Post-Lockdown Economic Recovery in China

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The Chinese government ended the 76-day lockdown of Wuhan on April 8. Outside Wuhan, many local governments had already eased restrictions on movement and shifted their focus to reviving the economy. This letter documents several facts of the post-lockdown economic recovery in China. The main findings are summarized as follows.

(1) The official statistics suggest a quick recovery in manufacturing. The bouncing-back of manufacturing can also be seen in non-official data on city-to-city truck flows, active online job posts and air pollution emissions.

(2) Electricity consumption, retail sales and catering income suggest a much more persistent output decline in services. The business registration data also shows less firm entry in services.

(3) There is huge cross-region heterogeneity. Our data on visits to key locations and firm entry suggest a stronger recovery in the southeast region.

(4) Small businesses were hit much harder; their February sales shrank to about 35% of their 2019 level, but have been slowly recovering in March 2020. April will be the key month to determine the recovery speed.

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We begin with official data provided by China's National Bureau of Statistics (NBS). The solid line in Figure 1 shows that industrial value added fell by 4.3% and 25.9% in January and February of 2020 on a year-on-year basis, respectively. But the decline narrowed down to 1% in March. Electricity consumption of the industrial sector (the dotted line) also bounced back. After double-digit decline in the first two months, electricity consumption shrank by merely 3.1% in March.
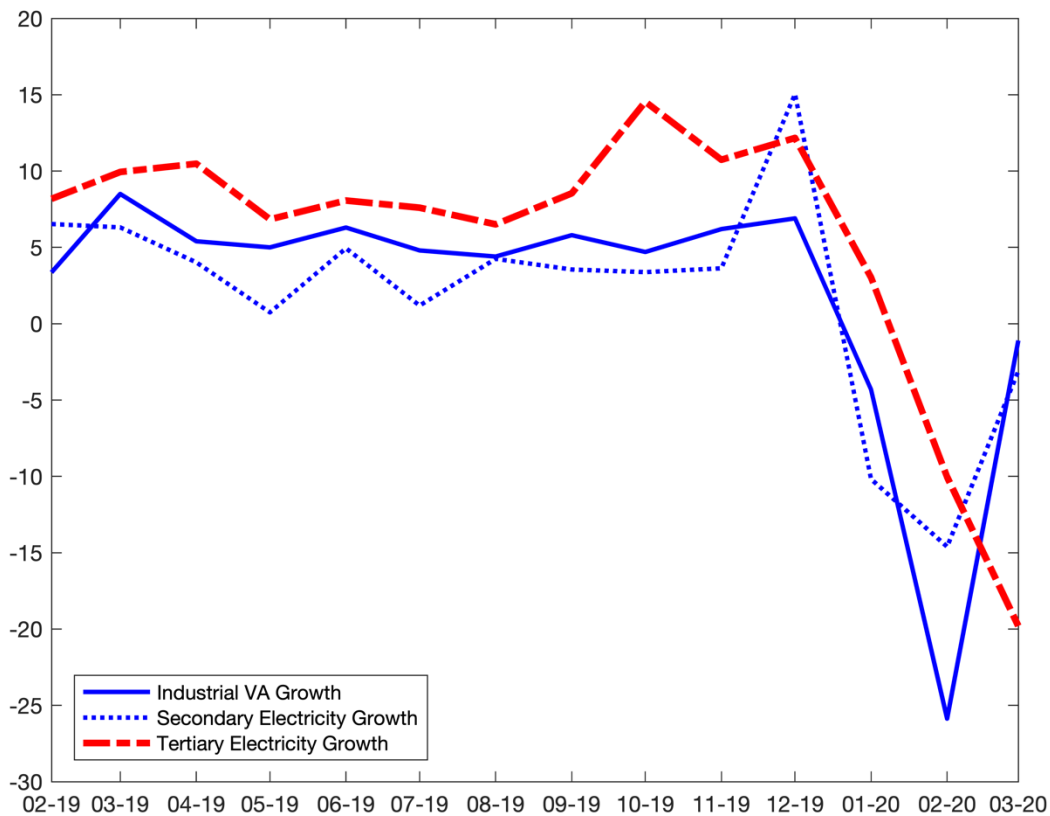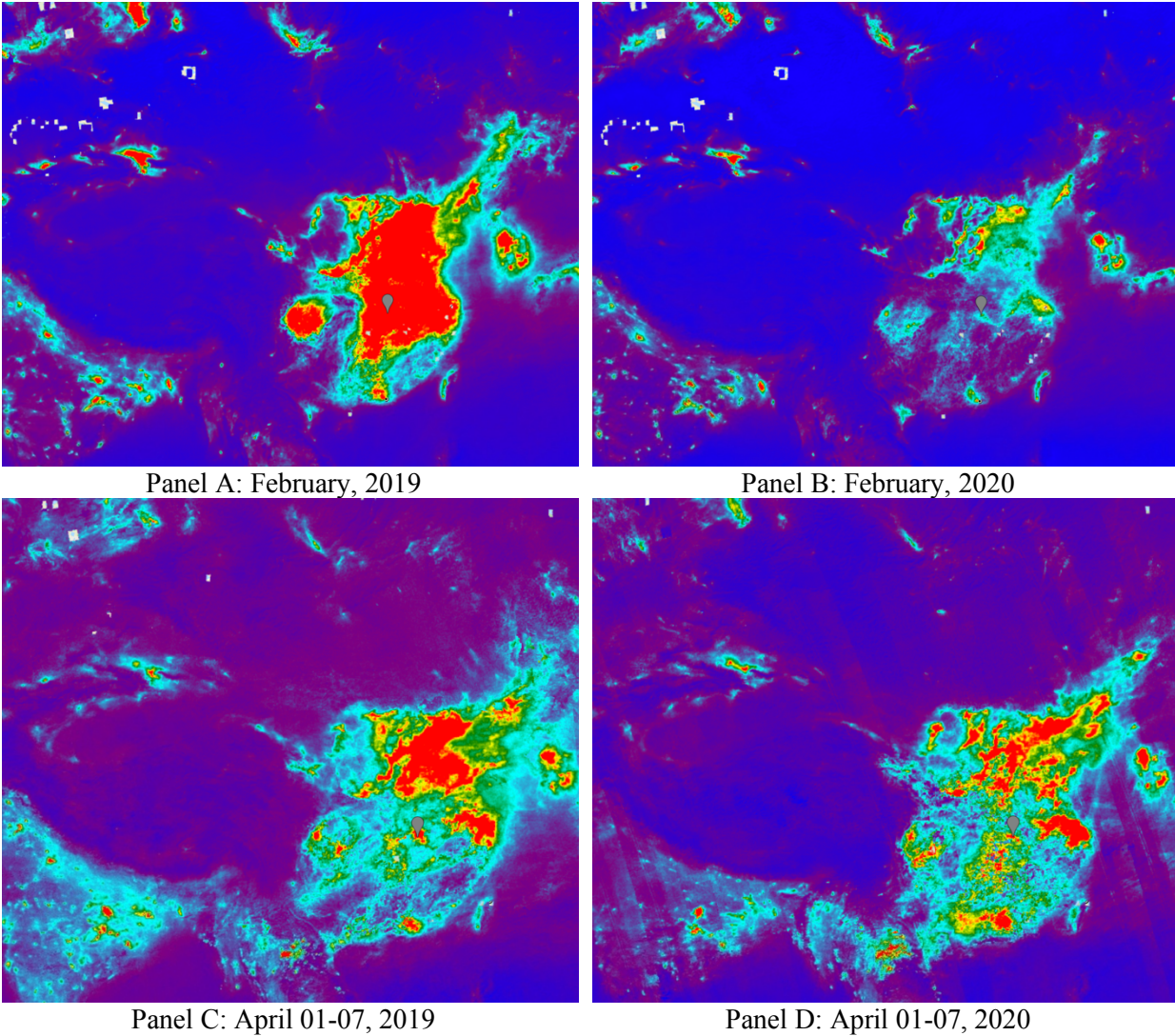

Figure 1. **Growth in the Industrial Value-Added, Electricity Consumption in the Secondary and Tertiary Sector**. All the changes are on a year-on-year basis. Data source: WIND.

An alternative way to measure industrial output is data on shipment of goods across Chinese cities. We have data from a private trucking company that provides logistical services to truck drivers. This company, G7, has real-time GPS data from two million trucks, accounting for about 10 percent of all trucks operating in China. We aggregated the movement of trucks in and out of a provincial capital by day. Figure 2 plots the daily truck flows between provincial capital cities, with the beginning day of the year normalized to one. The decline of truck flows before Wuhan lockdown captures the slowdown associated with the coming Chinese New Year. The truck data suggests goods flows outside Wuhan had returned to the normal level since the mid-March.
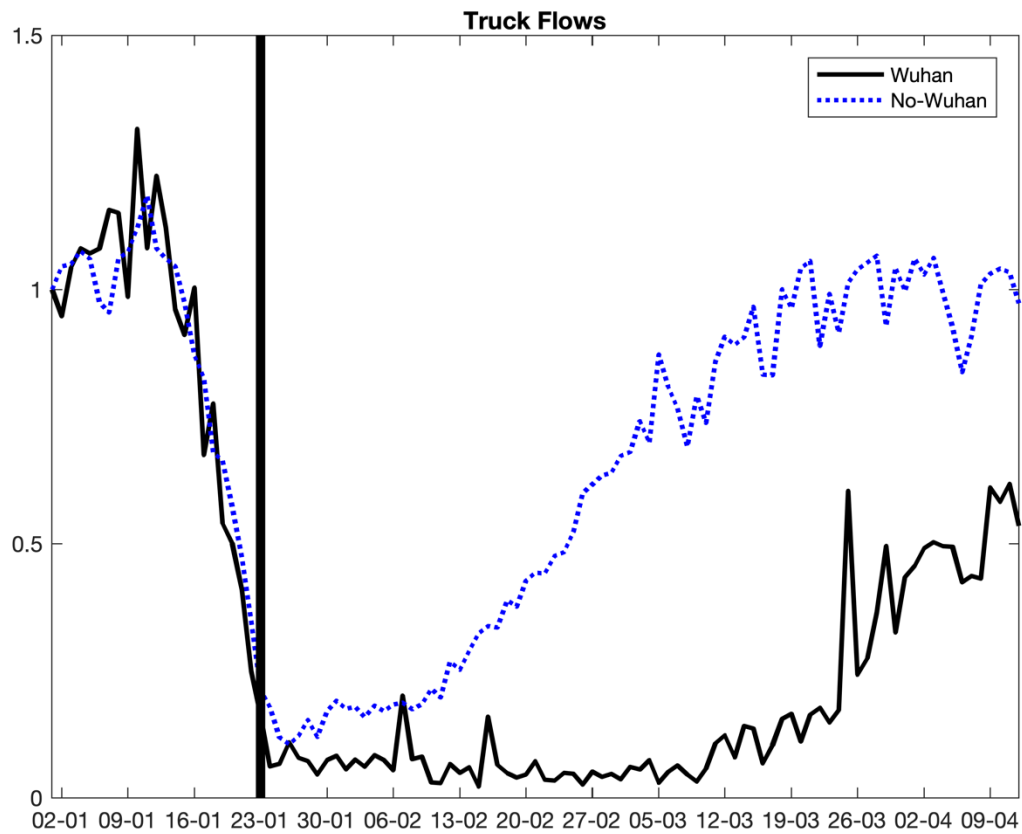
Figure 2: **Truck Flows among Provincial Capital Cities**, with the beginning day of the year normalized to one. The black bar marks Wuhan lockdown. The solid and dotted lines are for truck flows that involves and does not involve Wuhan, respectively. We use the 2018 regional trade flow data as weights for aggregation. Data Source: G7.

We can also gauge the intensity of industrial activities by satellite observations of nitrogen dioxide. Panel A and B of Figure 3 shows a dramatic reduction of NO_2 concentration in February. While we don't have a good measure that translates NO_2 concentration into industrial output, the recovery seems obvious by the bottom panels in the figure.

Panel A: February, 2019   Panel B: February, 2020

Panel C: April 01-07, 2019   Panel D: April 01-07, 2020

Figure 3: **Nitrogen Dioxide Image from Satellite.** Data source: Google Earth.

The quick recovery can also be seen from China's online job markets. We define active job posts as the sum of new and updated job posts. To avoid double counting, the same job post that appears multiple times will only be counted once. Figure 3 plots the number of total active job posts on all the major online job markets in 2019 (the dotted line) and 2020 (the solid line). The daily average number of active job posts in February was down by nearly 60% compared to last February. The number picked up rapidly after the first week of March and declined by less than a quarter from March 1 to 20 compared to the same period last year. [2]

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[2] We truncate the data at March 20 since more recent data are likely to over-estimate active job posts. The online job market data may also distinguish manufacturing and service job posts, which we haven't yet done.
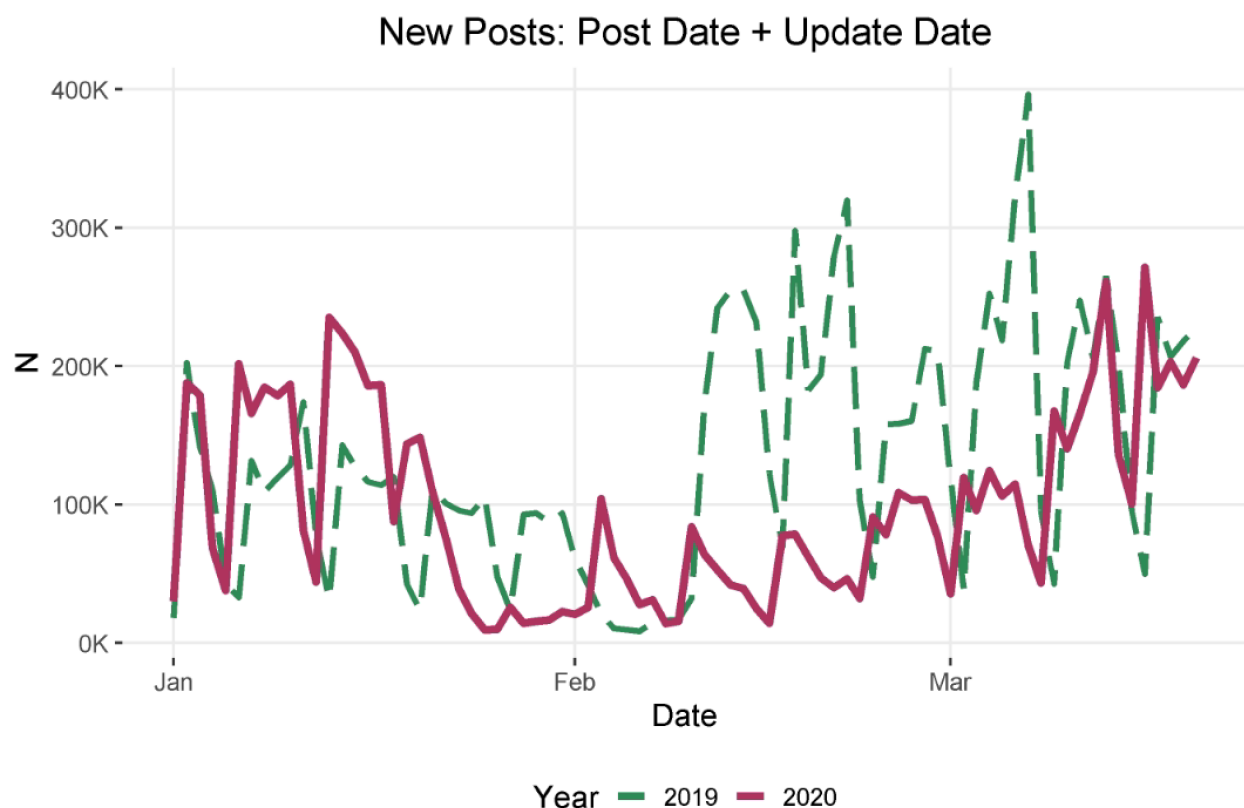
Figure 4: **Active Online Job Posts.** Data source: All major online job platforms.

Output decline in the service industries turns out to be much more persistent. Electricity consumption in the tertiary sector fell by 20%, doubling the decline in February (see the dashed line in Figure 1). Retail sales continued their double-digit drops. Specifically, retail sales of goods fell by 18% and 12.0% in January-February and March, respectively. The decline of Catering income was 43% and 47% in the two periods.

Business registration data provides another aspect of the differences between manufacturing and services. Figure 5 shows that the number of new firms registered in the first quarter fell by 18% in manufacturing. The decline was more severe in most service industries. New firms in Education, Hotels and Catering Services that were hit hard by the lockdown measures dropped by more than a third. Entry was reduced substantially even in Financial Intermediation and Information Transmission, Software and Technology, where output grew by 6% and 13%, respectively, in the first quarter by official statistics.
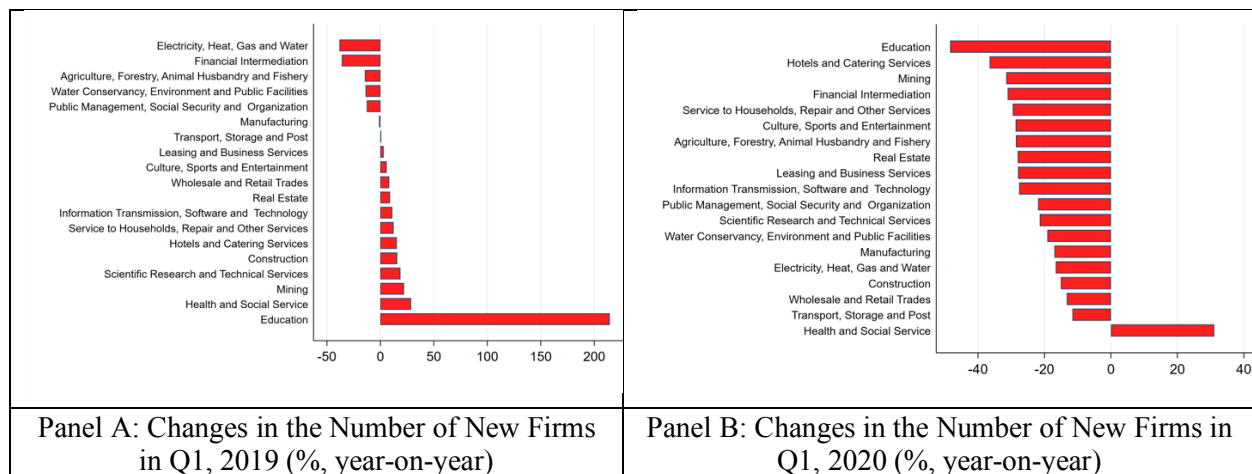
| Panel A: Changes in the Number of New Firms in Q1, 2019 (%, year-on-year) | Panel B: Changes in the Number of New Firms in Q1, 2020 (%, year-on-year) |

Figure 5: **New Firms across Industries.** Data source: China's business registration data.

The same data also reveals quite different speed of recovery across regions. Panel A of Figure 6 shows that the number of new firms registered in February declined dramatically in most cities compared to that in last February. However, the number in March became higher than that in last March in about a third of the Chinese cities, many of which are in the southeast and southwest regions.
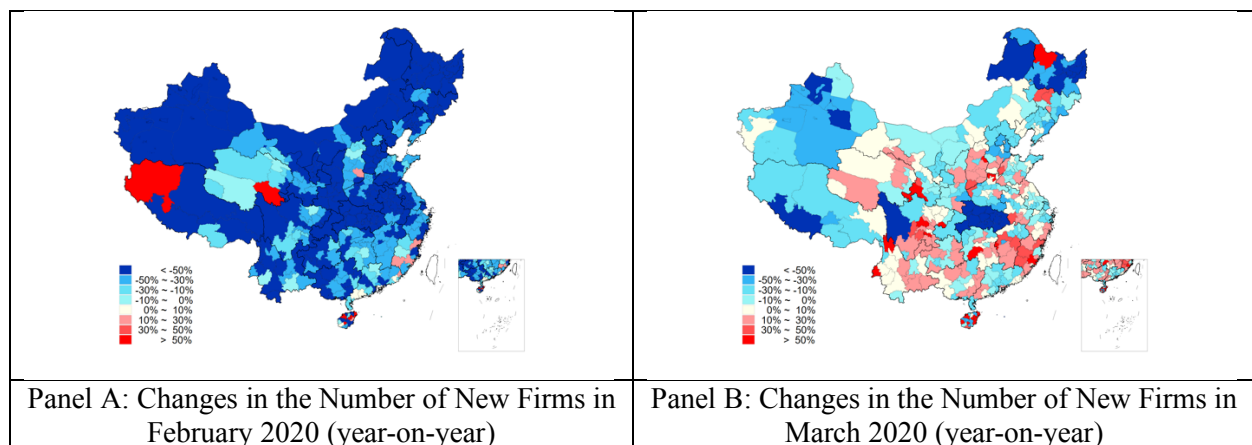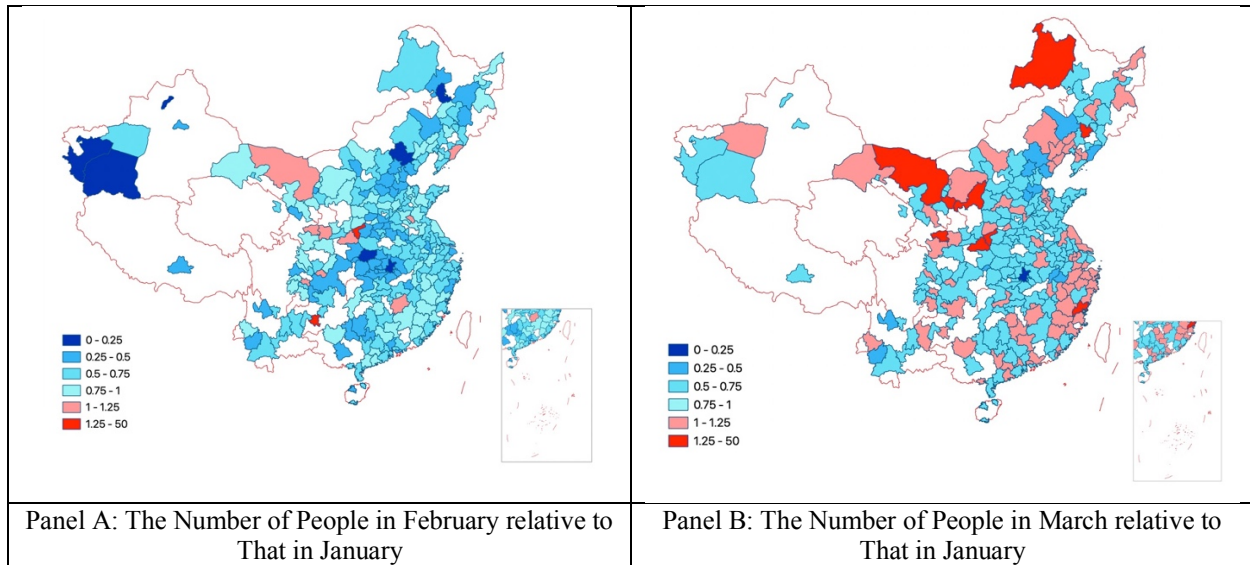

| Panel A: Changes in the Number of New Firms in February 2020 (year-on-year) | Panel B: Changes in the Number of New Firms in March 2020 (year-on-year) |

Figure 6: **New Firms across Cities.** Data source: China's business registration data.

To measure the recovery of economic activities involving personal interactions, we use location data provided by the three major mobile carriers in China. Specifically, we measure the daily number of people in the key locations of each city, including major shopping malls and office buildings, headquarter of listed firms and randomly selected unlisted firms. Panel A of Figure 7 shows that a sharp decline of visits to the key locations in February. The number in March was still below its level in January in most places. Yet, there are quite a few exceptions in the southeast region. An important question for future research is to understand the underlying mechanism for the uneven recovery across regions.

Panel A: The Number of People in February relative to That in January	Panel B: The Number of People in March relative to That in January

Figure 7: **The Number of People in the Key Locations**.

Small and Medium Enterprises (SMEs), which are perhaps the most vibrant sector of Chinese economy, mainly operate in the service sector. Just like the U.S. counterpart, the SME sector has been hit hard the most, and the disruption will likely be long-lasting. Based on a comprehensive dataset which covers the operating information for registered firms with annual sales below RMB 100 million in China, Figure 8 shows that relative to 2019, the sales dropped to 35% of the 2019 level in the February, and slightly recovered to 43% of the 2019 level in March, thanks to the eased lockdown and travel restrictions. Figure 9 breaks out the monthly sales disruptions by industry. One notable industry is construction and real estate: both double in March from their February levels.
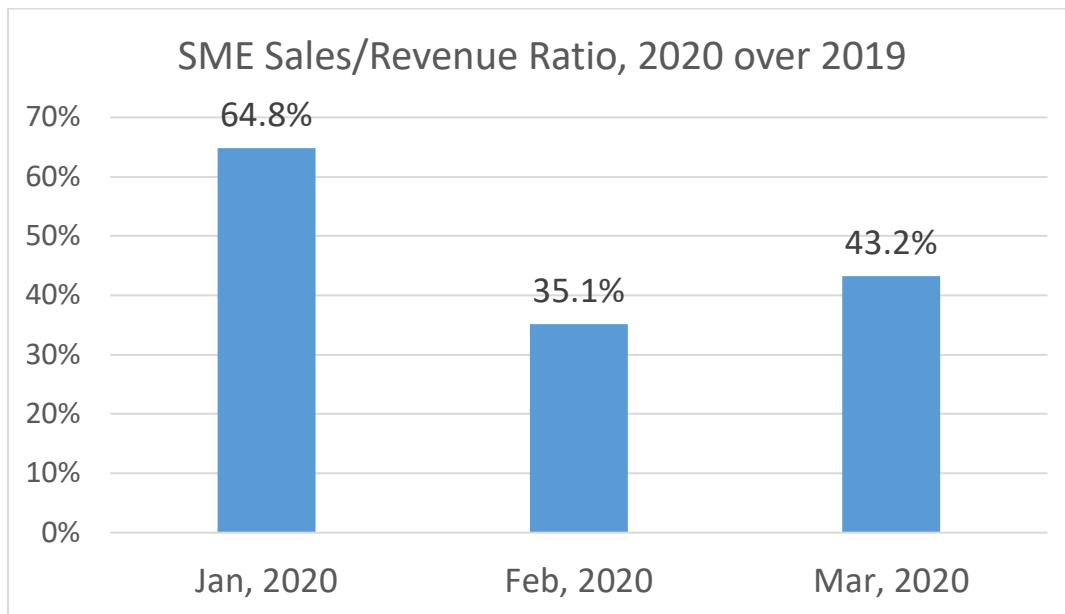
Figure 8: **The sales slump relative to 2019 for Small Medium Enterprises in China, Jan-Mar, 2020**.
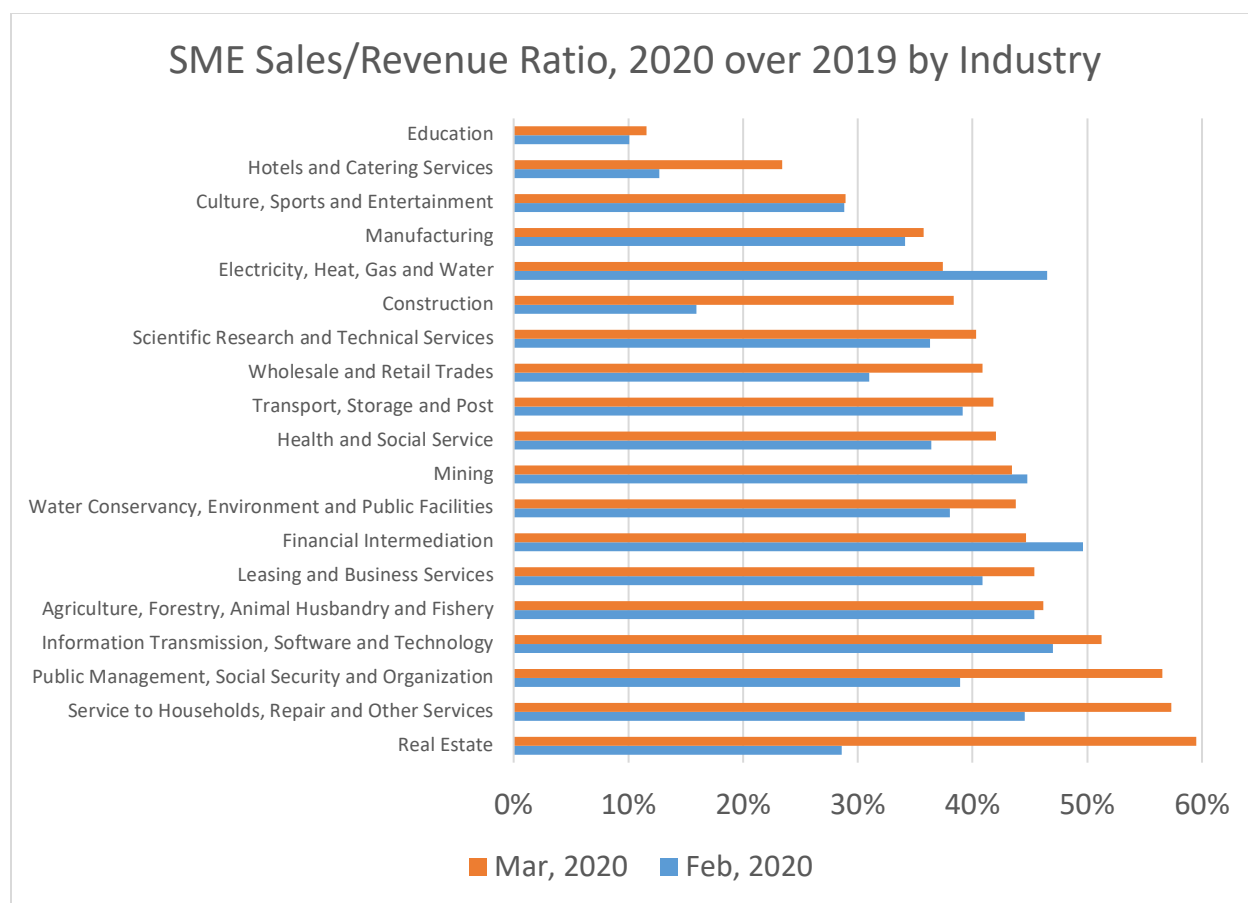
Figure 8: **The sales slump relative to 2019 for Small Medium Enterprises in China, across industries, Feb-Mar, 2020**.

Our previous report documented that flows of people and goods outside Hubei have come back to their pre-lockdown levels, but the recovery was sluggish in the economic activities involving face-to-face interactions. The latest official statistics confirmed that manufacturing output indeed bounced back in March. This is also in line with strong recovery suggested by other sources such as NO_2 emission and online job posts. Moreover, as our previous report pointed out, the recovery appears to be weaker in the service industries, where activities are more constrained by restrictions on movement and social distancing measures. Various data sources also reveal huge heterogeneity in terms of economic recovery across regions and between big and small businesses. We find stronger recovery in the southeast region. Small businesses were hit harder and recovered more slowly.

The Chinese authorities have been aware of the struggling of small businesses and rolling out more aggressive policies. Besides pushing the local governments---mainly the municipal level---for effective implementations of the supporting financial policies (e.g., waiving the rentals and other fees), many Chinese cities have issued digital consumption coupons to stimulate economy.[3]

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[3] https://www.scmp.com/economy/china-economy/article/3078838/coronavirus-china-handing-out-more-vouchers-spur-spending.