

ECONOMIC OUTLOOK FOR CHINA – REAL-TIME OBSERVATIONS BASED ON ALTERNATIVE DATA

China recently reported record high COVID-19 infections. With cities across China imposing localised lockdowns, mass testing and other curbs, it seems the measures imposed by a strict zero-COVID strategy are fuelling people’s frustration and have escalated the recent protests across the country. Lockdowns are also casting a shadow over the country’s economic outlook.

QuantCube has examined the current economic and social situation in China based on a diverse set of real-time alternative data sources, including satellite images, air traffic data and textual data from the web and social media. Our analysis has detected several signs of weakness that have started to emerge in the Chinese economy.

NO2 concentration data suggests industrial activity is weakening

In line with the zero-COVID strategy, several districts in numerous Chinese cities were put under lockdown by the Chinese authorities after a sharp rebound in COVID-19 cases. Leveraging real-time satellite images and our proprietary computer

vision technology, we measured NO2 concentration levels above five Chinese cities to gauge the level of industrial activity. NO2 is a greenhouse gas mostly emitted by heavy industry and transport. Its concentration levels can provide early insights on the current state of industrial activity.

Our data indicates a drop in NO2 concentration in general for five major industrial cities - Beijing, Shanghai, Guangzhou (Guangdong), Qingdao (Shandong), and Wuhan (Hubei) - since the end of October 2022. In our analysis we closely examined the cities of Wuhan and Guangzhou, two important manufacturing and industrial hubs in China where local lockdowns have been introduced recently.

Exhibit 1 shows the year-on-year evolution of NO2 concentration levels in Guangzhou. Until the beginning of November, NO2 concentration levels were stable vs. last year (0% yoy change). However, after November 2022, the NO2 level in the area dropped significantly corresponding to the introduction of restrictive measures that affected more than 4 million people.

NO2 concentration levels continued to drop during recent weeks and recorded a -33.2% yoy reduction. Similar NO2 concentration levels were observed in January 2022, when China was grappling with the spread of the Omicron variant. When we look at Wuhan, the situation is similar. In October 2022, we observed a significant rise in

year-on year NO2 concentration levels that peaked on October 24, registering a +50% increase. After a partial lockdown was introduced on October 27, however, the QuantCube NO2 Concentration Indicator immediately registered a sharp drop. NO2 concentration levels in Wuhan currently stand at -46.6% compared to one year ago.

Exhibit 1 - NO2 concentration above Guangzhou

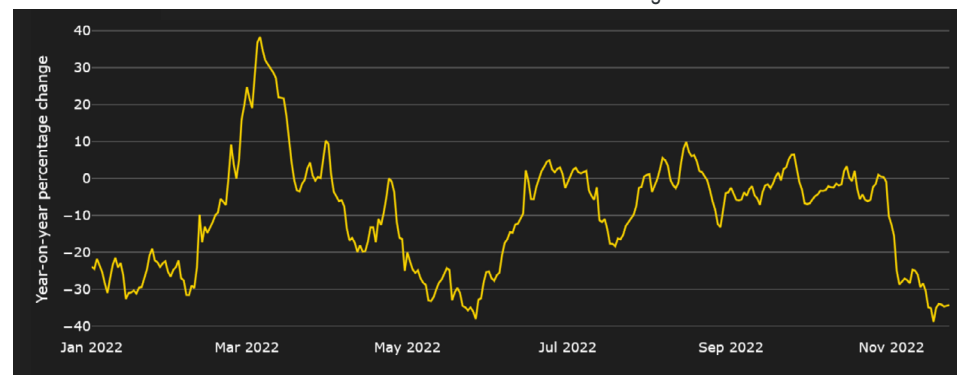
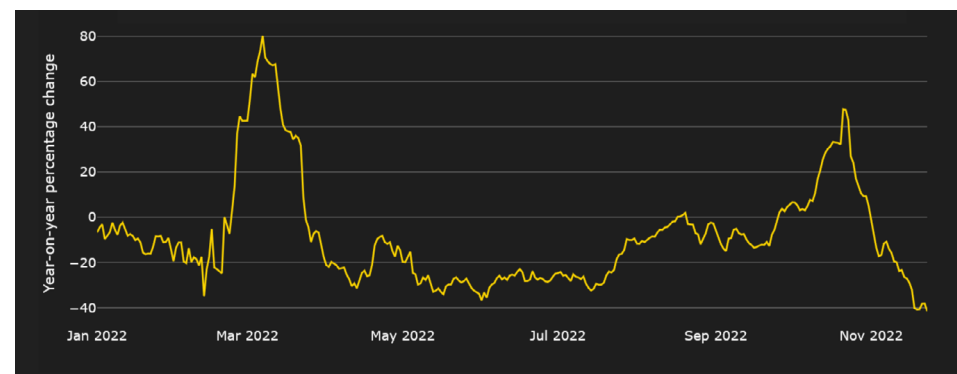


Exhibit 2 - NO2 concentration above Wuhan



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Underlying satellite images clearly show the drop in NO2 concentration levels on November 29, 2021 and November 29, 2022 for Guangzhou and Wuhan. Exhibits 3 and 4 represent

Exhibit 3 - QuantCube NO2 Concentration Indicator – Satellite - Guangzhou

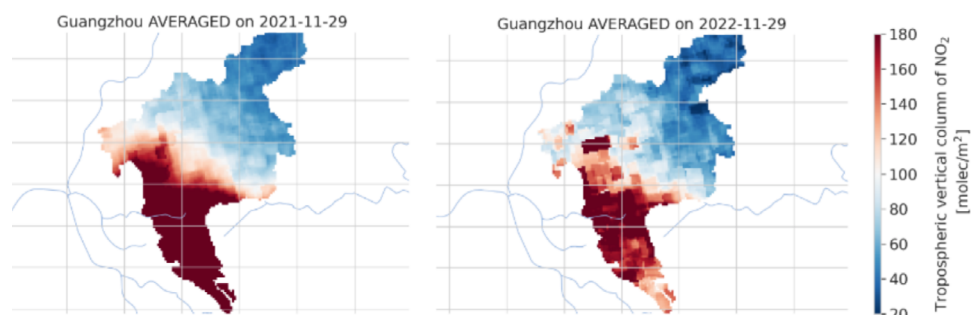
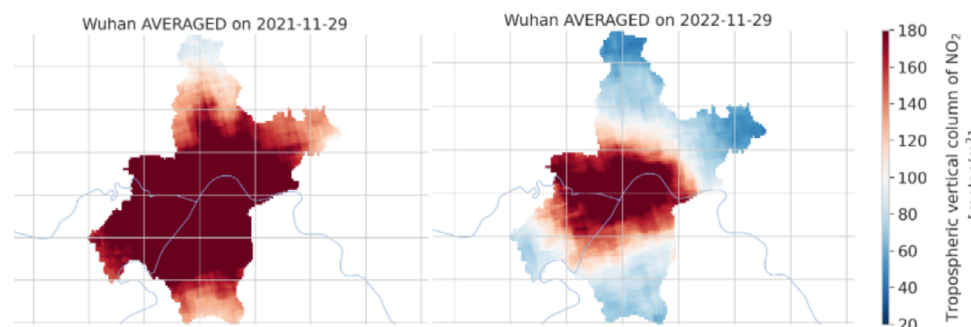


Exhibit 4 - QuantCube NO2 Concentration Indicator – Satellite – Wuhan



Private consumption – a slight rebound in consumer demand loses momentum

The strict zero-COVID strategy in China is not only affecting industrial activity, but also consumer behaviour.

We observe that consumers changed their spending habits as a result of the restrictive measures.

Based on real-time alternative data such as web search queries, people’s movements (based on

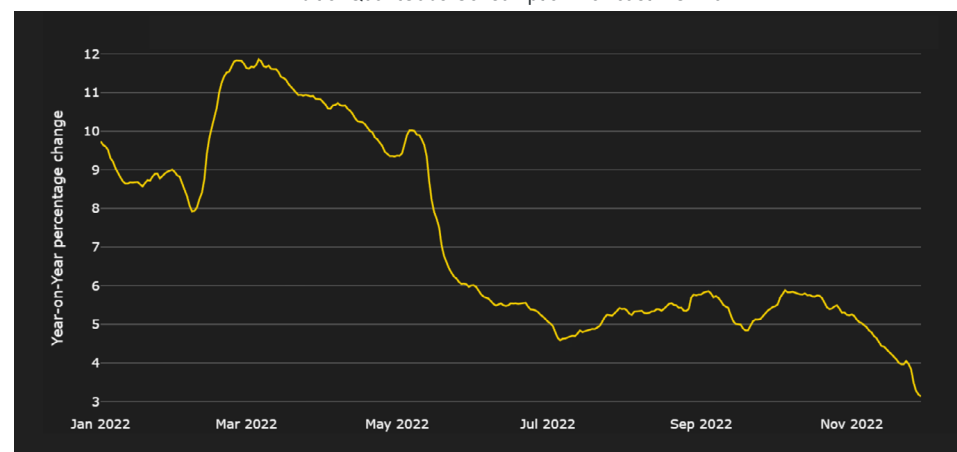
transportation data) and consumer reviews we track private consumption at country and sectoral levels. The results are updated daily to provide insights into current consumption levels, up to three months in advance of the publication of official numbers.

Exhibit 5 shows the overall consumption levels in China since January 2022. It started to drop significantly from March and reached the bottom in July as the authorities battled with the widespread Omicron

variant. National consumption slowly started to recover from mid-July as China emerged from lockdowns.

The expansive monetary policy adopted by the Central Bank also helped boost consumption to some extent. However, our consumption nowcast suggests that this rebound was short-lived and is now losing momentum. After the introduction of further strict zero-COVID measures at the end of October, Chinese private consumption has decreased visibly.

Exhibit 5. QuantCube Consumption Nowcast – China



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Exhibits 6 and 7 show consumption levels for the Food and Transport sectors. Our analysis indicates that Food and Transport are the biggest contributors to the overall reduction in Chinese consumption. The slowdown in the food sector is mostly driven

by a drop in eating out at restaurants, while the decrease in the transport sector is explained by the restricted movement of people, and a reduction in the use of trains, flights and gasoline.

The drop in Transport consumption is also affected by the reduction in air traffic as Exhibit 8 indicates. The QuantCube Air Traffic Nowcast tracks flight arrivals and departures at both country and city levels. It seems that the stringent COVID-19

curbs led to a significant reduction in domestic travel in China. Since September 2022, air traffic has been falling in several cities in China, with overall air traffic levels halved (-50% yoy) compared to the previous year.

Exhibit 6 - QuantCube Consumption Nowcast – China - Food

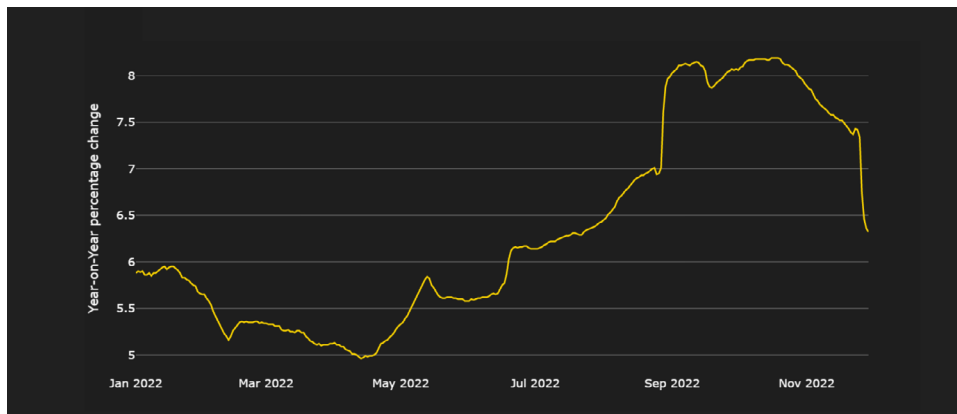


Exhibit 8 - QuantCube Air Traffic Nowcast - China

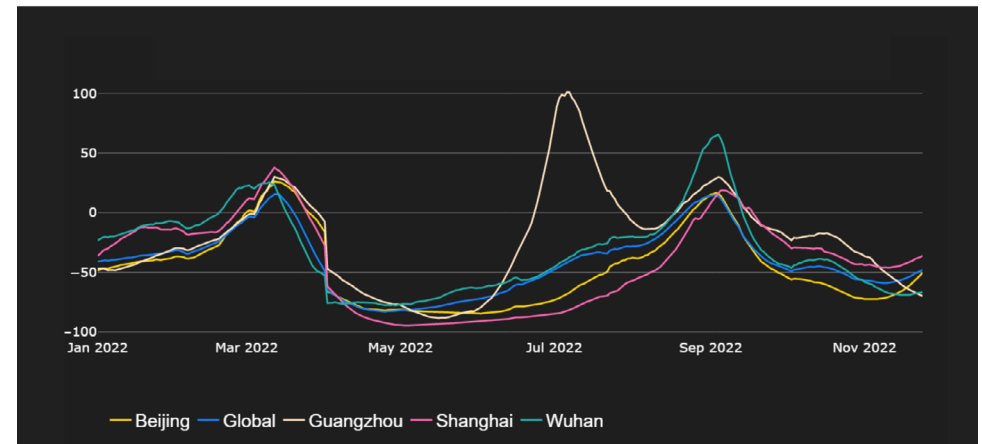
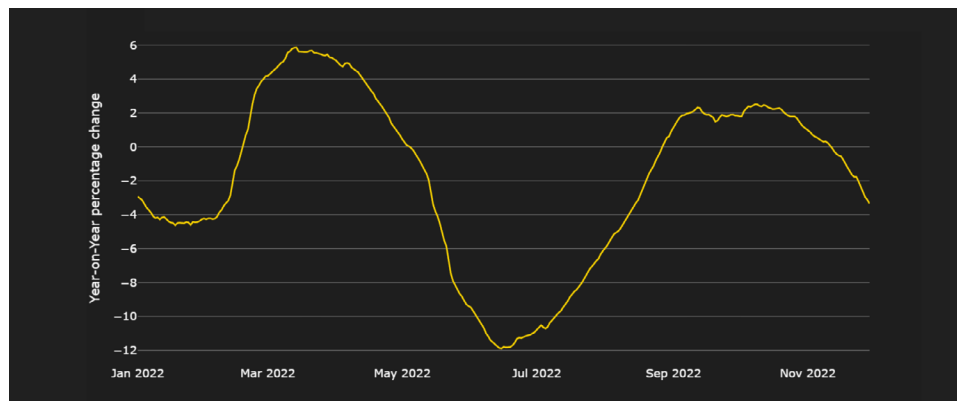


Exhibit 7 - QuantCube Consumption Nowcast – China - Transport



Uncertainty and discontent are fuelling people’s anxiety

The recent draconian measures undertaken by the authorities are fuelling people’s frustration and anxiety about the economy. To track the sentiment of the local population and measure the level of concern related to the state of the

economy, we examined the QuantCube Economic Anxiety Indicator. The indicator leverages textual data from social media sources and uses QuantCube’s NLP algorithms to observe what the Chinese population feels about international or local events that could affect the economy in a significant way.

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As demonstrated in Exhibit 9, the indicator reacted very quickly to the major events that affected people’s perception of the economy and their sentiment towards it. For example, it reported a significant increase right after Russia invaded Ukraine. Similar reactions were observed when the lockdown in Shanghai started and immediately after Pelosi’s visit to Taiwan. These events are all likely to affect China’s economic stability and people’s financial security. We observe that the indicator has been trending positively, suggesting that people are increasingly concerned about the risk of economic slowdown.

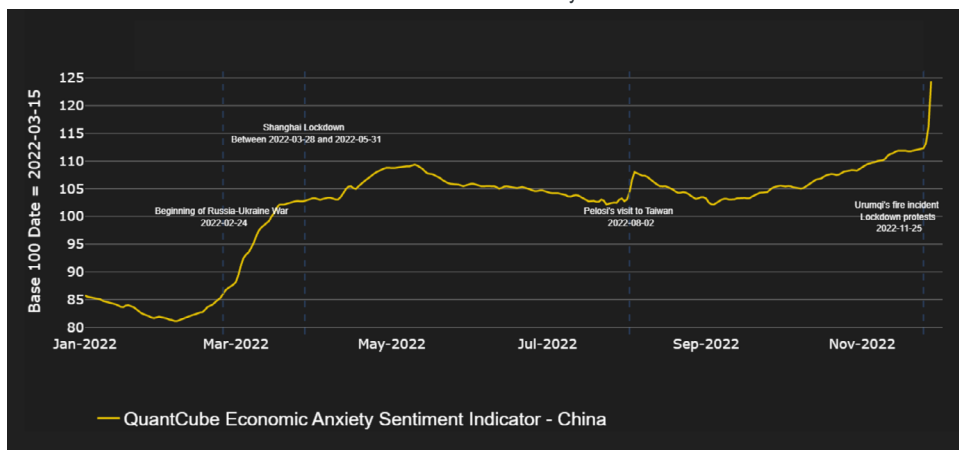
In particular, the economic anxiety has been skyrocketing in the last four days reflecting the protests over the deadly fire at an apartment building in the city of Urumqi. Protesters are blaming the authorities for causing unnecessary deaths as a result of the measures imposed by a strict zero-COVID strategy. Such an unusual and uncertain situation seems to be fuelling a rise in people’s concerns. After the fatal fire in Urumqi the QuantCube Economic Anxiety Sentiment Indicator rose sharply to 124 reflecting the increased anxiety experienced by people in China.

As China continues to pursue its strict zero-COVID-19 strategy, its economic outlook seems increasingly fragile. With the political tension escalating due to the recent protests across the country, China is facing significant challenges to bring its economy back on track. Chinese policymakers may introduce further stimulus measures to try to boost the economy. However, it remains questionable whether such additional stimulus

packages will be effective as the tough COVID-19 measures are visibly hindering industrial activity and people’s spending patterns.

A gradual shift to a more relaxed approach in dealing with COVID cases might be necessary to calm the political situation and boost domestic demand. We will continue to monitor China’s economic outlook using our real-time indicators.

Exhibit 9 – QuantCube Economic Anxiety Sentiment Indicator



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COMPANY BACKGROUND

QuantCube analyses billions of alternative data points in real time, using artificial intelligence and big data analytics to deliver insights ahead of the market – giving users an edge in their investment strategies. Today we are the global leader in macroeconomic intelligence nowcasting and in pinpointing macro regime change.

Our vision is to become the standard point of reference for macroeconomic, sector, corporate and environmental intelligence. By delivering timely, comprehensive and actionable economic insights we empower users within financial institutions, corporates and public bodies to reach their financial performance and sustainability goals. Headquartered in Paris, QuantCube employs a diverse international team of economists, quant analysts and data scientists with expertise in multilingual NLP, deep learning and machine learning techniques. The company’s shareholders include Moody’s and Caisse des Dépôts and its R&D in computer vision has been partially funded by the European Space Agency (ESA) and French government space agency CNES.

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