How trade affects pandemics? Evidence from severe acute respiratory syndromes in 2003

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Abstract
This paper investigates whether the rapid expansion of international trade after China's WTO entry in 2001 promotes the spread of severe acute respiratory syndromes (SARS) in 2003. Examining the relationship is helpful to distinguish the hidden costs of trade openness. This paper uses Frankel and Romer (1999, The American Economic Review, 89, 379) framework to construct the geography-based instruments by applying province-country gravity relation for causal identification. Utilising cross-section data of SARS cases of 31 provinces in China, our two-stage least squares regression results show that international trade accelerates the spread of SARS. Cross-country evidence also suggests the causal relation. In addition, we find that the people's inter-provincial mobility driven by trade expansion drives the spread of epidemic diseases.

KEYWORDS
gravity model, health, instrument, international trade, SARS

1 INTRODUCTION
The novel coronavirus (COVID-19) was identified in Wuhan, China, in December 2019 among a cluster of patients that presented with an unidentified form of viral pneumonia with shared history of visiting the Huanan seafood market. On 11 March 2020, the World Health Organization announced that the COVID-19 virus was officially a pandemic after barreling through 114 countries in three months and infecting over 118,000 people. Without a vaccine available, in the globalised
world, at the time of writing, the virus now spread along trade lines to nearly all countries in the globe, infecting nearly 30,000,000 people, causing over 2,300,000 deaths. And the spread was not anywhere near finished.

COVID-19 is caused by a novel coronavirus—a new coronavirus strain that has not been previously found in people. Symptoms include respiratory problems, fever and cough, and can lead to pneumonia and death. Like SARS, it is spread through droplets from sneezes. Although globalisation is regarded as the main cause of the rapid spread of the epidemic; however, there is no well established body of clear, causal evidence of its effects. This paper tries to fill this gap on one hand.

On the other, in low-income countries, the adoption of trade-led growth policies has been a popular approach among policymakers for promoting economic development. However, what is less clear is how costly it is to achieve growth through trade, especially on questions such as how trade liberalisation influences public health?

The conventional wisdom argues that an increase in globalisation and trade in the developing world will make people better off not only through increases in income but also through improvements in health because we often observe a positive link between income and health (Dollar, 2001; Levine & Rothman, 2006; Owen & Wu, 2007; Pritchett & Summers, 1996). However, some recent studies document totally different evidence and call into question whether trade really benefits health (Bombardini & Li, 2020; Fan et al., 2020 for China). Particularly, in the case of communicable diseases, historical episodes suggest that trade (while good for income) may be detrimental to health by promoting disease spread, for example, the Black Plague case originating from foreign merchant ships, and then spreading to the Asian region along the trade belt (Wagner, 2014) and HIV case in Africa by trucking (Lin & Sim, 2015; Oster, 2012).

In this paper, we explore the question of whether trade can be detrimental to health in an important policy context: SARS in mainland China in 2003. China's international trade was the most important driving force for China's economic growth for more than 40 years. After China joined the WTO at the end of 2001, trade expanded very fast, 22% growth in 2002 and 37% growth rate in 2003, while before WTO accession the growth of trade in 2001 was only around 7%. At the same time when trade expanded crazily in 2003, the first SARS epidemic was found in Guangdong, a province whose trade topped all the provinces in mainland China and accounted for around 40% of the national trade volume.

Is this a coincidence? Comparing the two events at the same time, we can find that the SARS epidemic happened just after China joined the WTO and with the take off of trade. This leads us to conjecture whether the positive correlation between the two is causal. If the historical evidence is a guide, increases in trade have the potential to increase the spread of the virus. This concern seems particularly worrying since individuals involved in trade-related activities, such as migrant workers are more likely to be infected with SARS. In 2003, there are a number of cases that migrant workers brought the virus back and subsequently caused the spread in local area. For example, in Sichuan, four migrant workers working in Guangdong were diagnosed after returning home in the early days of the outbreak. In Hunan, five migrant workers in Guangdong were confirmed after returning home, and imported

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1Although SARS and COVID-19 look similar, however, the spread of COVID-19 is much faster. Rely on strong isolation and blocking the route of transmission, on one hand, SARS was controlled soon after outburst. Unfortunately, due to improper prevention and control measures in Europe and United States, COVID-19 has become a global pandemic and it is now not easy to control it completely until enough vaccine is available. On the other, SARS is not as many people say that it is gone forever, but repeatedly attacking mankind. In 2003/9, 2003/12, 2004/1, 2004/4, 2008 and 2013, we had SARS case reports. See the news report at: http://k.sina.com.cn/article_1614857442_6040c4e201900q126.html.
cases became the main source of the epidemic. Similarly, Shanxi businessmen became ill after they came home from Guangdong.2

This paper focuses on estimating the impact of international trade activity on SARS incidence within a country from cross-province level data. The central question is whether the increase in trade increases SARS prevalence causally. To address the possible endogeneity of trade openness, we use Frankel and Romer (1999) methodology to construct geography-based instruments by running province-country level gravity equations.3 Using this two-stage least square regression technique, we find a fairly consistent positive causal relationship between trade and new SARS infections: 1% increase of trade leads to a 6.55% increase in the incidence.

Finally, we show that the underlying mechanisms driving the causal relationship between trade and SARS incidence. In the link between trade and infectious diseases, a natural logic indicates that trade activities promote the flow of people and speeds up the spread of disease. Therefore, this paper suggests that the linkage mechanism may be as follows: The increase of trade will promote the flow of people, especially migrant workers. We find that, conditional on income, railway transportation and migration can explain the causal relationship between trade and SARS incidence.

Our paper contributes to the several streams of literature. First, our paper contributes to the literature that directly analyses the impacts of globalisation on epidemic diseases. While Mary and Wilson (1996) pointed that human migration is the path of transmission of infectious diseases and Tatem et al. (2006) as well as Tong and James (2017) argue that trade could improve the global transmission speed of the virus; however, they did not give direct empirical evidence between trade and infectious diseases. Although Oster (2012) and Lin and Sim (2015) show such evidence that the increase of trade had a positive effect on the incidence of HIV in Africa, more evidence from other continents is needed. We hence offer the evidence from China to show that the positive link between trade and epidemic diseases could be the general pattern. We focus on China also because China is the world's largest exporting economy and also the largest population. Thus, it is crucial to understand the consequence of its trade policy on public health.

Second, our paper contributes to the literature that looks into how trade liberalisation affects health in general. For example, from child health perspective, existing studies have examined the link between trade and child health through channels such as income improving (Dollar, 2001; Levine & Rothman, 2006; Pritchett & Summers, 1996), knowledge spillover (Owen and Wu, 2007) and the environment deterioration (Bombardini & Li, 2020). From worker health perspective, the literature using individual-level survey data focus on the effects of trade liberalisation on worker health from channels via import competition (Colantone et al., 2015; McManus & Schaur, 2016; Pierce & Schott, 2016) and export expansion (Hummels et al., 2016). In a summary about previous literature, only Dollar (2001), Levine and Rothman (2006), Owen and Wu (2007), and Pritchett and Summers (1996), document evidences that trade benefits health while the majority find a negative impact reminding the hidden cost of trade liberalisation. Thus, it can be seen that the related research between trade and health still needs to be further explored, and it is also a big issue that China needs to pay attention to in the future.

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2See the website for details. https://baike.baidu.com/item/SARS%E4%BA%8B%E4%BB%B6/7702261?fr=aladdin. Visit time: 2019.3.6.

3This instrument variable is widely used in numerous economic papers (Alcala & Ciccone, 2004; Baghdadi et al., 2013; Levine & Rothman, 2006; Frankel & Romer 1999; Frankel & Rose, 2005; Irwin & Tervio 2002; Noguera & Siscart, 2005).
Thirdly, our paper is also related to the strand of literature on the impact of trade liberalisation on China. Dimensions along with firm's performance include improved total firm's productivity (Amiti & Konings, 2007; Brandt et al., 2017; Halpern et al., 2015; Kasahara & Rodrigue, 2008), expanded product scope (Goldberg et al., 2010), upgraded export quality (Bas & Strauss-Kahn, 2015; Fan et al., 2015), reduced firm's innovation (Liu & Qiu, 2016) and the education level (Li, 2018).

We structure the paper as follows. In Section 2, we describe the background of SARS. Section 3 describes our data, empirical strategy and checks on identifying assumption. Section 4 shows the benchmark result, robustness check and mechanism analysis, and cross-country evidence. Finally, Section 5 concludes the paper.

2 | SARS IN 2003

Severe acute respiratory syndromes refers to severe acute respiratory syndrome (SARS), which is a serious infectious disease. The disease is commonly referred to as ‘atypical pneumonia’ in mainland China and is referred to as ‘SARS’. It was first discovered and identified in Shunde, Guangdong province, China on 16 November 2002. After several months of cases, Severe Acute Respiratory Syndrome is believed to have possibly started with bats, spread to cats and then to humans in China, followed by other countries.

For the following nine months, the SARS spread to 24 provinces across the country. Until 7 August 2003, a total of 8422 cases and 916 deaths were reported and it spread to 29 countries. Among them, China is the country with the most serious epidemic. The cases and the deaths in mainland China are 5327 and 349 respectively.

The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) produced when an infected person coughs or sneezes. Droplet spread can happen when droplets from the cough or sneeze of an infected person are propelled a short distance (generally up to 3 feet) through the air and deposited on the mucous membranes of the mouth, nose or eyes of persons who are nearby. The virus also can spread when a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose or eye(s). Quarantine efforts proved effective and by July, the virus was contained and hasn't reappeared since. SARS was seen by global health professionals as a wake-up call to improve outbreak responses, and lessons from the pandemic were used to keep diseases like H1N1, Ebola and Zika under control.

3 | DATA AND EMPIRICAL STRATEGY

3.1 | Data

The data in this paper come from several sources:

1. The cases of SARS data of 31 provinces and other countries are from the State Council Information Office and World Health Organization. We collect the data on line by searching the websites. This paper uses the SARS data of the number of incidences, the amount of deaths and the number of infection cases except for the healthcare workers, such as doctors and nurses.
2. Trade data are from China Customs in 2002 including province-level trade data, province-country bilateral level trade, and China-third country bilateral level data.

3. The provincial-level population, highway miles per unit area, railway miles per unit area, GDP per capita, and urbanisation information is from China National Bureau of Statistics.

4. Migrant workers to local population among regions are computed from 2000 population census.

5. As for the construction of the instrumental variable, the gravity variable such as the provincial population and area data is from the provincial statistical yearbook.

The population of trading countries and area is largely from the World Development Indicators from the World Bank. The distance of a province and the trading country is calculated by the spatial distance between the Capitals of province and country. Landlocked information, border information and islands information are measured in Google map.

### 3.2 Empirical strategy

This paper uses the gravity model of Frankel and Romer (1999) to construct province-level trade openness instrument which is determined by exogeneous geography factors. We use the following gravity equation (1) to fit the trade pattern between province-country level bilateral trade. The trade share in the left-hand side is measured by the amount of trade between the province in China and their trading countries dividing the GDP of the province \( \frac{T_{ij}}{GDP_i} \). The amount of trade share is a function of the distance between them \( D_{ij} \), the populations \( N_i \) and \( N_j \), the areas \( A_i \) and \( A_j \), either of them is landlocked or not \( L_i \) and \( L_j \), 0 for two landlocked, otherwise, 1; whether there is a common border between them \( B_{ij} \), and six interactions between the border and other variables.

\[
\ln \left( \frac{T_{ij}}{GDP_i} \right) = b_0 + b_1 \ln D_{ij} + b_2 \ln N_i + b_3 \ln A_i + b_4 \ln N_j + b_5 \ln A_j + b_6 (L_i + L_j) \\
+ b_7 B_{ij} \ln D_{ij} + b_8 B_{ij} \ln N_i + b_9 B_{ij} \ln A_i + b_{10} B_{ij} \ln N_j + b_{11} B_{ij} \ln A_j + b_{12} B_{ij} (L_i + L_j) + \varepsilon_{ij}.
\]  

Table 1 reports the regression results using 2002 bilateral trade data to estimate equation (1). Generally, we can see that gravity works well in predicting bilateral trade between province and their country partners. Population size positively affects trade. Regions trade more with nearby partners and especially sharing the same border. Landlocked regions trade less and big regions also seem to trade less than regions with low areas.

The fitted values from equation (1) (column (2) of Table 1) are the predicted geographic components of each Chinese province’s trade with each country partner. Province-level geography determined trade is got by summing the fitted values such as \( \bar{T}_{ij} \)

\[
\bar{T}_{ij} = j \left\{ \sum \hat{b}^t X_{ij} \right\},
\]

where \( \hat{b} \) is a vector of the coefficients in Equation (1) and \( X_{ij} \) is the vector of the variables in the right hand. As shown in Figure 1, the predicted province-level trade share is actually highly correlated with the actual trade share, almost on the 45-degree line.

Our main estimating equation relates to SARS in province \( i \), as:

\[
\ln (E_i) = \alpha + \beta T_i + \delta Z_i + \varepsilon_i
\]
The variable $E_i$ measures the number of total SARS incidence cases during 2002–2003 in each province. The main causal variable $T_i$ is measured by trade over GDP ratio in 2002. $Z_i$ denotes other control variables in our baseline regression, robustness check and channel investigation, which includes the amount of population, highway miles per unit area, roadway miles per unit area, the logarithmic of GDP per capita and immigrants share. Finally, $\epsilon_i$ is the robust standard error term.

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The extent of how export expansion affects child health is summarised by $\beta$. This cannot be consistently estimated by OLS regression as trade is likely to be endogenous in the equation. For example, health condition could affect trade reversely. Healthy people can produce and consume more and thus trade more. Thus, $\beta$ is very likely to be underestimated in the absolute value. This paper uses gravity equation to construct the geography-based exogeneous instrument $\hat{T}_i$. Hence, the first-stage equation looks as:

$$T_i = \theta + \rho \hat{T}_i + \varphi Z_i + \epsilon_i$$  \hspace{1cm} (3)

Equation (2) is estimated using two-stage least squares in conjunction with (3) as the first-stage regression. We also estimate the effect of geography determined trade openness instrument on SRAS by looking at the reduced form equation:

$$\ln (E_i) = \pi + \gamma \hat{T}_i + \mu Z_i + \delta_i$$  \hspace{1cm} (4)

Table 2 reports the descriptive statistics for the main variables in this paper.

4 | RESULTS

Table 3 reports the main results of the paper. We first report our results from estimating equation (2) by ordinary least squares (OLS) method. While OLS regression is unidentified, it nonetheless provides a useful starting point for investigating the direction of bias in the estimate of how trade affects the spread of pandemics. Column (1) reports our naive regression with the only interested variable being included, and we can find that the estimated coefficient for our OLS estimator is around 2.83. The significant and positive correlation between trade and SARS incidence cases are at least not good news to us, although it is by no means indicative of a causal relationship. We then add all the control variables including the
population, income level measured by log GDP of per capita, distance to Guangdong and Beijing since the two provinces had the largest number of incidence cases in column (2).

Once these determinants are accounted for by the specification, is there any room left for the coefficient of exports? Interestingly, the answer is unambiguously positive. After including controls, we can see that our regression results even increased from 2.83 to 3.76. This pattern suggests at first blush that the OLS estimate is downward biased. The possible underestimate is due to negative reverse causality. Negative reverse causality bias arises since bad health has a negative effect on trade. Random measurement error in national accounts statistics also implies that OLS estimates are attenuated towards zero.

The results of the control variables are also in line with expectations. For example, more population leads to higher incidence rates of SARS. Near Guangdong and Beijing are more likely to be infected with SARS. The regression coefficient of per capita GDP logarithm is \(-2.38\). Although it is not significant, its negative relationship confirms the plausible conclusion that trade promotes the increase of income and then improves the level of public health.

To reduce the degree of endogeneity within the OLS framework and establish the causal relationship between trade and SARS, Column (3) presents the results of the second stage of a two-stage least squares regression (2SLS) of logarithmic of SARS cases on actual trade share instrumented by geographical trade share. The estimated coefficient for geographical trade share is 6.55 and is statistically significant at the 1% level of confidence. Compared to the coefficient of the result of OLS (3.76, significant at 10%), both the significance level and the magnitude of the coefficient increased. In other words, OLS results are severely underestimated due to endogeneity and when other conditions remain unchanged, a one-unit change in trade as a share of GDP corresponds to about a 6.55 per cent decrease in SARS cases. It means that trade accelerates the spread of SARS plausibly.

Concerning identification, we also report the first-stage regression results in column (4). We find that the coefficient is 0.74 and is significant at the level of 1%. More importantly, the first-stage F-statistic for geographical trade share is 37.90, which are well above the rule-of-thumb threshold

| TABLE 3 | Trade effect on SARS |
|----------|----------------------|
|          | (1) OLS | (2) OLS | (3) 2SLS-IV | (4) First stage | (5) Reduced |
| ln (Ei)  | ln (Ei)  | ln (Ei)  | T       | ln (Ei)  |
| \(T(\bar{T})\) | 2.83** | 3.76* | 6.55*** | 0.74*** | 4.82*** |
| (1.15)   | (2.18)  | (1.83)  | (0.17)  | (1.63)  |          |
| Population | 2.25** | 2.09** | 0.06   | 1.71    |          |
| (1.08)   | (0.97)  | (0.07)  | (1.19)  |          |          |
| Log (GDP per capita) | −1.10 | −2.38 | 0.18** | −1.24 |
| (1.52)   | (1.58)  | (0.07)  | (1.07)  |          |          |
| Distance to Guangdong | 1.10 | 2.38*** | 0.18** | 1.24 |
| (1.52)   | (2.58)  | (0.07)  | (1.07)  |          |          |
| Distance to Beijing | 5.14** | 6.67*** | 0.30** | 4.73** |
| (2.32)   | (2.42)  | (0.13)  | (2.18)  |          |          |
| N         | 31.00   | 31.00   | 31.00   | 31.00   |          |
| \(R^2\)  | .17     | .50     | .45     | .86     | .57      |

Notes: Robust standard errors in parentheses; (1) contains no control variables; (2)–(5) contains all the control variables.
*Significant at 10%; **Significant at 5%; ***Significant at 1%.
of 10 suggested by Staiger and Stock (1997). Column (5) shows the reduced regression results of the
effect of geography determined trade share on the cases of SARS directly. The trade effect is 4.82 and
is significant at the level of 1%. The results also confirm that the instrument variable has a significant
positive effect on the incidences of SARS.

On top of the baseline regression results in Table 3, we will investigate the possible channels link
the trade and pandemics, provide cross-country evidence and conduct a number of robustness checks
to support our argument in the remainder of the paper.

4.1 | Channels

In the literature, Mary and Wilson (1996) pointed that human migration is the path of transmission of
infectious diseases and Tatem et al. (2006) as well as Tong and James (2017) argue that trade could
improve the global transmission speed of the virus. Lin and Sim (2015) and Oster (2012) show direct
evidence that trade and mobility of people promoted the spread of HIV among African countries.
Hence, the possible causal channel proposed is that the development of trade promotes the frequency
of commercial activities, thus accelerating the flow of people and improving the possibility of virus
transmission.

This inference also has much anecdotal evidence. In year 2003, most of the provinces had the
epidemic occurred in imported cases, and subsequently caused the spread in local, including migrant
workers returning to home and businessmen return. For example, in Sichuan, four migrant workers
working in Guangdong were diagnosed after returning home in the early days of the outbreak. In
Hunan, five migrant workers in Guangdong were confirmed after returning home, and imported cases
became the main source of the epidemic. Similarly, Shanxi businessmen became ill after they came
home from Guangdong, and later entered Beijing, whom causing disease transmission in Shanxi and
Beijing.

From the anecdotal evidence, we can conjecture that mobility may be a dominated indicator. We
hence add the highway intensity, railway intensity and migrant population to local population ratio in
each province. The results of Table 4 show that when we control the transportation intensity which
measures the mobility of people indirectly in column (1), the coefficient of our main causal variable
reduced to 2.04 from our baseline estimate of 6.55. Column (2) adds migrant population to local
population ratio directly, the coefficient becomes to be not significant and the magnitude is near zero.

This shows that the flow of people is an important casual channel for the spread of infectious dis-
eases caused by international trade, because when they are added into the equation, the trade share
coefficient and significance level are greatly reduced. Thus, conditioning on people mobility mea-
sured by transportation and migration ratio, reduces the estimated effect of trade openness on SARS
incidence from statistically significant positive value to statistically insignificant and near zero one.
Taken on their face, these results suggest that a meaningful share of the positive effect of trade on
SARS operates through the channels of the increase of flow of people which is induced by trade.

The regression results of transportation variables show that railway intensity dominates the effect
while roadway loses significance in column (2) and negative in both cases. The main reason might be
that railway transportation is the main way to transport the large number of people between provinces
especially distant ones. We can also see that immigration ratio significantly increases the incidence
of SARS. Moreover, we show in column (3) and (4) that trade actually increases railway intensity and
immigration share. Therefore, the relationship between international trade and the SARS disease is
not simply that the trade development directly leads to SARS disease outbreaks. Under the support of
a complete transportation system, trade will promote people's inter-provincial mobility, thus accelerating the spread of epidemic diseases.

4.2 Cross-country evidence

To show more evidence, we collect cross-country SARS information to test whether international trade accelerated the spread of SARS. The number of SARS cases in various countries was taken from the World Health Organization (WHO), and the bilateral trade volume between China and other countries from the China Statistical Yearbook. It can be seen from Figure 2 that there is a strong linear relationship between the volume of bilateral trade and the number of SARS cases, which proves to some extent that the SARS epidemic spread to other countries outside China with the international trade.

We also report the regression results using conventional gravity controls in Table 5, which shows that after including other gravity variables, the elasticity between bilateral trade volume and the number of SARS cases is 0.80. In other words, the bilateral trade volume increases by 1%, and the number of SARS cases increases by 0.8%. Finally, we also use geography determined trade predicted from gravity to instrument actual trade and run the 2SLS regression results. Column (3) shows the 2SLS regression estimates. We can see that as the case of our baseline, the cross-country evidence also show that the 2SLS results are greater than the OLS regression estimate, suggesting the large causal effect of trade on the spread of pandemics.

4.3 Robustness checks

In this section, we mainly examine the robustness of the sign and statistical significance of the effect of trade expansion on SARS in our cross-province results. We consider several sensitivity tests from using new openness variables to change the outcome variable and redefine the instruments to
conduct various robustness checks. In our baseline, we use trade over GDP as the main measure and we now use the amount of trade volume per capita and export volume to GDP as the openness measure. Column (1) and (2) in Table 6 show the results. The elasticity of per capita trade volume to the cases of SARS cases is 0.61, which is significant at 5%. Similarly, we take the exports per GDP as an independent variable, and the estimated results are consistent with the previous conclusions.

In our baseline, we use the number of incidence cases as the main outcome variable. Now we use the number of deaths from SARS in each province as another indicator to do the robustness check. Besides, in the epidemic situation of SARS, medical and nursing staffs become vulnerable to infection because of the particularity of occupation, but the probability of their infection has few relationships
with the mobility of people caused by the development of trade in a province. Therefore, we used the number of cases of infection (total number of infections minus the number of infections among healthcare workers) as dependent variables. Column (3) and (4) in Table 6 reports the results which are still consistent with the previous results. According to second-stage results, when other conditions remain unchanged, the share of trade increases by one unit and the number of SARS deaths and the ordinary cases increases by 4.53 and 6.44 per cent, respectively.

In our baseline, we use Frankel and Romer (1999) methodology to construct instruments, now we directly uses distance to the coast as instruments Cosar and Fajgelbaum (2016). The closer the coastline is, the greater the trade volume is, and whether the province is coast or inland is an exogenous variable. Therefore, this paper use distance to the coast as another exogenous instrument variable of international trade to check the robustness. Column (5) reports the results and we the regression results are still significant. When other conditions remain unchanged, the share of trade increases by one unit and the number of SARS cases increases by 3.46%.

### Table 6: The alternative independent and outcome variables

|                | (1) IV | (2) IV | (3) (IV) | (4) (IV) | (5) (IV) |
|----------------|--------|--------|----------|----------|----------|
| ln(E₁)         | 0.61** | (0.26) |          |          |          |
| ln(E₁)         |        |        | Deaths   |          |          |
| Deaths         | 4.53***| (1.53) | 6.44***  | (2.23)   | 3.46*    |
| Ordinary cases | 6.29*  | (3.32) |          |          |          |
| Distance       |        |        |          |          |          |
| Trade volume per capita |        |        |          |          |          |
| Export volume per GDP |        |        |          |          |          |
| Controls       | Yes    | Yes    | Yes      | Yes      | Yes      |
| N              | 31.00  | 31.00  | 31.00    | 31.00    | 31.00    |
| R²             | .45    | .49    | .36      | .42      | .18      |

Robust standard errors in parentheses.

*Significant at 10%.; **Significant at 5%.; ***Significant at 1%.

5 CONCLUSION

Public health involves everyone’s welfare and health issues. It is also one of the indicators for the development level of countries. This article uses cross-provincial and cross-country data, builds province-country international trade instrument variables based on gravity model and explores the impact of international trade on SARS epidemic. This paper finds that the development of international trade has a positive impact on the spread of SARS epidemic in China. At the same time, under the support of a complete transportation system, the development of international trade will promote the increase of people’s mobility, thus promoting the spread of disease.

Our finding may have some policy implications. The development of international trade promotes the flow of people between regions, thus providing the possibility of the spread of infectious diseases. This will remind various governments to take measures to provide protection for national health while expanding its openness. However, this paper also has some shortcomings, for example, due to data
issue, the sample size is small and we only consider a special disease, SARS, thus, causal claims should be taken with some caution, although we argue that this evidence is suggestive of a causal relationship.

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