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Covid-19 vaccine approvals and stock market returns: The case of Chinese stocks

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ARTICLE INFO

Article history:
Received 6 December 2021
Received in revised form 25 March 2022
Accepted 27 March 2022
Available online 1 April 2022

JEL classification:
G14
I18

Keywords:
COVID-19
Vaccine news
Stock market returns

ABSTRACT

This paper investigates the Chinese stock market reactions to the announcements of Covid-19 vaccine approvals. These announcements generally impacted stock prices, but the impacts appeared to be heterogeneous across sectors. Particularly, firms in the manufacturing, wholesale, retail, and information technology sectors were persistently benefited. We also find that firms with poorer performance, smaller sizes, and greater ages reacted more positively compared to others.

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1. Introduction

The coronavirus (SARS-CoV-2) spreads worldwide rapidly. By March 16, 2022, the total number of confirmed cases was over 462 million, and the cumulative death toll was over 6 million.1 The pandemic has significantly impacted the world economy. Because there was no specific drug in the early pandemic stage, many countries adopted preventive measures such as quarantine, social distancing, lockdowns, and travel restrictions to combat the spread of the virus. Traditional service industries, such as the tourism and catering industries, have been struck. On the other hand, because of the rising demand for medical resources across the globe, the pharmaceutical and healthcare industries might grow because of the pandemic. Covid-19 vaccines are important weapons against the coronavirus. Therefore, the approvals of Covid-19 vaccines provide hope and confidence in economic recovery.

In this paper, we first study how vaccine approvals affect the stock market in terms of cumulative average abnormal return (CAAR). Then we investigate their impacts on stocks in different sectors. Lastly, we explore the relationships between firm characteristics and cumulative abnormal returns (CARs). We find that vaccine approvals affect the stock market positively. In general, they generate positive CAARs for almost all sectors. We also find that certain firm characteristics, such as ROA, tangible assets ratio, and size, are negatively correlated to CARs. At the same time, age and financial leverage are positively correlated to CARs.

Previous studies often find that infectious diseases, such as SARS and flu, affect stock markets in a negative way (Chen et al., 2018; McTier et al., 2013). A growing number of studies investigate the effects of the Covid-19 outbreak on the stock markets (for example, see Eichenbaum et al., 2021; Phan and Narayan, 2020; Cao et al., 2021; Harjoto et al., 2021; Heyden and Heyden, 2021). Yan (2020) shows that stock prices in China fall sharply after the lockdown of Wuhan. He et al. (2020) and Wang et al. (2021) study Covid-19’s impacts on stock prices across different sectors in China. They find that the impacts are heterogeneous. Wang et al. (2021) also find that listed firms with higher debt levels were more negatively affected. Yi et al. (2021) show that corporate social responsibility rating is positively associated with CAR. Interestingly, Arteaga-Garavito et al. (2021) find that in many countries, the release of Covid-related news helps equities in general, regardless of whether the news is positive or negative.

Our paper makes several contributions. First, we investigate the impacts of the news of several Covid-19 vaccine approvals on the Chinese stock returns. Second, we provide a sectoral analysis, which deepens the understanding of how stocks in different sectors respond to this type of news. Third, we explore how firms’ characteristics correlate to their CARs in these events.
The CAAR from day \(-n\) to day \(n\) around event \(T\) is
\[
CAAR[-n, n]_{IT} = \frac{\sum_{t=-n}^{n} CAR[-n, n]_{it}}{K},
\]
where \(K\) is the number of firms. Our benchmark model is specified as follows:
\[
CAR[-n, n]_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 Tan_{it} + \beta_3 Lev_{it} + \beta_4 Age_{i} + \beta_5 Size_{i} + \sum_{s=1}^{S} FE_{s}\eps_{it},
\]
where \(ROA\) is the return on assets, \(Tan\) is the tangible assets ratio, \(Lev\) is the log of financial leverage, \(Age\) is the gap between the event year and the IPO year, and \(Size\) is the log of total assets.\(^{6}\) We control for time-fixed effects, province-fixed effects, and industry-fixed effects. We focus on the cases where \(n = 3, 4,\) and 5.

3. Empirical results

Table 1 Panel A reports the stock market reactions to the four events. The CAARs are positive across the \([-3, 3]\), \([-4, 4]\), and \([-5, 5]\) event windows; in addition, they are all significant at the 1% level. These indicate that the market reacted positively to the announcements of Covid-19 vaccine approvals. Table 1 Panel B reports the results from the constant mean return model (see Mackinlay (1997)), and it shows that our results are robust.

We divide firms into different sectors using the China Securities Regulatory Commission (CSRC) Industry Classification (2012 Edition). Table 2 presents the sectoral CAARs over the three event windows. In the table, MR is the mean return of the sector (on the left of the CAARs), and \(N\) is the number of firms in the sector (on the left of the stars).\(^{7}\)

Overall, the short-term reactions to the events are positive for most sectors.\(^{8}\) By contrast, Wang et al. (2021) find that the short-term reactions to the Wuhan lockdown on January 23, 2020 are negative for the majority of sectors. Column 3 shows that sectors such as construction, business service, and public management were strongly boosted by the CanSino and SinoPharm (Wuhan) vaccine approval announcements, reporting CAARs of 12.2%, 10.3%, and 16.6%, respectively. While we see mixed results for some sectors, results for manufacturing, wholesale&retail, and information technology are persistently significant and positive across events and event windows. Another observation from Table 2 is that there are more significant results in columns 1 to 6 than in columns 7 to 12. This indicates that stocks in some sectors

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\(^{2}\) CanSino and SinoPharm (Wuhan) were conditionally approved by China. On March 17, Zhifei announced that its vaccine was approved for emergency use by China. SinoPharm (Beijing) and SinoVac were listed for emergency use by the World Health Organization (WHO).

\(^{3}\) The announcement of SinoPharm (Beijing)'s conditional approval from China was made one day after its clinical trial data was revealed. A few days after China conditionally approved SinoVac, the stock market was closed for a week (lunar new year holiday). The impacts of these two events are hard to evaluate, so we do not include them.

\(^{4}\) Firms under special treatment have the prefix “ST” in front of their stock names.

\(^{5}\) This index is collected from investing.com.

\(^{6}\) ROA, Tan, and Lev are quarterly. Age and Size are yearly.

\(^{7}\) They are calculated using data from February 18, 2021 to June 08, 2021. So our event windows are covered.

\(^{8}\) Sectors that have unstable results are typically small.
In regressions (2), (5), and (8), we also control for province-fixed effects; in regressions (3), (6), and (9), we further control for industry-fixed effects. It appears that our results are quite robust across event windows and specifications: there are only minor differences in the results, as well as their significances.

ROA, Tan, and Size are negatively correlated to CARs, while Age and Lev are positively correlated to CARs. In other words, firms that have high CARs have poor performance, low tangible assets ratios, and high financial leverages and are small and old. Without loss of generality, we take a closer look at the sixth column. The coefficient of ROA is −0.1324, and it is statistically significant at the 1% level. This implies a one standard deviation increase in ROA (0.025) from its mean reduces CAR[-4, 4] by 0.331%. Similarly, the coefficient of Size is −0.0097, and a one standard deviation increase in Size (1.402) from its mean reduces CAR[-4, 4] by 1.356%. By contrast, the coefficient of Age is 0.0004, and a one standard deviation increase in Age (8.433) from its mean increases CAR[-4, 4] by 0.337%.

**4. Conclusion**

This paper extends the Covid-19 literature in economics and finance. We explored the impacts of Covid-19 vaccine announcements on the Chinese stock market. We find that these announcements positively impacted stock prices in general. We also find that stocks in different sectors react differently to the announcements. Interestingly, firms with poorer performance, smaller sizes, and greater ages might benefit more from this type of positive public health announcement.
Table 4
Pearson correlation matrix.

|          | CAR[-3, 3] | CAR[-4, 4] | CAR[-5, 5] | ROA   | Tan   | Age   | Lev   | Size   |
|----------|------------|------------|------------|-------|-------|-------|-------|--------|
| CAR[-3, 3] | 1          | 0.904***   | 0.826***   | -0.015* | -0.019** | -0.007** | -0.087*** | -0.1250*** |
| CAR[-4, 4] | 0.904***   | 1          | 0.927***   | -0.047*** | -0.027*** | -0.009*** | -0.095*** | -0.1324*** |
| CAR[-5, 5] | 0.826***   | 0.927***   | 1          | -0.043*** | -0.033*** | -0.010*** | -0.104*** | -0.1521*** |
| ROA   | -0.015*    | -0.047***  | -0.043***  | 1      | -0.031*** | -0.028*** | -0.095*** | -0.104*** |
| Tan   | -0.019**   | -0.027***  | -0.033***  | -0.031*** | 1      | -0.029*** | -0.104*** | -0.104*** |
| Age   | -0.007**   | -0.009***  | -0.010***  | -0.028*** | -0.033*** | 1      | -0.104*** | -0.104*** |
| Lev   | 0.023***   | 0.023***   | 0.028***   | -0.006*** | -0.007*** | -0.010*** | 1      | -0.104*** |
| Size   | -0.087***  | -0.095***  | -0.104***  | -0.104*** | -0.104*** | -0.104*** | 1      | 1      |

*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 5
Regression results.

|          | [1] CAR[-3,3] | [2] CAR[-3,3] | [3] CAR[-3,3] | [4] CAR[-4, 4] | [5] CAR[-4, 4] | [6] CAR[-5, 5] | [7] CAR[-5, 5] | [8] CAR[-5, 5] | [9] CAR[-5, 5] |
|----------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Intercept| 0.1898***     | 0.1929***     | 0.2083***     | 0.2648***      | 0.2687***      | 0.2854***      | 0.3023***      | 0.3082***      | 0.3282***      |
| ROA      | -0.1282***    | -0.1260***    | -0.1154***    | -0.1587***     | -0.1521***     | -0.1324***     | -0.1535***     | -0.1420***     | -0.1126***     |
| Tan      | -0.0186**     | -0.0176**     | -0.0202**     | -0.0311***     | -0.0298***     | -0.0350***     | -0.0427***     | -0.0418***     | -0.0497***     |
| Age      | 0.0040***     | 0.0004***     | 0.0003***     | 0.0005***      | 0.0005***      | 0.0005***      | 0.0005***      | 0.0005***      | 0.0004***      |
| Lev      | 0.0024***     | 0.0049***     | 0.0039***     | 0.0067***      | 0.0065***      | 0.0056***      | 0.0090***      | 0.0087***      | 0.0080***      |
| Size     | -0.0069***    | -0.0060***    | -0.0075***    | -0.0090***     | -0.0092***     | -0.0097***     | -0.0100***     | -0.0103***     | -0.0110***     |
| FE      | YES           | YES           | YES           | YES            | YES            | YES            | YES            | YES            | YES            |
| Time     | YES           | YES           | YES           | YES            | YES            | YES            | YES            | YES            | YES            |
| Province | YES           | YES           | YES           | YES            | YES            | YES            | YES            | YES            | YES            |
| Industry | YES           | YES           | YES           | YES            | YES            | YES            | YES            | YES            | YES            |
| N       | 13205         | 13205         | 13205         | 13205          | 13205          | 13205          | 13205          | 13205          | 13205          |
| $R^2$   | 0.0266        | 0.0278        | 0.0306        | 0.0324         | 0.0340         | 0.0369         | 0.0519         | 0.0534         | 0.0573         |

Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Acknowledgment

Da Yang is grateful to the Think Tank Project of the Liaoning Provincial Education Department, China grant number LZX201902, the financial support of National Social Science Fund of China grant number 21VGQ027, and the Humanities and Social Science Research Foundation of the Ministry of Education of China grant number LNUJD201703.

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