.007)	(.007)	(.006)	(.006)	(.009)	(.009)	(.009)	(.008)
Expense	.195 ***	.148 ***	.197 ***	.153 ***	.205 ***	.127 ***	.208 ***	.130 ***
	(.008)	(.008)	(.008)	(.008)	(.011)	(.011)	(.01)	(.01)
Profit	.237 ***	.190 ***	.256 ***	.205 ***	.170 ***	.124 ***	.188 ***	.140 ***
	(.012)	(.011)	(.012)	(.01)	(.016)	(.014)	(.014)	(.013)
				B. State x time fixed effects				
Revenue	.120 ***	.111 ***	.132 ***	.121 ***	.080 ***	.062 ***	.089 ***	.070 ***
	(.007)	(.007)	(.006)	(.006)	(.01)	(.009)	(.009)	(.009)
Expense	.154 ***	.141 ***	.164 ***	.149 ***	.093 ***	.086 ***	.096 ***	.086 ***
	(.009)	(.008)	(.008)	(.008)	(.012)	(.012)	(.011)	(.011)
Profit	.210 ***	.175 ***	.230 ***	.190 ***	.170 ***	.116 ***	.189 ***	.134 ***
	(.012)	(.011)	(.012)	(.01)	(.016)	(.014)	(.014)	(.013)
Number of Obs	7,248,362	6,918,891	7,248,362	6,918,891	6,482,239	6,190,218	6,482,239	6,190,218
Firm-Household FE	X	X	X	X	X	X	X	X

Table A.3: MPC Event Study: Early-Phase vs. Vaccine-Phase

Notes: This table reports 2SLS-IV estimates of the owner households' consumption response per dollar change in business revenue, expense, and profit margin using equation (10). Columns 1 and 2 use variation by industry due to SIP or SIP and infections and Columns 3 and 4 use that due to NPI strictness or NPI strictness and infections as the excluded instruments. NPI strictness is as defined in Table 4. Outcomes are in dollars (level), and all regressions include firm and household pair fixed effects and time × county fixed effects. Therefore, the estimated coefficients can be interpreted as consumption declines (in dollar unit) per each dollar reduction in business outcomes. Firms that operate in sub-industries with less than 30 firms are dropped from the estimation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Variation by industry due to			
Endogenous Variable	SIP (1)	SIP and infections (2)	NPI strictness (3)	NPI strictness and infections (4)
	A. March 2020 Event Study			
Revenue	0.001	0.006 **	0.008 ***	0.011 ***
	(.002)	(.002)	(.002)	(.002)
Expense	0.008 *	0.012 ***	0.021 ***	0.021 ***
	(.003)	(.003)	(.003)	(.003)
Net Income	-0.019 **	0.001	-0.017 **	0.001
	(.007)	(.005)	(.006)	(.005)
Number of Obs	2,353,988	2,353,988	2,353,988	2,353,988
	B. March 2021 Event Study			
Revenue	0.025 ***	0.022 ***	0.025 ***	0.024 ***
	(.005)	(.003)	(.003)	(.002)
Expense	0.036 ***	0.035 ***	0.033 ***	0.034 ***
	(.007)	(.005)	(.003)	(.003)
Net Income	0.035 ***	0.019 **	0.048 ***	0.024 ***
	(.010)	(.007)	(.009)	(.007)
Number of Obs	3,011,272	3,011,272	3,011,272	3,011,272
Firm-Household FE	x	x	x	x
Time x County FE	x	x	x	x

Table A.4: Committed vs. Discretionary Consumption

Notes: This table reports 2SLS-IV estimates of the owner households' consumption response per dollar change in business revenue, expense, and profit margin using equation (10). Columns 1 and 2 use variation by industry due to SIP or SIP and infections and Columns 3 and 4 use that due to NPI strictness or NPI strictness and infections as the excluded instruments. NPI strictness is as defined in Table 4. Outcomes are in dollars (level), and all regressions include firm and household pair fixed effects and time × county fixed effects. Therefore, the estimated coefficients can be interpreted as consumption declines (in dollar unit) per each dollar reduction in business outcomes. Committed consumption includes the following categories: groceries, insurance, rent, government payments, utilities, uncategorized check payments, uncategorized payments. Discretionary consumption includes the following categories: fuel, retail, durable retail, auto repair, medical, entertainment, food away, personal services, professional services, other services, travel, cash. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Variation by industry due to			
Endogenous Variable	SIP (1)	SIP and infections (2)	NPI strictness (3)	NPI strictness and infections (4)
	A. Committed Consumption			
Revenue	0.006***	0.007***	0.005***	0.007***
	(.002)	(.001)	(.001)	(.001)
Expense	0.009***	0.012***	0.009***	0.011***
	(.002)	(.002)	(.002)	(.002)
Net Income	0.012*	0.009*	0.003	0.003
	(.005)	(.004)	(.004)	(.004)
Number of Obs	5,119,324	5,119,324	5,119,324	5,119,324
	B. Discretionary Consumption			
Revenue	0.007***	0.009***	0.009***	0.010***
	(.001)	(.001)	(.001)	(.001)
Expense	0.010***	0.013***	0.013***	0.015***
	(.002)	(.001)	(.001)	(.001)
Net Income	0.022***	0.015***	0.020***	0.014***
	(.004)	(.003)	(.003)	(.003)
Number of Obs	5,119,324	5,119,324	5,119,324	5,119,324
Firm-Household FE	x	x	x	x
Time x County FE	x	x	x	x

Table A.5: Marginal Propensity to Consume out of Business Outcomes

Notes: This table reports 2SLS-IV estimates of the owner households' consumption response per dollar change in business revenue, expense, and profit margin using equation (10). Columns 1 and 2 use variation by industry due to SIP or SIP and infections and Columns 3 and 4 use that due to NPI strictness or NPI strictness and infections as the excluded instruments. NPI strictness is as defined in Table 4. Outcomes are in dollars (level), and all regressions include firm and household pair fixed effects and time × county fixed effects. Therefore, the estimated coefficients can be interpreted as consumption declines (in dollar unit) per each dollar reduction in business outcomes. Firms that operate in sub-industries with less than 30 firms are dropped from the estimation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Variation by industry due to				Variation by industry due to			
Endogenous Variable	SIP (1)	SIP and infections (2)	NPI strictness (3)	NPI strictness and infections (4)	SIP (5)	SIP and infections (6)	NPI strictness (7)	NPI strictness and infections (8)
	Committed Consumption				Discretionary Consumption			
	A. March 2020 Event Study							
Revenue	-0.003 .	0.000	0.000	0.002 .	0.005 ***	0.005 ***	0.008 ***	0.008 ***
	(.002)	(.001)	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)
Expense	0.000	0.004 *	0.007 **	0.008 ***	0.008 ***	0.009 ***	0.014 ***	0.013 ***
	(.002)	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.001)
Net Income	-0.025 ***	-0.011 **	-0.023 ***	-0.011 **	0.006 .	0.012 ***	0.006 .	0.012 ***
	(.005)	(.004)	(.005)	(.004)	(.004)	(.003)	(.003)	(.003)
Number of Obs	2,353,988	2,353,988	2,353,988	2,353,988	2,353,988	2,353,988	2,353,988	2,353,988
	B. March 2021 Event Study							
Revenue	0.018 ***	0.013 ***	0.012 ***	0.012 ***	0.007 **	0.010 ***	0.013 ***	0.012 ***
	(.003)	(.002)	(.002)	(.002)	(.003)	(.002)	(.001)	(.001)
Expense	0.027 ***	0.020 ***	0.016 ***	0.017 ***	0.009 *	0.015 ***	0.016 ***	0.017 ***
	(.005)	(.003)	(.002)	(.002)	(.004)	(.002)	(.002)	(.002)
Net Income	0.020 **	0.010 *	0.020 **	0.009 *	0.015 **	0.009 *	0.028 ***	0.015 ***
	(.007)	(.005)	(.006)	(.005)	(.006)	(.004)	(.005)	(.004)
Number of Obs	3,011,272	3,011,272	3,011,272	3,011,272	3,011,272	3,011,272	3,011,272	3,011,272
Firm-Household FE	x	x	x	x	x	x	x	x
Time x County FE	x	x	x	x	x	x	x	x

Figure A.1: Average business outcomes of a random subset of all businesses (levels)

Notes: This figure shows average weekly dollar levels of business revenues, expenses, profits, and household consumption from the week starting December 30th, 2019 to the week starting May 25th, 2020 for a random subset (20%) of businesses in the all businesses sample. Dotted vertical lines denote the week of national emergency, which was declared the week starting March 9th, 2020. Blue horizontal lines denote the average of respective outcomes between January 13, 2020 to February 9, 2020 (i.e., two months before the week of national emergency). This figure illustrates that the business owners sample that we use for our main analysis have similar declining patterns as the broader sample of businesses in the all businesses sample.

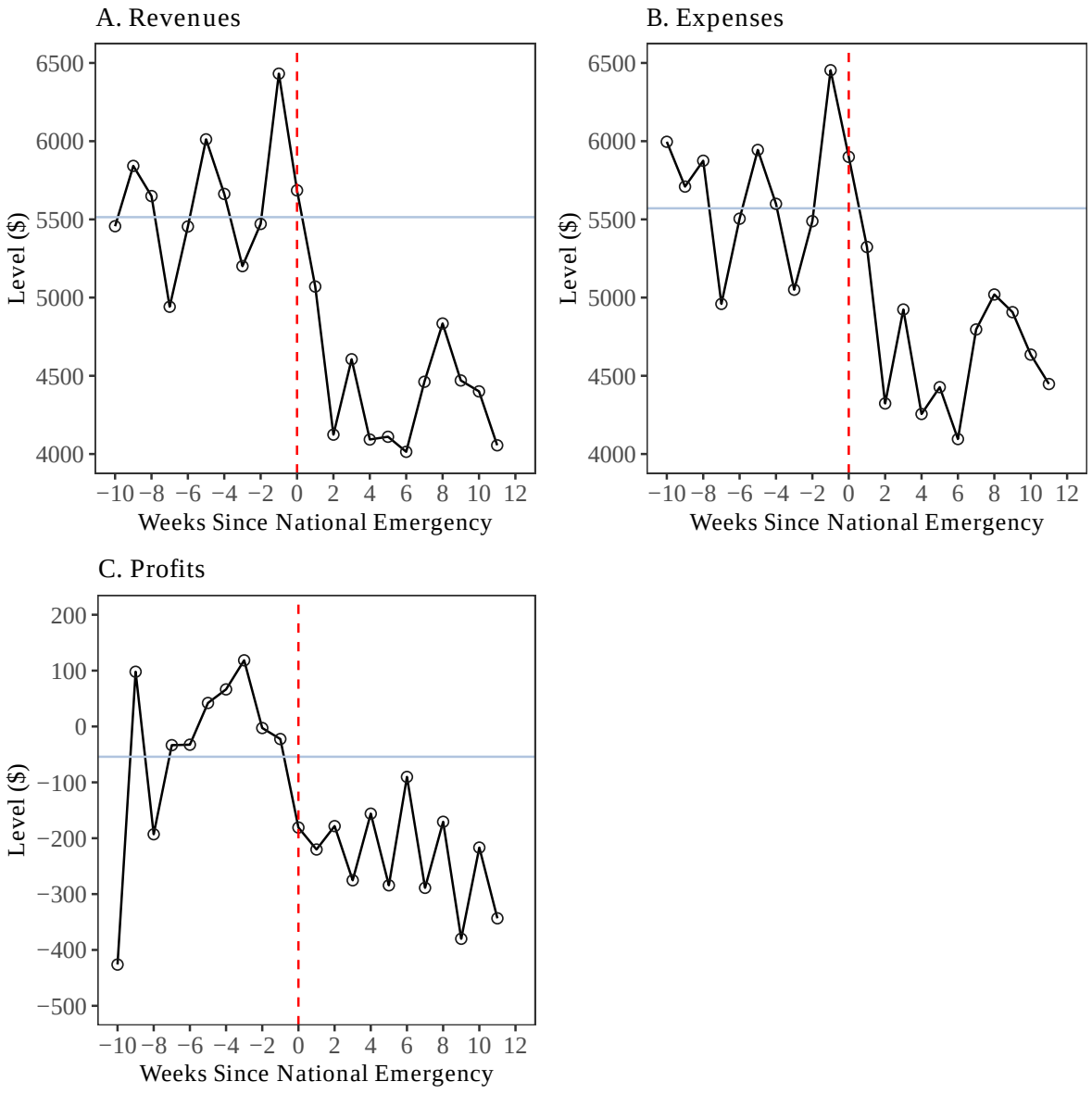

Figure A.2: Average changes in business outcomes of a random subset of all businesses

Notes: This figure shows average weekly changes in business revenues, expenses, profits, and household consumption from the week starting December 30th, 2019 to the week starting May 25th, 2020 for a random subset (20%) of businesses in the all businesses sample. Outcomes are normalized by the centered 9-week average from a year ago, and the change is defined as a percent change from its own average between January 13, 2020 and February 9, 2020 (i.e., two months before the week of national emergency). Dotted vertical lines denote the week of national emergency, which was declared the week starting March 9th, 2020.

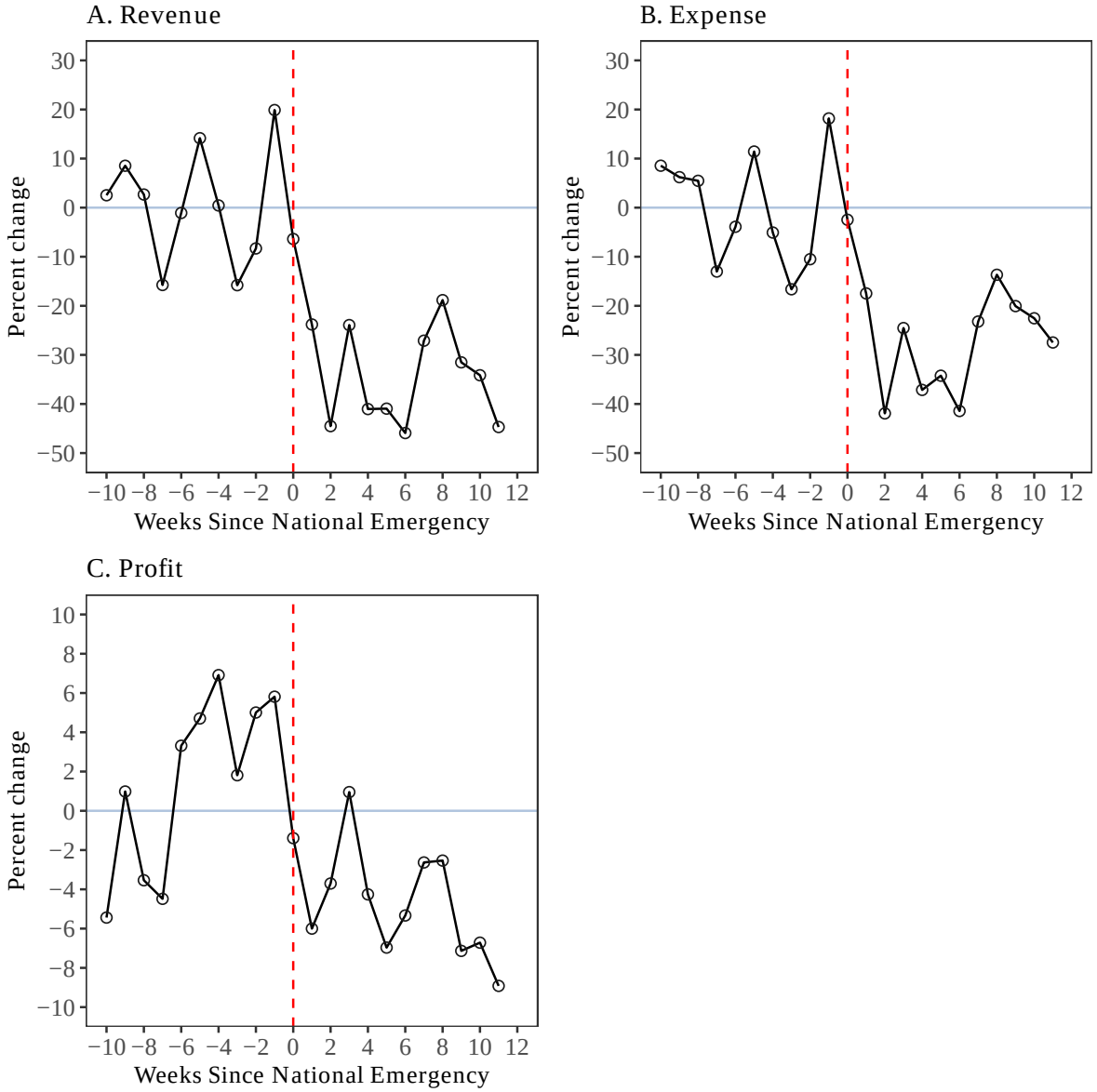

Figure A.3: Decomposition of average changes in business outcomes and household consumption

Notes: This figure shows a decomposition of the observed decline in business outcomes and owner's consumption. Outcomes are normalized based on the centered 3-month average from the previous year, with changes defined as percent deviations from their averages between September 2019 and March 2020 (i.e., the six months prior to the national emergency). Black lines plot average monthly changes in respective outcomes. Red and blue lines plot average changes net of changes predicted by the effects of local infections and SIP on these outcomes. Specifically, we subtract predicted changes in outcomes using the estimated effects of local infections and SIP reported in columns 5 and 6 of Table 3 that include time effects (blue) and do not include time effects (red): $Y_{i,t} - \hat{\beta}_1 LIR_{c(i),t} - \hat{\beta}_2 1[\text{SIP}_{s(i),t}] - \mathbb{X}_{i,t}$. Since the combined effects of local infections and SIP on revenues, for example, are negative, the red line in panel A can be interpreted as average changes in revenues that would have prevailed in the absence of changes in infections, SIP, or other factors that correlate with infections and SIP. The gap between the black and red lines captures the effect of revenue changes explained by infections and SIP. Since the blue lines are constructed using estimates including time-effects, the gap between the blue and black lines captures the effect of local infections and SIP that is solely driven by cross-sectional differences. The dotted vertical lines indicate two key points: the month of the national emergency declaration (March 9th, 2020) and one year after the declaration.

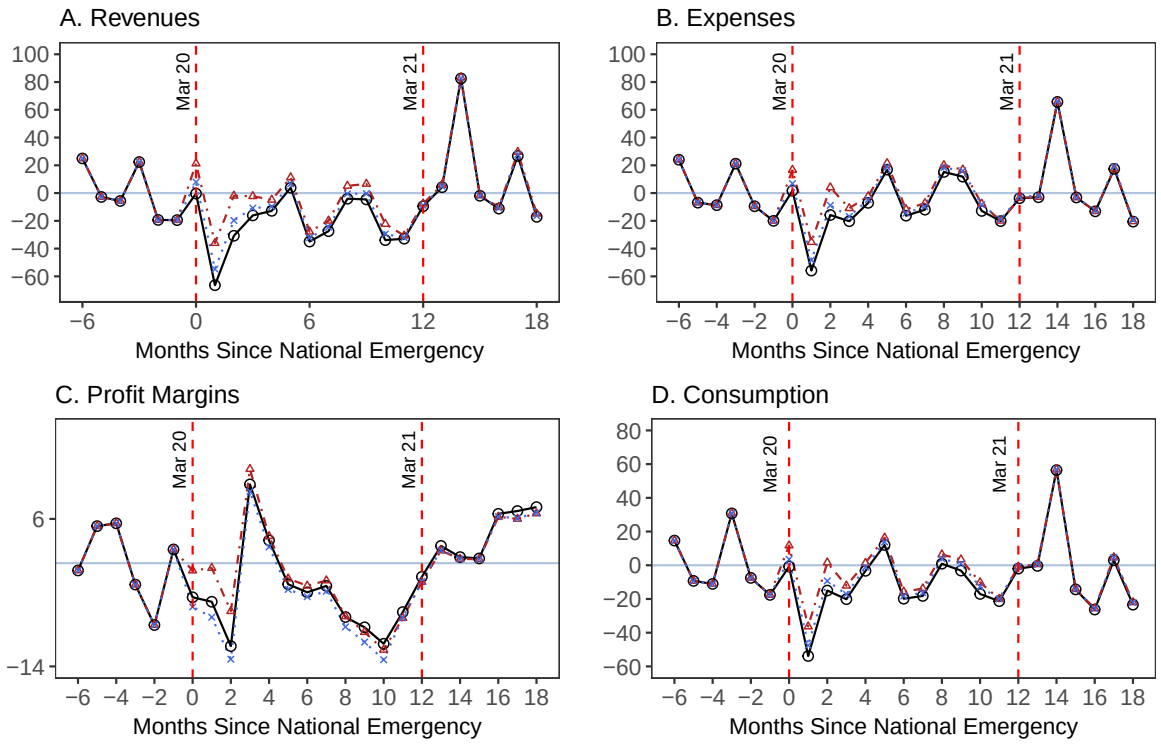

Figure A.4: Average changes in business revenues and owners' consumption by industry performance for the lowest and the middle three deciles

Notes: This figure shows average weekly changes in business revenues (blue) and owners' consumption (red) for businesses in the middle and bottom three deciles of industry performance. Outcomes are normalized by the centered 9-week average from a year ago, and the change is defined as a percent change from its own average between January 13, 2020 and February 9, 2020 (i.e., two months before the week of national emergency). Dotted vertical lines denote the week of national emergency, which was declared the week starting March 9th, 2020. Line types capture different industry rankings in terms of their average drop in revenues since the onset of the national emergency. Each decile contains roughly 20 industries. For this analysis, we restrict the sample to industries with at least 100 businesses.

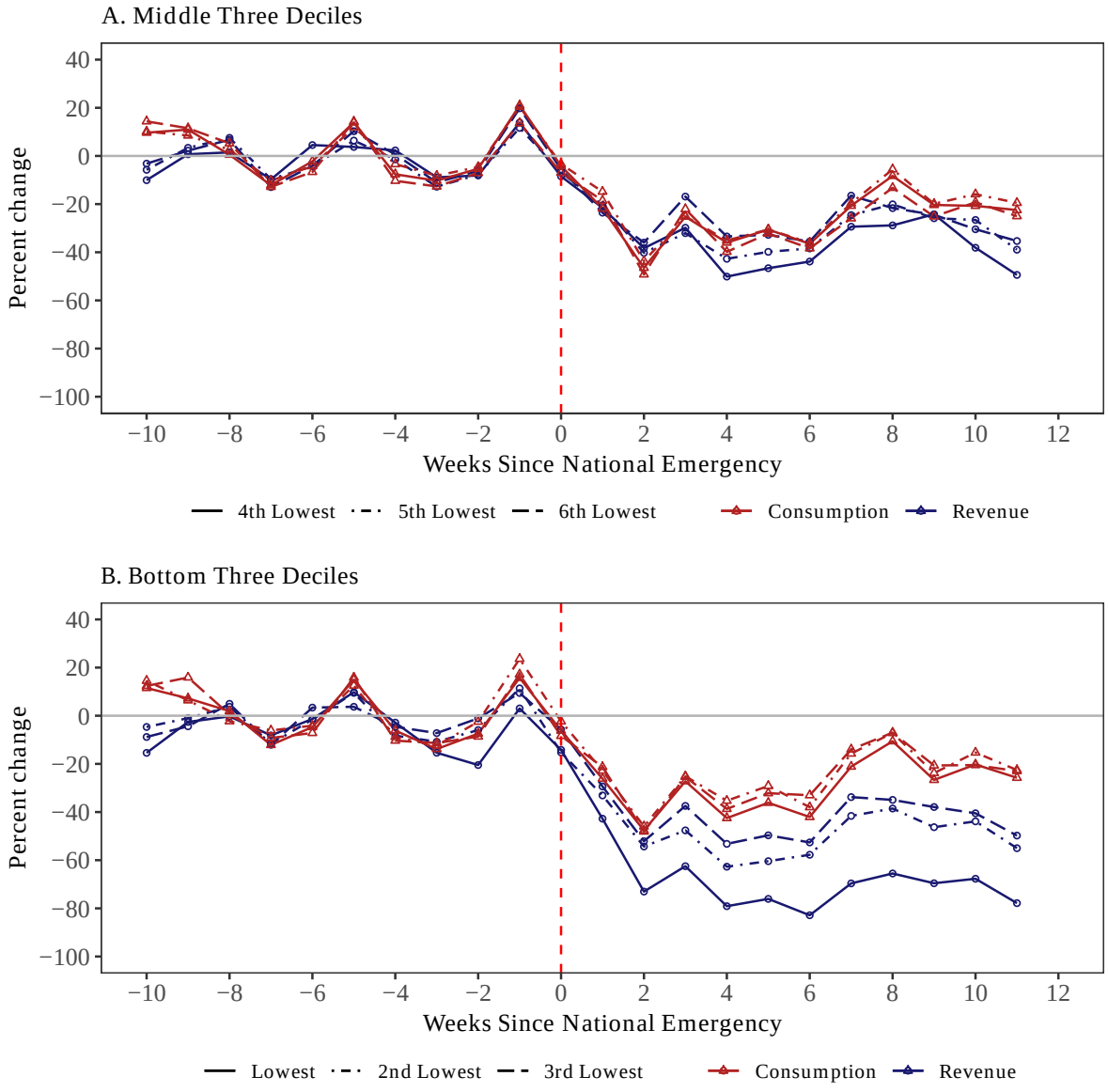

Figure A.5: Average changes in business revenue by top and bottom performing sectors

Notes: This figure shows average weekly changes in business revenues for businesses in the top five and the bottom five performing industries. Industry performance is defined as the average drop in revenues by NAICS 4-digit industries since the onset of the national emergency. Panel A plots revenue series for businesses in the five least affected (i.e., best performing) industries, and Panel B plots those for businesses in the five most affected (i.e., worst performing) industries. Industries shown in this figure correspond to the underlying sectors in the least and the most affected industries shown in Figure 7. For this analysis, we restrict the sample to industries with at least 100 businesses. Outcomes are normalized by the centered 9-week average from a year ago, and the change is defined as a percent change from its own average between January 13, 2020 and February 9, 2020 (i.e., two months before the week of national emergency). Dotted vertical lines denote the week of national emergency, which was declared the week starting March 9th, 2020.

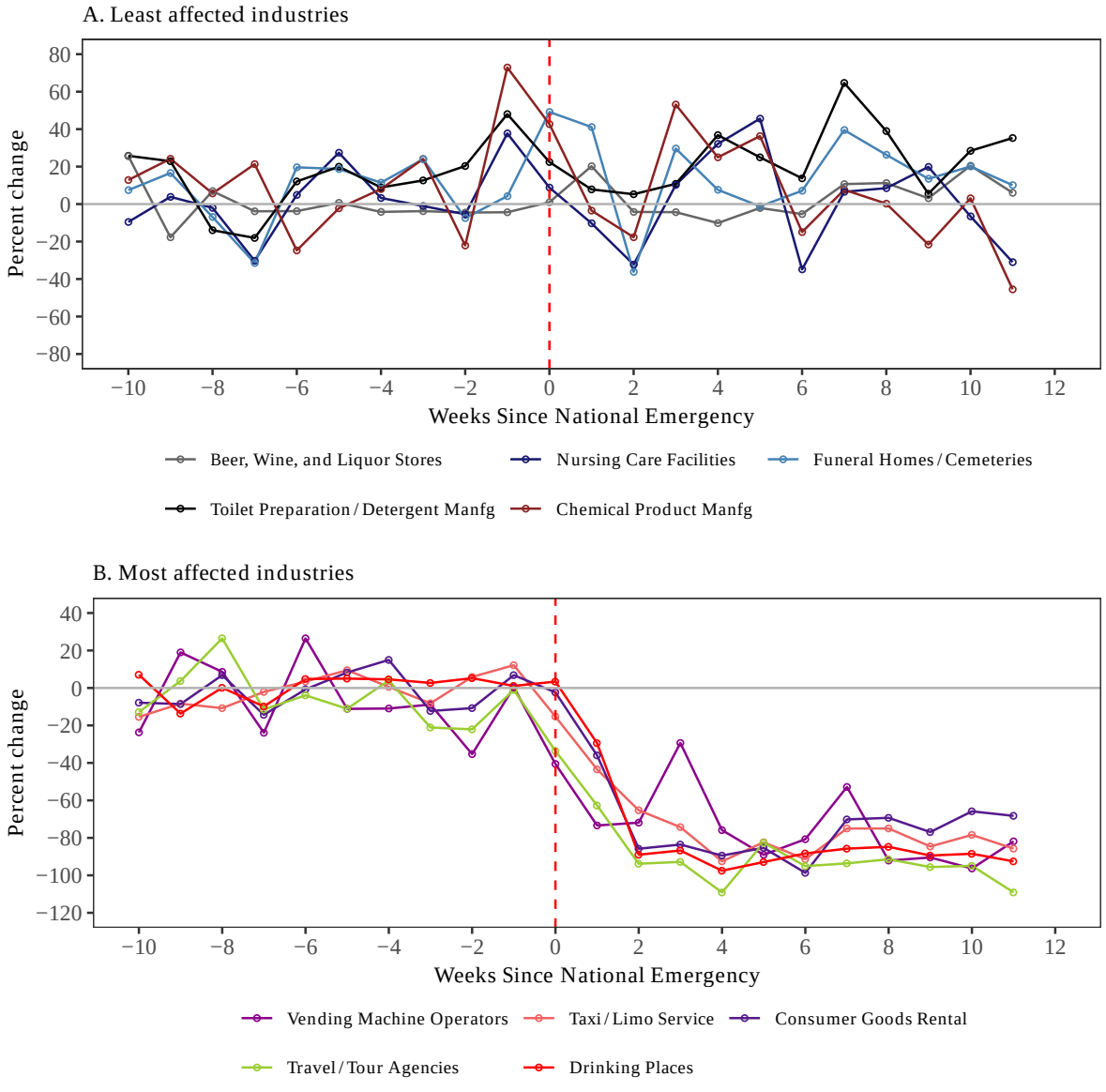

Figure A.6: Average changes in household consumption by top and bottom performing sectors

Notes: This figure shows average weekly changes in business owner's consumption for businesses in the top five and the bottom five performing industries. Industry performance is defined as the average drop in revenues by NAICS 4-digit industries since the onset of the national emergency. Panel A plots revenue series for businesses in the five least affected (i.e., best performing) industries, and Panel B plots those for businesses in the five most affected (i.e., worst performing) industries. Industries shown in this figure correspond to the underlying sectors in the least and the most affected industries shown in Figure 7. For this analysis, we restrict the sample to industries with at least 100 businesses. Outcomes are normalized by the centered 9-week average from a year ago, and the change is defined as a percent change from its own average between January 13, 2020 and February 9, 2020 (i.e., two months before the week of national emergency). Dotted vertical lines denote the week of national emergency, which was declared the week starting March 9th, 2020.