



SARS Is Not a Model for Coronavirus

Drawing parallels between the two outbreaks is tempting but risky.

February 2020

KEY INSIGHTS

- The potential impact of the COVID-19 virus on the Chinese economy has been compared with that of the SARS virus in 2003.
- However, there were external factors weighing on the Chinese economy in 2003 that do not exist today.
- We believe our approach, based on calculating the impact of lost working days on production, provides a more accurate assessment of the economic impact of COVID-19.

Commentators seeking to understand the long-term implications of COVID-19 (a coronavirus) are frequently comparing it with the 2002–2003 severe acute respiratory syndrome (SARS) outbreak, which had a severe

impact on both the Chinese and the global economies. But the 2003 SARS outbreak coincided with slowing global gross domestic product (GDP) growth, the Iraq War, and higher oil prices. So is SARS really a good case study for understanding the likely economic



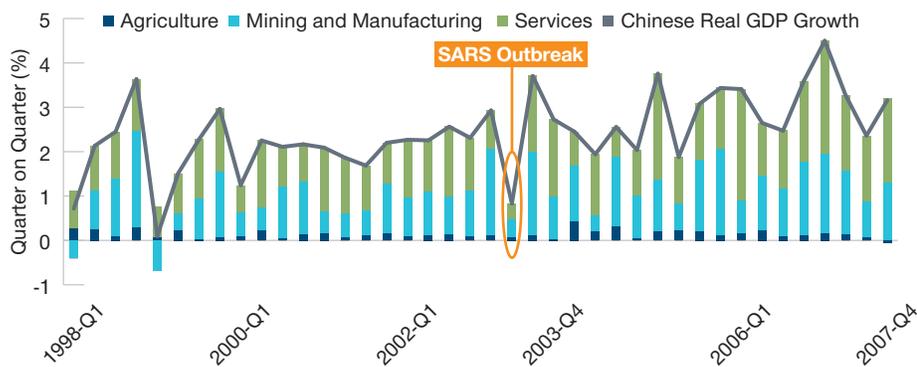
Chris Kushlis
Sovereign Analyst



Tomasz Wieladek
International Economist

Chinese GDP Growth During the SARS Outbreak

(Fig. 1) The impact of the virus appears at first glance to be severe.



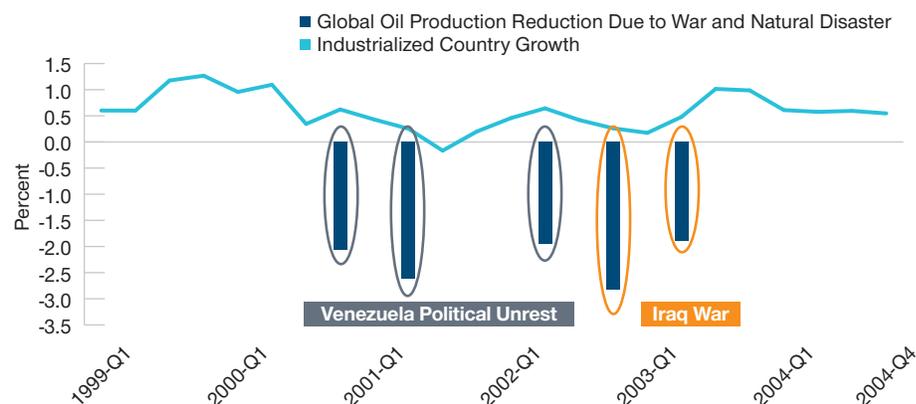
Analysis as of February 14, 2020.
Source: National Bureau of Statistics.

“There are significant differences between the situation today and that of China in 2003.

— Chris Kushlis
Sovereign Analyst

Macroeconomic Developments in 2003

(Fig. 2) Growth declined, and oil production fell.



Analysis as of February 14, 2020.

Source: Organisation for Economic Co-operation and Development.

effects of COVID-19? And if it is not, what other evidence can we turn to?

The SARS outbreak caused 8,098 cases and 774 deaths in 17 countries. Although the first cases appeared as early as November 2002, it was not until April 2003 that the World Health Organization issued a global health alert. Shortly afterwards, the Chinese authorities announced that all primary and secondary schools would be closed for two weeks and closed down other public venues, such as theatres and discos.

It was also in April 2003 that the first quarantine measures were introduced. As Figure 1 shows, this coincided with a significant reduction in Chinese Q2 2003 GDP growth in which the quarter-on-quarter growth rate fell by 2.1% (from 2.9% in Q1 2003 to 0.8% in Q2 2003). This decline was driven by a reduction in services and manufacturing growth, which was likely partly caused by containment measures taken by the Chinese government. Many observers, therefore, argue that the SARS episode is a good case study from which to extrapolate the effects of COVID-19.

However, there are significant differences between the situation today and that of China in 2003. Then, China composed only 5% of the world economy and was just in the process of becoming central to global supply chains on the back of its World Trade Organization accession in 2001. Rather than being a driver of the world economy, China was more a recipient of fluctuations and shocks from elsewhere.

Moreover, there were two important global economic developments occurring at the same time (Figure 2): First, in early 2003, growth in G7 economies (75% of global GDP at the time) was slowing; and second, in anticipation of the U.S. invasion of Iraq, which reduced global oil production by around 2%. The Q2 2003 Chinese slowdown is often wholly attributable to SARS, but is it possible that these two macro factors may also have played a part?

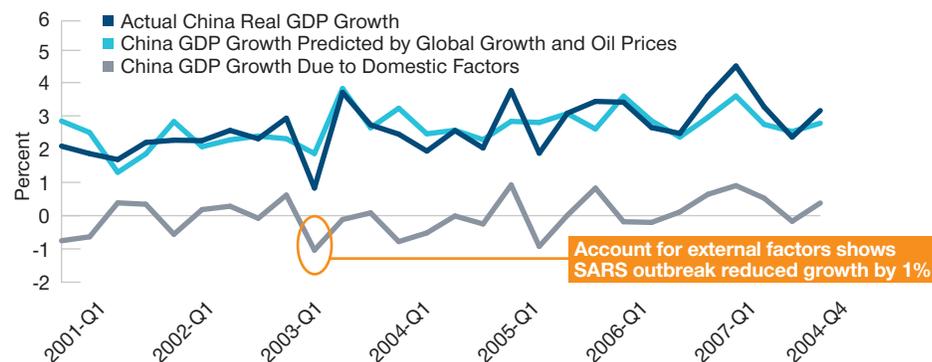
We used a simple linear regression analysis to determine the extent to which industrialized country growth and real oil price growth rates impacted Chinese GDP growth from Q1 2001 to Q4 2007. The residual from this

The coincidental global slowdown and rise in real oil prices mean that the effect of SARS was likely greatly exaggerated in Chinese GDP data.

— Tomasz Wieladek
International Economist

The Impact on Chinese GDP of Domestic and External Factors

(Fig. 3) SARS had less of an effect than first thought.



Analysis as of February 14, 2020.

Source: National Bureau of Statistics, Organization for Economic Co-operation and Development. Data analysis by T. Rowe Price. Results predicted from the regression model (light blue and gray lines) are estimates and do not represent actual results.

regression shows the impact on growth from idiosyncratic factors over the period. Figure 3 shows the results from this exercise. The grey line shows Chinese growth predicted by the global factors in the regression model and indicates that these would have led to a moderation of growth in China without the outbreak of SARS. The residual weakness in growth, which can be attributed to China-specific factors in that quarter, is 1%—much lower than the 2.1% effect that can be calculated by looking at quarterly growth rates alone.

Overall, the coincidental global slowdown and rise in real oil prices mean that the effect of SARS was likely greatly exaggerated in Chinese GDP data. In our view, SARS is, therefore, not a good case study for understanding the potential economic consequences of COVID-19 on Chinese real GDP growth.

If SARS is not a good case study to assess the economic impact of COVID-19, what should investors look at instead? We believe that the most useful approach is to quantify the effect of lost working days on overall production. We estimate that the current measures imposed by

the Chinese government through early February have led to eight lost working days for the country as whole. A reduction in one working day in Q1 leads to roughly a 0.4% loss in output, meaning that the eight lost working days so far translate into a quarterly growth reduction of 3.2%. This number is 50% larger than 2.1% growth impact measured during the SARS outbreak, and three times as large as the estimated 1% impact adjusted for external factors. Although this number could rise further, it is significantly smaller than extrapolating the economic impact based on virus cases in China, which, with 78,000 cases to date, is 15 times larger than the 5,237 cases that China experienced during SARS.

We believe that by looking at the sensitivity of growth to each working day lost (0.4% of GDP), we can get a much better sense of the economic impact of COVID-19 than can be obtained from arbitrarily scaling up the consequences of SARS. The same method can be applied to the impact of COVID-19 on growth in other countries that have been badly hit by the virus, including Italy.

We will continue to track high-frequency indicators around travel patterns, pollution, and coal consumption at power plants. This will help us to more accurately gauge how many effective

working days have been lost in real time and, therefore, what the economic impact is likely to be—and to do so significantly ahead of the publication of longer-term hard data.



WHAT WE'RE WATCHING NEXT

We will be closely monitoring developments in COVID-19 over the coming weeks and months and modifying our assessment of its likely impact on the Chinese and global economies as new data come in. In particular, we will look closely at working days lost in order to gain a better understanding of the potential effect the virus may have on Chinese GDP.

INVEST WITH CONFIDENCESM

T. Rowe Price focuses on delivering investment management excellence that investors can rely on—now and over the long term.

T.RowePrice[®]

Important Information

This material is being furnished for general informational and/or marketing purposes only. The material does not constitute or undertake to give advice of any nature, including fiduciary investment advice, nor is it intended to serve as the primary basis for an investment decision. Prospective investors are recommended to seek independent legal, financial and tax advice before making any investment decision. T. Rowe Price group of companies including T. Rowe Price Associates, Inc. and/or its affiliates receive revenue from T. Rowe Price investment products and services. **Past performance is not a reliable indicator of future performance.** The value of an investment and any income from it can go down as well as up. Investors may get back less than the amount invested.

The material does not constitute a distribution, an offer, an invitation, a personal or general recommendation or solicitation to sell or buy any securities in any jurisdiction or to conduct any particular investment activity. The material has not been reviewed by any regulatory authority in any jurisdiction.

Information and opinions presented have been obtained or derived from sources believed to be reliable and current; however, we cannot guarantee the sources' accuracy or completeness. There is no guarantee that any forecasts made will come to pass. The views contained herein are as of the date written and are subject to change without notice; these views may differ from those of other T. Rowe Price group companies and/or associates. Under no circumstances should the material, in whole or in part, be copied or redistributed without consent from T. Rowe Price.

The material is not intended for use by persons in jurisdictions which prohibit or restrict the distribution of the material and in certain countries the material is provided upon specific request. It is not intended for distribution to retail investors in any jurisdiction.

Important Information (Continued)

Australia—Issued in Australia by T. Rowe Price Australia Limited (ABN: 13 620 668 895 and AFSL: 503741), Level 50, Governor Phillip Tower, 1 Farrer Place, Suite 50B, Sydney, NSW 2000, Australia. For Wholesale Clients only.

Brunei—This material can only be delivered to certain specific institutional investors for informational purpose upon request only. The strategy and/or any products associated with the strategy has not been authorised for distribution in Brunei. No distribution of this material to any member of the public in Brunei is permitted.

Canada—Issued in Canada by T. Rowe Price (Canada), Inc. T. Rowe Price (Canada), Inc.'s investment management services are only available to Accredited Investors as defined under National Instrument 45-106. T. Rowe Price (Canada), Inc. enters into written delegation agreements with affiliates to provide investment management services.

China—This material is provided to specific qualified domestic institutional investor or sovereign wealth fund on a one-on-one basis. No invitation to offer, or offer for, or sale of, the shares will be made in the People's Republic of China ("PRC") (which, for such purpose, does not include the Hong Kong or Macau Special Administrative Regions or Taiwan) or by any means that would be deemed public under the laws of the PRC. The information relating to the strategy contained in this material has not been submitted to or approved by the China Securities Regulatory Commission or any other relevant governmental authority in the PRC. The strategy and/or any product associated with the strategy may only be offered or sold to investors in the PRC that are expressly authorized under the laws and regulations of the PRC to buy and sell securities denominated in a currency other than the Renminbi (or RMB), which is the official currency of the PRC. Potential investors who are resident in the PRC are responsible for obtaining the required approvals from all relevant government authorities in the PRC, including, but not limited to, the State Administration of Foreign Exchange, before purchasing the shares. This document further does not constitute any securities or investment advice to citizens of the PRC, or nationals with permanent residence in the PRC, or to any corporation, partnership, or other entity incorporated or established in the PRC.

DIFC—Issued in the Dubai International Financial Centre by T. Rowe Price International Ltd. This material is communicated on behalf of T. Rowe Price International Ltd. by its representative office which is regulated by the Dubai Financial Services Authority. For Professional Clients only.

EEA ex-UK—Unless indicated otherwise this material is issued and approved by T. Rowe Price (Luxembourg) Management S.à r.l. 35 Boulevard du Prince Henri L-1724 Luxembourg which is authorised and regulated by the Luxembourg Commission de Surveillance du Secteur Financier. For Professional Clients only.

Hong Kong—Issued in Hong Kong by T. Rowe Price Hong Kong Limited, 6/F, Chater House, 8 Connaught Road Central, Hong Kong. T. Rowe Price Hong Kong Limited is licensed and regulated by the Securities & Futures Commission. For Professional Investors only.

Indonesia—This material is intended to be used only by the designated recipient to whom T. Rowe Price delivered; it is for institutional use only. Under no circumstances should the material, in whole or in part, be copied, redistributed or shared, in any medium, without prior written consent from T. Rowe Price. No distribution of this material to members of the public in any jurisdiction is permitted.

Korea—This material is intended only to Qualified Professional Investors upon specific and unsolicited request and may not be reproduced in whole or in part nor can they be transmitted to any other person in the Republic of Korea.

Malaysia—This material can only be delivered to specific institutional investor upon specific and unsolicited request. The strategy and/or any products associated with the strategy has not been authorised for distribution in Malaysia. This material is solely for institutional use and for informational purposes only. This material does not provide investment advice or an offering to make, or an inducement or attempted inducement of any person to enter into or offer to enter into, an agreement for or with a view to acquiring, disposing of, subscribing for or underwriting securities. Nothing in this material shall be considered a making available of, solicitation to buy, an offering for subscription or purchase or an invitation to subscribe for or purchase any securities, or any other product or service, to any person in any jurisdiction where such offer, solicitation, purchase or sale would be unlawful under the laws of Malaysia.

New Zealand—Issued in New Zealand by T. Rowe Price Australia Limited (ABN: 13 620 668 895 and AFSL: 503741), Level 50, Governor Phillip Tower, 1 Farrer Place, Suite 50B, Sydney, NSW 2000, Australia. No Interests are offered to the public. Accordingly, the Interests may not, directly or indirectly, be offered, sold or delivered in New Zealand, nor may any offering document or advertisement in relation to any offer of the Interests be distributed in New Zealand, other than in circumstances where there is no contravention of the Financial Markets Conduct Act 2013.

Philippines—THE STRATEGY AND/ OR ANY SECURITIES ASSOCIATED WITH THE STRATEGY BEING OFFERED OR SOLD HEREIN HAVE NOT BEEN REGISTERED WITH THE SECURITIES AND EXCHANGE COMMISSION UNDER THE SECURITIES REGULATION CODE. ANY FUTURE OFFER OR SALE OF THE STRATEGY AND/ OR ANY SECURITIES IS SUBJECT TO REGISTRATION REQUIREMENTS UNDER THE CODE, UNLESS SUCH OFFER OR SALE QUALIFIES AS AN EXEMPT TRANSACTION.

Singapore—Issued in Singapore by T. Rowe Price Singapore Private Ltd., No. 501 Orchard Rd, #10-02 Wheelock Place, Singapore 238880. T. Rowe Price Singapore Private Ltd. is licensed and regulated by the Monetary Authority of Singapore. For Institutional and Accredited Investors only.

South Africa—T. Rowe Price International Ltd ("TRPIL") is an authorised financial services provider under the Financial Advisory and Intermediary Services Act, 2002 (FSP Licence Number 31935), authorised to provide "intermediary services" to South African investors.

Switzerland—Issued in Switzerland by T. Rowe Price (Switzerland) GmbH, Talstrasse 65, 6th Floor, 8001 Zurich, Switzerland. For Qualified Investors only.

Taiwan—This does not provide investment advice or recommendations. Nothing in this material shall be considered a solicitation to buy, or an offer to sell, a security, or any other product or service, to any person in the Republic of China.

Thailand—This material has not been and will not be filed with or approved by the Securities Exchange Commission of Thailand or any other regulatory authority in Thailand. The material is provided solely to "institutional investors" as defined under relevant Thai laws and regulations. No distribution of this material to any member of the public in Thailand is permitted. Nothing in this material shall be considered a provision of service, or a solicitation to buy, or an offer to sell, a security, or any other product or service, to any person where such provision, offer, solicitation, purchase or sale would be unlawful under relevant Thai laws and regulations.

UK—This material is issued and approved by T. Rowe Price International Ltd, 60 Queen Victoria Street, London, EC4N 4TZ which is authorised and regulated by the UK Financial Conduct Authority. For Professional Clients only.

USA—Issued in the USA by T. Rowe Price Associates, Inc., 100 East Pratt Street, Baltimore, MD, 21202, which is regulated by the U.S. Securities and Exchange Commission. For Institutional Investors only.

© 2020 T. Rowe Price. All rights reserved. T. ROWE PRICE, INVEST WITH CONFIDENCE, and the bighorn sheep design are, collectively and/or apart, trademarks or registered trademarks of T. Rowe Price Group, Inc.