

REAL-TIME ECONOMIC DATA: CHALLENGES AND OPPORTUNITIES[‡]

Timely Business Dynamics Using Google Places[†]

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Tracking business dynamics—new openings and permanent closures—usually relies on registries or tax records, but the pandemic challenged this approach along three dimensions. First, many businesses did not exit but only temporarily closed before reopening after COVID restrictions were eased. Second, official statistics are released with a time lag, but the speed of the pandemic highlighted the need for nontraditional real-time statistics on business health (Crane et al. 2022). Third, fewer statistics exist on small business establishments despite their importance for employment.

In this paper, we introduce a new real-time method to measure business opening and closure rates in any given area by relying on Google Places, the data behind the Google Maps platform. We provide evidence that the opening and closure rates of customer-facing industries (food, retail, accommodation) reflect well the temporary closures and reopenings not only during the pandemic but also in normal times. We also show that the number of reviews left by customers is correlated with business

dynamics: fewer reviews are associated with exits, and more reviews are associated with new job vacancies for expanding businesses.

I. Timely Measure with Google Places

Google Places provides geo-coded data coming primarily from business owners who have an account with Google as well as customers who leave reviews and report inaccurate business listings. There are two main differences compared to traditional administrative or tax records. First, the data are available for each location—that is, at the establishment level—even if one enterprise has multiple establishments. Second, the data also capture self-employed business owners without employees who would therefore not be captured by payroll records.

We use data publicly available from the Google Places application programming interface (API), with a small fee for each query. We use the functionality of “Nearby Search” that returns all businesses of a given type within a bounding circle, defined by a point (in latitude and longitude) and a radius (in meters). We focus on consumer-facing business types in city centers that are most likely to be well reported in Google Places: the food sector, using the keywords “restaurant,” “bar,” “cafe,” and “night_club”; the retail sector, using the keywords “store” and “gas_station”; and the accommodation sector, using the keyword “lodging.”

When loading Google Maps, one often does not see all pins if the search area is too wide, and the same holds for Google Places. Each query returns at most 20 places, with a flag indicating whether more than 20 places were available but not returned by the query. We design a simple bisection algorithm to find a set of queries such that each query returns no greater than 20 results and a desired area is fully covered. We begin

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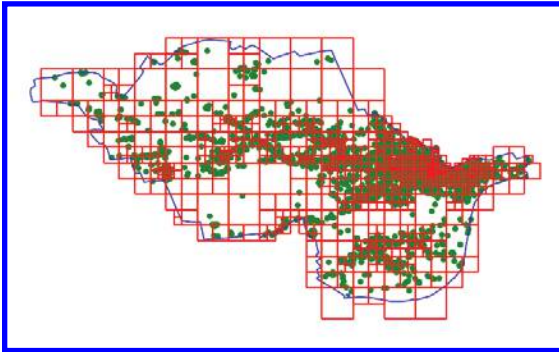


FIGURE 1. SEARCH FOR “RESTAURANT” IN WESTMINSTER

Notes: The blue polygon is the chosen search area corresponding to the borough of Westminster in London, United Kingdom. The red squares are those inscribed in the coverage disks of each query, and each green point is one restaurant found in Google Places as of September 2022. The code used to create this figure with the Google Places API is available at <https://doi.org/10.38886/E184106V1>.

with a single large square and query the circle that circumscribes it. Whenever the query flags that there are more than 20 results, we subdivide the square into four smaller squares and rerun the query on each. This terminates when there are no more than 20 results per query. Figure 1 shows that the higher the density of businesses (the dots), the finer the search grid needs to be (the squares).

Google Places API returns only the most recent information and no historical data, so we repeatedly scrape the same area at regular intervals to build a time series. But the absence of long time series prevents us from benchmarking opening and closure rates with pre-COVID times. During a crisis, collecting the data every week or every month may be more informative, but in normal times, lower frequencies may save on query costs. To further save on costs, instead of beginning each data collection with an uninformative search grid, we initialize the algorithm by using the grid of squares resulting from the previous period’s query.

We identify an exit if a business’s unique identifier, “place_id,” no longer appears in the dataset. Temporary closures are identified by “business_status,” which indicates whether a business is currently operational or temporarily closed. The closure rate is the fraction of exiting or temporarily closing businesses compared to the number of operational businesses in the previous period. Likewise, we identify an

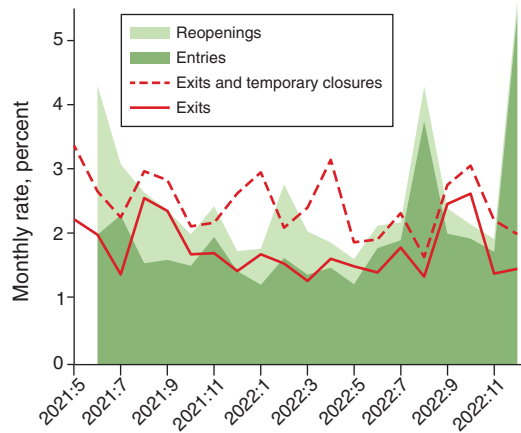


FIGURE 2. OPENING AND CLOSURE RATES

Note: Downtown Toronto, Vancouver, Montreal, and Ottawa, covering about 24,000 businesses a month (initially only 15,000, as we focused on a smaller area) from Google Places in the retail, food, and accommodation sectors.

entry when a new unique identifier appears in the dataset. A reopening is a previously temporarily closed business that is operational again. The opening rate is the fraction of entrant or reopening businesses compared to the previous period. Note that businesses that move within the area we cover are not treated as entries since the unique identifier captures the business, not the location.

II. Temporary Closures and Reopenings

Figure 2 displays the opening and closure rates for businesses in the retail and food sectors of downtown Toronto, Vancouver, Montreal, and Ottawa. April and May 2021 correspond to lockdowns and stay-at-home orders due to the third wave of COVID, with the phased reopening starting early June 2021. As expected, openings in June were largely driven by reopenings rather than entries of new businesses. The majority of reopenings and entries in the summer of 2021 were confirmed for Ottawa by a survey of businesses (Rigobon et al. 2022). Reopenings were spread over several months depending on the progressive lifting of restrictions that one can track by splitting data across business types (Duprey et al. 2022). Reopenings across cities also reflect the severity and timing of the restrictions: restrictions in April 2021 were less severe

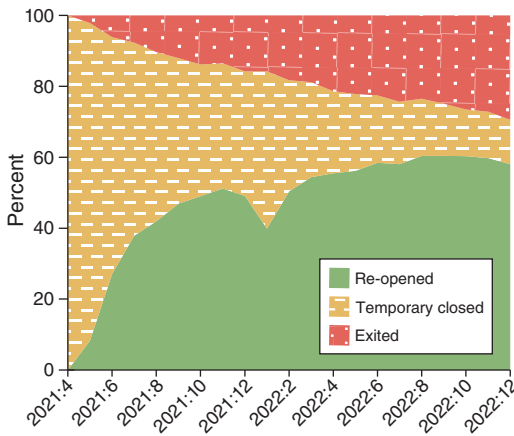


FIGURE 3. STATUS OF BUSINESSES TEMPORARILY CLOSED IN APRIL–MAY 2021

Note: Downtown Toronto, Vancouver, Montreal, and Ottawa, covering about 1,000 temporarily closed businesses from Google Places in the food sector during the lockdown and stay-at-home orders of April–May 2021.

and were lifted earlier for Vancouver than the other cities we cover. Similarly, the fifth wave with Omicron in December and January 2022 was associated with new restrictions, mostly for Montreal, that drive the higher temporary closures in December 2021 and reopenings in January 2022. The importance of reopenings during the COVID period is in line with Crane et al. (2022) and Kurmann, Lalé, and Ta (2021).

In April and May 2021, over a somewhat smaller sample, we find that about 8 percent of retail businesses and 12 percent of food businesses in downtown Toronto, Vancouver, Montreal, and Ottawa were temporarily closed, for a total of 1,000 businesses temporarily closed. For retail businesses, more than half of those temporarily closed reopened just after restrictions were lifted. For businesses in the food sector, about 40 percent reopened as soon as restrictions were lifted, with another 20 percentage points taking more time to reopen (Figure 3). Some of those businesses had to temporarily close again in January 2022 during the Omicron wave. Eventually, government support for temporarily closed businesses during the COVID restrictions may have contributed to the faster reopenings. Within the food sector, bars were the fastest to reopen, with about half reopened already by July 2021. By the end of 2022, only one-fourth of bars and restaurants

that were initially temporarily closed eventually exited, but it was about half for cafés, the category in our sample that was most severely hit.

But businesses can also be temporarily closed in normal times for a variety of reasons—for instance, for repairs or reorganization of the store. One could be concerned that businesses flagged as temporarily closed are in fact permanently closed businesses that just never left the database. For this reason, we collect data for the United Kingdom and merge it with Companies House data, the business registry. The specific benefit of focusing on the United Kingdom is that Companies House registry is compulsory and businesses have to pay a yearly fee, as well as a penalty fee if they are filling their information late. Thus, businesses would have an incentive to report a permanent closure of their business to avoid additional costs. Out of 3,300 restaurants and cafés in the City of Westminster obtained from Google Places from September to December 2022, we fuzzy match 40 percent to the registry. In the data recovered from Google Places, 10.5 percent of the businesses are temporarily closed, while this ratio remains very close at 9.4 percent in the matched dataset with Companies House. This suggests that most business owners of temporarily closed businesses are still expecting to reopen later, or else the owner would unlist the business from the registry to avoid associated fees.

In addition, business entries that we can match in the City of Westminster for the last quarter of 2022 were most frequently also reported as opening in the same month by Companies House, although the date of incorporation preceded the entry identified by Google Places in more than half of the cases.

III. Reviews and Business Dynamics

In the dataset of retail, food, and accommodation sectors for the four main cities in Canada, about 80 percent of businesses have at least one review. We provide preliminary evidence that reviews left by customers can reveal valuable information associated with business dynamics.

We find that the business status is directly correlated with the number of reviews. Namely, when compared to businesses that remain, entries tend to accrue more reviews, while exits gain fewer. In addition, businesses that exit tend to be lower rated than those that continue

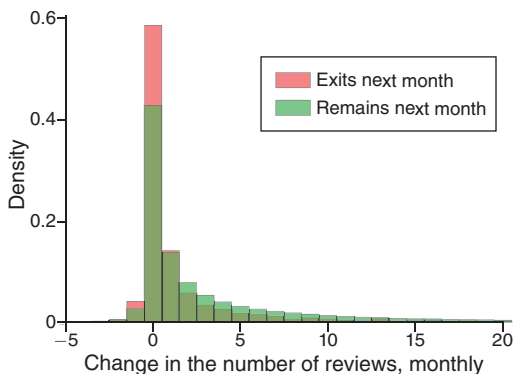


FIGURE 4. MORE RATED BUSINESSES ARE MORE LIKELY TO REMAIN IN BUSINESS

Note: Downtown Toronto, Vancouver, Montreal, and Ottawa, covering about 400,000 observations from Google Places in the retail, food, and accommodation sectors from April 2021 to December 2022.

operating. As a result, changes in reviews may be a useful—and unique—proxy for a business's level of activity. The change in reviews can also be a potential early indicator of a business exit. Figure 4 shows the distribution of the number of new reviews in a given month if a business remains operational or exits in the subsequent month. We find a statistically significant difference in the distribution, suggesting that businesses that are generating fewer reviews during a month are more likely to exit over the next month.

Figure 5 shows how the monthly growth in the number of reviews from Google Places for establishments in each city in our sample correlates with the monthly growth of all job vacancies per city from the job listing website Indeed. Despite the coverage difference in the two datasets, we find a strong positive relationship at the city-month level, suggesting that businesses that are generating more reviews are also the most dynamic in terms of employment growth. A similar positive correlation is obtained when restricting both datasets to cover the food and accommodation sectors only, at the cost of losing the cross-city comparison. Better-rated businesses on average are also correlated with more job listings. This is consistent with Bahaj, Piton, and Savagar (2022), who find that Indeed job vacancies in the United Kingdom postpandemic correlate with new firms creation, and with

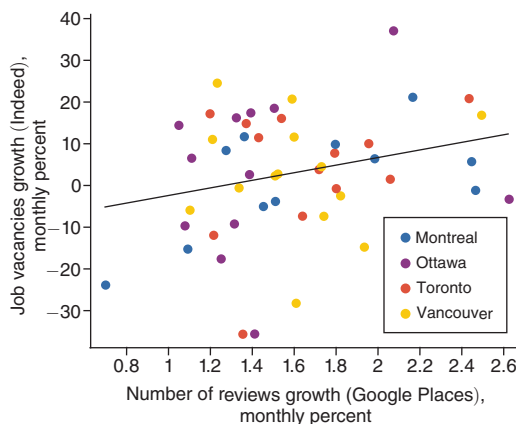


FIGURE 5. A HIGHER NUMBER OF NEW REVIEWS CORRELATES WITH AN INCREASE IN VACANCIES

Notes: Data are from April 2021 to December 2022. For Google Places, data are averaged across downtown of the four cities for the retail, food, and accommodation sectors. For Indeed, data are averaged across the four metropolitan areas for all business types.

Kurmann, Lalé, and Ta (2021), who find that small businesses that reopened after COVID were key drivers of employment dynamics.

IV. Discussion

Our new real-time methodology complements recent efforts to generate timely statistics on business dynamics. For instance, experimental estimates of business openings and closures built during the pandemic are now available monthly after three months in Canada (Statistics Canada 2020) or quarterly with a one-month lag for the United Kingdom (Office for National Statistics 2022), compared to previous official statistics that lagged by one year. For the United States, monthly statistics on business applications are now available within a few weeks (Haltiwanger 2021). A broader set of nontraditional data could also be compiled to construct real-time composite indices of business health. For instance, Statistics Canada (2021) further merges business opening and closures with foot traffic data from Google to create an index of business activity. Crane et al. (2022) discuss alternative sources of data for business dynamics, such as Google searches, paycheck issuance, phone-tracking data, or alternative data providers like SafeGraph Places. Our results also suggest that aggregate

data on reviews could be a valuable timely source of information on consumer demand and business activity.

Such new data on small firms dynamics open several new avenues. Researchers may want to investigate the effect of localized natural disasters on firms, or new business trends with a move away from brick and mortar as well as a possible relocation of businesses away from city centers postpandemic. Data providers may want to consider compiling business health statistics themselves, as the coverage and reliability of datasets like Google Places will continue to improve over time. Eventually, regulators and statistical agencies may want to invest in new tools combining nontraditional business data with administrative or tax records, which may be especially valuable the next time a crisis unfolds.

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