

ACI Research Paper #05-2021

From Shock to Recovery: Macroeconomic Performances of Chinese Provinces under the COVID-19 Crisis

Ke MAO

Xuyao ZHANG

Yan ZHU

July 2021

Please cite this article as:

Mao, Ke, Xuyao Zhang and Yan Zhu, "From Shock to Recovery: Macroeconomic Performances of Chinese Provinces under the COVID-19 Crisis", Research Paper #05-2021, *Asia Competitiveness Institute Research Paper Series (July 2021)*

From Shock to Recovery: Macroeconomic Performances of Chinese Provinces under the COVID-19 Crisis

Mao Ke, Zhang Xuyao and Zhu Yan

Abstract

This paper examines the COVID-19 impact on China's secondary and tertiary sectors at provincial level from Q4 2019 to Q4 2020. While GRDP in all the 26 provinces recovered in Q2 2020, sectoral performances varied across provinces throughout the quarters. Most of the indicators such as industrial enterprise total profit, investment in real estate, passenger transport by road and number of delivered parcels demonstrate a V-shape curve. Others such as insurance premium shows an inverted V-shape. The overall performance index summaries the uneven impact of COVID-19 on the 26 provinces and is indicative of their varying levels of resilience and speed of recovery.

Key Words: COVID-19, Provincial Resilience, Secondary Industry, Tertiary Industry

1. Impact of COVID-19 on China's Economy

In 2020, China registered positive economic growth given worldwide economic downturns under the COVID-19 pandemic. Lockdowns and strict movement controls kept Chinese people at home but did not halt China's business activities. The year saw businesses provide services at a distance. There may be a link between the rapid digitisation of economic activities and China's positive growth rate in the crisis. Businesses could improve productivity by means of switching to online sales channels, thus reaching a wider group of customers at a lower cost. By and large, the pandemic effect on China's economy should not be overlooked.

China's e-commerce industry has burgeoned. Alibaba's Singles Day sales set a new record high in 2020: total gross merchandise volume hit RMB 498.2 billion, almost doubling the figure in 2019 (CNBC 2020; The Straits Times 2020).

The pandemic has also led to the upgrade of China's industrial practices. Digital approaches were adopted to expedite the production and delivery of items in various industries. For example, Haier COSMOPlat industrial internet platform, launched on 30 January 2020, provided timely information on medical supplies from enterprises and demand in epidemic areas, thus helping government coordinate the deployment of resources. Through HanCloud's online platform, civil engineers monitored more than 100 sets of equipment during the construction of Wuhan Huoshenshan hospital and remotely directed the construction of field hospitals in Beijing, Xi'an and Zhuhai (Xinhua News Agency 2020a).

Additionally, shifting businesses from offline to online channels occurred even in the healthcare industry, which is known for being rigid in adopting new technologies. Jones et al. (2019) considers mindset, organisational culture and governance as the three biggest barriers to digitisation in healthcare. Nonetheless, those sociological excuses could capitulate to harsh reality in the aftermath of the pandemic, as face-to-face diagnosis may become costly in places like fever clinics owing to the risk of contagion. Given that premise, people in the healthcare industry may not be so reluctant to change. Consider Suining, a prefecture-level city in Sichuan

province, that established a network to provide online fever diagnoses to patients in only eight hours (Xinhua News Agency 2020b).

In view of these trends, one may conclude that the pandemic has triggered digital transformation across China's industries in a wider than pre-pandemic breadth. The effect of such a transformation would be welcomed. Secondary and tertiary sectors embracing new technologies in the production of goods and delivery of services would logically see an increase in productivity and may sustain China's economic growth in the long run.

It may be difficult to predict when this wide-ranging transformation will end, but the pandemic effect on various secondary and tertiary industries still deserves scrutiny. In particular, little is known about to what extent the disease has affected those industries on a sub-national level. The regional imbalance may also give rise to uneven impact across the economies. These two intriguing conditions motivate the study in this paper.

The empirical study seeks to investigate the relative performances and, more importantly, the resilience of China's sub-national secondary and tertiary sectors during the impact period, from the fourth quarter (Q4) of 2019 to the fourth quarter (Q4) of 2020. The paper is structured as follows. Section 2 delineates the research framework. Sections 3 to 5 conduct a descriptive analysis of indicators within the index. Section 6 presents the final index and summarises the main findings. Section 7 concludes.

2. Research Framework

The study covers only 26 Mainland China provinces. The other five provinces, namely, Tibet, Qinghai, Xinjiang, Gansu and Ningxia, are excluded for two reasons. First, locating in the west of China, these provinces are sparsely populated and subject to less impact from the coronavirus. Second, they are not commonly considered China's industrial bases and therefore take little presence in China's economic transition.

As shown in Table 1, a set of 10 indicators is used to compare provincial secondary and tertiary sectors. These indicators are divided into two themes, namely, manufacturing, industry & construction and services. As shown in Table 2, additional eight indicators are used in the descriptive section to supplement the sub-national economic context during the COVID period. The selection of indicators is primarily based on data availability, and indicator units are standardised to either a per capita or percentage change measure. The key reason for this standardisation is to ensure the comparability of economies of different sizes.

We employ quarterly data in this study. The temporal dimension of the data ranges from the Q4 of 2019 to Q4 of 2020. Pre-COVID data in Q4 2019 serves as the baseline for comparison. Macroeconomic indicators are retrieved from official sources. Air traffic, active accounts, and box office statistics are based on open-source data from third-party websites.

Calculations are based on an adapted Competitiveness Analysis Algorithm. For baseline (Q4 2019) scores, the computation follows the standard steps described in Tan, Wang, and Xie (2017). However, scores derived in such a way are not comparable across time. Some ad hoc steps for succeeded periods (Q1, Q2, Q3 and Q4 2020) are taken to ensure the comparability of scores across time. ACI TWP #12-2020 explains the comparability problem and details those non-standard steps to resolve it. Furthermore, final scores are rescaled by adding 2 units to each number to avoid negative values.

Table 1: List of Indicators for Comparative Analysis

No.	Theme	Indicator	Unit	Source
1	Manufacturing, Industry & Construction	Industrial Enterprise Total Profit	Thousand RMB per Person	National Bureau of Statistics
2		Electricity Generation	Thousand kWh per Person	National Bureau of Statistics
3		Cement Production	Tons per Thousand Persons	National Bureau of Statistics
4		Investment in Real Estate Development	Thousand RMB per Person	National Bureau of Statistics
5	Services	Passenger Transport by Road	Percentage Change (from Previous Quarter)	Ministry of Transport
6		Number of Flights in Capital City	Percentage Change (from Previous Quarter)	VariFlight
7		Number of Delivered Parcels	Per Person	National Bureau of Statistics
8		Active Accounts on Mobile Applications	Accounts Per Person	Baidu Statistics, QuestMobile
9		Box Office Record	RMB per Person	Maoyan
10		Insurance Premium	RMB per Person	National Bureau of Statistics

Source: Asia Competitiveness Institute.

Table 2: List of Macroeconomic Indicators for the Descriptive Analysis

No.	Indicator	Unit	Source
1	GRDP	Thousand RMB per Person	National Bureau of Statistics
2	Retail Sales of Consumer Goods	Percentage Change (Year-on-Year)	National Bureau of Statistics
3	Exports	RMB per Person	National Bureau of Statistics
4	Imports	RMB per Person	National Bureau of Statistics
5	Fixed Asset investment	Percentage Change (Year-on-Year)	National Bureau of Statistics
6	Disposable Income	RMB per Person	National Bureau of Statistics
7	Private Consumption Expenditure	RMB per Person	National Bureau of Statistics
8	Average Consumer Price Index (Base = Same Period Last Year)	Index	National Bureau of Statistics

Source: Asia Competitiveness Institute.

3. Sub-national Economies in Recovery Phase

As shown in **Error! Reference source not found.**, all sub-national economies experienced V-shaped recoveries (a downward leg followed by an upward one) in GRDP throughout the period. In terms of GRDP per capita, provinces have illustrated different level resilience to the pandemic shock. Most of the provinces experienced a drop from 20% to 25% in Q1 2020. Guangdong, Hainan, Inner Mogolia, Jilin, Liaoning, Shandong, Shanghai, Tianjin and Zhejiang provinces' drop rate is slightly higher, ranging from 25% to 30%. Majority of these

provinces are from more developed area, i.e. Eastern Coastal region. Only two provinces, Heilongjiang and Hubei, experienced a drop more than 50%.

However, retail sales across provinces in the year of 2020 were consistently lower than 2019 levels, although their gaps narrowed over the quarters. Although consumer demand in 2020 was still weaker than in the previous year, the quarterly trend may suggest a gradual recovery in consumer confidence.

Except for Hainan, Jilin, Liaoning, and Shanxi, all economies saw V-shaped exports trends after Q2 2020. As for those exceptions, Hainan's exports rose in Q1 but dropped in all the subsequent quarters; Liaoning and Jilin's dropped over the five quarters; Shanxi's fell to around RMB 500 per capita in Q1 2020, but the level carried over to Q2. Imports, on the other hand, do not demonstrate any universal trend across provinces.

On the other hand, provincial businesses might be more risk-averse during the impact period, as negative year-on-year growth in fixed asset investment in Q1 2020 suggests liquidity hoarding behaviour. Such a pattern was less phenomenal in Q2 2020 as growth rates turned positive across most provinces. The only eight exceptions are Beijing, Fujian, Guizhou, Hubei, Inner Mongolia, Jiangsu, Liaoning and Tianjin. All the provinces have recovered to positive growth by the end of 2020, except for Fujian and Hubei.

Error! Reference source not found. lists the macroeconomic indicators related to the price levels and people's living standards during the pandemic. Interestingly, there was no significant drop in disposable income for any province in Q1 2020. Price levels were also generally stable across sub-national economies throughout the period with some provinces showing slight negative inflation in Q4 2020. However, people across provinces responded to the pandemic by being thrifty. Per capita consumption expenditure dropped in Q1 2020 for all provinces. Although Yunnan registered an increase in this indicator, downtrends continued in the other provinces in Q2, but recovered by the end of 2020. It would seem that although the pandemic has strongly affected China's sub-national economies, the living conditions of Chinese residents have not been substantially disturbed.

Table 3: Macroeconomic Indicators in Mainland Economies (Part A), Q4 2019–Q2 2020

Indicator		GRDP	Retail Sales of Consumer Goods	Exports	Imports	Fixed Asset Investment
Unit		Thousand RMB per Person	Percentage Change	RMB per Person	RMB per Person	Percentage Change
Anhui	Q4 2019	16.358	0.106	1132.503	666.477	0.092
	Q1 2020	12.286	-0.119	918.046	664.850	-0.111
	Q2 2020	15.284	-0.035	1436.388	702.511	0.010
	Q3 2020	15.892	-0.005	1348.912	739.809	0.024
	Q4 2020	17.299	0.026	1206.577	649.785	0.051
Beijing	Q4 2019	46.075	0.044	2559.507	7343.849	-0.024
	Q1 2020	34.643	-0.215	1700.764	6025.155	-0.071
	Q2 2020	40.591	-0.163	2771.356	5823.799	-0.015
	Q3 2020	44.355	-0.131	2403.762	7226.160	0.018
	Q4 2020	48.018	-0.089	2078.384	6846.215	0.022
Chongqing	Q4 2019	21.202	0.087	3243.342	1637.938	0.057
	Q1 2020	15.966	-0.186	2014.398	1412.775	-0.161
	Q2 2020	19.917	-0.072	3164.738	1568.097	0.002
	Q3 2020	20.798	-0.022	3207.052	1597.446	0.025
	Q4 2020	23.354	0.013	3136.996	1489.145	0.039
Fujian	Q4 2019	29.940	0.100	5065.830	3097.801	0.059
	Q1 2020	22.651	-0.125	3798.705	2515.857	-0.169
	Q2 2020	27.441	-0.054	4507.903	2512.331	-0.008
	Q3 2020	28.770	-0.025	5005.273	2673.882	0.014
	Q4 2020	31.644	-0.014	4950.891	2313.162	-0.004
Guangdong	Q4 2019	26.222	0.080	12150.027	7653.537	0.111
	Q1 2020	19.546	-0.190	7594.731	5887.126	-0.153
	Q2 2020	23.189	-0.140	10358.370	6490.660	0.001
	Q3 2020	25.313	-0.093	12442.676	6793.408	0.050
	Q4 2020	28.091	-0.064	12537.640	6342.436	0.072
Guangxi	Q4 2019	12.014	0.070	810.214	1689.975	0.095
	Q1 2020	9.417	-0.152	558.457	1398.497	-0.079
	Q2 2020	11.160	-0.088	744.314	1451.022	0.011
	Q3 2020	11.679	-0.061	682.314	1575.135	0.021
	Q4 2020	12.415	-0.045	816.537	1524.297	0.042
Guizhou	Q4 2019	12.987	0.051	267.533	83.734	0.010
	Q1 2020	10.224	-0.130	173.575	45.967	-0.102
	Q2 2020	11.818	-0.055	243.074	51.012	-0.049
	Q3 2020	12.875	-0.010	388.825	69.312	0.010
	Q4 2020	14.288	0.049	263.233	115.143	0.032
Hainan	Q4 2019	15.763	0.053	901.458	1917.057	-0.092
	Q1 2020	11.802	-0.314	983.432	1995.997	-0.016
	Q2 2020	13.415	-0.162	665.734	1942.835	0.030
	Q3 2020	15.432	-0.052	638.107	2532.642	0.084
	Q4 2020	17.895	0.012	478.758	2227.864	0.080
Hebei	Q4 2019	12.974	0.084	1129.600	1120.241	0.061
	Q1 2020	9.760	-0.163	858.479	1051.450	-0.077
	Q2 2020	11.824	-0.056	1069.940	931.985	0.009
	Q3 2020	12.404	-0.037	1148.844	1150.840	0.017
	Q4 2020	13.702	-0.022	1235.082	1070.058	0.032

Source: Asia Competitiveness Institute.

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Indicator		GRDP	Retail Sales of Consumer Goods	Exports	Imports	Fixed Asset Investment
Unit		Thousand RMB per Person	Percentage Change	RMB per Person	RMB per Person	Percentage Change
Heilongjiang	Q4 2019	12.978	0.062	299.266	902.818	0.063
	Q1 2020	6.422	-0.334	208.194	888.234	-0.109
	Q2 2020	7.576	-0.227	291.609	563.108	0.003
	Q3 2020	8.982	-0.168	253.173	620.001	0.021
	Q4 2020	13.540	-0.091	192.849	554.486	0.036
Henan	Q4 2019	15.793	0.104	1538.196	682.234	0.080
	Q1 2020	11.940	-0.219	768.895	440.339	-0.075
	Q2 2020	14.625	-0.113	1024.400	417.242	0.026
	Q3 2020	14.801	-0.070	955.307	649.132	0.036
Hubei	Q4 2020	15.685	-0.041	1726.746	1082.076	0.043
	Q4 2019	21.695	0.103	1071.163	736.039	0.106
	Q1 2020	10.763	-0.449	546.245	528.487	-0.828
	Q2 2020	18.730	-0.341	1277.931	662.537	-0.562
Hunan	Q3 2020	20.751	-0.274	1167.534	743.566	-0.339
	Q4 2020	23.054	-0.208	1216.911	643.639	-0.188
	Q4 2019	16.123	0.102	817.012	418.997	0.101
	Q1 2020	12.756	-0.115	540.931	336.694	-0.040
Inner Mongolia	Q2 2020	14.746	-0.066	865.152	431.011	0.047
	Q3 2020	15.545	-0.046	712.238	417.306	0.065
	Q4 2020	17.347	-0.026	780.238	425.794	0.076
	Q4 2019	19.014	0.041	510.713	886.466	0.068
Jiangsu	Q1 2020	13.980	-0.216	410.593	819.100	-0.373
	Q2 2020	16.351	-0.138	439.172	814.977	-0.223
	Q3 2020	18.173	-0.099	418.516	956.048	-0.077
	Q4 2020	19.842	-0.058	411.561	913.520	-0.015
Jiangxi	Q4 2019	34.641	0.062	8953.369	6091.626	0.051
	Q1 2020	26.026	-0.181	6773.019	5454.932	-0.202
	Q2 2020	31.871	-0.094	8744.700	5811.733	-0.072
	Q3 2020	33.564	-0.047	8486.145	6357.755	-0.017
Jilin	Q4 2020	35.824	-0.016	8222.481	5596.752	0.003
	Q4 2019	14.888	0.113	1217.233	619.457	0.092
	Q1 2020	11.452	-0.119	992.346	550.129	-0.043
	Q2 2020	13.604	-0.042	1398.830	586.135	0.058
Liaoning	Q3 2020	14.352	-0.013	1372.850	565.762	0.073
	Q4 2020	15.653	0.030	1144.417	484.663	0.082
	Q4 2019	12.227	0.034	370.616	935.576	-0.163
	Q1 2020	9.074	-0.273	315.640	836.551	-0.082
Liaoning	Q2 2020	11.149	-0.200	296.409	948.619	0.078
	Q3 2020	12.467	-0.151	277.371	903.535	0.089
	Q4 2020	13.061	-0.092	243.250	914.023	0.083
	Q4 2019	16.060	0.061	2220.522	3299.555	0.005
Liaoning	Q1 2020	11.678	-0.248	1996.385	3066.350	-0.162
	Q2 2020	13.903	-0.170	1758.373	2537.868	-0.027
	Q3 2020	15.109	-0.111	1538.457	2819.950	0.001
	Q4 2020	17.020	-0.073	1625.732	2324.588	0.026

Source: Asia Competitiveness Institute.

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Indicator		GRDP	Retail Sales of Consumer Goods	Exports	Imports	Fixed Asset Investment
Unit		Thousand RMB per Person	Percentage Change	RMB per Person	RMB per Person	Percentage Change
Shaanxi	Q4 2019	18.672	0.074	1190.123	1148.270	0.025
	Q1 2020	14.034	-0.254	1071.976	1097.660	-0.165
	Q2 2020	16.396	-0.158	1145.708	1139.912	0.001
	Q3 2020	17.767	-0.093	1187.729	1017.223	0.039
	Q4 2020	19.351	-0.059	1106.909	888.776	0.041
Shandong	Q4 2019	19.802	0.064	3095.735	3483.346	-0.084
	Q1 2020	14.816	-0.152	2487.756	2894.422	-0.041
	Q2 2020	17.981	-0.095	3006.654	2698.683	0.013
	Q3 2020	19.027	-0.045	3138.766	3011.683	0.027
	Q4 2020	20.797	0.000	3029.668	2541.291	0.036
Shanghai	Q4 2019	44.093	0.065	13541.048	23354.683	0.051
	Q1 2020	32.358	-0.204	10481.467	19831.551	-0.093
	Q2 2020	39.128	-0.112	11968.723	19586.509	0.067
	Q3 2020	40.960	-0.046	11461.509	22960.867	0.103
	Q4 2020	46.946	0.005	11154.500	21508.897	0.103
Shanxi	Q4 2019	12.811	0.078	719.971	397.586	0.093
	Q1 2020	9.747	-0.257	509.086	256.293	0.025
	Q2 2020	11.228	-0.163	506.911	277.221	0.083
	Q3 2020	12.546	-0.102	686.895	410.806	0.095
	Q4 2020	13.816	-0.040	791.575	411.960	0.106
Sichuan	Q4 2019	15.617	0.104	1279.457	1184.917	0.086
	Q1 2020	12.147	-0.130	959.412	998.218	-0.073
	Q2 2020	14.278	-0.075	1412.360	1050.935	0.016
	Q3 2020	15.253	-0.048	1404.155	1001.817	0.022
	Q4 2020	16.351	-0.024	1367.888	967.347	0.028
Tianjin	Q4 2019	25.336	-0.003	4667.674	11581.850	0.139
	Q1 2020	18.402	-0.255	3594.925	9078.933	-0.148
	Q2 2020	21.991	-0.217	4776.015	9186.690	-0.040
	Q3 2020	24.239	-0.168	4426.832	8872.280	0.013
	Q4 2020	25.533	-0.151	4201.159	8275.446	0.030
Yunnan	Q4 2019	13.413	0.104	738.756	735.831	0.085
	Q1 2020	10.514	-0.143	469.404	639.177	-0.116
	Q2 2020	12.396	-0.086	523.420	564.084	0.035
	Q3 2020	13.195	-0.055	590.189	561.052	0.065
	Q4 2020	14.372	-0.036	711.360	546.213	0.077
Zhejiang	Q4 2019	29.906	0.087	10604.940	3680.750	0.101
	Q1 2020	22.417	-0.147	7612.981	3086.781	-0.052
	Q2 2020	27.304	-0.063	10472.146	3086.334	0.038
	Q3 2020	28.614	-0.049	10981.703	3285.304	0.043
	Q4 2020	32.115	-0.026	10293.914	3159.872	0.054

Source: Asia Competitiveness Institute.

Table 4: Macroeconomic Indicators in Mainland Economies (Part B), Q4 2019–Q2 2020

Indicator		Disposable Income	Private Consumption Expenditure	Average Consumer Price Index
Unit		RMB per Person	RMB per Person	Index
Anhui	Q4 2019	6667.733	5232.046	104.157
	Q1 2020	7625.155	4733.209	104.900
	Q2 2020	6349.845	4279.791	102.775
	Q3 2020	6955.000	4581.000	102.960
	Q4 2020	7173.000	5283.000	100.067
Beijing	Q4 2019	17215.321	11496.773	102.928
	Q1 2020	17874.242	10003.029	103.755
	Q2 2020	16698.758	8616.971	101.895
	Q3 2020	17199.000	9324.000	100.885
	Q4 2020	17662.000	10959.000	100.433
Chongqing	Q4 2019	6821.736	5871.299	103.685
	Q1 2020	8481.804	5114.750	104.950
	Q2 2020	7253.196	4941.250	102.390
	Q3 2020	7804.000	5176.000	102.276
	Q4 2020	7285.000	6446.000	99.800
Fujian	Q4 2019	7815.213	6816.502	104.071
	Q1 2020	10356.647	6319.877	104.504
	Q2 2020	8634.353	5718.123	102.414
	Q3 2020	9780.000	6498.000	101.934
	Q4 2020	8431.000	6590.000	99.867
Guangdong	Q4 2019	8259.336	7997.425	104.959
	Q1 2020	10955.836	6885.796	105.790
	Q2 2020	9818.164	6227.204	103.268
	Q3 2020	11260.000	7419.000	101.946
	Q4 2020	8995.000	7960.000	99.667
Guangxi	Q4 2019	6159.137	4826.146	105.161
	Q1 2020	6560.933	3845.665	105.700
	Q2 2020	5425.067	3714.335	103.838
	Q3 2020	6040.000	3715.000	101.861
	Q4 2020	6536.000	5082.000	100.133
Guizhou	Q4 2019	5740.738	4394.381	103.807
	Q1 2020	5301.246	3652.962	104.961
	Q2 2020	4956.754	3114.038	102.972
	Q3 2020	5394.000	3756.000	102.603
	Q4 2020	6143.000	4351.000	99.800
Hainan	Q4 2019	6711.022	5560.682	105.763
	Q1 2020	7093.646	4625.786	105.760
	Q2 2020	6937.354	4393.214	103.345
	Q3 2020	6639.000	4436.000	101.249
	Q4 2020	7234.000	5517.000	99.067

Source: Asia Competitiveness Institute.

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Indicator		Disposable Income	Private Consumption Expenditure	Average Consumer Price Index
Unit		RMB per Person	RMB per Person	Index
Hebei	Q4 2019	6794.430	5112.428	104.096
	Q1 2020	6547.666	4225.429	104.505
	Q2 2020	6309.334	4051.571	102.108
	Q3 2020	6940.000	4222.000	102.203
	Q4 2020	7339.000	5538.000	99.700
Heilongjiang	Q4 2019	7154.393	5074.227	104.174
	Q1 2020	6619.940	3951.506	104.908
	Q2 2020	4562.060	3156.494	102.591
	Q3 2020	5895.000	4145.000	101.809
	Q4 2020	7825.000	5803.000	100.133
Henan	Q4 2019	6852.500	4625.400	104.614
	Q1 2020	6285.802	3841.784	105.460
	Q2 2020	5144.198	3572.216	102.733
	Q3 2020	6108.000	3892.000	102.584
	Q4 2020	7272.000	4837.000	100.433
Hubei	Q4 2019	7729.604	5940.848	104.494
	Q1 2020	7072.013	4735.748	106.092
	Q2 2020	5354.987	3967.252	102.971
	Q3 2020	7027.000	4792.000	102.462
	Q4 2020	8427.000	5751.000	99.567
Hunan	Q4 2019	8147.470	5923.512	104.121
	Q1 2020	7718.307	5095.929	104.573
	Q2 2020	5898.693	4698.071	102.526
	Q3 2020	7114.000	4844.000	102.393
	Q4 2020	8649.000	6360.000	99.767
Inner Mongolia	Q4 2019	8092.488	5593.625	103.191
	Q1 2020	7844.153	4722.853	103.748
	Q2 2020	6783.847	4075.147	101.819
	Q3 2020	8316.000	4837.000	101.730
	Q4 2020	8553.000	6159.000	100.333
Jiangsu	Q4 2019	9979.385	7304.013	104.514
	Q1 2020	13588.469	6413.234	104.940
	Q2 2020	8537.531	5801.766	102.916
	Q3 2020	10541.000	6556.000	102.136
	Q4 2020	10723.000	7454.000	100.133
Jiangxi	Q4 2019	7669.981	5362.306	103.906
	Q1 2020	6930.904	4212.841	104.769
	Q2 2020	5713.096	3708.159	102.637
	Q3 2020	7146.000	4353.000	102.560
	Q4 2020	8227.000	5681.000	100.433
Jilin	Q4 2019	6909.511	5253.770	104.251
	Q1 2020	7034.684	3940.562	104.897
	Q2 2020	5545.316	3544.438	102.437
	Q3 2020	5836.000	4189.000	102.030
	Q4 2020	7335.000	5644.000	99.933

Source: Asia Competitiveness Institute.

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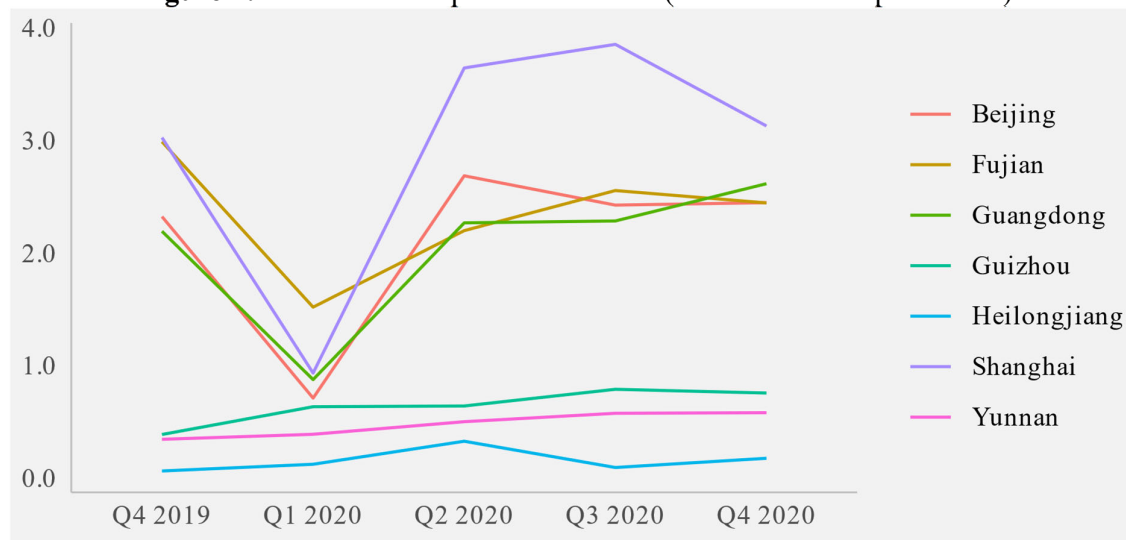
Indicator		Disposable Income	Private Consumption Expenditure	Average Consumer Price Index
Unit		RMB per Person	RMB per Person	Index
Liaoning	Q4 2019	7687.207	6316.567	103.875
	Q1 2020	8706.406	5020.088	104.807
	Q2 2020	7944.594	4603.912	102.360
	Q3 2020	7989.000	4882.000	102.224
	Q4 2020	8098.000	6166.000	100.300
Shaanxi	Q4 2019	6035.729	4599.379	103.978
	Q1 2020	6565.917	4022.662	104.731
	Q2 2020	6216.083	4004.338	102.515
	Q3 2020	6912.000	4420.000	102.430
	Q4 2020	6532.000	4971.000	100.433
Shandong	Q4 2019	7443.036	6215.374	105.149
	Q1 2020	8879.611	4886.955	105.572
	Q2 2020	7588.389	4246.045	103.153
	Q3 2020	8452.000	4976.000	102.849
	Q4 2020	7966.000	6831.000	99.800
Shanghai	Q4 2019	17149.201	12048.481	103.195
	Q1 2020	19621.436	10409.700	103.395
	Q2 2020	16955.564	9702.300	102.030
	Q3 2020	17549.000	10583.000	101.398
	Q4 2020	18106.000	11841.000	100.100
Shanxi	Q4 2019	6581.149	4535.757	103.576
	Q1 2020	6014.041	3811.711	104.976
	Q2 2020	5306.959	3242.289	103.153
	Q3 2020	6838.000	4067.000	102.894
	Q4 2020	7055.000	4612.000	100.667
Sichuan	Q4 2019	6456.857	6072.488	105.343
	Q1 2020	6944.906	4486.652	106.236
	Q2 2020	6352.094	4193.348	104.029
	Q3 2020	6309.000	4906.000	103.144
	Q4 2020	6916.000	6197.000	99.733
Tianjin	Q4 2019	8762.532	8103.123	103.780
	Q1 2020	12081.278	7048.004	103.975
	Q2 2020	9985.722	6238.996	102.349
	Q3 2020	12402.000	7571.000	101.945
	Q4 2020	9385.000	7603.000	99.967
Yunnan	Q4 2019	6475.200	4744.602	104.088
	Q1 2020	5561.005	3667.162	105.911
	Q2 2020	5286.995	4059.838	103.680
	Q3 2020	5559.000	4037.000	103.842
	Q4 2020	6888.000	5028.000	100.900
Zhejiang	Q4 2019	11353.204	8660.516	103.640
	Q1 2020	15574.551	7890.996	104.190
	Q2 2020	11464.449	7138.004	102.159
	Q3 2020	13082.000	7933.000	102.103
	Q4 2020	12276.000	8333.000	100.667

Source: Asia Competitiveness Institute.

4. Manufacturing, Industry and Construction Heading up after the Negative Shock

The total profit of industrial enterprises in most provinces declined in Q1 2020 as the epidemic raged but rebounded in Q2 2020 when the situation eased. Shanghai had the largest total profit per capita in Q4 2019, followed by Fujian, Beijing and Guangdong. As shown in Figure 1, values of this indicator in these four provinces display a V shape in the first three quarters, indicating a severe jolt in Q1 2020. However, for provinces with less profitable enterprises, the impact of the pandemic was not evident. For instance, Heilongjiang, Guizhou, Yunnan and Xinjiang's industrial total profit each registered minor but constant increase from Q4 2019 to Q2 2020. As the COVID-19 situation entered a stable stage in China since Q2 2020, total profit of industrial enterprises has returned to the pre-pandemic level.

Figure 1: Industrial Enterprise Total Profit (Thousand RMB per Person)

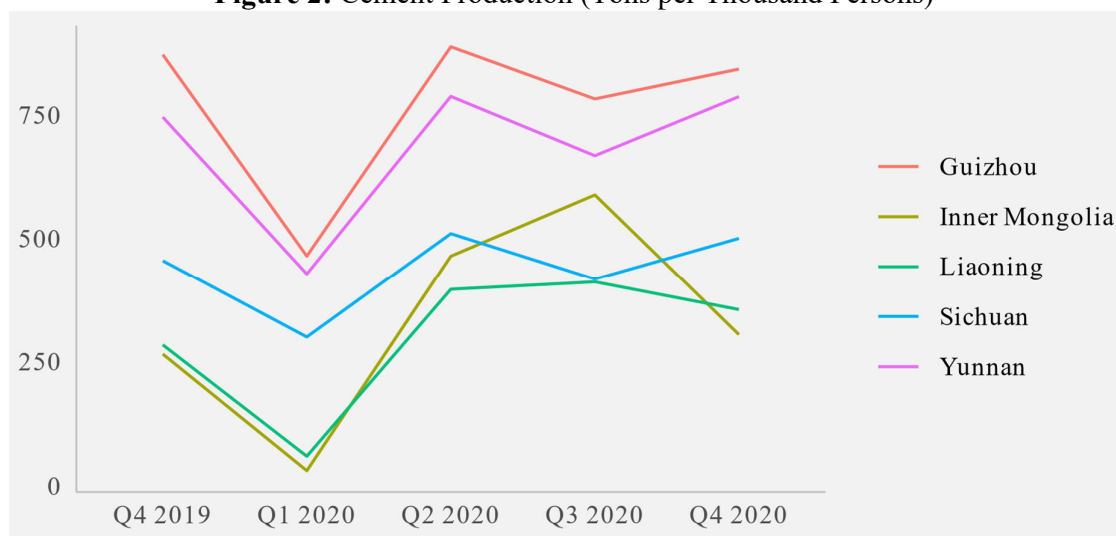


Source: Asia Competitiveness Institute.

The electricity generation in the first half of 2020 did not change much, as provinces saw small dips in Q1 2020. One reason for such pattern concerns that the pandemic affected industry and household electricity consumption in differing ways. On the one hand, as people performed more indoor activities than outdoor ones in Q1 2020, residential electricity consumption would increase. On the other hand, the COVID-19 disruption to production led to less electricity demand from manufacturers. The two effects could offset each other as if there is a single but less-varying shock.

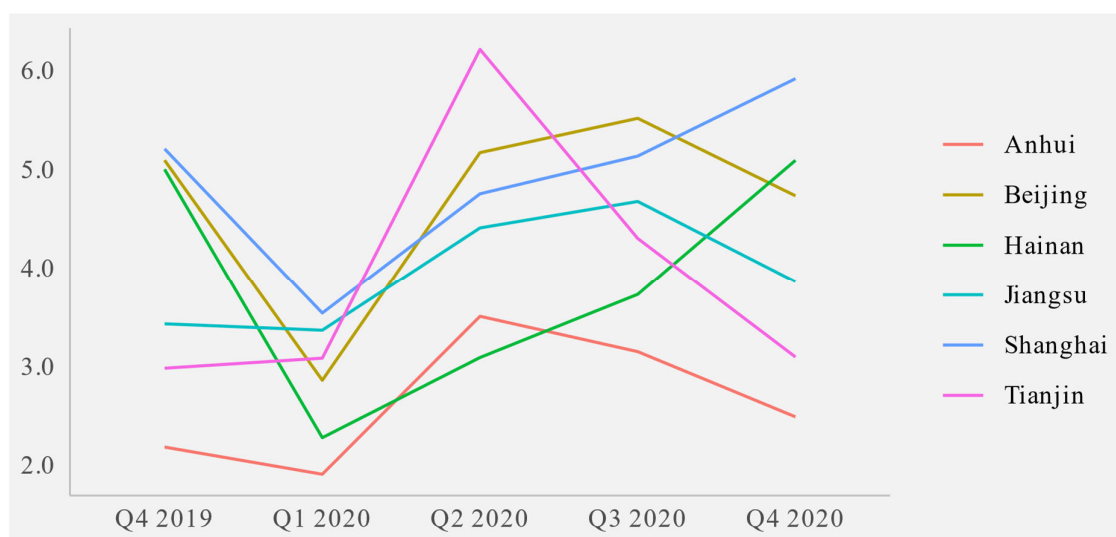
As the construction industry was sluggish in Q1 2020, cement production declined as well. As shown in Figure 2, before the pandemic, Guizhou and Yunnan were the two top provinces in cement production. Their production declined during the pandemic. The ranking of most other provinces did not change. All provinces showed a strong recovery in Q2 2020, 13 out of which even produced more than Q4 2019. In the post-pandemic era, there are some fluctuations of the cement production. For instance, Inner Mongolia produced up to 589 tons of cement per thousand persons in Q3 2020, which was two times higher than the output in Q4 2019.

Figure 2: Cement Production (Tons per Thousand Persons)



Source: Asia Competitiveness Institute.

Figure 3: Investment in Real Estate Development (Thousand RMB per Person)



Source: Asia Competitiveness Institute.

Unlike cement production, where there was a uniform V-shaped pattern from Q4 2019 to Q2 2020, investment in real estate development exhibited varying trends across provinces. As shown in Figure 3, investment in real estate development in Tianjin and Jiangsu grew in the first half of 2020 despite the pandemic. Anhui saw a slight decline in investment in Q1 2020, but its indicator quickly bounced back in Q2 to a much higher than pre-pandemic level. Hebei, Inner Mongolia, Liaoning and Jilin shared a similar trend of growing more than 50 percent from Q4 2019 to Q2 2020. As suggested by the growth, these provinces' construction sectors might be less affected by the pandemic than the others. However, some provinces like Tianjin and Anhui saw some extent of decline in investment after Q2 2020. This might be due to the seasonality effect associated with the real estate industry.

Table 5: Manufacturing, Industry and Construction Indicators in Mainland Economies, Q4 2019–Q4 2020

Indicator		Industrial Enterprise Total Profit	Electricity Generation	Cement Production Tons per	Investment in Real Estate Development
Unit		Thousand RMB per Person	Thousand kWh per Person	Thousand Persons	Thousand RMB per Person
Anhui	Q4 2019	0.899	1.060	636.132	2.186
	Q1 2020	0.477	0.927	325.127	1.911
	Q2 2020	0.948	0.989	616.093	3.509
	Q3 2020	0.940	1.129	587.182	3.151
	Q4 2020	1.239	1.168	698.467	2.491
Beijing	Q4 2019	2.328	0.539	34.910	5.095
	Q1 2020	0.716	0.571	5.830	2.861
	Q2 2020	2.690	0.395	37.903	5.171
	Q3 2020	2.429	0.476	41.655	5.518
	Q4 2020	2.451	0.608	47.808	4.735
Chongqing	Q4 2019	1.174	0.601	619.306	3.577
	Q1 2020	0.312	0.549	319.518	2.447
	Q2 2020	1.073	0.624	607.707	4.413
	Q3 2020	1.259	0.657	539.641	3.656
	Q4 2020	1.577	0.650	615.475	3.414
Fujian	Q4 2019	2.992	1.647	660.991	3.448
	Q1 2020	1.524	1.208	388.681	2.852
	Q2 2020	2.203	1.552	636.969	4.462
	Q3 2020	2.559	1.944	682.672	4.278
	Q4 2020	2.449	1.681	734.119	3.578
Guangdong	Q4 2019	2.197	1.092	445.873	3.808
	Q1 2020	0.880	0.812	215.688	2.212
	Q2 2020	2.272	1.168	386.768	4.240
	Q3 2020	2.289	1.257	395.171	4.204
	Q4 2020	2.620	1.111	484.504	4.371
Guangxi	Q4 2019	0.528	0.994	723.176	2.499
	Q1 2020	0.215	0.830	403.210	1.315
	Q2 2020	0.398	0.978	651.162	2.376
	Q3 2020	0.490	0.931	626.220	1.613
	Q4 2020	0.663	1.071	766.395	2.449
Guizhou	Q4 2019	0.393	1.503	872.520	2.199
	Q1 2020	0.640	1.253	465.390	1.658
	Q2 2020	0.646	1.487	888.450	2.469
	Q3 2020	0.794	1.530	783.049	2.725
	Q4 2020	0.761	1.731	843.336	2.585
Hainan	Q4 2019	0.398	0.807	664.021	5.003
	Q1 2020	0.101	0.697	237.679	2.281
	Q2 2020	0.330	0.896	567.952	3.091
	Q3 2020	0.539	0.984	538.523	3.732
	Q4 2020	0.430	0.798	601.716	5.094

Source: Asia Competitiveness Institute.

Table 5: (Continued)

Indicator		Industrial Enterprise Total Profit	Electricity Generation	Cement Production Tons per	Investment in Real Estate Development
Unit		Thousand RMB per Person	Thousand kWh per Person	Thousand Persons	Thousand RMB per Person
Hebei	Q4 2019	0.706	1.048	327.470	1.247
	Q1 2020	0.307	1.019	137.621	0.734
	Q2 2020	0.757	1.012	477.421	2.056
	Q3 2020	0.826	1.029	479.876	1.848
	Q4 2020	0.795	1.149	448.476	1.423
Heilongjiang	Q4 2019	0.069	0.782	109.021	0.673
	Q1 2020	0.129	0.725	3.698	0.057
	Q2 2020	0.333	0.682	184.997	0.751
	Q3 2020	0.100	0.678	255.275	1.053
	Q4 2020	0.182	0.803	125.208	0.760
Henan	Q4 2019	1.152	0.643	233.783	2.355
	Q1 2020	0.498	0.648	171.043	1.213
	Q2 2020	0.762	0.689	388.891	2.259
	Q3 2020	0.563	0.769	364.098	2.122
	Q4 2020	0.816	0.746	291.927	2.480
Hubei	Q4 2019	1.222	1.148	535.582	1.998
	Q1 2020	0.205	0.877	130.642	0.434
	Q2 2020	1.102	1.131	469.094	2.273
	Q3 2020	1.474	1.623	525.325	2.796
	Q4 2020	1.469	1.273	580.472	2.745
Hunan	Q4 2019	0.833	0.561	485.230	1.900
	Q1 2020	0.487	0.478	233.391	0.947
	Q2 2020	0.793	0.513	433.050	1.933
	Q3 2020	0.728	0.595	435.579	2.015
	Q4 2020	0.931	0.576	493.055	2.160
Inner Mongolia	Q4 2019	1.486	5.496	266.322	0.750
	Q1 2020	0.804	4.976	31.039	0.183
	Q2 2020	1.019	5.300	465.006	1.356
	Q3 2020	1.332	5.818	589.104	2.112
	Q4 2020	2.022	6.087	305.544	0.981
Jiangsu	Q4 2019	1.710	1.549	552.789	3.433
	Q1 2020	0.952	1.304	242.565	3.368
	Q2 2020	2.491	1.549	529.169	4.411
	Q3 2020	2.647	1.740	512.754	4.678
	Q4 2020	3.037	1.664	613.015	3.864
Jiangxi	Q4 2019	1.644	0.703	621.643	1.135
	Q1 2020	0.617	0.544	297.218	0.909
	Q2 2020	1.116	0.651	569.795	1.371
	Q3 2020	1.394	0.827	564.796	1.566
	Q4 2020	2.098	0.802	662.005	1.250
Jilin	Q4 2019	0.453	0.856	131.123	1.119
	Q1 2020	0.292	0.849	20.245	0.173
	Q2 2020	0.894	0.826	245.716	1.853
	Q3 2020	0.481	0.892	305.430	2.312
	Q4 2020	0.441	0.943	168.533	1.090

Source: Asia Competitiveness Institute.

Table 5: (Continued)

Indicator		Industrial Enterprise Total Profit	Electricity Generation	Cement Production Tons per	Investment in Real Estate Development
Unit		Thousand RMB per Person	Thousand kWh per Person	Thousand Persons	Thousand RMB per Person
Liaoning	Q4 2019	0.666	1.209	284.914	1.060
	Q1 2020	0.200	1.104	60.197	0.924
	Q2 2020	0.959	1.098	397.262	2.471
	Q3 2020	1.060	1.231	412.305	2.137
	Q4 2020	0.738	1.280	356.129	1.312
Shaanxi	Q4 2019	1.465	1.646	432.689	2.878
	Q1 2020	0.811	1.437	221.054	1.338
	Q2 2020	1.146	1.392	547.603	3.325
	Q3 2020	1.324	1.446	526.287	3.331
	Q4 2020	1.730	1.603	459.152	3.369
Shandong	Q4 2019	0.909	1.404	389.142	2.215
	Q1 2020	0.436	1.255	176.197	1.528
	Q2 2020	1.026	1.286	487.705	2.634
	Q3 2020	1.202	1.451	445.296	2.655
	Q4 2020	1.589	1.484	456.646	2.567
Shanghai	Q4 2019	3.029	0.815	48.745	5.210
	Q1 2020	0.939	0.839	15.041	3.542
	Q2 2020	3.647	0.757	45.902	4.755
	Q3 2020	3.857	0.892	44.673	5.137
	Q4 2020	3.132	0.885	54.823	5.918
Shanxi	Q4 2019	0.585	2.240	345.997	1.116
	Q1 2020	0.241	2.053	108.887	0.523
	Q2 2020	0.655	2.078	462.979	1.663
	Q3 2020	0.722	2.331	493.456	1.514
	Q4 2020	0.967	2.566	379.353	1.208
Sichuan	Q4 2019	0.958	1.126	455.741	2.031
	Q1 2020	0.687	0.857	300.789	1.591
	Q2 2020	0.880	1.051	510.706	2.422
	Q3 2020	0.947	1.587	418.230	2.365
	Q4 2020	1.304	1.258	501.114	2.358
Tianjin	Q4 2019	2.013	1.230	118.926	2.983
	Q1 2020	0.756	1.127	28.878	3.085
	Q2 2020	1.706	1.081	106.736	6.214
	Q3 2020	1.911	1.230	105.132	4.304
	Q4 2020	1.782	1.382	112.326	3.097
Yunnan	Q4 2019	0.350	1.633	746.283	2.691
	Q1 2020	0.395	1.151	428.796	1.543
	Q2 2020	0.507	1.582	788.150	2.482
	Q3 2020	0.582	2.316	668.206	2.479
	Q4 2020	0.586	2.056	787.698	2.769
Zhejiang	Q4 2019	2.193	1.464	680.546	4.491
	Q1 2020	0.931	1.077	281.649	3.495
	Q2 2020	2.649	1.522	647.362	5.580
	Q3 2020	3.005	1.639	624.153	5.518
	Q4 2020	2.892	1.516	709.424	4.918

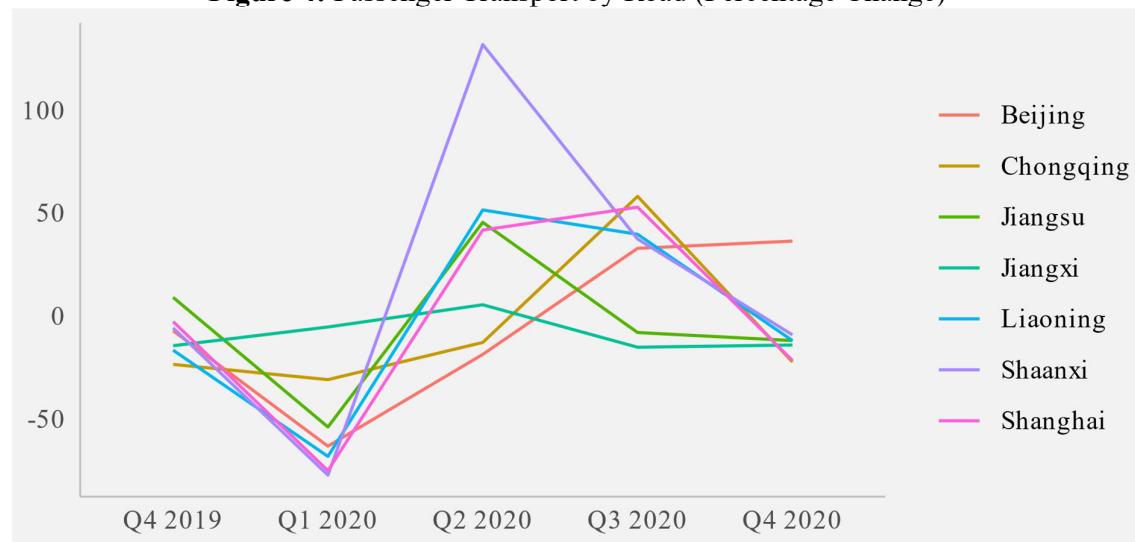
Source: Asia Competitiveness Institute.

5. Service Sector Performing Diversely with Online Services Growing at Speed

The service sector has been growing rapidly for the past decade. In 2012, it overtook the manufacturing and industry sector as the most significant component of China's economy. According to the National Bureau of Statistics of China, the service sector contributed to 54.3 percent of GDP in 2019. The COVID-19 pandemic has significantly disrupted the service sector. This section discusses the pandemic impact on transport, delivery, TMT and insurance, respectively.

Following the first COVID lockdown in Wuhan, many provinces adopted movement control measures to curb the spread of the virus. As a result, passenger transport and the number of flights reduced across Mainland provinces in Q1 2020. Figure 4 shows the passenger transport by road in eight selected provinces throughout the period. Except for Jiangxi and Chongqing, all selected provinces experienced greater drops in passenger transport in Q1 2020 than Q4 2019. Moreover, all provinces except Beijing and Chongqing saw recoveries in passenger transport in Q2 2020 as the pandemic situation eased. The reason that some provinces, Shaanxi and Liaoning for instance, experienced decline in passenger transport in Q4 2020 is probably because of the local outbreak of the COVID-19 which led to subsequent stricter movement control measures.

Figure 4: Passenger Transport by Road (Percentage Change)

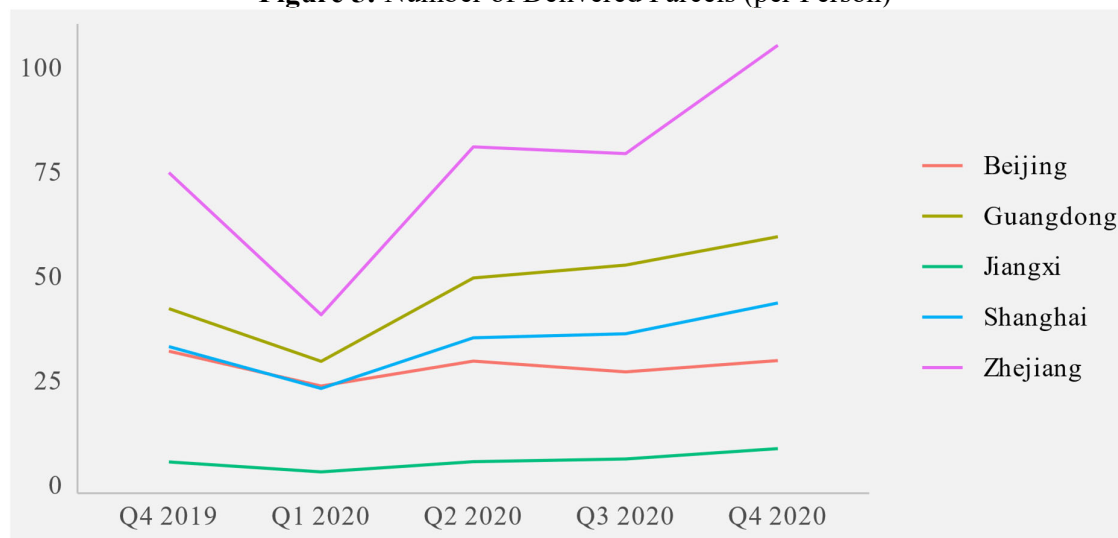


Source: Asia Competitiveness Institute.

As shown in Table 6, the number of flights in the capital city followed a pattern similar to passenger transport by road. All provinces saw negative growth in Q1 2020. Hubei's number of flights dropped most significantly by 75.4 percent, as its capital, Wuhan, was the initial epicentre of the pandemic. The "Five One" policy restricted international flights to only a few designated airports. The indicator in Q2 2020 was significantly affected by this policy. Air traffic increased in provinces housing designated airports (e.g. Chongqing) but continued to decrease in the other places. Most provinces did not see a full recovery of this indicator until Q3 2020.

Rapid e-commerce development in China has given rise to blossoming delivery businesses. Compared to 31.28 billion in 2016, the number of delivered parcels doubled in 2019. Figure 5 shows the top five provinces with the greatest number of delivered parcels per capita from Q4 2019 to Q4 2020. Homes to many online sellers, Zhejiang and Guangdong ranked first and second throughout the quarters, respectively.

Figure 5: Number of Delivered Parcels (per Person)

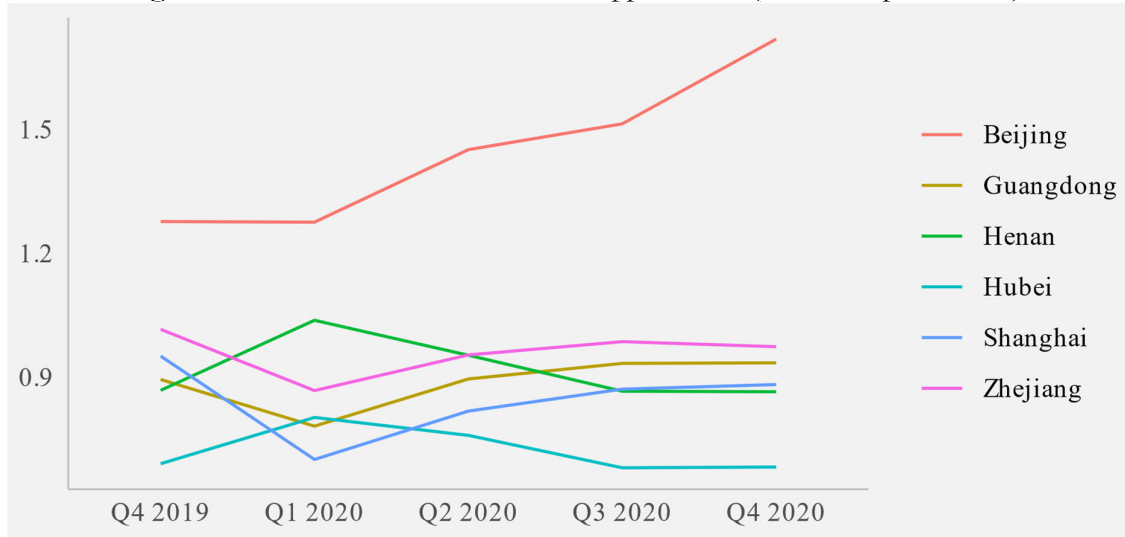


Source: Asia Competitiveness Institute.

Q1 2020 saw fewer delivered parcels than the previous quarter did in many provinces. However, it is difficult to determine the driver of this drop. On the one hand, online sellers might have insufficient stocks to cater to surging demand due to mobility controls during the pandemic. On the other hand, lockdown measures in many cities impeded logistics across regions, resulting in a longer lead time as if fewer parcels delivered in a given time. Also, as many businesses were closed leading up to the Spring Festival in Q1 2020, there would not be timely delivery even if an order was placed. After the COVID-19 shock, the delivery industry was recovered in most provinces and though to different extent, their pattern of fluctuation were quite similar.

The TMT industry was also one of the most impacted sectors during the pandemic. Figure 6 plots the number of active accounts on mobile applications in six selected provinces during the impact period. Beijing took the lead in this indicator across time and demonstrated an increasing gap with the provinces behind it. Zhejiang, Guangdong and Shanghai showed a decrease in this indicator in Q1 2020 and recovered since Q2 2020; Henan and Hubei increased initially during the pandemic but subsequently decreased from Q1 to Q3 2020. Beijing's top position might be ascribed to its booming new media industry. Zhejiang, Guangdong and Shanghai's negative changes in their numbers of active accounts seem counter-intuitive, as most economic activities during the impact period had to be conducted online. A plausible reason for the decrease is that the annual migration during the Spring Festival results in a shift of online user distribution across Mainland provinces. The demographic effect might eclipse the pandemic impact.

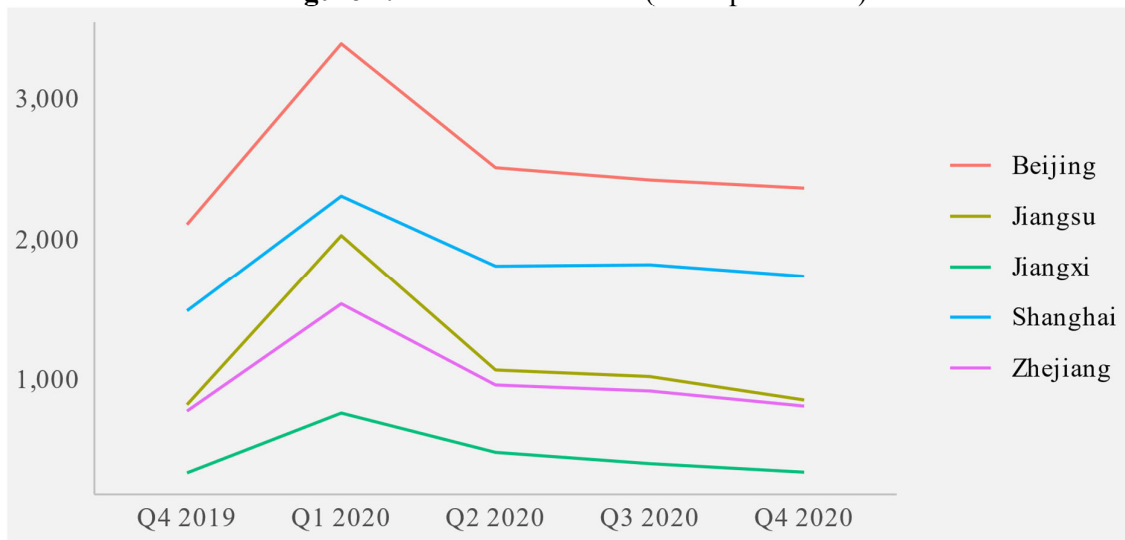
Figure 6: Active Accounts on Mobile Applications (Accounts per Person)



Source: Asia Competitiveness Institute.

As shown in Table 7, the film industry was hit severely in the first half of 2020. The central government closed all cinemas from 24 January 2020 to 20 July 2020 to reduce virus transmissibility. As a result, all provinces saw sharp drops in their box office records in Q1 2020. The number remained zero in Q2 2020. Before the pandemic, the top four provinces with the highest per capita box office records were Beijing, Shanghai, Tianjin and Chongqing. They remained to be the top four provinces in box office after the pandemic.

Figure 7: Insurance Premium (RMB per Person)



Source: Asia Competitiveness Institute.

As shown in Figure 7, insurance premium per capita showed an inverted V shape across provinces throughout the period. The ranking of and gaps between most provinces remained stable over the period. It is not surprising that Beijing, Shanghai, Jiangsu, Zhejiang and Tianjin are the top five provinces in this indicator as economically, these are the more developed

provinces in Mainland China. One possible explanation is that more people are seeking insurance protection during the pandemic.

Table 6: Service Sector Indicators in Mainland Economies (Part A), Q4 2019–Q4 2020

Indicator		Passenger Transport by Road	Number of Flights in Capital City	Number of Delivered Parcels
Unit		Percentage Change (from Previous Quarter)	Percentage Change (from Previous Quarter)	Per Person
Anhui	Q4 2019	0.021	-0.056	7.671
	Q1 2020	-0.639	-0.455	5.036
	Q2 2020	0.339	0.104	8.866
	Q3 2020	0.147	0.599	9.258
	Q4 2020	-0.037	0.037	11.434
Beijing	Q4 2019	-0.069	-0.045	32.136
	Q1 2020	-0.629	-0.554	23.784
	Q2 2020	-0.184	-0.424	29.757
	Q3 2020	0.331	0.84	27.169
	Q4 2020	0.366	0.311	29.884
Chongqing	Q4 2019	-0.232	-0.063	5.168
	Q1 2020	-0.306	-0.402	3.92
	Q2 2020	-0.126	0.249	5.667
	Q3 2020	0.583	0.125	6.174
	Q4 2020	-0.221	0.27	7.64
Fujian	Q4 2019	-0.044	-0.11	20.765
	Q1 2020	-0.517	-0.411	13.403
	Q2 2020	-0.179	0.056	21.804
	Q3 2020	0.412	0.409	22.705
	Q4 2020	0.029	0.144	28.469
Guangdong	Q4 2019	-0.055	-0.02	42.318
	Q1 2020	-0.506	-0.47	29.698
	Q2 2020	-0.021	-0.023	49.67
	Q3 2020	0.192	0.573	52.746
	Q4 2020	-0.041	0.174	59.551
Guangxi	Q4 2019	-0.173	-0.096	3.389
	Q1 2020	-0.199	-0.463	2.727
	Q2 2020	0.046	0.163	4.027
	Q3 2020	0.144	0.545	3.969
	Q4 2020	-0.176	0.082	4.98

Source: Asia Competitiveness Institute.

Table 6: (Continued)

Indicator		Passenger Transport by Road	Number of Flights in Capital City	Number of Delivered Parcels
Unit		Percentage Change (from Previous Quarter)	Percentage Change (from Previous Quarter)	Per Person
Guizhou	Q4 2019	-0.055	0.049	1.96
	Q1 2020	-0.625	-0.422	1.239
	Q2 2020	0.294	0.194	1.968
	Q3 2020	0.809	0.438	2.079
	Q4 2020	-0.01	0.004	2.486
Hainan	Q4 2019	-0.135	0.032	2.635
	Q1 2020	-0.569	-0.403	2.706
	Q2 2020	-0.057	-0.06	3.734
	Q3 2020	0.894	0.457	2.437
	Q4 2020	-0.246	0.286	2.775
Hebei	Q4 2019	-0.089	-0.104	9.972
	Q1 2020	-0.699	-0.522	6.177
	Q2 2020	-0.174	0.454	11.789
	Q3 2020	0.695	0.354	13.679
	Q4 2020	0.233	0.073	17.122
Heilongjiang	Q4 2019	-0.257	-0.076	3.099
	Q1 2020	-0.631	-0.403	1.664
	Q2 2020	-0.308	-0.302	2.935
	Q3 2020	1.092	1.224	3.356
	Q4 2020	0.148	0.138	4.181
Henan	Q4 2019	0.052	-0.096	7.082
	Q1 2020	-0.648	-0.421	4.575
	Q2 2020	-0.031	0.203	7.896
	Q3 2020	0.471	0.361	8.733
	Q4 2020	-0.001	0.094	10.955
Hubei	Q4 2019	0.012	-0.086	8.794
	Q1 2020	-0.676	-0.754	2.682
	Q2 2020	-0.2	-0.064	7.581
	Q3 2020	0.388	2.334	8.782
	Q4 2020	0.126	0.247	11.072
Hunan	Q4 2019	-0.108	-0.157	4.654
	Q1 2020	-0.478	-0.499	3.359
	Q2 2020	-0.129	0.367	5.215
	Q3 2020	0.32	0.489	5.67
	Q4 2020	0.033	0.021	7.024

Source: Asia Competitiveness Institute.

Table 6: (Continued)

Indicator		Passenger Transport by Road	Number of Flights in Capital City	Number of Delivered Parcels
Unit		Percentage Change (from Previous Quarter)	Percentage Change (from Previous Quarter)	Per Person
Inner Mongolia	Q4 2019	-0.327	-0.253	1.755
	Q1 2020	-0.672	-0.53	1.159
	Q2 2020	0.308	0.408	1.852
	Q3 2020	1.055	0.597	2.152
	Q4 2020	-0.248	-0.094	2.537
Jiangsu	Q4 2019	0.093	-0.082	22.118
	Q1 2020	-0.536	-0.487	13.483
	Q2 2020	0.457	0.198	22.693
	Q3 2020	-0.078	0.504	22.079
	Q4 2020	-0.116	0.077	28.198
Jiangxi	Q4 2019	-0.142	-0.057	5.611
	Q1 2020	-0.051	-0.447	3.219
	Q2 2020	0.057	0.104	5.672
	Q3 2020	-0.149	0.614	6.314
	Q4 2020	-0.138	0.029	8.8
Jilin	Q4 2019	-0.432	-0.071	3.725
	Q1 2020	-0.462	-0.415	2.783
	Q2 2020	-0.464	-0.13	4.157
	Q3 2020	2.973	0.818	4.416
	Q4 2020	-0.488	0.122	5.253
Liaoning	Q4 2019	-0.163	-0.115	5.719
	Q1 2020	-0.678	-0.437	4.411
	Q2 2020	0.517	-0.056	6.195
	Q3 2020	0.399	0.8	6.558
	Q4 2020	-0.117	0.091	8.566
Shaanxi	Q4 2019	-0.055	-0.078	5.942
	Q1 2020	-0.769	-0.489	3.757
	Q2 2020	1.32	0.217	5.735
	Q3 2020	0.376	0.478	6.818
	Q4 2020	-0.089	-0.084	7.362
Shandong	Q4 2019	0.02	-0.141	9.254
	Q1 2020	-0.818	-0.502	6.593
	Q2 2020	0.46	0.089	10.353
	Q3 2020	0.471	0.844	11.084
	Q4 2020	-0.049	0.074	13.2

Source: Asia Competitiveness Institute.

Table 6: (Continued)

Indicator		Passenger Transport by Road	Number of Flights in Capital City	Number of Delivered Parcels
Unit		Percentage Change (from Previous Quarter)	Percentage Change (from Previous Quarter)	Per Person
Shanghai	Q4 2019	-0.024	-0.06	33.23
	Q1 2020	-0.748	-0.486	23.207
	Q2 2020	0.419	-0.328	35.337
	Q3 2020	0.531	1.015	36.304
	Q4 2020	-0.213	-0.051	43.674
Shanxi	Q4 2019	-0.156	-0.075	3.253
	Q1 2020	-0.647	-0.505	2.199
	Q2 2020	0.151	0.089	3.497
	Q3 2020	0.881	0.699	3.915
	Q4 2020	0.039	0.129	4.758
Sichuan	Q4 2019	-0.1	-0.043	6.593
	Q1 2020	-0.369	-0.362	4.502
	Q2 2020	-0.033	0.02	6.064
	Q3 2020	0.295	0.465	6.979
	Q4 2020	0.166	-0.002	8.146
Tianjin	Q4 2019	-0.051	-0.192	14.083
	Q1 2020	-0.576	-0.479	8.827
	Q2 2020	0.369	0.24	14.237
	Q3 2020	0.302	0.499	16.186
	Q4 2020	-0.077	-0.05	20.141
Yunnan	Q4 2019	-0.202	-0.068	2.764
	Q1 2020	-0.337	-0.444	2.097
	Q2 2020	-0.222	0.08	3.207
	Q3 2020	0.477	0.273	3.73
	Q4 2020	-0.12	0.267	3.93
Zhejiang	Q4 2019	-0.135	-0.06	74.897
	Q1 2020	-0.47	-0.472	40.861
	Q2 2020	-0.044	0.012	81.065
	Q3 2020	0.335	0.726	79.448
	Q4 2020	0.052	0.065	105.399

Source: Asia Competitiveness Institute.

Table 7: Service Sector Indicators in Mainland Economies (Part B), Q4 2019–Q4 2020

Indicator		Active Accounts on Mobile Applications	Box Office Record	Insurance Premium
Unit		Accounts Per Person	RMB per Person	RMB per Person
Anhui	Q4 2019	0.706	2.867	364.436
	Q1 2020	0.781	0.343	822.275
	Q2 2020	0.732	0	519.101
	Q3 2020	0.786	1.135	491.046
	Q4 2020	0.787	2.335	372.306
Beijing	Q4 2019	1.278	43.971	2107.707
	Q1 2020	1.277	5.555	3389.879
	Q2 2020	1.452	0	2511.188
	Q3 2020	1.514	13.32	2424.002
	Q4 2020	1.719	29.099	2366.249
Chongqing	Q4 2019	0.665	13.038	556.978
	Q1 2020	0.754	1.7	1295.903
	Q2 2020	0.751	0	704.513
	Q3 2020	0.752	4.947	645.487
	Q4 2020	0.712	9.428	515.493
Fujian	Q4 2019	0.807	3.579	465.643
	Q1 2020	0.758	0.475	989.554
	Q2 2020	0.828	0	555.726
	Q3 2020	0.791	1.097	544.828
	Q4 2020	0.797	2.581	441.455
Guangdong	Q4 2019	0.896	5.218	723.028
	Q1 2020	0.783	0.727	1309.201
	Q2 2020	0.897	0	834.311
	Q3 2020	0.935	1.659	798.741
	Q4 2020	0.936	3.551	702.691
Guangxi	Q4 2019	0.67	2.61	264.113
	Q1 2020	0.77	0.385	558.528
	Q2 2020	0.69	0	321.331
	Q3 2020	0.572	1.008	326.835
	Q4 2020	0.539	2.101	273.81
Guizhou	Q4 2019	0.641	2.737	253.933
	Q1 2020	0.661	0.377	524.482
	Q2 2020	0.656	0	319.1
	Q3 2020	0.678	1.161	316.726
	Q4 2020	0.615	2.257	252.25

Source: Asia Competitiveness Institute.

Table 7: (Continued)

Indicator		Active Accounts on Mobile Applications	Box Office Record	Insurance Premium
Unit		Accounts Per Person	RMB per Person	RMB per Person
Hainan	Q4 2019	0.978	9.087	423.28
	Q1 2020	0.917	1.094	736.614
	Q2 2020	0.941	0	511.958
	Q3 2020	0.948	3.027	512.063
	Q4 2020	0.93	6.309	418.307
Hebei	Q4 2019	0.923	1.524	483.404
	Q1 2020	0.993	0.25	976.001
	Q2 2020	1.047	0	662.079
	Q3 2020	1.093	0.519	625.211
	Q4 2020	1.034	1.15	487.816
Heilongjiang	Q4 2019	0.739	3.632	418.555
	Q1 2020	0.784	0.465	979.739
	Q2 2020	0.813	0	680.485
	Q3 2020	0.787	1.108	550.2
	Q4 2020	0.797	2.872	421.568
Henan	Q4 2019	0.87	2.553	435.685
	Q1 2020	1.039	0.384	992.002
	Q2 2020	0.955	0	590.498
	Q3 2020	0.868	1	577.095
	Q4 2020	0.867	2.148	439.99
Hubei	Q4 2019	0.693	6.796	536.528
	Q1 2020	0.804	0.835	1228.21
	Q2 2020	0.761	0	691.497
	Q3 2020	0.683	2.114	634.857
	Q4 2020	0.685	4.472	574.135
Hunan	Q4 2019	0.68	3.858	383.059
	Q1 2020	0.737	0.547	803.137
	Q2 2020	0.691	0	522.955
	Q3 2020	0.707	1.516	482.509
	Q4 2020	0.702	2.882	378.534
Inner Mongolia	Q4 2019	0.821	2.497	539.37
	Q1 2020	0.835	0.494	1008.189
	Q2 2020	0.817	0	749.488
	Q3 2020	0.71	1.086	655.157
	Q4 2020	0.736	2.086	500.551

Source: Asia Competitiveness Institute.

Table 7: (Continued)

Indicator		Active Accounts on Mobile Applications	Box Office Record	Insurance Premium
Unit		Accounts Per Person	RMB per Person	RMB per Person
Jiangsu	Q4 2019	0.929	3.68	821.561
	Q1 2020	0.878	0.431	2029.083
	Q2 2020	0.919	0	1068.711
	Q3 2020	1.023	1.251	1022.144
	Q4 2020	1.027	2.82	855.403
Jiangxi	Q4 2019	0.68	2.836	336.477
	Q1 2020	0.777	0.364	762.216
	Q2 2020	0.736	0	482.555
	Q3 2020	0.74	1.038	402.186
	Q4 2020	0.758	2.256	341.599
Jilin	Q4 2019	0.798	5.043	419.918
	Q1 2020	0.657	0.764	1025.084
	Q2 2020	0.669	0	659.606
	Q3 2020	0.676	1.731	555.221
	Q4 2020	0.733	4.23	398.848
Liaoning	Q4 2019	0.821	3.494	392.923
	Q1 2020	0.791	0.494	790.303
	Q2 2020	0.805	0	569.187
	Q3 2020	0.844	1.149	472.381
	Q4 2020	0.842	2.785	396.071
Shaanxi	Q4 2019	0.845	8.059	487.616
	Q1 2020	0.83	1.012	1119.324
	Q2 2020	0.799	0	642.518
	Q3 2020	0.806	2.893	598.71
	Q4 2020	0.861	6.128	484.494
Shandong	Q4 2019	0.857	1.227	487.587
	Q1 2020	0.867	0.165	1134.548
	Q2 2020	0.882	0	701.281
	Q3 2020	0.882	0.531	608.272
	Q4 2020	0.906	1.046	506.792
Shanghai	Q4 2019	0.953	39.699	1490.939
	Q1 2020	0.703	4.748	2309.02
	Q2 2020	0.82	0	1811.491
	Q3 2020	0.873	15.251	1821.458
	Q4 2020	0.884	27.959	1739.209

Source: Asia Competitiveness Institute.

Table 7: (Continued)

Indicator		Active Accounts on Mobile Applications	Box Office Record	Insurance Premium
Unit		Accounts Per Person	RMB per Person	RMB per Person
Shanxi	Q4 2019	0.913	2.72	396.889
	Q1 2020	0.945	0.389	989.381
	Q2 2020	0.918	0	586.35
	Q3 2020	0.811	1.07	540.574
	Q4 2020	0.81	2.337	385.09
Sichuan	Q4 2019	0.701	6.162	475.224
	Q1 2020	0.755	0.793	1064.74
	Q2 2020	0.696	0	601.421
	Q3 2020	0.639	2.368	574.77
	Q4 2020	0.596	4.343	473.779
Tianjin	Q4 2019	0.868	15.414	806.658
	Q1 2020	0.742	1.99	1541.229
	Q2 2020	0.76	0	1005.57
	Q3 2020	0.626	5.254	950.384
	Q4 2020	0.688	11.238	805.57
Yunnan	Q4 2019	0.585	3.23	306.711
	Q1 2020	0.577	0.414	564.018
	Q2 2020	0.597	0	342.198
	Q3 2020	0.667	1.253	364.306
	Q4 2020	0.662	2.429	286.599
Zhejiang	Q4 2019	1.017	7.012	776.068
	Q1 2020	0.869	0.84	1540.957
	Q2 2020	0.956	0	962.017
	Q3 2020	0.988	2.496	919.214
	Q4 2020	0.976	4.814	811.897

Source: Asia Competitiveness Institute.

6. Relative Performances of 26 Mainland Economies

Error! Reference source not found. demonstrates the secondary and tertiary sector relative performances of the 26 economies in Q4 2019, Q1 2020, Q2 2020, Q3 2020 and Q4 2020. A higher score translates to better performance. Given that not a few but most provinces experienced position ups and downs over time, the uneven impacts of the virus on Mainland economies seem justified. Uniform impacts on all economies should otherwise induce parallel improvements or deteriorations in provincial secondary and tertiary sectors and thus more consistent rankings in the period of analysis.

There were five economies exhibiting significant fluctuations (more than six places) in their ranks throughout the period. Beijing dropped from the first place in Q4 2019 and Q1 2020 to the 11th position in Q4 2020; Chongqing only ranked 13th in Q4 2019 but climbed up to the sixth place in Q4 2020; Hainan fell from the seventh to the 18th position over the five quarters;

Inner Mogolia improved from 21st place in Q4 2019 to rank 11th in Q4 2020; Jiangxi also improves 11 positions over the period.

On the other hand, some provinces are more resilient to the pandemic shock. Anhui, Guangdong, Guizhou, Jiangsu, Shandong, Shanghai, Tianjin and Zhejiang are consistently performs above the average, with position changed less than four over the period. Even though there are fluctuations in the early of 2020, but they quickly stabilised by the end of 2020.

The uneven impacts may be attributed to the mixed effect of government responses and the virus. For example, it comes as no surprise that Hubei, China’s initial epicentre, saw a trough in its secondary and tertiary sector performance in Q1 2020. The province’s capital, Wuhan, and many other cities were under strict lockdowns during that time; their economies ceased to function. Hainan’s continued drop in ranking may result from the province’s shrinking tourism industry, which was the main pillar of Hainan’s economy before the pandemic. The virus *per se* might not have triggered the sharp decline in Q1 2020, but the prevalence of lockdowns and other mobility control measures in China could have done so. Chongqing rising to the top is likely a result of China’s “Five One” policy. The policy restricted international flights to only certain designated airports, one of which is hosted by the province. By and large, policy treatments differing across provinces should lead to fluctuated responses.

Table 8: Secondary and Tertiary Sector Relative Performances (Scores in Descending Order), Q4 2019–Q4 2020

Rank	Q4 2019	Q1 2020	Q2 2020
1	Beijing	3.331	3.175
2	Shanghai	3.062	2.923
3	Zhejiang	2.953	2.805
4	Guangdong	2.583	2.709
5	Jiangsu	2.522	2.620
6	Fujian	2.392	2.520
7	Hainan	2.302	2.244
8	Shaanxi	2.088	2.210
9	Guizhou	2.015	2.182
10	Tianjin	2.015	2.125
11	Hubei	1.941	2.085
12	Anhui	1.926	2.067
13	Chongqing	1.883	1.991
14	Shandong	1.845	1.986
15	Henan	1.835	1.905
16	Sichuan	1.819	1.896
17	Shanxi	1.745	1.744
18	Jiangxi	1.716	1.706
19	Hebei	1.702	1.612
20	Yunnan	1.668	1.563
21	Inner Mongolia	1.661	1.521
22	Guangxi	1.622	1.425
23	Liaoning	1.499	1.384
24	Hunan	1.475	1.307
25	Jilin	1.208	1.168
26	Heilongjiang	1.193	1.127

Source: Asia Competitiveness Institute.

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Rank	Q3 2020		Q4 2020	
1	Zhejiang	3.390	Zhejiang	3.389
2	Jiangsu	3.384	Jiangsu	3.366
3	Shaanxi	2.741	Shaanxi	2.726
4	Shanghai	2.474	Guangdong	2.505
5	Guangdong	2.430	Shanghai	2.448
6	Inner Mongolia	2.338	Chongqing	2.295
7	Tianjin	2.248	Jiangxi	2.226
8	Chongqing	2.244	Tianjin	2.178
9	Guizhou	2.155	Guizhou	2.132
10	Jiangxi	2.146	Inner Mongolia	2.085
11	Fujian	2.111	Beijing	2.075
12	Hebei	2.055	Fujian	2.066
13	Anhui	2.021	Anhui	2.028
14	Shandong	1.970	Shandong	2.009
15	Hubei	1.920	Hebei	1.984
16	Beijing	1.887	Hubei	1.975
17	Hainan	1.751	Guangxi	1.860
18	Guangxi	1.722	Hainan	1.860
19	Shanxi	1.713	Shanxi	1.672
20	Henan	1.640	Henan	1.646
21	Liaoning	1.631	Hunan	1.628
22	Hunan	1.571	Sichuan	1.603
23	Sichuan	1.557	Yunnan	1.496
24	Yunnan	1.416	Liaoning	1.471
25	Jilin	1.175	Jilin	0.995
26	Heilongjiang	0.309	Heilongjiang	0.282

Source: Asia Competitiveness Institute.

The results also shows the inequality in speed of recovery from the pandemic. From the discussion in Section 3, provinces with more resilience to the shock (in terms of GRDP per capita reduction) may not be recovering fast. For example, even though Beijing (with a GRDP reduction of 24% in Q1 2020) has improved since Q2 2020 as compared to itself, its dropping in the ranking indicates the slower speed of recovery than the other provinces. One possible reason is that Beijing experienced a second lockdown in June 2020. On the other hand, Hubei province (with a GRDP reduction of 50% in Q1 2020), the center of the pandemic, experienced a fast recovery. Its score has decreased from 1.941 in Q4 2019 to 1.179 in Q2 2020, but returned to 1.975 in Q4 2020.

7. Conclusions and Policy Implications

In this exercise, we evaluate the relative performances of secondary and tertiary sector indicators in China's sub-national economies. We construct a trimmed-down version of the competitiveness index for 26 Mainland provinces. The key approach to such an index is the adapted Competitiveness Analysis Algorithm, which produces comparable standardised scores across time. We first present a descriptive analysis of indicators within the index and then compute the ranking and scores for sub-national economies.

The COVID-19 pandemic has significantly affected the secondary and tertiary sectors across China's provinces. Manufacturing, industry & construction sectors worsen in Q1 2020 for most provinces but rapidly recover in Q2 2020. Contrary to the secondary sectors, services

industries flourish as rising demand for courier and online services, in part because the disease facilitates online channels displacing traditional offline ones.

Our index shows interesting patterns. The rankings throughout the five quarters evince a shuffle of positions. Such significantly unique changes over a year timespan suggest uneven impacts of the coronavirus on sub-national economies and inequality in the speed of recovery. Except for the virus itself, distinct policy responses across sub-national economies may also account for this heterogeneity in relative performances.

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