

The Impact of the COVID-19 Pandemic on Consumption Learning from High Frequency Transaction Data

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COVID-19 and the Economy

- As of April 17, > 2 million infections and > 150K deaths in 210 countries
- Stringent public health measures
- Severe economic impact
 - Supply
 - Demand
- Gigantic stimulus packages, often > 10% of country's GDP
 - More likely to follow

Assessing the Economic Impact

- Magnitude and nature
- Challenging
 - Ongoing
 - Unprecedented
- Goal: provide early facts on the economic impact of COVID-19
 - China experience
 - 12 weeks after the outbreak (Jan 23, 2020 to April 14, 2020)

Objective

- Focus on consumption
 - ~42% of China's GDP in the most recent decade
- Two questions
 - How large and persistent is the consumption impact?
 - How does consumption respond to the epidemic severity?
- Inform us about the aggregate demand implications
 - Due to distancing and mobility restrictions (inability to consume)
 - Due to COVID-19-induced uncertainty and anxiety (unwillingness to consume)

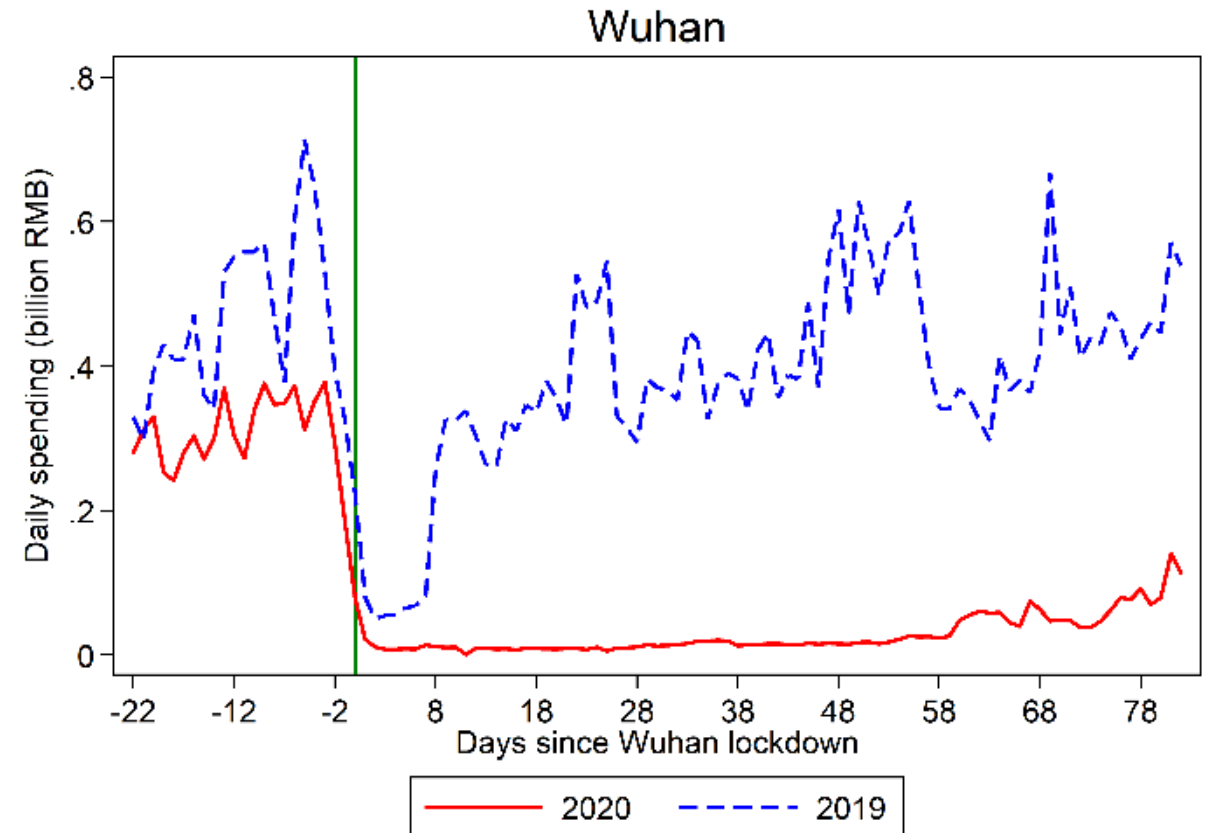
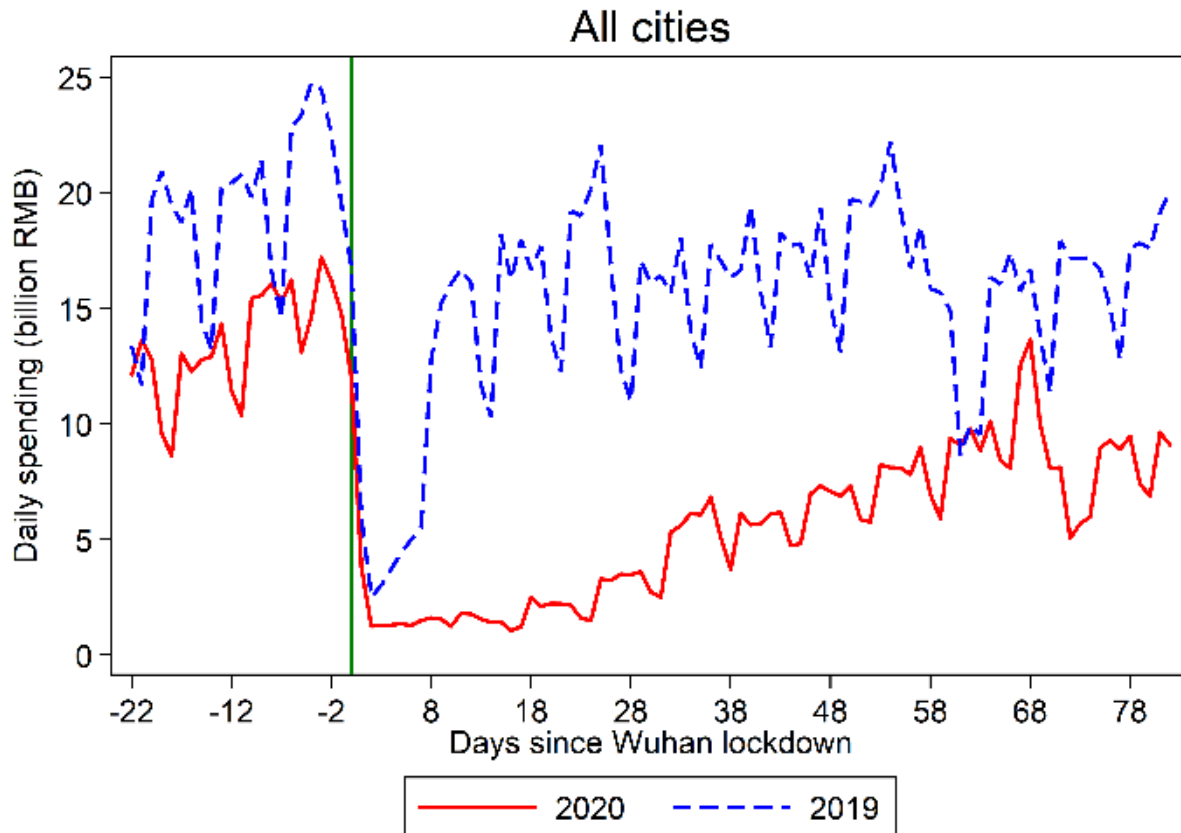
Data

- Universe of all *offline* spending transactions from China UnionPay Merchant Service Corporation (China UMS)
 - Covers bank card transactions (POS machines)
 - Covers QR transactions via Alipay and WeChat pay (UnionPay's QR scanners)
- UnionPay: one of China's largest payment service providers
 - 2019: **30%** of China's total offline retail consumption
- Offline consumption in China
 - 2019: **76%** of total retail consumption
 - Offline retailers matter for employment

Sample and Methodology

- Consumption aggregated at the city-day level
- 214 cities, > 1 million urban population
 - 92% of China's GDP and 90% of China's urban population
- Sample period
 - January 1, 2020 to April 14, 2020
 - January 12, 2019 to April 26, 2019 (control period)
- Difference-in-differences
 - Event date: Wuhan lockdown (January 23, 2020) and the corresponding lunar calendar date in 2019
 - City, distance-to-CNY (event date), day of week fixed effects
 - Standard errors are clustered at the city level

Consumption: Raw Data



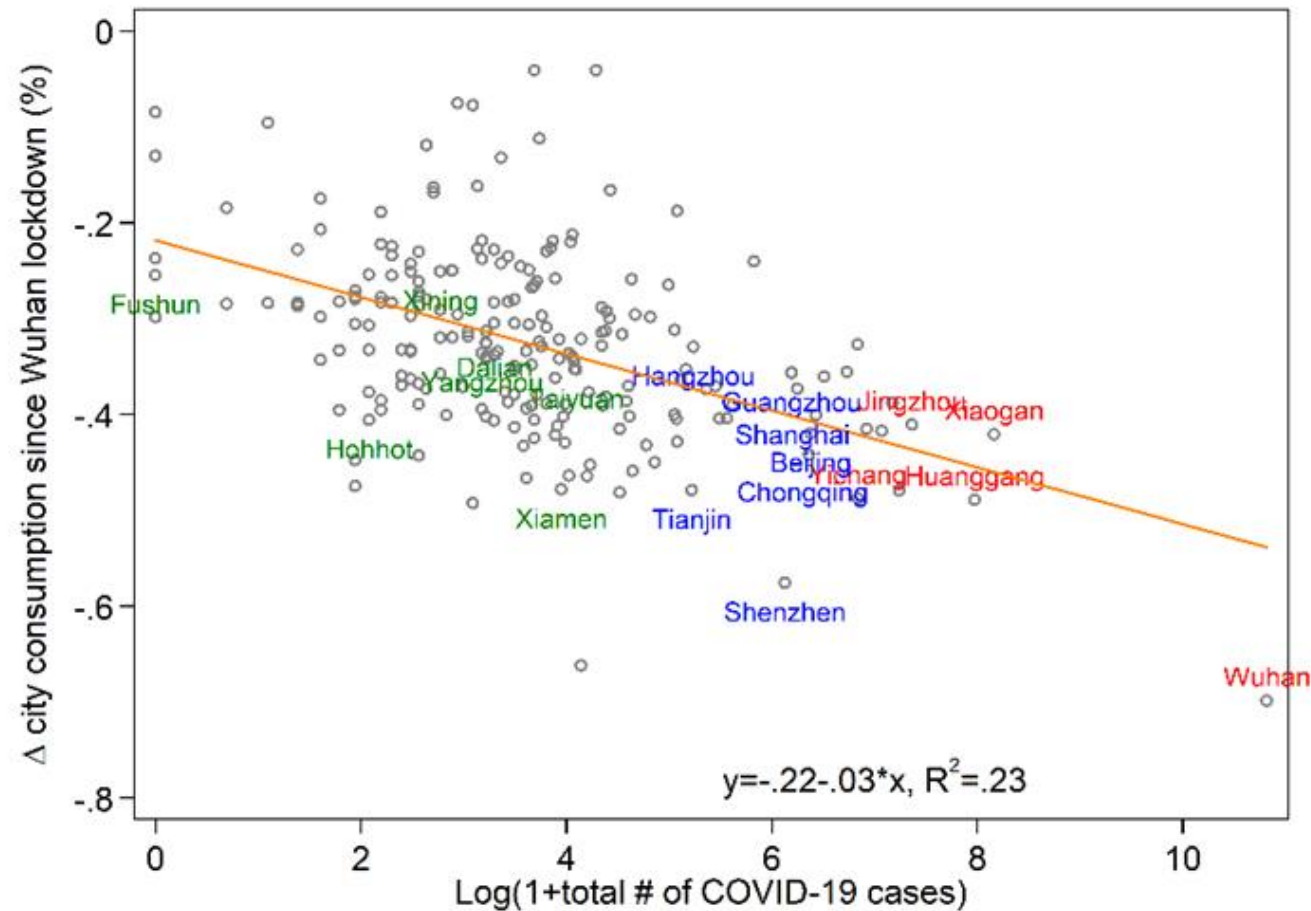
The Average Effect

	Spending amt by category /pre-period average					
	(1) All	(2) Daily necessities	(3) Discretionary items	(4) Durable goods	(5) Dining & Entertain.	(6) Travel-related
<i>treat*post</i>	-0.32*** (0.01)	-0.15*** (0.03)	-0.29*** (0.01)	-0.35*** (0.02)	-0.64*** (0.02)	-0.59*** (0.01)
Observations	44,940	44,940	44,940	44,940	44,940	44,940
R-squared	0.57	0.44	0.66	0.34	0.63	0.65

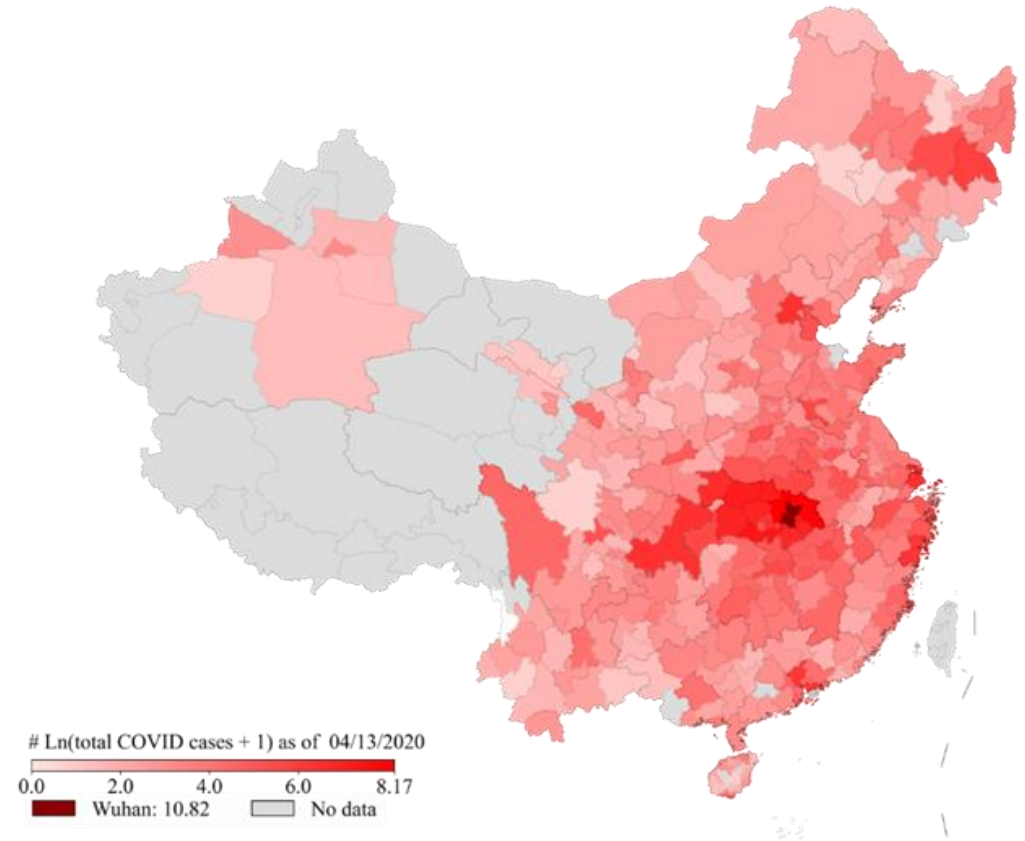
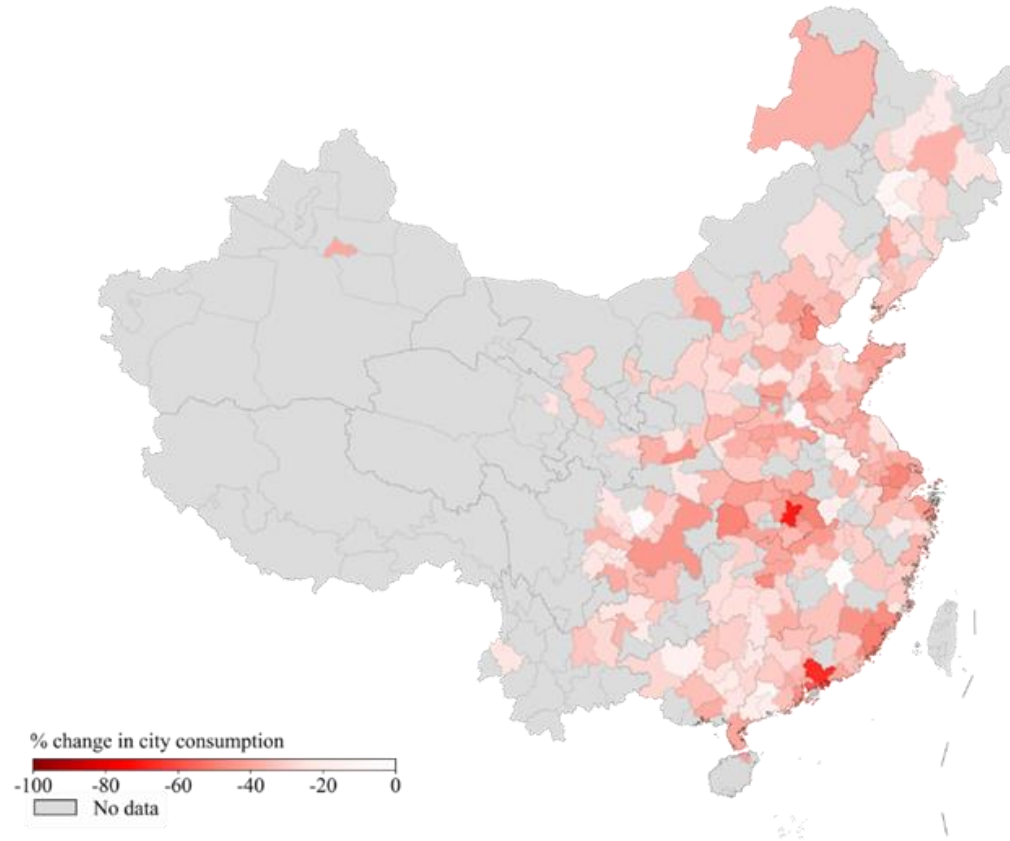
Aggregate Impact

- Dollar effect: 18.57 million per city per day
- Back of the envelope
 - 14.72 billion RMB per day ($=18.57 \text{ million} \times 214 / (0.9 \times 0.3)$)
 - 1.22 trillion during the twelve-week post-outbreak period
 - 1.2% of China's 2019 GDP
- Online spending response
 - Based on online service provider, ChinaPay (about 5% market share)
 - Decrease by 13% during the same period
- Total consumption down by 27%

Cross City Variation



Geographical Pattern



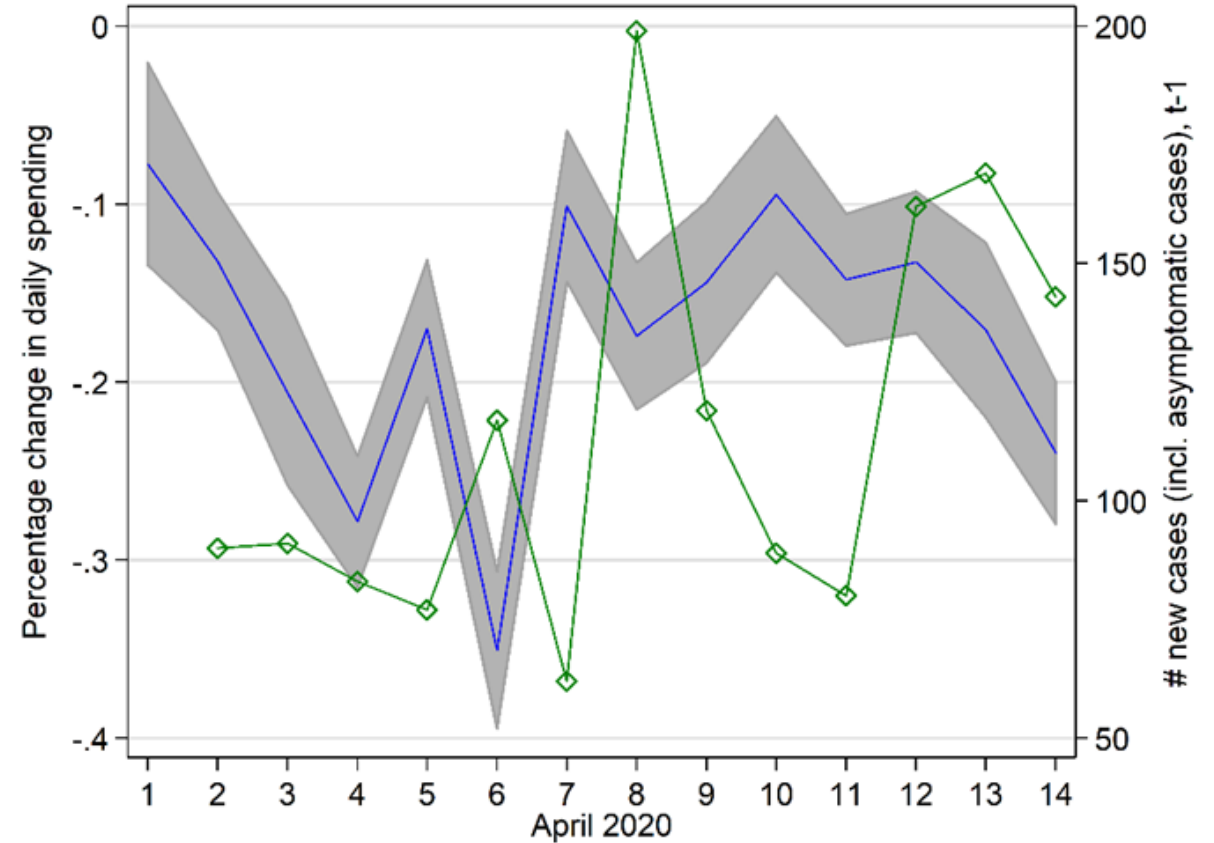
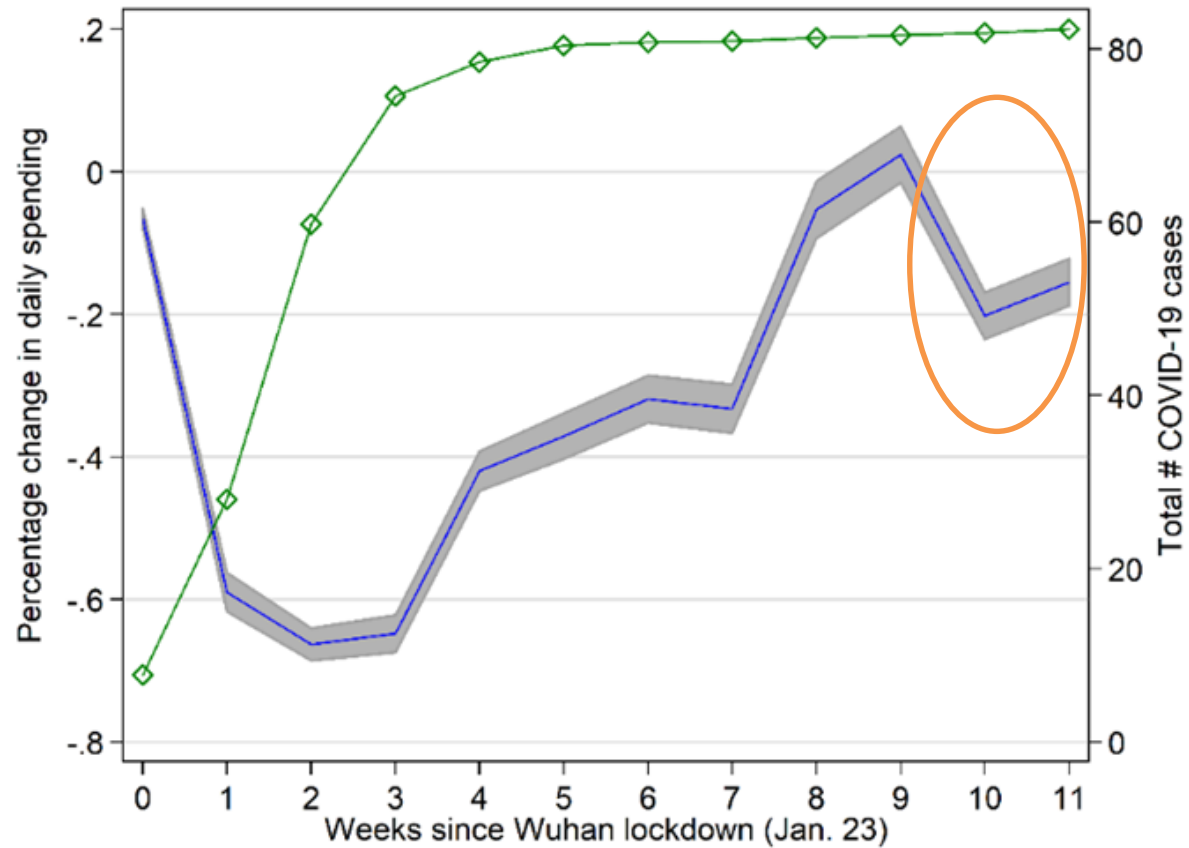
Interpretation

- Strong correlation with exposure to COVID-19
- Due to physical constraints
 - Dining & entertainment and travel-related spending especially hard hit
- Direct impact of COVID-19
 - Huge uncertainty regarding the pandemic trajectory
- Exploit within-city day-to-day changes in epidemic severity
 - Infected cases, stress on hospital capacity, total death toll
 - Mobility restrictions (or macro conditions) do not vary at such high frequency

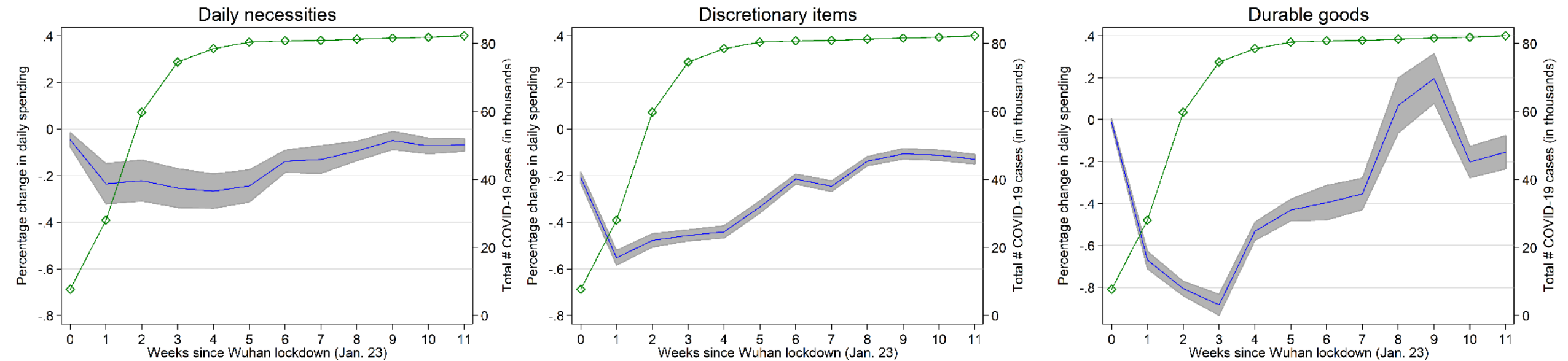
Within-City Variation in Epidemic Severity

	Spending amt/pre-period average		
	(1)	(2)	(3)
<i>treat*post</i>	-0.30*** (0.01)	-0.31*** (0.01)	-0.31*** (0.01)
<i>treat*post*log(1+newcase)</i>	-0.07*** (0.01)		
<i>treat*post*PTBtop</i>		-0.05*** (0.02)	
<i>treat*post*log(1+deaths)</i>			-0.03*** (0.01)
Constant	0.81*** (0.00)	0.81*** (0.00)	0.81*** (0.00)
Observations	44,921	44,940	44,940
R-squared	0.58	0.58	0.58

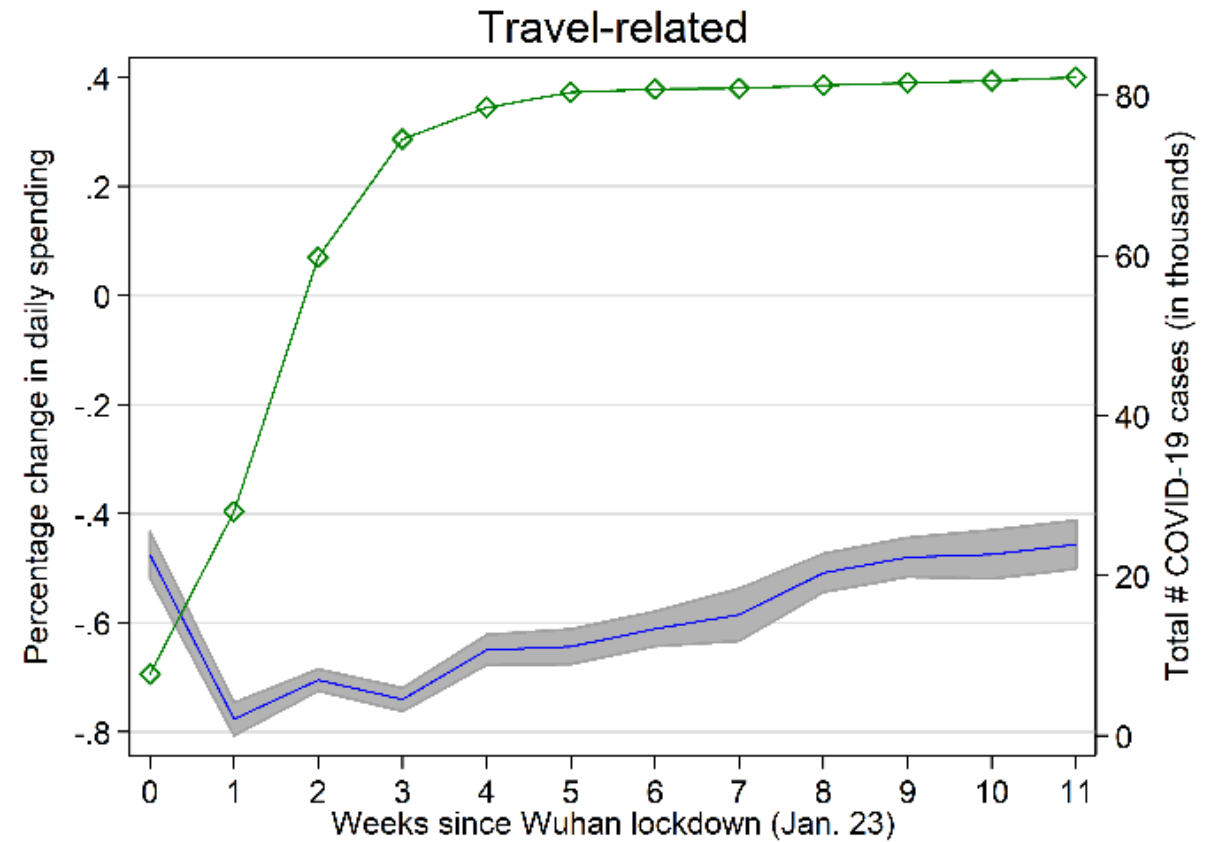
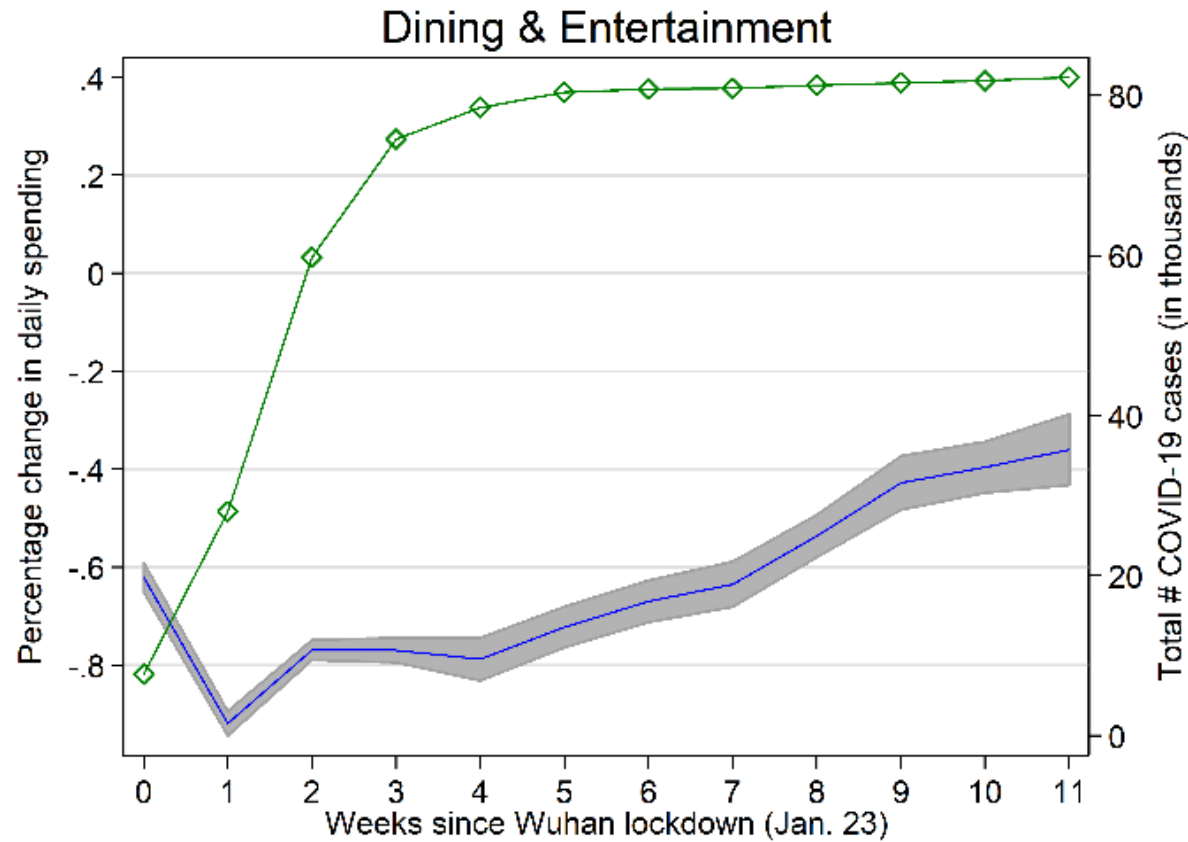
Consumption Impact Over Time



Consumption Recovery: By Category

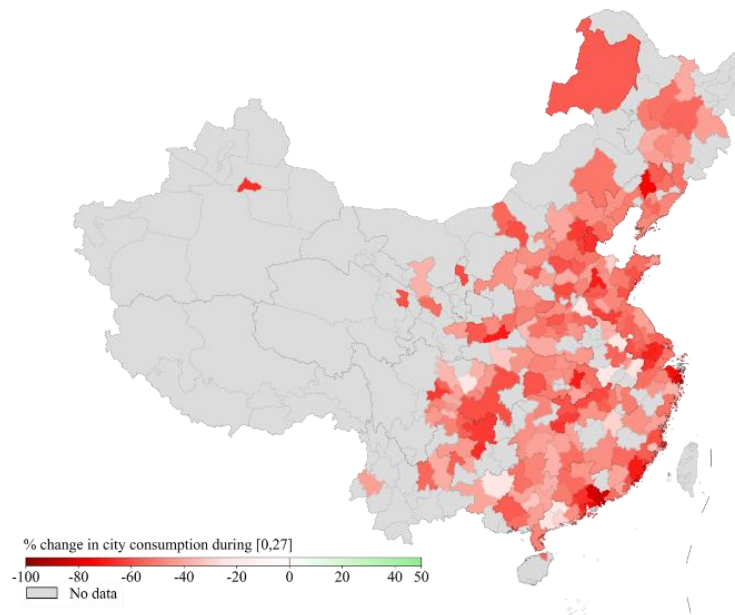


Consumption Recovery: By Category

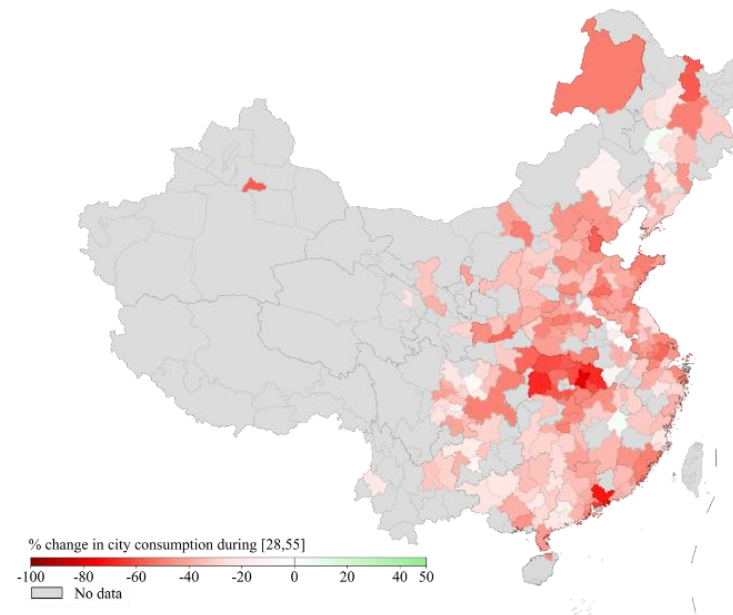


Consumption Dynamics Across Cities

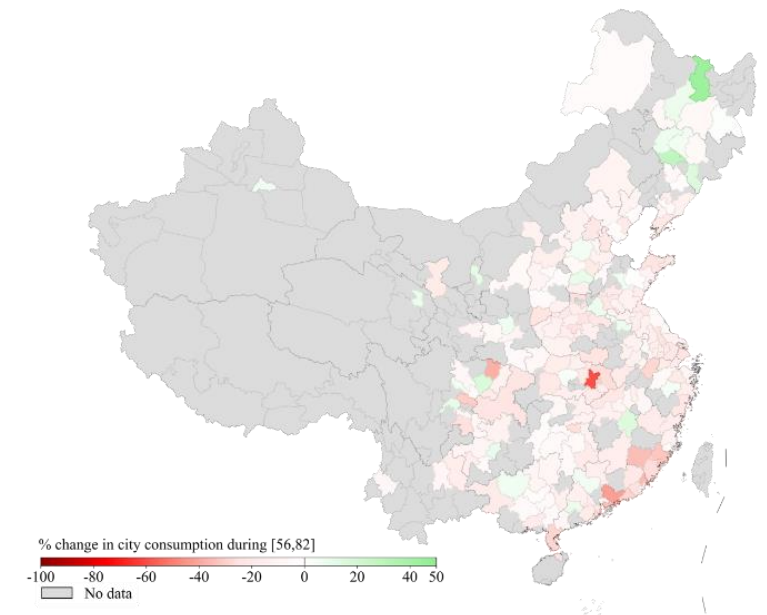
Event period [0,27]



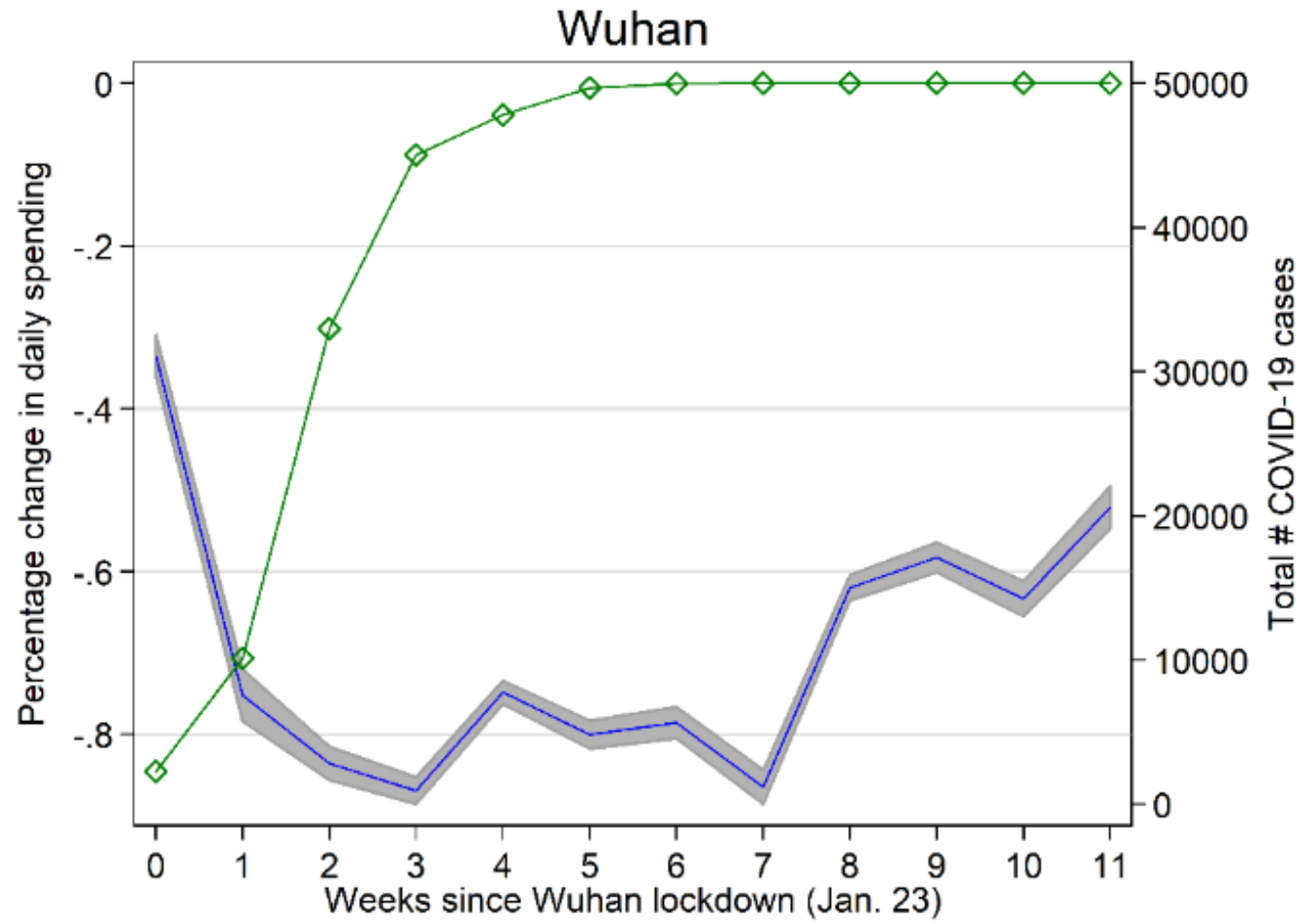
Event period [28, 55]



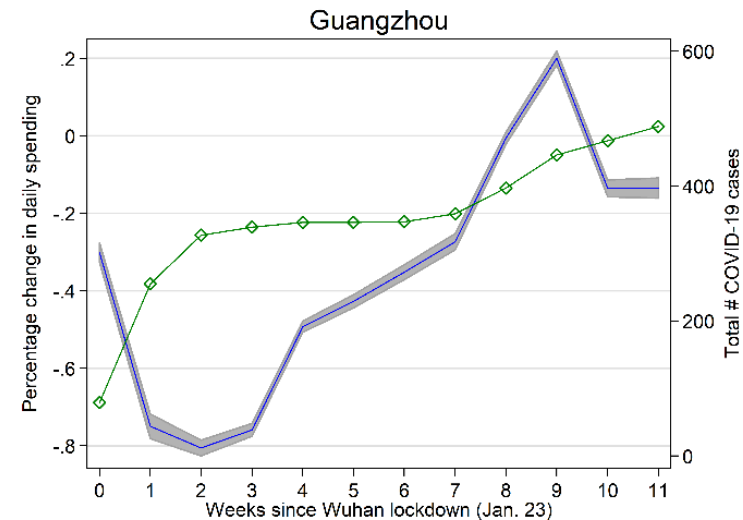
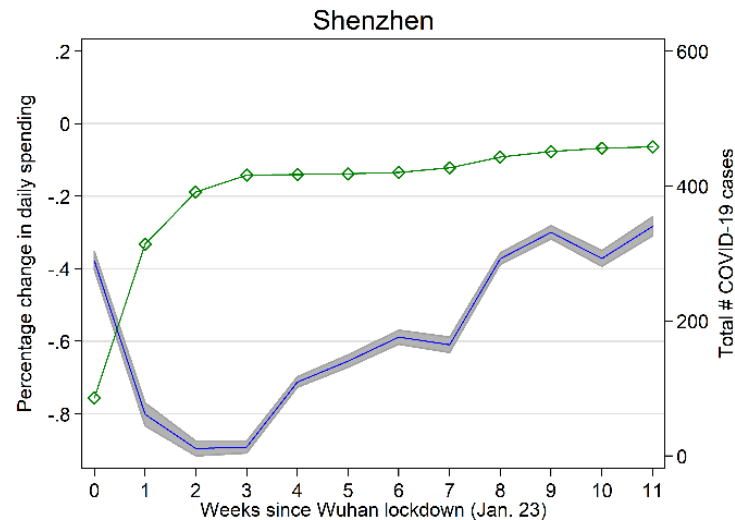
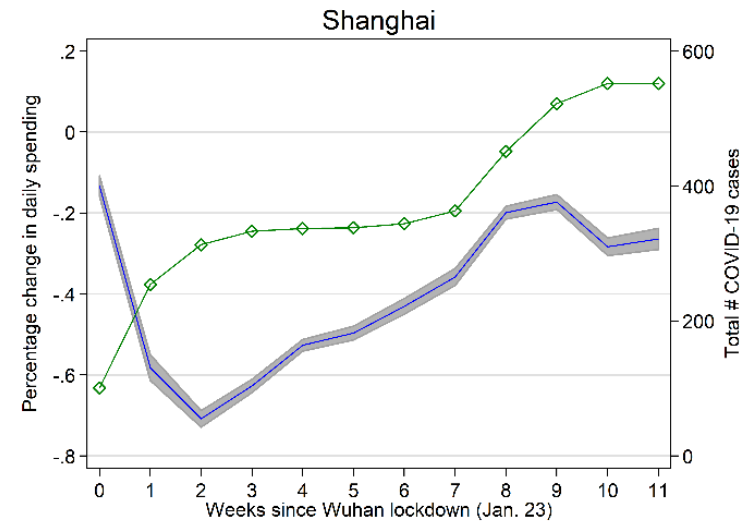
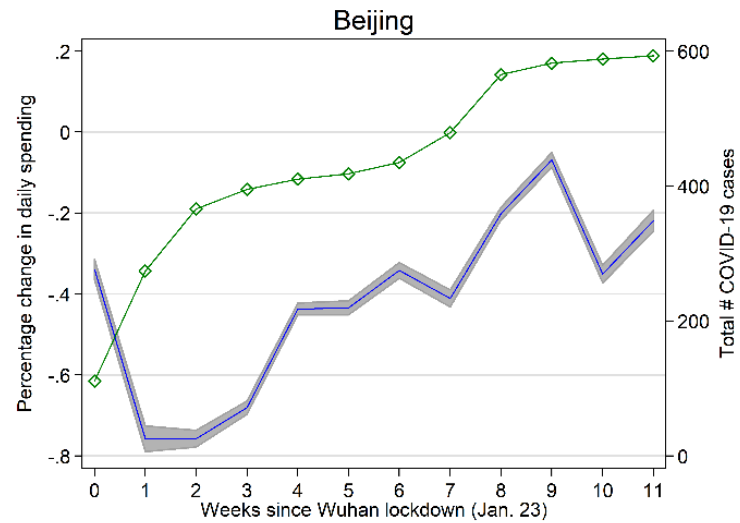
Event period [56, 82]



Wuhan



Four Municipalities



Key Takeaways

- Immediate and severe consumption impact
 - Over 1.2% of China's 2019 GDP
 - Wuhan's offline consumption down by 70%
 - Service and retail (durable goods especially) affected the most
- Strong negative sensitivity to the epidemic severity
 - More than what can be explained by mobility restrictions
 - Consumption recovery appears to trace the virus containment progress
 - Effective public health interventions crucial for reinvigorating the economy
 - Significant economic value through lessened negative consumption impact and faster recovery
 - Cities with zero COVID-19 deaths on average had 4.5% smaller consumption decrease in the first post-outbreak month and 4.6% greater consumption recovery in the second month