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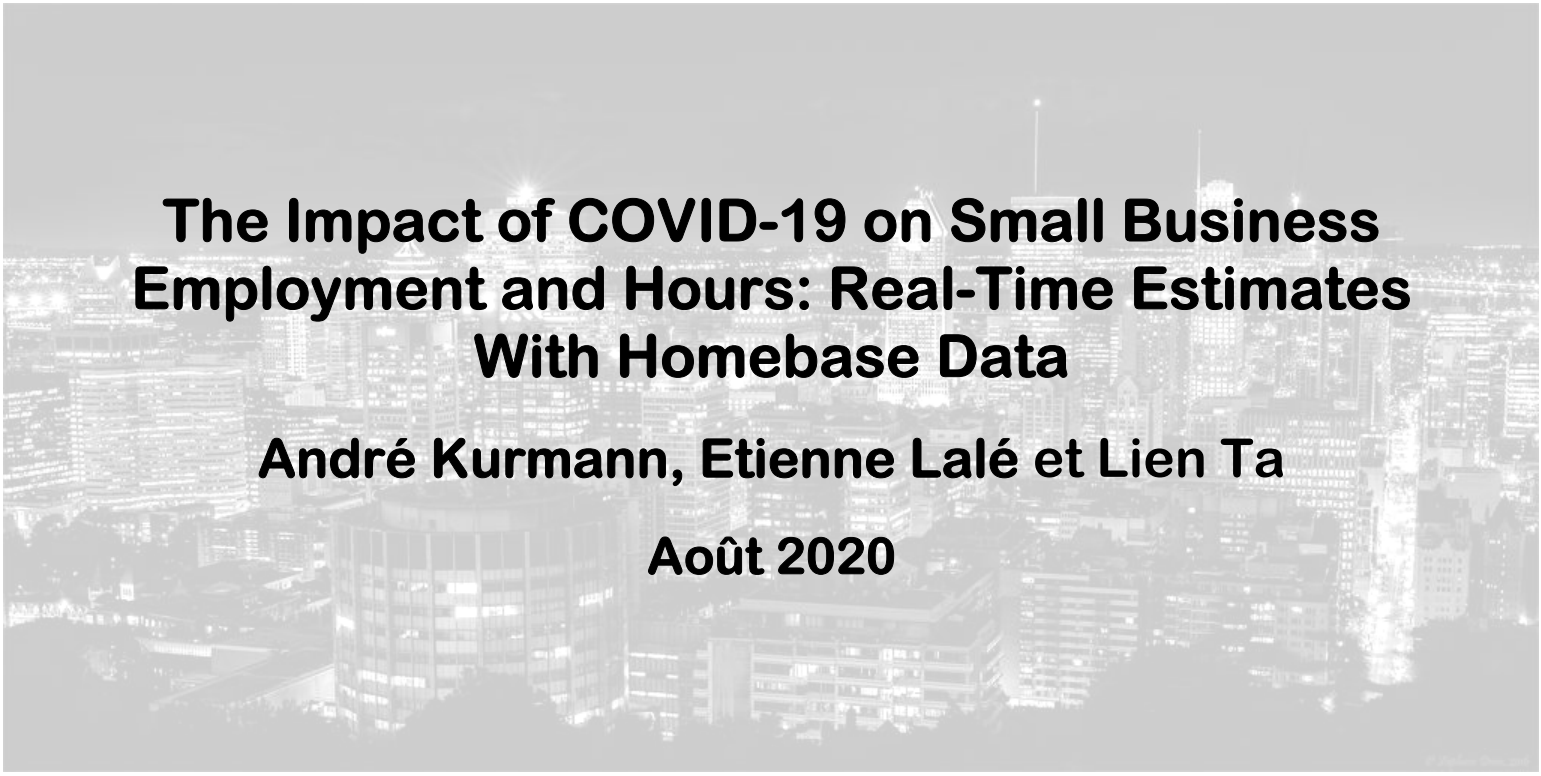
No. 2020-09



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André Kurmann, Etienne Lalé et Lien Ta

Août 2020

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August 5, 2020

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Abstract

We use worker-firm matched data from Homebase to construct new real-time estimates of the impact of the COVID-19 pandemic on employment and hours worked of small businesses. We find four key results: (1) employment of small businesses in four of the hardest hit service sectors contracted by an estimated 17.8 million between mid-February and mid-April – a staggering 60% decline – with more than half of the decline due to business closures; (2) small business employment recovered by about 8.5 million between mid-April and mid-June and more than half of the closed businesses have reopenend, but since mid-June this recovery has stalled; (3) small businesses have rehired a large share of previously furloughed workers but their employment remains 20-30% below pre-pandemic levels; (4) average weekly hours of job stayers declined sharply in the second half of March but have since fully recovered. The estimates highlight the key role that small business closures and reopenings play not only for the dramatic decline in service sector employment but also for the recovery that has come to a halt in mid-June. Unless many of the still closed businesses reopen and rehiring picks up again, service sector employment will remain persistently lower.

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1 Introduction

The COVID-19 pandemic has unfolded with tremendous speed and is affecting U.S. labor markets in unprecedented ways. This makes having timely and accurate measures of the impact all the more important in order to assess the effects of different health and economic policy alternatives. Unfortunately, the Bureau of Labor Statistics (BLS) releases official labor market estimates only with a lag of about a month. Furthermore, these estimates do not provide information about the impact on small businesses – a segment accounting for a large share of jobs in customer-oriented service industries that are especially vulnerable to the disruptions caused by the pandemic.

In this paper we use daily worker-firm matched data on employment and hours worked from Homebase, a scheduling and time clock software provider used by more than 60,000 mostly small service-sector businesses in the U.S., to help address these challenges. We match the Homebase records to Safegraph Places of Interest (POI) data to obtain consistent NAICS industry codes for each establishment and then benchmark the Homebase data against administrative data from the Quarterly Census of Employment and Wages (QCEW). This allows us to assess the representativeness of the Homebase data and construct industry-specific real-time estimates of employment and hours worked that can be compared to the monthly establishment estimates from the BLS' Current Employment Statistics (CES).

The primary focus of our analysis is on small businesses with less than 50 employees in service-providing sectors that were among the hardest hit by the COVID-19 pandemic: Leisure & Hospitality, Retail Trade, Educational & Health Services, and Other Services.[1] We find four key results:

(1) Small business employment in the four sectors contracted by an estimated 17.8 million between mid-February and mid-April – a staggering 60% decline – with more than half of the decline due to business closures.

(2) From mid-April to mid-June, small business employment regained about 8.5 million and more than half of the closed businesses reopened, but since mid-June this recovery has stalled.

(3) Small businesses have primarily rehired previously furloughed workers but their employment remains 20-30% below pre-pandemic levels, with businesses that reopened later having recovered less of their pre-pandemic employment.

(4) Average weekly hours worked of job stayers declined sharply in the second half of March but have since fully recovered.

[1] Coverage of the HB data is highest in these sectors, but we are in the process of analyzing other sectors as well.

Our real-time estimates predicted not only the sharp drop in service-sector employment from mid-March to mid-April that the BLS reported in its April Employment Situation but also the partial recovery in its mid-May and mid-June reports, which were greeted by many economic commentators as unexpected positive surprises. More importantly, our estimates reveal that this recovery has come to a halt since mid-June, with reopenings declining and employment of currently active small businesses persisting below their pre-pandemic levels. This suggests that unless many of the still closed small businesses reopen and the pace of rehiring picks up, service sector employment will remain persistently lower. Our data allows us to monitor these developments in real-time and relate them to information on business restrictions, the public health situation, and economic policy interventions.

Both the job loss of 17.8 million between mid-February and mid-April and the subsequent rebound by 8.5 million that we estimate for small businesses in the four selected service sectors alone are staggering numbers, but they seem broadly consistent with data on initial unemployment claims as well as other available evidence. At the same time, our estimates are considerably larger than the BLS' CES estimates for *all* businesses in the four selected sectors, implying that employment suffered a sharper drop off and remains farther below pre-pandemic levels despite the rebound since mid-April. While it is difficult to pinpoint the reasons for this difference, we argue that one important explanation is the treatment of business closures and reopenings. The CES sample naturally skews towards larger establishments that have lower closure rates, and the BLS' estimation takes into account only a portion of establishments reporting zero employment, respectively establishments returning from zero employment.[2] In contrast, we take into account the employment effects of all closures and reopenings of small businesses and show that this represents a key factor behind not only the dramatic employment contraction in the beginning of the pandemic but also the strong yet partial recent recovery.

While the HB data offers a remarkable amount of real-time information, it also comes with limitations that may lead us to overestimate the extent of the contraction in small business employment in the four service sectors considered. In particular, the majority of workers tracked in the HB data are hourly-paid employees; and HB businesses may be disproportionally located in metropolitan areas that were more affected by the pandemic. In ongoing work, we assess the importance of these issues and perform various robustness checks.

The paper contributes to a growing literature that tries to measure the impact of the COVID-19

[2] As discussed in more detail below, the BLS historically did not include employment losses from businesses reporting zero employment and instead netted out these losses by imputing employment gains from establishment birth and then adjusting this imputation with an econometric net birth/death forecast based on historical data. With the release of the April report, the BLS modified this procedure by taking into account a portion of reported zeros in the sample and including current employment growth of continuing establishments as a variable in the econometric forecast.

pandemic on U.S. labor markets. Homebase, Bartik et al. (2020), Chetty et al. (2020) as well as a number of other researchers report percent changes in total hours worked, employed workers, and active establishments computed from the raw HB data. We expand on these results first by classifying each establishment in the HB database with a NAICS industry code that allows us to benchmark the HB data to administrative data; second by using this information to estimate the effects of the pandemic on employment *levels*, establishment *counts,* and *number* of hours worked; and third by following businesses and workers longitudinally to analyze business closures and reopenings and worker recall over time. This allows us to directly compare our results to official BLS estimates as well as existing research on business and worker flow dynamics. In terms of empirical methodology, our paper is most closely related to Cajner et al. (2020) who use micro-data from ADP, the biggest payroll processing company in the U.S., and estimate that U.S. private-sector employment declined by about 21% or 26.5 million between mid-February and late April and then rebouneded modestly thereafter. Consistent with our estimates, they also find a disproportionate contraction in customer-oriented service sectors and a large effect from small businesses closures. Other studies that estimate the employment losses from the crisis are Bick and Blandin (2020), Coibon et al. (2020) and Kahn et al. (2020). Even though the empirical methodology is different from ours, these studies also estimate a dramatic contraction in U.S. employment from mid-March to mid-April and a partial recovery thereafter.[3]

2 The Homebase Data

The Homebase (HB) data consists of daily records of individual hours worked and wages of employees, linked longitudinally to the establishment where they work and the firm that controls the establishment. The data is recorded in real-time through HB's proprietary software and is used by many of the businesses for payroll processing. HB provides free data access to researchers and updates the data regularly with the latest observations. The data used for this report extends from January 1, 2018 to August 1, 2020 and is stripped of all confidential information about individuals and businesses.

As detailed in the online Appendix, as of early 2020 the available data covered about 500,000 active employees and about 60,000 active establishments for the U.S. Most establishments are small, employing fewer than 50 workers who are primarily hourly-paid.

The HB data also contains an industry category for each establishment, but the available categories do not directly line up with standard industry classification and for about one third of the records,

[3]There are many other papers analyzing the impact of the COVID-19 pandemic. We will cite them as the draft progresses.

industry category is missing altogether. This is an important limitation for the purpose of constructing estimates that can be benchmarked to official statistics. One of the major contributions of the paper on the data side is to match the HB establishment records by name and address to Safegraph's Places of Interest (POI) data, which contains consistent NAICS-6 industry coding. The match procedure involves several data preparation steps and is explained in detail in the Appendix.[4] For now, we only retain HB establishment records that merge exactly by name and address to Safegraph POIs as these are the matches for which we have the highest confidence that they are correct. For future versions of the draft, we plan to extend the sample by also including results from various fuzzy name match and substring match algorithms.

The sample of retained merges contains 32,783 establishments with positive employment in mid-February (the reference point for our estimation). As shown in the Appendix, establishments of a different HB industry category do not necessarily match to the expected NAICS industry classification. For example, while over 80% of the establishments in the category "food and drink" match to "Food Services and Drinking Places" (NAICS 722), about 5% match to "Food Manufacturing" (NAICS 311), and about 7% match to various industries in "Retail Trade" (NAICS 44-45). We are exploring these correspondences in more detail in ongoing work.

Our sample of exact merges has the largest coverage in Leisure & Hospitality (NAICS 71 and 72), followed by Retail Trade (NAICS 44-45), Education and Health Services (NAICS 61-62), and Other Services (NAICS 81).[5] Aside from coverage, we focus on these customer-oriented sectors because they appear to be particularly vulnerable to the disruptions and stay-at-home orders caused by the COVID-19 crisis.

To benchmark the HB data, we use information from the QCEW, which also serves as the sample frame for the CES. The QCEW is derived from state unemployment insurance records and the publicly available data contains population counts of establishments and employment as well as wages by establishment size category, industry, and geography. This information becomes available about 6 months after the end of the quarter.[6] As shown in the online Appendix, the HB data provides reasonable coverage for

[4]Name and addresses are self-reported in the HB data. We are cleaning and standardizing these names and apply the same procedure to the Safegraph data. In addition, about two thirds of the HB records come with a Google Places ID. For those cases, we use a Places API script to retrieve name and address details from Google.

[5]Other Services includes "Repair and Maintenance" (NAICS 811) and Personal and Laundry Services (NAICS 812), which contains many of the HB establishments categorized under "home and repair, "beauty and personal care", and "health care and fitness". Interestingly, the HB data also contains several hundred establishments each in Utilities (NAICS 22), Construction (NAICS 23), Food, Textile and Apparel Manufacturing (NAICS 31) and Real Estate, Rental and Leasing (NAICS 53). We are analyzing these sectors in ongoing work.

[6]Currently, the last available QCEW data is for the third quarter of 2019. Tabulations by establishment size category are available only for the first quarter of the year; i.e currently the first quarter of 2019.

establishments with fewer than 50 employees in the selected service-providing sectors but contains only very few establishments with 50 employees or more. We therefore focus most of our analysis on small establishments, i.e. establishments with less than 50 employees. For these small businesses, average employee by size category are close to the ones in the QCEW.

3 Empirical Methodology

One of our main goals is to compute employment and hours estimates that can be compared to the official statistics published by the BLS in their monthly Employment Situation report. For small businesses employment in a given sector (e.g. Leisure & Hospitality), we start with the headline employment number for that sector from the CES for February 2020 (week 0) and then use the HB data to estimate employment in week t as

$$\widehat{E}_t = \widehat{E}_{t-1} \times \frac{\sum_i \omega_i e_{it}}{\sum_i \omega_i e_{it-1}}, \tag{1}$$

where e_{it} is employment in week t of HB establishments in size-industry cell i; and ω_i is the corresponding sampling weight, constructed as the ratio of QCEW establishment counts to HB establishment counts in that size-industry cell.[7]

This estimation is conceptually similar to the "weighted link-relative technique" that the BLS uses to estimate monthly employment from the CES, but there are important differences.[8] First, our measure is a real-time estimator that offers a weekly update of the extent to which the COVID-19 pandemic is affecting small business employment. Second, we include employment of all establishments present in the HB data in February, independent of whether they have positive employment in week t or before. By doing so, we directly take into account employment changes due to establishment closings and reopenings.[9] The CES estimation, in contrast, includes a portion of the establishments that report zero employment in month t and establishment that return to positive employment in month t, respectively, and then adjusts separately for a residual "net birth/death" with an econometric adjustment model based on current and on historical data.[10] Third, we measure establishment employment e_{it} as the number of workers with

[7] The CES only provides estimates by industry and not by establishment size class. To compute employment estimates of small establishments, we multiply the February 2020 CES number by the ratio of employment of small establishments to total employment from the latest available QCEW numbers (first quarter of 2019), adjusted for growth in small establishment to total employment between 2019 and 2020.

[8] See https://www.bls.gov/web/empsit/cestn.htm for details on the CES and estimation.

[9] While our calculations include employment changes from all establishment closures and reopenings, we do not take into account employment gains from establishment birth since entry of new establishments in the HB data was relatively small between mid-February and mid-March and then came to an almost complete stop.

[10] See https://www.bls.gov/web/empsit/cesbd.htm for details. Historically, the CES estimation only included establishments that reported positive employment in both t and $t-1$ and the net/birth death adjustment was based on an ARIMA

positive hours in week t, whereas the CES defines employment as the number of workers on payrolls who received pay for any part of the pay period that includes the 12th day of the month, independent of whether they actually worked or not in that week. As we show below, these differences may be important in a situation such as the current pandemic where the number of active establishments and the number of employees actually working changes greatly within just a few days.

For average weekly hours (AWH), we proceed similarly as for employment. We start with the headline number from the February 2020 CES and then use our HB data to estimate

$$\widehat{AWH}_t = \widehat{AWH}_{t-1} \times \frac{\left(\sum_i \omega_i wh_{it}\right) / \left(\sum_i \omega_i e_{it}\right)}{\left(\sum_i \omega_i wh_{it-1}\right) / \left(\sum_i \omega_i e_{it-1}\right)}, \tag{2}$$

where wh_{it} is total weekly hours worked of HB establishments i in week t. We compute this estimate for three different groups of workers: all workers employed across all establishments in week t; all workers employed in establishments that have remained open continuously throughout the entire sample; and all job stayers who remained employed continuously in establishments that have remained open continuously. We consider all three groups to highlight the effects of compositional change, which turns out to play an important role during the pandemic as many workers are getting temporarily furloughed or laid off. Also note that this this estimation of AWH is different from the "link and taper technique" used to construct AWH in the CES, which adjusts the current estimate towards the previous estimate so as to keep it close to the overall sample average over time. The CES estimate may therefore not capture large changes in actual AWH that occur in times of economic disruptions, whereas our estimate does because it is based on current information only.[11]

In addition to these two main estimates, we decompose the total employment change into contributions from establishment closure and reopenings; and contributions from gross hirings and separations. Details of these decompositions are provided in the online Appendix.

model of actual net birth/death residuals from QCEW data over the preceding five years. By not including establishments that failed to report employment in both months, the CES estimate effectively treated them as deaths and imputed employment growth of the sample of active establishments so as to offset missing employment gains from establishment birth, which are on average closely related to employment losses from establishment death. In light of the large labor market disruptions caused by the COVID-19 pandemic, the BLS changed its birth/death adjustment for the April report as described by including a portion of reported zeros in the sample employment growth calculation and by adding current sample employment growth to the net birth/death adjustment model.

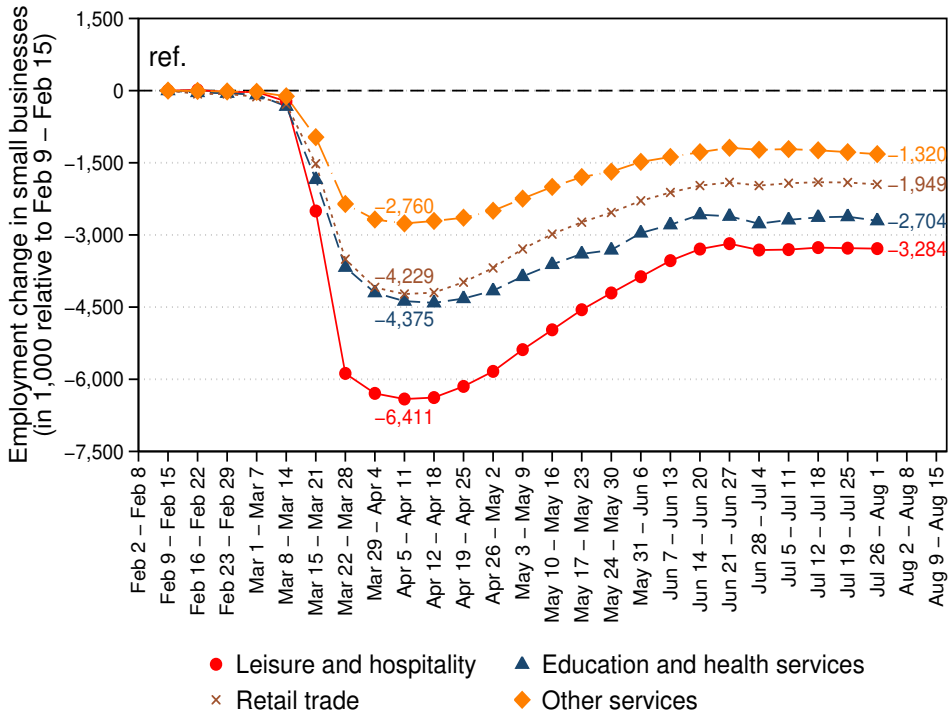
[11]The link-and-taper estimate used in the CES can be expressed as $\widehat{AWH}_t = 0.9\left(\widehat{AWH}_{t-1} - \widehat{awh}_{t-1}\right) + \widehat{awh}_t$, where $\widehat{AWH}_t$ is the official estimate and $\widehat{awh}_t = \left(\sum_i \omega_i wh_{it}\right) / \left(\sum_i \omega_i e_{it}\right)$. If $\widehat{AWH}_{t-1} > \widehat{awh}_{t-1}$ in the previous month, then the current month official estimate will be raised relative to actual data, and vice versa if $\widehat{AWH}_{t-1} < \widehat{awh}_{t-1}$. The CES makes a slight adjustment to this estimator to account for atypical reports although it is unclear what makes a report atypical.

4 Results

4.1 Employment

Figure 1 reports our estimates of the cumulative employment loss since mid-February by small businesses for the selected service-providing sectors. As shown by the red solid line, small business employment in Leisure & Hospitality declined by an estimated 6.4 million between mid-February and mid-April, most of it occurring during the second half of March as states imposed business closures and stay-at-home orders. This represents a 67% decline relative to the 9.5 million jobs of small businesses in this sector just two months earlier. Between mid-April and mid-June, employment by small businesses in Leisure & Hospitality regained 3.1 million or almost half of that loss. But since mid-June, this recovery has stalled and employment remains about 3.3 million or 34% below the employment level prior to the pandemic.

Figure 1: Cumulative Employment Loss by Small Businesses



Notes: Estimated employment change (in thousands) of small businesses with less than 50 employees in Retail Trade (NAICS 44-45), Education and Health Services (NAICS 61-62), Leisure and Hospitality (NAICS 71-72), and Other Services (NAICS 81). The estimates are constructed based on February 2020 CES employment estimates (week of Feb 9 – Feb 15) and QCEW shares of small business employment from 2019 extrapolated to February 2020.

As shown by the other three lines in the figure, small business employment also dropped substantially for the other three sectors, although in absolute terms the decline is not as dramatic as in Leisure & Hospitality. Relative to mid-February employment levels, the decline by mid-April amounts to 56% for

Retail Trade (brown dotted line), 51% for Education and Health Services (blue dashed line), and 62% for Other Services (orange dash-dotted line). Similar to Leisure & Hospitality, small business employment in the three sectors has recovered roughly half of the loss since mid-April, but this recovery has come to a halt in mid-June and employment remains far below the respective pre-pandemic levels.

Our estimates imply that employment of small businesses in the four service sectors combined declined by 17.8 million between mid-February and mid-April and has since recovered about 8.5 million of that decline. These are staggering numbers, especially since this segment of the labor market represented only about 23% of total private employment prior to the pandemic.[12] But our estimates seem broadly consistent with available data on unemployment. Since the beginning of March, over 40 million workers have filed new unemployment benefit claims and the total number of workers claiming benefits stands at around 30 million, which – even though unprecedented by historical standards – may not capture the full extent of job loss because some of the workers who lost their job may not have filed because they left the labor force.[13] The customer-oriented service sectors was hit much harder by the pandemic (see Cajner et al., 2020 and Chetty et al., 2020) and accounts for a disproportionate share of new claims (see e.g. Kandra et al., 2020). Furthermore, small businesses within these sectors have been more vulnerable than larger businesses (see again Cajner et al., 2020 and Chetty et al., 2020), perhaps because they entered the crisis in better financial health, have had easier access to emergency funding and government loan programs, or operate a business model that is more adaptable to the new economic environment (e.g. chain-operated fast food restaurants that can more easily switch to take-out / delivery only than small high-end dining). Our estimates therefore seem within plausible range.

At the same time, both the 17.8 million decline between mid-February and mid-April and the partial recovery of 8.5 million between mid-April and mid-June are considerably larger than the CES estimates reported by the BLS. Indeed, according to the CES, employment of *all* businesses in the four sectors declined by about 13.5 million between mid-February and mid-April and then regained about 6 million by mid-June (the latest available CES estimate).[14] Unless service-sector businesses with more than 50 employees have on average increased jobs during the pandemic, this suggests that employment in the four sectors and private-sector employment more generally suffered a sharper drop off and remains farther

[12] Our estimate of small business employment in the four sectors for mid-February is 30 million and the CES estimate of total private sector employment is 128 million.

[13] See Coibon et al. (2020) who find based on a large-scale household survey that many of those who lost their jobs are not actively looking to find new ones and therefore may not file for unemployment.

[14] The headline CES employment estimate declined by 21 million from mid-February to mid-April on a seasonally adjusted basis and 19 million on an unadjusted basis. Since the usual seasonal adjustment factors may not be appropriate for the large changes in employment that we are currently experiencing, we do not adjust our estimates and compare them to unadjusted numbers from official statistics whenever possible. See Rinz (2020) for an excellent discussion of this point.

below pre-pandemic levels than implied by the CES estimates.

Digging deeper, we find that even in retail subsectors considered essential such as Building Material Dealers (NAICS 444), Food and Beverage Stores (NAICS 445), Gasoline Stations (NAICS 447), or General Merchandise Stores (NAICS 452) where the CES estimates show almost no job loss across all businesses, our HB estimates show large declines in small business employment between mid-February and mid-April. See the online Appendix for details.

There are a number of potential explanations for the difference between our estimates and the CES estimates. First, the HB data covers mostly hourly paid workers who may be more vulnerable to job loss during this pandemic than salaried workers. Second, HB clients may be disproportionally located in affluent metropolitan areas that were hit harder by the pandemic (see Chetty et al., 2020). Both of these factors would imply that we overestimate the employment decline. We are investigating both of these possibilities in ongoing work.

A third potential explanation of the difference is our measurement of employment which, as described in the previous section, differs from the measurement of employment in the CES. While employment in the CES counts workers receiving pay for any part of the pay period that includes the 12th of the month independent of whether they actually worked, we measure employment by the number of workers who logged positive hours in a given week. So, if some workers who were temporarily furloughed in mid-April still received pay even though they were no longer working, then they were counted in the CES but no in our HB data. Perhaps more importantly, the CES estimate only includes a portion of the employment changes from establishments reporting zero employment, respectively establishments returning to positive employment, and adjusts for the remaining net employment effect from establishment birth and death with an econometric model. If small businesses account for a disproportionate share of establishment closures and reopenings or do not report at all because they are temporarily closed, then the resulting employment changes are presumably not taken fully into account.[15] Both of these differences may explain why our data show a more dramatic drop of employment from mid-February to mid-April and also a stronger rebound between mid-April and mid-June.

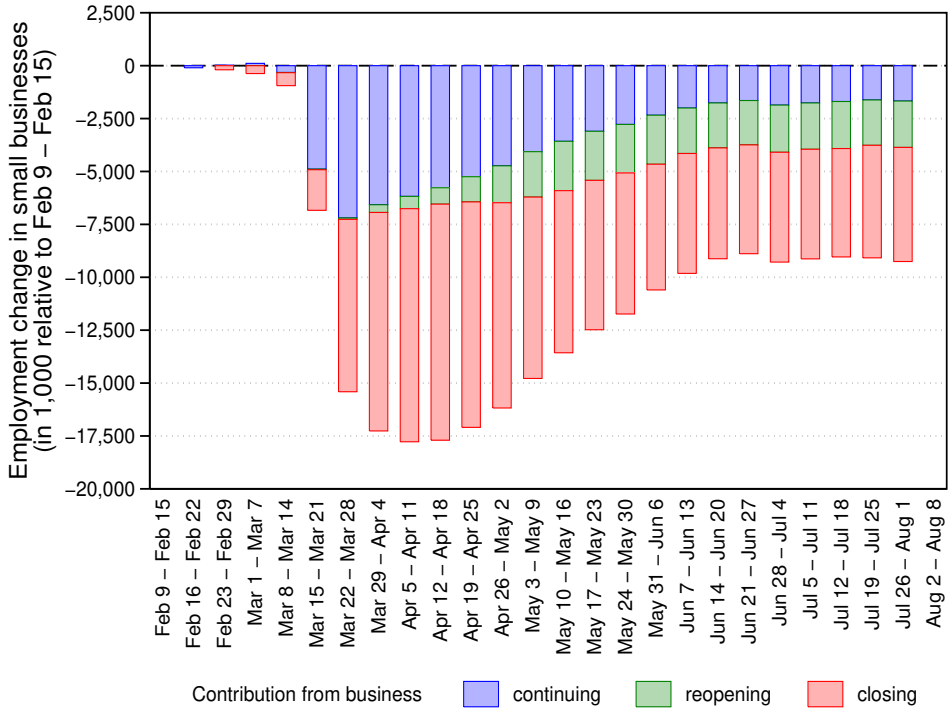
In this regard, it is also interesting to compare our estimates to the ones by Cajner et al. (2020) who use data from ADP, the biggest payroll processing company in the U.S. that covers about 20 percent of total U.S. private employment and inludes many larger businesses. Their employment concept is pay-based as in the CES but their estimates include all business closures and reopenings. Their estimates

[15] Unfortunately, the BLS does not provide details on the portion of business closures taken into account in the CES estimate, how this portion is determined, or the extent to which small businesses factor in this adjustment. See https://www.bls.gov/web/empsit/cesbd.htm for a description.

imply that employment of *all* businesses in the four sectors that we consider declined by 20.2 million between mid-February and late April and then recovered by about 4 million by late May, i.e. a net decline of about 16 million. Given that businesses with fewer than 50 employees accounted for almost half of employment in the four sector prior to the pandemic and smaller businesses were disproportionally affected by the crisis, this estimate appears quite closely aligned with the net decline of about 9 million for small businesses between mid-February and mid-June that we estimate.

To illustrate the importance of small business closures and reopenings further, we decomposes the combined employment change across the four selected sectors into the contributions from employment changes by businesses that operated continuously from mid-February until at least week t (but possibly longer), employment changes by businesses that closed at some point between mid-February and week $t-1$ but have reopened by week t, and employment changes from businesses that operated in mid-February but are closed in week t.

Figure 2: Contribution of Small Business Closures and Reopenings to Cumulative Employment Loss



Notes: Contribution to total employment change in Leisure and Hospitality, Retail Trade, Education and Health Services, and Other Services by businesses that operated continuously from mid-February until at least week t (blue bars), employment changes by businesses that closed at some point between mid-February and week $t-1$ but have reopened by week t (green bar), and employment changes from businesses that operated in mid-February but are closed in week t (red bars).

As shown by the red bars in Figure 2, business closures account for more than half of the total employment decline from mid-March onward and also drive a large part the recovery between mid-April

and mid-June. Job losses by continuing businesses (blue bars), in comparison, account for a large part of the employment decline in the beginning of the downturn but have since recovered more than three quarters of the lost jobs. Returning businesses (green bars), finally, account for a growing part of the total employment decline between mid-April and mid-June as these businesses reopened with fewer workers than before the pandemic.

The take-away from the decomposition is that the recovery of small business employment has been driven in large part by the reopening of temporarily closed businesses. The main reason for why the recovery has stalled since mid-June is that employment losses from business closures have stopped shrinking. The extent of the recovery back towards pre-pandemic levels therefore depends crucially on whether still closed businesses will reopen in the coming months or not.

Since business closures play such an important role, we analyze it further and contrast it to new establishment entry. As shown by the solid red line in the top panel of Figure 3, only about 5% of small businesses out of all businesses that were active in mid-February had closed by mid-March. From there, this closure rate increased steeply and peaked at about 45% in mid-April. From mid-April onward, the cumulative closure rate declined gradually to about 24% by mid-June. Since mid-June, the closure rate has remained about constant.

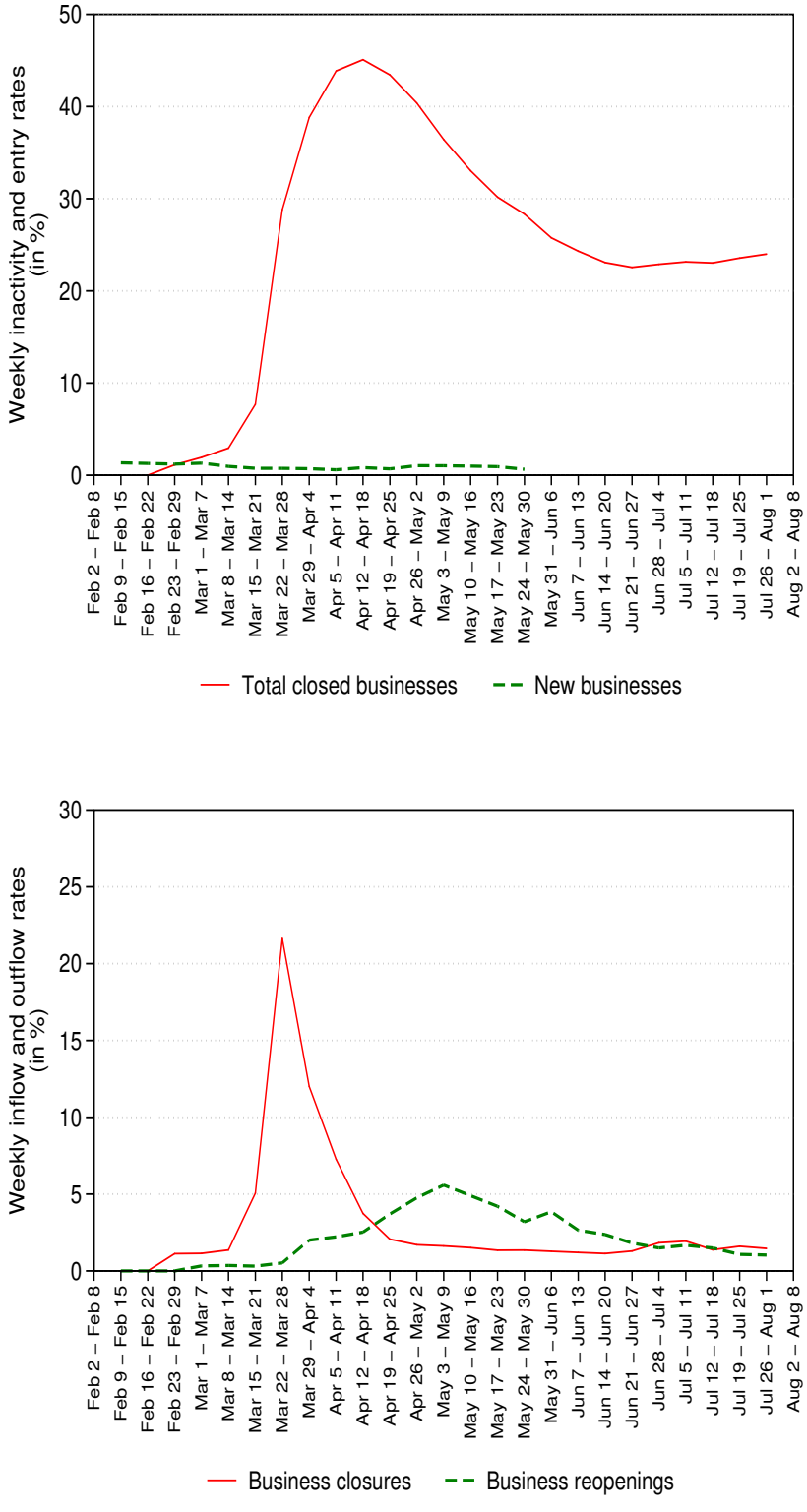
The dashed green line of the top panel, in turn, shows the entry rate of new establishments in the HB data. Entry has held steady at about 1.5% until early March, then dropped to about 0.75% by mid-April, and has since increased to about 1.2%.[16] While this entry rate is difficult to interpret since it conflates business birth with HB client acquisition of existing businesses, the overall decline in entry is consistent with the temporary contraction in new business formations reported by the U.S. Census Bureau (see Haltiwanger (2020)). For now, we do not take this entry of new businesses into account, but we will quantify its importance in future versions of the paper.

The second panel of Figure 3 expands on the above cumulative business closure rate by showing the weekly rates of new business closures (solid red line) and the weekly rate of business reopenings (dashed green line). New business closures spiked the week of March 22 - March 28, with more than 25% of all small businesses in the four selected sectors closing. By late April, the rate of new business closures had returned to pre-pandemic levels and remained constant until mid-June when closures edged up again. The rate of businesses reopenings increased from early April onward and peaked in early May at about 5%.[17]

[16] The entry rate stops end of May because we have not yet matched businesses that entered HB after that date with Safegraph POI records.

[17] The majority of establishments that closed and reopened have so far remained open.

Figure 3: Business closures, reopenings and New Establishments in HB Data



Notes: Cumulative establishment closures and new establishments relative to count of active establishments in HB data in Leisure and Hospitality, Retail Trade, Education and Health Services, and Other Services (top panel), and rate of new business closures and business reopenings in the same sectors (bottom panel).

Since then, this return rate has declined gradually, implying that the pace of businesses reopening has slowed down. From late June onward, the reopening rate has been about the same as the closure rate, which explains why the cumulative rate of business closures in the top panel has flattened out and why, as noted above, the employment recovery has stalled.

To complete this analysis, we decompose employment losses by small businesses in the selected sectors into gross hiring and separation flows.

Figure 4: Gross Hiring and Separation Rates of Small Businesses

Notes: Gross hiring and separation rates of small businesses in Leisure and Hospitality, Retail Trade, Education and Health Services, and Other Services. See the Appendix for definitions.

As Figure 4 shows, the separation rate spiked in the week of March 22-28, the same week as business closures spiked, while the hiring rate dropped only slightly. Separations therefore account for the bulk of the large employment losses in the second half of March. From early April to early May, the hiring rate increased gradually and peaked at 15%, about double the pre-crisis rate. As we will see below, this increase in the hiring rate is in large part driven by recalls. Since early May, the hiring rate has declined gradually and stands just below 10% since mid-June. This is about the same rate as the separation rate since mid-June, thus providing another way of understanding the stalled recovery of small business employment.

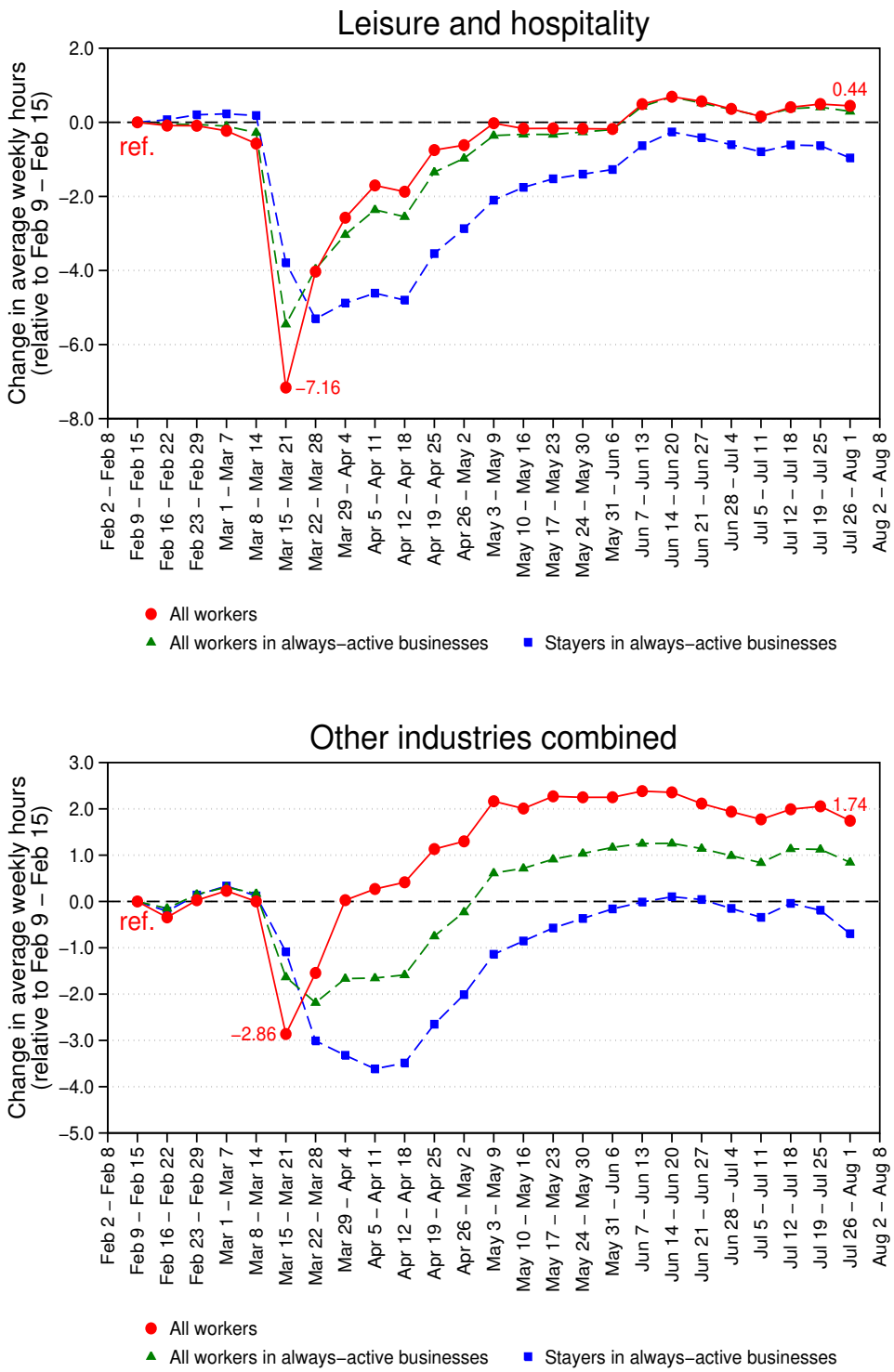
4.2 Average weekly hours

Figure 5 shows different estimates of average weekly hours (AWH), one for all workers employed in week t, one for all workers employed in week t in businesses that operated continuously throughout the entire sample, and one for all job stayers.

As shown in the top panel for Leisure & Hospitality, AWH for all workers (red solid line) and AWH for all workers in businesses that remained active throughout the sample (green dashed line) both declined sharply in the third week of March but have since fully recovered and currently exceed pre-pandemic levels somewhat. The sharp decline precedes the week of March 22-28, the week of the largest employment decline and is driven both by the reduction in AWH of job stayers (blue line) and the fact that some of the laid off and furloughed workers stopped working mid-week. Interestingly, AWH of job stayers remains about 5 hours lower all through mid-April and does not fully recover. As we analyze below, this difference is driven by compositional change: job stayers work on average more hours per week than the workers that were laid off or temporarily furloughed. As layoffs and furloughs increased, this changed the composition of workers towards job stayers, thus increasing AWH of all workers and AWH of all workers in continuously active businesses.

For the other three sectors considered, shown in the bottom panel, the overall picture is similar although the magnitudes are different. AWH also declined in the second half of March but to a lesser extent than in Leisure & Hospitality. Thereafter, AWH for all workers and AWH for workers in continuously active businesses recovered relatively quickly and has been above the mid-February level for the last three months. In comparison, AWH of job stayers continued to decline until mid-April and then recovered gradually to its pre-pandemic level. As discussed above for the case of Leisure & Hospitality, this difference is driven by compositional change towards job stayers who work on average more hours per week.

Figure 5: Average Weekly Hours of Small Business Employees



Notes: Average weekly hours of employees in small businesses in Leisure and Hospitality (top panel) and Retail Trade, Education and Health Services, and Other Services (bottom panel), constructed based on February 2020 CES estimate (week of Feb 9 – Feb 15). The solid red line shows the change in average weekly hours of all workers employed in all small businesses. The dashed green line shows the change in average weekly hours of all workers employed in small businesses that remain active throughout the entire sample. The blue dashed line shows the change in average weekly hours of job stayers; i.e. workers who remained employed in the same small businesses throughout the entire sample.

Overall, the two graphs show that hours of workers in small service-sector businesses who stayed in their job have recovered, which stands in large contrast to all the millions of workers who have lost their jobs.

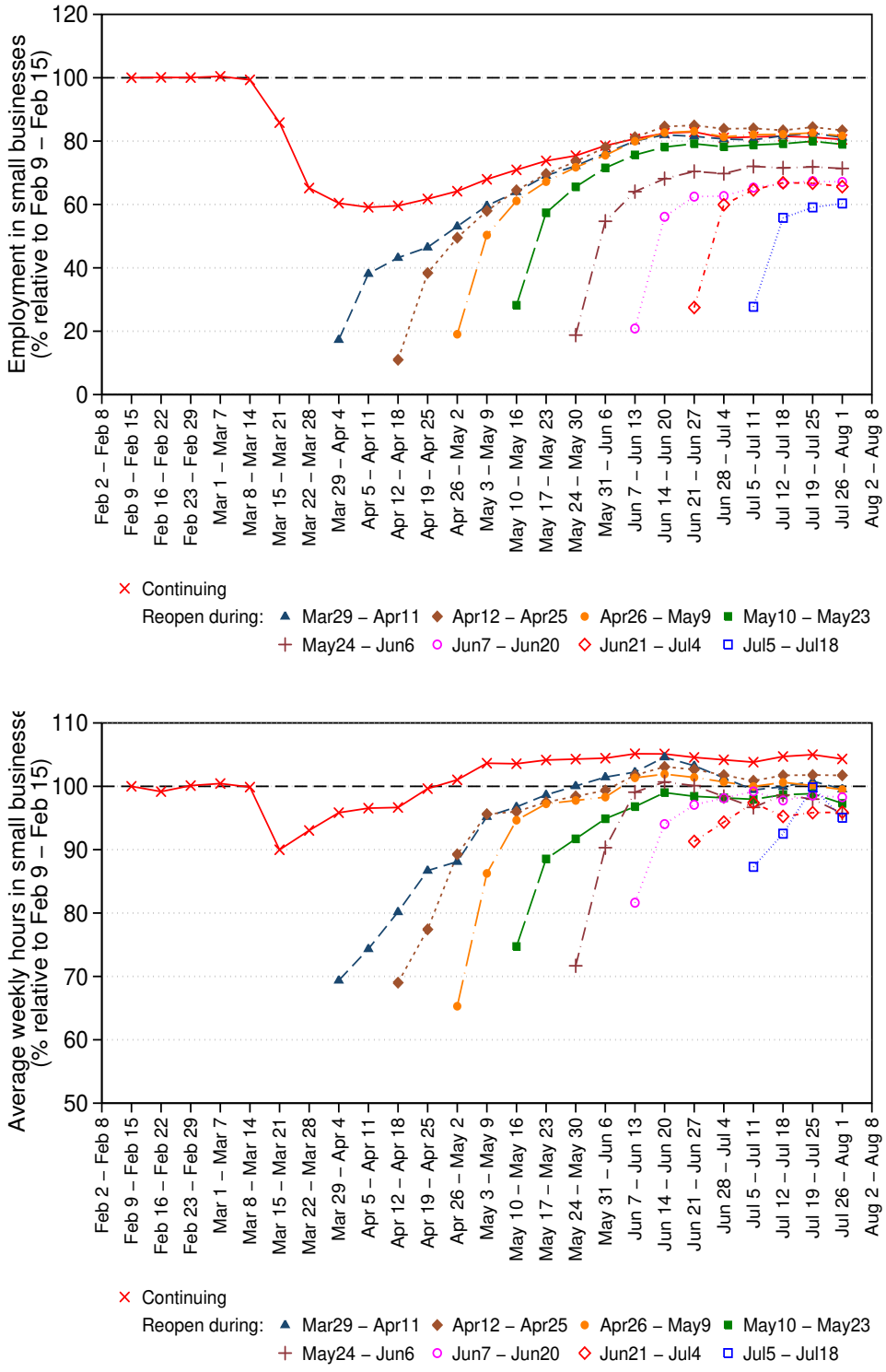
4.3 A Closer Look at the Recovery

Our estimates imply that small service-sector businesses have regained about half of the lost jobs since mid-April but that the recovery has stalled since the end of June. We now analyze this recovery further by comparing businesses that remained open throughout the pandemic with businesses that closed and have since reopened.

As shown in the top panel of Figure 6, continuing businesses that never closed decreased employment on average by about 40% by mid-April and then regained about half of that loss by the end of June. Consistent with above results, this recovery then stalled and employment remains about 20% below the pre-pandemic level. Businesses that closed temporarily first reopen with very little employment but then ramp up jobs rapidly. For businesses that reopened by mid-May, this ramping up was so large that they are now at the same employment relative to pre-pandemic levels as continuing businesses that never closed. For businesses that reopened after mid-May, in contrast, relative employment seems to level out at a lower rate of 60-70%. This suggests that there may be noticeable scarring among small businesses that closed for a longer period and reopened later.

As shown in the bottom panel of Figure 6, continuing businesses decreased AWH of their workers by just over 10% within one week in mid-March. AWH then recovered by early April and has since increased slighly to about 4% above the pre-pandemic level. In comparison, businesses that temporarily closed reopen initially with substantially lower AWH. Some of this difference may be due to the rapid rehiring of workers when businesses reopen, with some of these rehires starting mid-week which would artificially reduce AWH. After a few weeks, AWH then returns to essentially the pre-pandemic level and then increases slightly above, independent of the date of reopening. Given the large and persistent employment decline across all of these businesses, the relatively small decline in AWH during the worst of the crisis and the subsequent recovery are surprising and suggest the presence of strong labor market indivisibilities (e.g. fixed costs, worker-specific economies of scale) that make it optimal for small businesses to employ fewer full-time workers as opposed to more part-time workers.

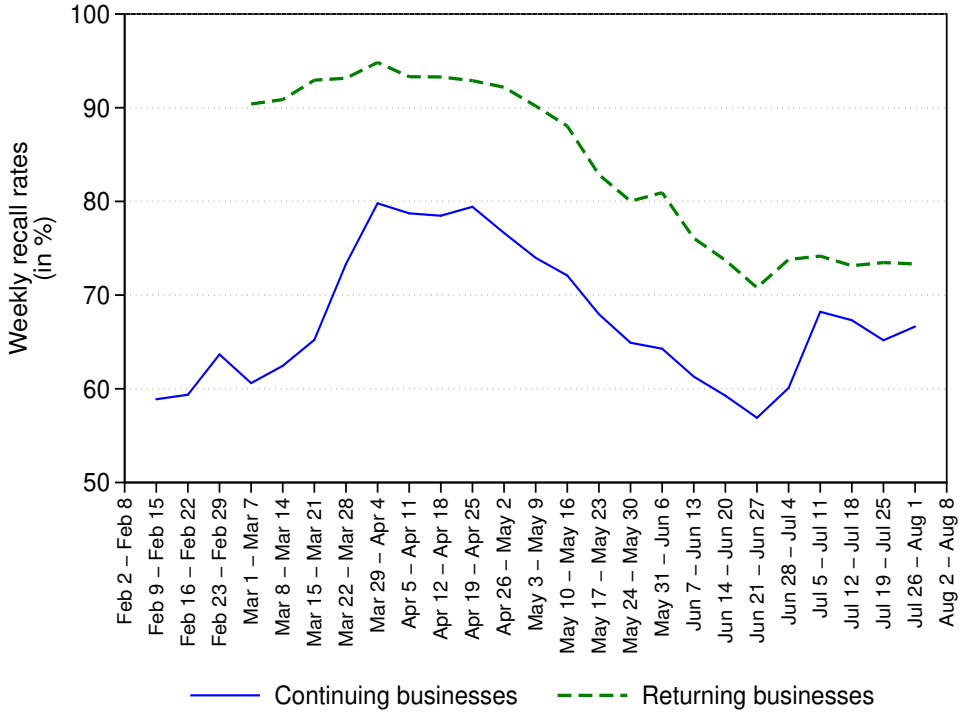
Figure 6: Employment and AWH of Continuing vs Reopened Small Businesses

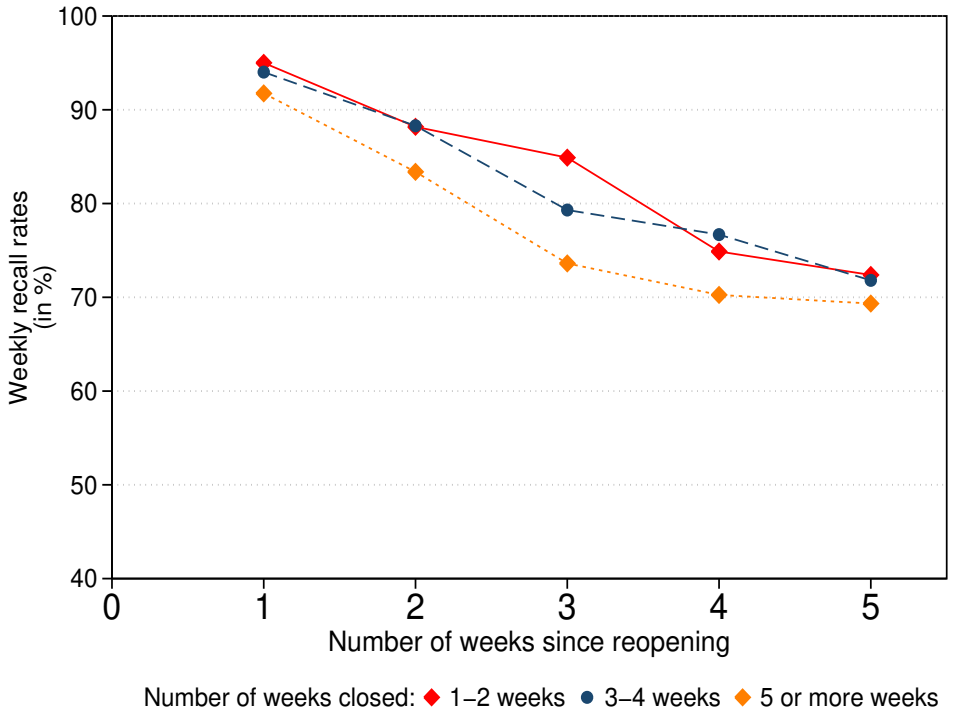


Notes: Employment and average weekly hours relative to week of February 9-16 of small businesses in Leisure and Hospitality, Retail Trade, Education and Health Services, and Other Services. The red solid line shows the results for small businesses that continued operating throughout the entire sample while the other lines show the results for small businesses that temporarily closed and reopened but the indicated date.

Next we look at the rate of recalled workers relative to total hiring.

Figure 7: Recall of Small Business Employees





Notes: Rate of employees returning to the same business relative to all new hires in small businesses in Leisure and Hospitality, Retail Trade, Education and Health Services, and Other Services.

We define a recalled worker as any hire who has previously worked for the same business.[18] As shown in the top panel of Figure 7, both continuing small businesses and businesses that temporarily closed have primarily regained employment since early April by recalling furloughed employees. Interestingly, until mid-June, this recall rate has been on average about 10% higher for small businesses that temporarily closed than for small businesses that remained open throughout the pandemic. For both continued and temporarily closed small businesses, this recall rate has declined gradually between mid-April and mid-June and then leveled out around 70%.

The bottom panel of Figure 7 explores recall further by reporting average recall rates by number of weeks of business closure. Recalls account for 90% to 95% of total hiring in the first week of reopening, independent of whether businesses were closed for 1-2 weeks, 3-4 weeks or 5 or more weeks. This recall rate then declines steadily with the number of weeks since reopening and after five weeks, the recall rate is about 70%. This suggests that at least so far, the worker-firm match of furloughed workers have remained relatively strong independent of the number of weeks that small businesses closed temporarily.

5 Future Work

We will continuously update our estimates with the latest data from HB and assess the extent to which small businesses in the different service-providing sectors recover from the crisis. It will be particularly interesting to see the extent to which the stalling of the recovery since mid-June will continue and how this relates to recent regional variations in infection counts and hospitalizations.

[18] Our recall rates may therefore include employees who work regularly for a given business but not in every week. This would somewhat artificially inflate our recall rates. We will investigate this possibility in future drafts.

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