

The 2015 Chinese Food Safety Law and Market Quality*

Qizhi Wang

Rui Ota[†]

Maruha Nichiro Corporation

Department of Economics

Yokohama City University

January 1, 2018

Abstract

Safety standards such as food safety laws provide the necessary infrastructure within which to conduct smoother transactions in a market economy. This study investigates the impact of China's revised Food Safety Law, which took effect in October 2015, on its capital market. Using an event study approach, we empirically analyze the impact of nine official news events about the new Food Safety Law on the stock prices of companies engaged in food-related businesses, such as dairy products, foods and drinks. The study demonstrates that three news events have a statistically significant and robust impact, and that all of the events have a negative influence on the prices.

*This paper is based on Wang's master thesis submitted to Yokohama City University (Wang, 2017). We appreciate the beneficial comments from Yoshiyuki Nakazono, Junichiro Wada, and the participants of The 2017 International Academic Consortium for Sustainable Cities. Ota gratefully acknowledges the financial support of the Grant-in-Aid for Scientific Research (KAKENHI #25780168 and #16K03635).

[†]Corresponding author. Address: 22-2 Seto, Kanazawa-ku, Yokohama 236-0027 Japan. Tel: +81-45-787-2122 -2413(Fax). E-mail: rota@yokohama-cu.ac.jp

The results imply that the revised Food Safety Law will improve the quality of the Chinese stock market in the long run. (128 words)

Key words: China's new Food Safety Law, Capital market, Market quality, Event study

JEL Classification numbers: G14, K32, L66, O16.

1 Introduction

The quality of products in market transactions is an important issue, both domestically and internationally. Currently, for developed countries, trade with less developed countries has become increasingly important. However, some countries have not established safety standards for products, which deters imports from such countries. For example, Japan drastically reduced the import of frozen spinach from China when it found Chlorpyrifos, an agrochemical, exceeding the reference values in 2002.

As the above example shows, safety standards such as food safety laws provide the necessary infrastructure within which to conduct smoother transactions. From this point of view, Yano (2009) developed the concept of market quality, and demonstrates theoretically that a high-quality market embodied by infrastructures such as the legal system is required for the development and growth of the modern economy.¹ China enforced a food safety law in 2009 for the first time, and revised it in 2015. According to the market quality theory, this is likely an example of improving market quality. The purpose of this study is to empirically investigate how improvements in market quality affect market activities.

Yano (2009) defines market quality as a measure of the efficiency in the allocation and fairness in dealing. In particular, fairness in dealing is a fairly new concept. In an empirical study, Yano and Komatsubara (2014) define fairness as a state conforming to the "established commonly accepted" rules adopted for a market. As we discuss below in detail, one of the

¹The theoretical literature on market quality is increasing. For example Yano (2010, 2013) studies stock market quality, and Ma and Dei (2009), Dei (2011), and Ngienthi (2013) study market quality in international trade and economic development contexts.

reasons China revised its Food Safety Law was to harmonize the law with the international standard, which is the "established commonly accepted" rule. Thus, it is adequate to focus on China's revised Chinese Food Safety Law to determine the effect of an improvement in market quality.

This study investigates impact of China's revised Food Safety Law on its stock market using the event study method. In contrast to Yano and Komatsubara (2014), this study does not directly create indices of market quality and then test them. Instead, it uses the publicly available data on stock returns and market portfolios. Although the stock price is not a direct index of market quality, higher quality market could induce higher stock prices, as shown in Yano and Komatsubara (2014).² Thus, the study uses the stock price as a proxy for market quality.

Event study is a common method to measure the impact of a specific event on stock prices over a short period. In our study, events are the dates on which the National People's Congress of the People's Republic of China (NPC) released news on the new Food Safety Law to society. We empirically analyze the impact of nine events on the stock prices of companies engaged in food-related businesses, such as dairy products, foods and drinks. We demonstrate that three news have a robust and statistically significant impact, and that all events have a negative influence on stock prices.

Of the three events that had a negative impact on the stock market, Event 7 was the largest in magnitude. The event has a special feature that is related to market quality. Just one month before Event 7, the Chinese stock market launched a new system called the "Shanghai-Hong Kong Stock Connect Program," which allows direct investment in listed shares between the Shanghai market and the Hong Kong market. Because the Shanghai market has thus far been closed to foreign investors, the new program might increase the number of participants in the Chinese stock market. This may, in turn, increase the quality

²Yano and Komatsubara (2014) demonstrate that the Japanese stock market is of lower quality with respect to both efficiency and fairness than the US stock market. In 2014, the Dow Jones Industry Average, which is a representative index of the US stock market, grew six times larger than its 1990 level, while Nikkei 225, which is the Japanese counterpart, was just a half of its 1990 level.

of the market. For example, Proposition 2 of Yano and Komatsubara (2014) states that “the more likely a knowledgeable/experienced investor is to participate, the higher the stock market quality from the viewpoint of efficiency.” Therefore, an increase in market quality through fairness and efficiency leads to a decrease in stock prices.

How can we interpret the results? In market quality theory, Yano (2009) mentions the “Triple-C dynamics of market quality,” showing that past industrial revolutions have resulted in a significant decline in market quality, at least temporarily. We apply this phenomenon to the revised Food Safety Law because the Standing Committee of the NPC called the revision of the Food Safety Law as “the most severe food safety law in history.” In this sense, our results suggest that the revised Food Safety Law would improve the quality of the Chinese stock market in the long run.

China’s revised Food Safety Law is stricter than the original law that took effect in 2009, in several ways. This stricter laws induce two opposite effects on stock prices in existing economic theories. On the one hand, only high quality products survive under the strict law, which means that the stock prices of companies producing high quality products will rise. On the other hand, a stricter law levies a heavier cost on firms to maintain the product quality, which reduces the stock price. Using an event study approach, this study empirically clarifies which effect is dominant.

The rest of the paper proceeds as follows. Section 2 provides a brief history of China’s Food Safety Law and discuss how the revision can improve the quality of the Chinese food market. Section 3 presents the events, which are news releases about the new Food Safety Law, and empirically shows the impacts of the events on the stock market using the event study method. Finally, Section 4 concludes the paper.

2 The 2015 Chinese Food Safety Law

The original Food Safety Law of the People's Republic of China was adopted in 2009. However, even after enforcing the original law, accidents related to food safety have occurred regularly in China. For example China's largest meat processor, Shanghai Group, apologized that an illegal additive, Clenbuterol, was allegedly found in meat products in an affiliate of the company.³ In addition, in 2014, a TV program noted that the Shanghai Fuxi Food Product Limited Company, a subsidiary of a US-based meat factory called the OSI group, used expired meat that had gone. This was shocking news because the company is a meat supplier for well-known international fast food chains such as McDonald's, Kentucky Fried Chicken, and Pizza Hut. Six years after the enforcement of the original Food Safety Law, the Standing Committee of the National People's Congress passed the revision bill calling it "the most severe food safety law in history." This was enforced on October 1st 2015.

According to the existing literature, there were two reasons for implementing the new Food Safety Law. The first was that consumers would become highly dissatisfied with domestic products without government controls. For example, in 2008, the Chinese government recalled powdered milk for infants because it was contaminated with the chemical substance melamine. According to Xiu and Klein (2010), consumption of melamine caused infants to develop kidney stones and "more than 290,000 people (most of them infant children) were poisoned and at least six babies are confirmed to have died from ingesting the melamine contaminated infant milk powder." In order to manage incidents on food safety that occurred after the original Food Safety Law, a new safety law was needed.⁴

The second reason was the necessity of harmonizing China's Food Safety Law with in-

³Clenbuterol is a chemically synthesized substance that promotes protein synthesis and has few fat, and is used for meat production with lean meat. If people ingest it in large amounts, there are side effects such as palpitations and increased blood pressure.

⁴According to Qiao, Guo, and Klein (2010), a survey conducted after the melamine shock showed that many Chinese people had confidence in dairy products because "many believe that the measures taken by government agencies and the dairy companies will be effective in preventing similar health and safety concerns in the future."

ternational standards. International originations such as the World Health Organization (WHO) are trying to reduce the adverse effects of food-borne diseases.⁵ In particular, the globalization of the world’s food supply has made food safety problems difficult and complex. To this end, the WHO focuses on strengthening national food control systems by promoting partnerships among member states and partners, including China. With regard to the international trade of vegetables, Dou, Yanagishima, Li, Li, and Nakagawa (2015) empirically demonstrate that the export-promoting effect of stringent regulations on maximum residue limits of pesticides in an exporting country on its trade, using the data from 1996 to 2010. This trend requires that China harmonize its law with international standards in order to gain from economic growth through international trade.⁶

Constructing safety standards that agree with international standards provides as an infrastructure for the market economy. This is the concept of “competitive fairness” that expresses market quality as follows:

$$\text{market quality} = Q(\text{efficiency, fairness}).$$

More specifically, as defined in Yano (2008), fairness is a state conforming to the “established commonly accepted” rules adopted for a market. Therefore, having internationally harmonized safety standards might increase market quality by improving fairness.

The purpose of this study is to investigate to what extent fairness (*i.e.*, providing an “established, commonly accepted” rules) affects an economy. To this end, we focus on changes in the stock prices of food-related firms resulting from news releases on the new Food Safety Law in China. A stock market is worth investigating in terms of market quality because it plays an important role in the modern economy, as Yano and Komatsubara (2014) mention. In addition, a stock price is an appropriate economic indicator for the analysis

⁵See for example, World Health Organization (2012).

⁶Trading quality-differentiated products is an important issue in the field of international trade. For example Bond (1984) investigates the impact of quality uncertainty on the gain from trade theoretically. Hufbauer, Kotschwar, and Wilson (2002) analyze food trade among countries in Central America, and suggest that harmonizing with international standards would be beneficial for these countries.

because it changes immediately following news releases. Thus, we investigate how the quality of the Chinese stock market improved after setting up the new food safety law through the lens of stock prices .⁷

3 Empirical Study of Market Quality

The new Food Safety Law is stricter than the original law of 2009.⁸ Some major differences from the original Food Safety Law are summarized in Table 1.⁹ As the table shows, the new law regulates a wider scope of management and firms have to pay higher penalties when they violate the law.¹⁰

::: Insert Table 1 around here :::

It is known that there are two opposing effects of stricter regulation on stock prices. On the one hand, a stricter regulation will induce a higher quality of products, which may stimulate exports. Daughety and Reinganum (1995) show that under asymmetric information on product quality between sellers and buyers, firm profits and social welfare improve if a minimum product safety law is implemented. This suggests that there is a positive correlation between the enforcement of a stricter food safety law and firms' current returns. On the other hand, a stricter food safety law will increase production costs. For example, several features of the new Food Safety Law of China such as the "Food Safety Traceability System"

⁷There are several ways to evaluate how the new law improves the economy. For example, a direct investigation is to study the effect on the volume of domestic food consumption or that of exports. However, it might be too soon to see these direct effects because the new law has only been effective for about two years.

⁸At the Central Rural Activities Conference in December 2013, General Secretary Xi Jinping said, "We will protect the public's food safety through the most stringent standards, the most severe supervision, the most severe penalties and the most severe responses."

⁹See the website of the National People's Congress of the PRC for more detail: http://www.npc.gov.cn/npc/cwhhy/12jcw/2015-04/25/content_1934591.html.

¹⁰In order to see that the new law works effectively, it will be important to check how the government implements the law. Ni and Zeng (2009) and Lam, Remais, Fung, Xu, and Sun (2013) point out that the implementation of the original Food Safety Law was weak, even though the law was enforced.

or the "Food Safety Self-Examination System" will increase the administrative burden on firms. In addition, the new law strengthens protection of consumers. Article 148 of the new Food Safety Law says "Where a consumer is harmed by food that does not meet the food safety standards, he may claim compensation for losses from the operator or claim compensation for the loss from the producer." As Takaoka (2006) mentions, lowering litigation costs for consumers will lead to a decrease in a firm's profit and in the stock price.

A contribution of the study is that we clarify the effect of the stricter Food Safety Law empirically. Using the event study approach, we empirically demonstrate which effect dominates in the Chinese stock market.

3.1 Estimation Methods and Results: Event Study

Event study is a common method to measure the impact of a specific event on stock price over a short period. Essentially, we compare the stock price when the event occurs with the expected stock price calculated from past data. Thus, we can demonstrate the impact of the event by the difference between the real and expected stock prices.

In this study, events refer to the dates when the National People's Congress of the People's Republic of China (NPC) released news on the new Food Safety Law to society. The events are mainly political actions, such as the submission of the draft and a discussion about the new rules. In China, announcements by the NPC have great influence on the people, with high credibility. Specifically, we investigate nine events, picked up from the official website of the NPC. Table 2 summarizes these nine events.¹¹

::: Insert Table 2 around here :::

We employ a standard event study method.¹² Let T be the date of an event. First, we estimate the following market model based on the capital asset pricing model (CAPM). For

¹¹See http://www.npc.gov.cn/npc/lfzt/spaqfxd/node_25114.htm.

¹²For example, MacKinlay (1997) explains the event study method in detail.

any stock i , it holds that

$$R_{it} = a_i + b_i R_{mt} + u_{it},$$

where R_{it} and R_{mt} are the returns on stock i and the market portfolio at time t , respectively. The error term u_{it} is assumed to be distributed normally with a zero mean. The sample period is called an estimation window, and shows a period before the event occurs. In this study, the estimation window is set as 100 days before the event, that is $t \in [T - 100, T - 1]$. Using this estimation window, we estimate parameters \hat{a}_i and \hat{b}_i using the ordinary least squares method for each stock. In order to reduce the error on the dispersion due to the heterogeneous structure and to handle it as a stationary process, we use the log return of R_{it} , that is $R_{it} = \log(p_t/p_{t-1})$, where p_t is the closing price of stock i at date t . The market portfolio R_{mt} is the closing index at time t .

Second, given the estimates of the parameters, we calculate the abnormal returns AR_{iT} by

$$AR_{iT} = R_{iT} - \hat{R}_{iT}$$

where \hat{R}_{iT} is the theoretical value of the returns of stock i . In this calculation, we only use firm i when the estimates \hat{b}_i are statistically significant. Because the news provided by the NPC is influential and credible, the information on the law will be conveyed to market participants smoothly once it is released. Thus, we set that the event window is two days: the day when the event is released and the following day. The cumulative abnormal return is given by $CAR_i = \sum_{s=T}^{T+1} AR_{is}$. Then, we test the null hypothesis that each event has no impact on the behavior of returns CAR_i .

In order to create our sample set, we choose firms satisfying the following requirements:

1. Food-related firms that publish transaction information and are listed on the Shanghai and Shenzhen markets within the observation periods. Specifically, we identified companies engaged in business related to dairy products, and to foods and drinks.
2. From these firms, we choose those that existed when the new law was first proposed

in October 2012 until October 2015. We do not select firms that were acquired by another company in the study period.¹³

There are 69 listed food-related enterprises satisfying the above two requirements. Table 3 lists the sample firms. Data on the returns on securities and on the market portfolio are taken from "TongDaXin."

::: Insert Table 3 around here :::

The estimation results are summarized in column (1) in Table 4. As shown, all events that are statistically significant have negative effects on the stock prices, except for Event 2.¹⁴ Of these, Events 3 and 7 had the biggest impacts. On the day of the third event, the first draft revision was released for the first time to society. Its contents were as follows: (i) members of society should oversee each other's behavior; (ii) punishment will be more severe in the case of a violation of the law; (iii) supervision over the corporate responsibility of managers will be strengthened; and (iv) restrictions on food additives will be more stringent. It is easy to imagine that food-related companies would have to respond by investing to meet the requirements of the new safety law. The negative impact will result from the expectation of market participants that companies will do so.

On the day of Event 7, the second draft of the new law was submitted to the 12th meeting of the Standing Committee of the 12th NPC. Its main contents were as follows: (i) when firms produce and handle genetically modified foods, they must clearly indicate this; and (ii) to strengthen the management of the preservation of foods, food delivery service, and distribution of agricultural products. Similarly to Event 3, the negative impact of Event 7 might come from investor's expectations that these requirements will burden firms with addition costs.

¹³At the 18th National Conference in November 2012 the Communist Party of China made the following statement: to improve people's health level, and to reform and improve the food and drug safety regulatory system. See, for example, Zhang and Jiang (2015)

¹⁴It turns out that the positive impact of Event 2 is not robust.

In contrast to the previous events, Event 7 has a special feature. On November 17, 2014, the Chinese stock market launched a new system called the "Shanghai-Hong Kong Stock Connect Program." This system permits direct investment in listed shares between the Shanghai market and the Hong Kong market. While Hong Kong was already open to foreign investors, it was difficult for foreigners to invest in the Shanghai market, until then. Because investors in Shanghai and Hong Kong can invest directly, foreign investors who might be familiar with the stricter food safety standard in their countries can also invest in China Shanghai "A" shares through Hong Kong's securities company. Thus, it is reasonable to explain the significant impact of Event 7 as an increase in participants who are familiar with how a severe food safety law will affect companies.

::: Insert Table 4 around here :::

3.2 Robustness Check

This section provides several robustness checks on the estimation results described above. First, instead of using the closing average index for the market portfolio, R_{mt} , we employ the capitalization-weighted index in order to exclude the market risk-free rate. The estimation results are summarized in columns (2) and (3) in Table 4, where we use samples that are statistically significant for estimate \hat{b}_i at the 10% and 1% levels, respectively. Compared with the previous results, all events except Event 2 with effects that are statistically significant in (1) are also statistically significant in this specification.

Second, instead of using the CAPM, we employ Fama and French (1993)'s three-factor model to estimate the returns of stock, \hat{R}_{it} . The feature of the three-factor model is that it reflects an enterprise-scale factor and the net asset market capitalization ratio in order to account for the return. Then, our estimation equation becomes

$$R_{it} = a_i + b_i R_{mt} + s_i SMB_t + h_i HML_t + u_{it},$$

where SMB_t is a variable representing the scale of a firm, and HML_t is a variable showing the net asset market capitalization ratio.¹⁵ Wang, Wang, and Luo (2010) uses the three-factor model to study the Chinese stock market, and demonstrate that the model is applicable to the analysis.

The estimation results are summarized in column (4) in Table 4. Here, we pick firm i when the estimates \hat{b}_i are statistically significant at the 1% level. From the table, we find that Events 1, 3, and 7 have a statistically significant impact on the stock price in all specifications. These events all negatively affect the stock price. In addition, Event 7, which is the first event after the Shanghai-Hong Kong Stock Connect Program became available, has the biggest impact. Therefore, we conclude that our interpretation described in the previous subsection is robust.

4 Concluding Remarks

This study investigates the impacts on the Chinese stock market of the country's new Food Safety Law until its implementation in 2015. This is an empirical issue because, theoretically, a stricter law would have two opposing impacts on stock prices. On the one hand, the stricter regulation will induce higher quality products, which may stimulate exports and raise stock prices. On the other hand, the stricter law will increase production costs, which will lower stock prices. By using the event study method, we demonstrate that the new, stricter Food Safety Law had negative impacts on the stock prices. That is, the latter effect outweighs the former.

Among our sample events, Event 7 has a special feature in that, one month prior to the event, the Chinese stock market launched a new system called the "Shanghai-Hong Kong Stock Connect Program," which allows direct investment in listed shares between the Shanghai market and the Hong Kong market. Because the Shanghai market had previously

¹⁵Daily data of equity market capitalization used to create SMB and that of the net asset market capitalization ratio used to create HML are obtained from "Resset Database."

been closed to foreign investors, the new program might increase the number of participants in the Chinese stock market. As discussed in section 2, one of the reasons for revising the original Food Safety Law was to harmonize local standards with international standards. Therefore, it is reasonable to explain the significant impact of Event 7 as an increase in foreign participants who are familiar with how a severe food safety law will affect companies.

In market quality theory, Yano (2009) mentions the “Triple-C dynamics of market quality,” showing that past industrial revolutions resulted in a temporary, but significant decline in market quality. We apply this phenomenon to the revised Food Safety Law to explain the fall in stock prices because the Standing Committee of the NPC called the revision bill of Food Safety Law “the most severe food safety law in history.” In this sense, our results suggest that the revised Food Safety Law will improve the quality of the Chinese stock market in the long run.

We mention some limitations of the analysis as final remarks. First, this study does not distinguish between companies based on their ownership: state-owned enterprises and private enterprises. The analysis shows that it is likely for investors to expect that a stricter law will increase firms’ costs. Therefore, the negative effect on state-own enterprises could be smaller because investors would expect the government’s help. This study could not control for such a governmental influence on stock prices. Second, our event study analysis was unable to eliminate influences brought by information other than the new Food Safety Law. The events chosen in this study are mainly on the dates of meetings of the National People’s Congress of China, when many other issues were discussed. Although it is very difficult to single out the effect of the new Food Safety Law, it is definitely an important future work.

References

- BOND, E. W. (1984): “International Trade with Uncertain Product Quality,” *Southern Economic Journal*, 196–207.
- DAUGHETY, A. F. AND J. F. REINGANUM (1995): “Product Safety: Liability, R&d, and Signaling,” *American Economic Review*, 1187–1206.
- DEI, F. (2011): “Quality of Labor Markets in a Developing Country,” *Review of International Economics*, 19, 626–633.
- DOU, L., K. YANAGISHIMA, X. LI, P. LI, AND M. NAKAGAWA (2015): “Food Safety Regulation and Its Implication on Chinese Vegetable Exports,” *Food Policy*, 57, 128–134.
- FAMA, E. F. AND K. R. FRENCH (1993): “Common Risk Factors in the Returns on Stocks and Bonds,” *Journal of Financial Economics*, 33, 3–56.
- HUFBAUER, G., B. KOTSCHWAR, AND J. WILSON (2002): “Trade and Standards: A Look at Central America,” *The World Economy*, 25, 991–1018.
- LAM, H.-M., J. REMAIS, M.-C. FUNG, L. XU, AND S. S.-M. SUN (2013): “Food Supply and Food Safety Issues in China,” *The Lancet*, 381, 2044–2053.
- MA, Y. AND F. DEI (2009): “Product Quality, Wage Inequality, and Trade Liberalization,” *Review of International Economics*, 17, 244–260.
- MACKINLAY, A. C. (1997): “Event Studies in Economics and Finance,” *Journal of Economic Literature*, 35, 13–39.
- NGIENTHI, W. (2013): “Offshoring Prompts High Quality Labour Markets,” *Pacific Economic Review*, 18, 628–643.
- NI, H.-G. AND H. ZENG (2009): “Law Enforcement Is Key to China’s Food Safety,” *Environmental Pollution*, 157, 1990–1992.

- QIAO, G., T. GUO, AND K. KLEIN (2010): “Melamine in Chinese Milk Products and Consumer Confidence,” *Appetite*, 55, 190–195.
- TAKAOKA, S. (2006): “Product Defects and the Value of the Firm in Japan: The Impact of the Product Liability Law,” *Journal of Legal Studies*, 35, 61–84.
- WANG, Q. (2017): “Effects of a New Food Safety Law on Chinese Food Industry: An Empirical Analysis,” Master’s thesis, Graduate School of International Management, Yokohama City University.
- WANG, Y., L. WANG, AND X. LUO (2010): “F-f Three-factor Asset Pricing Model Expansion and Empirical Research,” *Financial Theory and Practice*, 6, 45–50, in Chinese.
- WORLD HEALTH ORGANIZATION (2012): “Western Pacific Regional Food Safety Strategy 2011-2015,” WHO Western Pacific Region Publication.
- XIU, C. AND K. KLEIN (2010): “Melamine in Milk Products in China: Examining the Factors That Led to Deliberate Use of the Contaminant,” *Food Policy*, 35, 463–470.
- YANO, M. (2008): “Competitive Fairness and the Concept of a Fair Price under Delaware Law on M&A,” *International Journal of Economic Theory*, 4, 175–190.
- (2009): “The Foundation of Market Quality Economics,” *Japanese Economic Review*, 60, 1–32.
- (2010): “The 2008 World Financial Crisis and Market Quality Theory,” *Asian Economic Papers*, 9, 174–194.
- (2013): “Market Infrastructure and the 2008 World Financial Crisis in Industrial Revolution Cycles,” in *Raising Market Quality*, ed. by M. Yano, Tokyo: Keio-Kyoto Joint Global Center of Excellence Program.

YANO, M. AND T. KOMATSUBARA (2014): “Participation of Ordinary Investors and Stock Market Quality: A Comparison between Japanese and US Markets,” *Pacific Economic Review*, 19, 537–558.

ZHANG, W. AND Y. JIANG (2015): “Analysis of the Current Situation and Multiple Strategies on Chinese Food Safety,” *ICCS Journal of Modern Chinese Studies*, 8, 1–5, in Chinese.