論　説

The Quality of Local Government and Firm Strategy: The Case of Japanese Divestment in China*

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Introduction

As has been documented, economic growth in China has been driven by its export and inward foreign direct investment (FDI) in recent years (Cole et al. 2009: 1494). Hagiwara (2015) shows that the annual FDI into China is around 110 billion U.S. dollars during 2011–2014. However, the distribution of the inward FDI may be changing due to differences in the quality of local governments and the frequent labour strikes in China. From Japan's perspective, the wage gap between Japan and China has been gradually decreasing, thus the incentive to transfer plants in China to other countries may be growing. Because of such changes, it is possible that the number of Japanese firms exiting China has started to increase (Hagiwara 2015: 12).

On the one hand, as a divestment by a firm refers to the closure of a subsidiary in a host country, it is often seen as a negative event (Boddewyn 1983). Since there are differences in culture, society, policy, among other aspects, between home and host countries, it may be difficult to accommodate the business environment in another country. On the other hand, recent studies have recognised divestment as one of many firm strategies that take into account the firm's characteristics. Although the research field of divestment is recognised as one of the most important in international trade and management, it seems that only a small number of studies have conducted empirical analyses on the topic (Pattnaik and Lee 2014, Song 2014, Belderbos and Zou 2009). Furthermore, most such studies only take into account a specific industry or use aggregate data, which cannot reflect differences among sectors. The purpose of this paper is to conduct an econometric analysis using data from Japanese firms in both the manufacturing and service sectors to fill this gap.

Our findings are fourfold. First, we find that local government efficiency might not be an important determinant of divestment by Japanese firms. This may be due to the fact that these firms had chosen locations with better quality local governments when originally investing in China, which implies that few Japanese companies will be found in provinces with poorer social infrastructure efficiency (Cole et al. 2009). Second, we find that a higher average wage may increase the likelihood of Japanese plant closures in China. Third, we find that firms that have plants in other countries tend not to be exiting compared with those without such other country plants. This may be explained by the results from Song (2014) indicating that headquarters controls the production volume of each plant when suffering from negative economic shocks such as a rise in production costs. Finally, this third finding applies, in general, to firms in manufacturing sectors.

The remainder of this paper is organised as follows. Section I summarises related studies and presents our hypothesis development while section II reviews our dataset. In section III, we conduct an empirical analysis and the last section concludes.

I. Literature review and hypothesis development

In this section, we summarise results from previous studies on divestment and clarify the gap we fill. First, theoretical works that explore the mechanism of divestment are reviewed. Second, we summarise empirical studies on the determinants of divestment. Finally, our hypotheses that will be tested in the empirical analysis are explained.

1. Literature review

1.1 Divestments as firm strategy

In the field of international trade, there have been a variety of studies on the relationships among firm heterogeneity, export, and FDI[(1)]. However, it seems that little attention has been paid to the topic of divestment in international trade and management in both theoretical and empirical studies. In this subsection, we summarise the results of related studies and construct our hypotheses to be tested in our quantitative analysis section.

Primary studies seem to recognise divestments as failures. Boddewyn (1983) points out that there are differences in features such as politics, society, and culture between home and foreign countries. Thus, foreign divestments may be highly likely due to such heterogeneities and may cause difficulties in assessing firm performance. However, recent studies tend to view divestment as a strategic option in the international division of labour, which means that companies decide to divest to maximise their profits. Furthermore, although a divestment decision may play an important role in international business, the study of this topic might have been neglected (McDermott 2010).

Many studies have conducted empirical analyses on the footloose effect, which states that multinational companies can more flexibly transfer their production facilities or subsidiaries from their home country to another host country (Inui et al. 2009, Beveren 2007, Görg and Strobl 2003). Since multinational firms have the experience and profits that can cover the fixed costs of FDI, they are highly likely to redeploy their plants when they suffer from negative economic shocks. Although footloose multinationals have been explored, the determinants of divestment or the closures of subsidiaries have not been investigated.

There are a few studies that have conducted empirical research considering both macroeconomic factors and firm specific characteristics (Amankwah-Amoah et al. 2013, Chung et al. 2010, Belderbos and Zou 2009, Belderbos and Zou 2006). We review two papers as main reference works as follows.

Pattnaik and Lee (2014) investigate the effects of nine series of distance, for example, politics, culture, and the business environment, on the foreign plant and subsidiary divestment decision using data from 2,435 Korean subsidiaries in 67 countries over the period 2000–2010. They test three hypotheses in their work. The first covers a variety of distance measures and states that each distance variable has a positive impact on divestment by Korean multinational enterprises. The second states that the effect of distance measures on divestment is stronger among firms that enter foreign markets through joint ventures. The third is on firm performance. The hypothesis states that, in general, more productive firms do not exit the market and the distance effects on closure are weaker among these firms. Using a Cox proportional hazard rate model, they test all hypotheses as well as their results are consistent with this hypothesis. Nevertheless, they do not take into account industrial characteristics in their study.

Song (2014) explores the connection between network effects and the divestment decisions of 101 Korean manufacturing firms in 31 countries using data for 1,560 plants in labour intensive industries for the period 1990–2008. The study tests two hypotheses. The first is that the volume of intra-firm transactions negatively affects the possibility of exit when local production costs rise. The second is that the higher the intra-firm trade, the lower the likelihood of divestment when the difference in labour costs between the home and host countries is larger. Although the results support the hypotheses, it should be noted that the study only focuses on labour intensive industries and does not mention cross-industrial differences regarding the network effects among multinational firms.

1.2 The quality of local governments

In the studies investigating the public choice theory, there are a number of studies on the connection between the quality of government, for instance policies and the frequency of corruptions, and economic outcomes such as investment and economic growth (Johnson et al. 2011, Swaleheen 2011, Méon and Sekkat 2005). For instance, Johnson et al. (2011) empirically show that corruptions negatively affects economic growth using American state level data. They employ political and governance data as instrument variables controlling for an endogeneity between corruption and economic growth. As Hagiwara (2015) states that the difference in the quality of local government and policy may change the distribution of FDI when firms determine their locations in China. However, the number of studies empirically examining how the level of local government and policy affect divestments of firms seems relatively small, even though also the event might decrease the size of local market and economic growth. Thus, the paper intends to quantify the effect of the quality of local government on divestments in China as a firm strategy.

To fill these gaps, we conduct empirical analyses in section III. In the next subsection, we explain the hypotheses tested in our study.

2. Main hypothesis development

In this subsection, we discuss our hypotheses regarding divestment, which are based on previous studies. There are three main hypotheses in this paper and they include both firm and regional characteristics. First, macroeconomic factors concerning production costs are one determinant of both FDI and divestment (Chung et al. 2010). The rise in the local wage means an increase in production costs. Since firms prefer a lower factor price, for example, wage or rent, higher production costs lead to a higher rate of plant closures. Second, controlling the volume of production in each plant is one key strategy for headquarters (Song 2014). Since the fixed costs of exit of a subsidiary are quite high, managers may avoid payment of such expenditures. To do so, managers control the quantity of production among their plants. Thus, the number of subsidiaries owned decreases the likelihood of divestment. Third, the second point may differ among sectors. As it is more difficult to adjust the operation between affiliates in service industries, the network effects may occur only in manufacturing sectors. Subsequently, we test the following three hypotheses in the empirical section:

Hypothesis 1: The higher the production costs in a host country, the higher the likelihood of divestment.

Hypothesis 2: In general, a firm with more plants in other countries tends not to divest in the host country.

Hypothesis 3: Regarding hypothesis 2, this effect does not apply to service industries.

Ⅱ. Data

To conduct the empirical study to test the hypotheses, we collect firm- and province-level data from various sources for the period 2008–2014[2]. In this section, we explain the characteristics of our dataset and the Japanese divestment trend in China.

1. Japanese divestment in China

To explore the determinants of Japanese divestment in China, we need to analyse firm-level data that include records of firm features and locations in China. For a dependent variable, which is the activity of divestment in each year, in our estimation, we use the information from *Kaigai Shinshutsu Kigyo Souran 2007-2014*, *Toyo Keizai Shimposha*. From this source, we can access the statistics on, for example, the investors and subsidiaries, date of investment and divestment, industry, the number of employees, and addresses of subsidiaries. Employing those variables, we can identify the place and date of Japanese divestments by firm, industry, and region.

The number of Japanese divestments in China is summarised in Table 1. There are mainly three findings in terms of the characteristics of Japanese firm divestment. First, the numbers of closures in 2009 and 2010 are larger than those in other periods, which indicates that the financial crisis in 2008 and 2009 negatively affected the performance of Japanese plants, leading them to close. Second, there is an inequality in the distribution of the closures of Japanese plants in the provinces in China. For instance, the top five divestment provinces are Shanghai (90), Guangdong (36), Jiangsu (33), Zhejiang (16), and Shandong (14), while there are many provinces where no Japanese firm divested during the period: Inner Mongolia, Heilongjiang,

Table 1: The number of Japanese divestments by province

Province	Year 2008	2009	2010	2011	2012	2013	2014	Total	The number of Japanese Investments in 2008 (stock)
Beijing	1	3	2	1	0	1	1	9	1,591
Tianjin	0	2	2	1	2	3	2	12	1,239
Hebei	0	0	0	0	0	1	0	1	307
Shanxi	0	1	0	0	0	0	0	1	2
InnerMongolia	0	0	0	0	0	0	0	0	49
Liaoning	1	2	1	1	2	3	2	12	1,573
Jilin	0	1	0	0	0	0	0	1	107
Heilongjiang	0	0	0	0	0	0	0	0	28
Shanghai	15	23	13	6	14	10	9	90	10,142
Jiangsu	1	10	4	7	1	4	6	33	4,353
Zhejiang	3	2	5	2	3	0	1	16	1,323
Anhui	1	1	1	0	0	0	0	3	146
Fujian	0	0	2	1	1	1	0	5	357
Jiangxi	0	0	0	0	0	0	0	0	28
Shandong	3	2	5	3	1	0	0	14	1,299
Henan	0	2	0	0	0	0	0	2	109
Hubei	0	3	0	0	0	0	0	3	202
Hunan	0	0	0	1	0	0	0	1	88
Guangdong	3	8	8	3	2	5	7	36	4,141
Guangxi	0	0	0	2	0	0	0	2	57
Hainan	0	0	0	0	0	0	0	0	14
Chongqing	0	1	1	0	2	0	0	4	155
Sichuan	0	0	1	0	0	0	0	1	185
Guizhou	0	0	0	0	0	0	0	0	28
Yunnan	0	0	0	0	0	0	0	0	70
Shaanxi	0	0	0	1	0	0	0	1	130
Qinghai	0	0	0	0	0	0	0	0	7
Ningxia	0	0	0	0	0	0	0	0	21
Xinjiang	0	0	1	0	0	0	0	1	24
Total	28	61	46	29	28	28	28	248	27,775

Source: *Kaigai Shinshutsu Kigyo Souran 2008-2014, Toyo Keizai Shimposha*.
Note: This table shows the distribution of Japanese divestments in China. The divestment variable includes both the number of plant closures and the subsidiaries that are merged by a third company. There is the difference in the number of Japanese investments in 2008 between table 1 and table 2 as some firms only provide the information on location or industry.

Jiangxi, Hainan, Guizhou, Yunnan, Qinghai, and Ningxia. This fact implies that provincial characteristics may affect the divestment decision of Japanese firms. Furthermore, it could be the case that the distribution of Japanese divestments differs across sectors. To check this, we divide the Japanese plant closures by sector and year.

Table 2: The number of Japanese divestments by industry

Sector	2008	2009	2010	2011	2012	2013	2014	Total	The number of Japanese Investments in 2008 (stock)
Manufacturing	13	38	26	17	14	14	16	140	16,474
Rubber and leather	0	0	1	0	0	0	0	1	465
Other manufacturing	0	1	1	0	0	0	0	2	572
Pulp and paper	0	0	1	0	0	0	0	1	241
Chemical and pharmaceutical	1	7	4	6	2	4	5	29	2,619
Machinery	2	3	3	1	0	2	0	11	2,273
Metal products	0	3	2	1	0	0	0	6	793
Automobile parts	2	8	5	0	3	1	1	20	2,049
Grocery	2	1	1	1	2	0	2	9	861
Precision mechanical equipment	0	1	0	1	0	1	0	3	404
Textile industry	1	4	5	1	2	2	2	17	1,506
Steel industry	2	1	1	1	0	0	0	5	414
Electrical and electronic equipment	2	4	2	5	5	4	5	27	3,319
Ceramic manufacture, soil and stone, and glass	0	1	0	0	0	0	1	2	506
Non-ferrous metal	1	5	0	0	0	0	1	7	452
Service industry	15	22	20	12	14	14	11	108	9,614
Consulting and market research	0	0	1	1	2	1	1	6	261
Other services	0	0	4	0	1	0	0	5	381
Other transportation and transportation services	2	1	1	1	1	1	1	8	659
Other wholesale trade and trade	2	1	1	0	1	0	0	5	1,069
Leisure and entertainment	0	0	0	1	0	0	0	1	88
Chemical and pharmaceutical wholesale	0	0	1	0	0	0	0	1	591
Planning , development, and research	0	2	1	0	0	2	1	6	292
Machinery wholesale	2	0	2	0	0	2	0	6	934
Metal products wholesale	0	2	0	0	0	0	0	2	116
Finance	1	0	0	0	0	0	0	1	36
Construction and contractors	2	1	1	1	0	0	1	6	333
Automobile and parts wholesale	0	1	1	0	0	0	0	2	348
Publishing and printing	0	0	0	0	0	1	0	1	76
Retailing	2	0	1	0	0	0	0	3	208
Information services (including software)	1	3	1	1	5	1	4	16	1,046
Staffing industry	0	1	0	0	0	0	0	1	51
Precision equipment wholesale	0	1	0	1	2	0	1	5	282
Textile products wholesale	0	0	1	0	0	1	0	2	310
Warehouse and logistics -related industry	0	3	1	2	0	0	0	6	612
Steel products wholesale	0	1	0	0	0	0	0	1	128
Electrical and electronic equipment wholesale	2	2	3	2	1	5	2	17	1,395
Agricultural and marine products and food wholesale	0	2	0	1	0	0	0	3	92
Non-ferrous metals wholesale	1	0	0	0	0	0	0	1	43
Real estate business	0	1	0	0	0	0	0	1	149
Wood , furniture, pulp and paper wholesale	0	0	0	1	1	0	0	2	114

Source: *Kaigai Shinshutsu Kigyo Souran 2008-2014, Toyo Keizai Shimposha*.

Note: This table shows the distribution of Japanese divestment in China. The divestment variable includes both the number of plant closures and the subsidiaries that are merged by a third company. There is the difference in the number of Japanese investments in 2008 between table 1 and table 2 as some firms only provide the information on location or industry.

Table 2 summarises the number of divestments by Japanese firms by industry and year[3]. First, firms in the manufacturing industry seem more likely to divest than those in the service industry (138 and 108, respectively). This implies that firms in manufacturing may be more flexible in terms of divesting their plants. Second, even within both industries, there is a variation in Japanese divestment. This implies that we should consider industrial characteristics in our empirical analysis. Next, we check provincial characteristics, namely, local government efficiency in China.

2. Provincial characteristics in China: the quality of local governments

Now, we review the features of the provinces in China. As the divestment decision can be affected by macroeconomic factors, such as market size and wage, we need to consider these conditions in the empirical section. Furthermore, political factors are also important for the FDI decisions of multinational enterprises (Cole et al. 2009). To quantify the efficiency of Chinese local governments, we employ the method developed by Tang et al. (2014). The results are reported in Table 3.

Table 3 represents the provincial characteristics regarding government efficiency. A higher value of the standardised measure (STD) means that the local government is more efficient. From the table, we can see that the top five provinces in 2013 are Beijing, Jiangsu, Shandong, Shanghai, and Tianjin, while the bottom five regions are Yunnan, Sichuan, Gansu, Hainan, and Guangxi. This indicates that the eastern provinces might have more organised local governments than the central and western provinces. Cole et al. (2009) state that where the quality of local governments is worse, the value of inward FDI is lower as well. Therefore, there is a possibility that where there are more efficient local

Table 3: Government efficiency index by province

Province	Region	2007		2008		2009		2010		2011		2012		2013	
		STD	Rank	STD	Rank	STD	Rank	STD	Rank	STD	Rank	STD	Rank	STD	Rank
Beijing	Eastern province	0.70	1	0.74	2	0.49	3	4.37	1	4.76	1	4.36	1	4.35	1
Tianjin	Eastern province	0.35	5	0.19	8	0.18	8	1.79	5	2.38	4	1.63	6	1.40	5
Hebei	Eastern province	0.11	10	0.1	11	0.10	12	0.86	9	0.03	15	-0.36	17	0.10	14
Shanxi	Central province	-0.03	16	-0.07	17	-0.07	16	-0.36	18	-0.48	17	-0.05	15	0.28	12
InnerMongolia	Western province	0.14	9	0.08	13	0.09	13	0.11	13	0.28	12	0.31	9	0.51	9
Liaoning	Eastern province	0.29	6	0.3	5	0.33	5	0.72	10	0.65	10	0.26	13	0.36	11
Jilin	Central province	0.07	11	0.11	10	0.15	9	1.00	7	1.12	8	1.27	7	1.00	7
Heilongjiang	Central province	0.16	8	0.26	6	0.21	7	0.66	11	0.05	14	0.28	11	0.70	8
Shanghai	Eastern province	0.68	2	0.75	1	0.56	2	2.82	2	2.42	3	2.20	3	1.58	4
Jiangsu	Eastern province	0.43	3	0.51	3	0.59	1	2.35	3	2.49	2	2.59	2	2.71	2
Zhejiang	Eastern province	0.39	4	0.37	4	0.40	4	1.16	6	1.41	6	1.77	4	1.39	6
Anhui	Central province	-0.14	20	-0.19	22	-0.07	16	-1.16	24	-1.09	23	-0.44	18	-0.91	22
Fujian	Eastern province	-0.13	19	-0.15	21	0.04	14	0.10	14	0.06	13	-0.01	14	-0.43	17
Jiangxi	Central province	-0.15	21	-0.19	22	-0.11	19	-1.33	25	-1.22	24	-1.29	26	-0.93	23
Shandong	Eastern province	0.29	7	0.21	7	0.31	6	1.92	4	1.63	5	1.68	5	1.98	3
Henan	Central province	-0.15	22	-0.12	19	-0.15	22	-1.45	27	-1.39	27	-1.03	23	-0.99	24
Hubei	Central province	-0.09	18	-0.09	18	-0.11	19	-0.28	16	-0.61	18	-0.35	16	-0.30	16
Hunan	Central province	-0.15	23	-0.21	24	-0.19	24	-0.32	17	-0.80	20	-0.47	19	-0.81	20
Guangdong	Eastern province	0.03	12	0.09	12	0.12	11	-0.07	15	0.42	11	0.31	8	0.26	13
Guangxi	Western province	-0.28	27	-0.31	28	-0.29	28	-0.92	22	-1.62	28	-1.49	28	-1.35	27
Hainan	Eastern province	-0.24	25	-0.13	20	-0.25	27	-1.52	28	-1.30	25	-1.45	27	-1.38	28
Chongqing	Western province	-0.30	28	-0.26	26	-0.23	26	-0.77	20	-0.68	19	-0.62	20	-0.54	19
Sichuan	Western province	-0.18	24	-0.24	25	-0.09	18	-1.35	26	-0.93	22	-0.79	21	-0.84	21
Guizhou	Western province	-0.53	30	-0.46	30	-0.55	30	-2.36	31	-2.42	31	-1.80	29	-1.81	30
Yunnan	Western province	-0.37	29	-0.29	27	-0.20	25	-2.20	29	-2.23	29	-2.03	31	-1.99	31
Tibet	Western province	-0.59	31	-0.84	31	-0.84	31	0.90	8	0.67	9	-1.05	24	-0.52	18
Shaanxi	Western province	0.01	13	0.15	9	0.13	10	-0.78	21	-0.12	16	0.27	12	-0.07	15
Gansu	Western province	-0.24	26	-0.39	29	-0.32	29	-2.36	30	-2.39	30	-1.91	30	-1.72	29
Qinghai	Western province	-0.02	15	0	15	-0.01	15	-1.08	23	-0.85	21	-0.91	22	-1.14	25
Ningxia	Western province	-0.07	17	-0.02	16	-0.14	21	-0.63	19	-1.37	26	-1.18	25	-1.35	26
Xinjiang	Western province	0.01	13	0.03	14	-0.17	23	0.21	12	1.14	7	0.28	10	0.46	10

Note: STD values in this table show the efficiency of local governments in China. A higher STD value indicates that the local province government is more efficient. The STD measure is calculated using data from the China Statistical Yearbook 2008-2014, National Bureau of Statistics of China. See Tang et al. (2014) for more details governments, there is a lower likelihood of divestment. In the next section, we explain the specification of our econometric analyses.

Ⅲ. Empirical analysis

1. Empirical methodology and descriptive statistics

In this section, we explain the specifications of our empirical analysis and discuss the results from the estimations. First, we describe the equations to be estimated by the Cox proportional hazard model(4). Second, descriptive statistics are summarised. Finally, empirical results are presented and compared with our hypotheses.

1.1 Survival function, hazard function, and Cox proportional hazard model

1.1.1 Kaplan Meier estimation

Survival analysis has been used in medical investigations and the method has been employed as well in economics. One of the most frequently used models is the Kaplan-Meier model. In the model, the survival function is written as:

$$S(t) = p(T \geq t) \tag{1}$$

where T and t denote random variables that associate time with the failure event and the time the firm has survived in the market, respectively. Then, the non-parametric estimation of the survival function can be driven by the Kaplan-Meier estimation:

$$\hat{S}(t) = \Pi_{tj \leq t}\left(\frac{n_j - d_j}{n_j}\right) \tag{2}$$

where n_j indicates the number of firm-province pairs at risk in time t_j and d_j denotes the number of firm-province pairs whose firms exit the market. In addition, the hazard function can be viewed as an alternative way to express the hazard function (rate) as follows:

$$h(t_j) = p(T = t_j \mid T \geq t_j). \tag{3}$$

Furthermore, the hazard function for the non-parametric estimation is defined as

$$\hat{h}(t_j) = \frac{d_j}{n_j}. \tag{4}$$

Finally, the specific relationship between survival and the hazard functions is expressed as

$$\hat{S}(t) = \Pi_{tj \leq t}(1 - \hat{h}(t_j)). \tag{5}$$

The Kaplan-Meier estimation can capture the relationship between macro- and firm-level factors and firm divestment; however, it seems difficult to quantify the impact of those variables on the firm's choice. Therefore, this paper employs the Cox proportional hazard model to investigate how economic and political factors affect the likelihood of Japanese firm divestment in China.

1.1.2 Cox proportional hazard model

Cox (1972) developed the Cox proportional hazard model, which is written theoretically as:

$$h(t \mid x_i) = h_0(t) e^{\beta x_i} \tag{6}$$

where x_i denotes the firm-province variant covariates and β indicates an estimated parameter. In this specification, $h_0(t)$ is the baseline hazard rate function and it is non-parametric and left unestimated. The baseline hazard is presented as a result when all covariates are zero. The hazard ratio is higher than one, which indicates that the variable is highly likely to have a positive relationship with the hazard rate, and vice versa.

The specification of the econometric analysis is as follows

$$h(t \mid X, Z, F) = h_0(t) exp(\beta \times X_{ijkt} + b \times Z_{jkt} + \gamma \times F)$$

where i, j, k, and t represent firm, province, sector, and year, respectively. X and Z denote the $NT \times c$ matrix that includes the variable regarding provincial and firm characteristics. X consists of industrial GDP, average wage, and government efficiency and Z includes the number of co-parent companies, listed company dummy, the percentage of share of a parent company, the economics zone dummy, and the number of other subsidiaries owned by the parent company in other countries. F includes two fixed effects (province and sector fixed effects). Before we estimate the equation (1), we check the descriptive statistics used in our empirical study.

The mean value and standard deviation of variables in our dataset are summarised in Table 4. The columns (1)-(4) denote the values for the entire sample, the manufacturing sectors, the service sectors, and the exit firms, respectively. There are three features in our dataset. First, the difference in the mean value of the wage in all the columns cannot be seen in our sample. Second, in terms of age, the mean value of the exit firms is smaller than in the other columns, which indicates that the divested firms might be younger firms. Finally, and most important, the

Table 4: Data Description

Variable	Total Samples (1)	Manufacturing (2)	Service (3)	Exit firms (4)
Divestment	0.009 (0.094)	0.008 (0.091)	0.010 (0.098)	1 (0)
GDP	8.658 (1.035)	9.288 (0.692)	7.741 (0.656)	8.556 (1.029)
Wage	10.212 (0.325)	10.149 (0.251)	10.313 (0.393)	10.252 (0.377)
Government	1.167 (1.153)	1.028 (1.089)	1.376 (1.210)	0.942 (0.995)
Listed dummy	0.711 (0.453)	0.706 (0.455)	0.715 (0.451)	0.770 (0.422)
Percentage of share	69.284 (37.690)	68.521 (36.038)	70.251 (40.247)	64.669 (38.874)
Economic Zone	0.437 (0.496)	0.593 (0.491)	0.202 (0.402)	0.427 (0.496)
Other plants	34.871 (82.352)	30.003 (70.017)	42.340 (98.071)	26.101 (65.712)
Observations	27,775	16,698	11,068	248

Note: The table reports the mean value of variables. Standard deviations are reported in parentheses.

mean value of other plants in the exit firm column (4) is also smaller than in the other columns. This could be interpreted as parent firms with fewer plants in other countries being more likely to divest than firms with more plants in other countries. Now, we estimate the equation (1) by maximum likelihood using the robust standard errors option.

2. Empirical results

In this subsection, we summarise our findings and discuss the consistency of the results with our hypotheses[5].

Table 5 reports the results from our baseline specification. The main findings are threefold. First, the coefficient on wage is statistically significant and larger than the coefficient for firms in manufacturing alone, which is consistent with Hypothesis 1. Our finding indicates that an increase in production costs may lead to Japanese plant closures in China. Second, coefficients on government efficiency are statistically insignificant. This result is discussed later as it is not consistent with findings in a previous study (Cole et al. 2009). Third, the measure of other plants is statistically significant and smaller than one. This verifies hypothesis 2. Thus far, the results mainly support our

Table 5: Results from the baseline specification

	All sectors		Manufacturing		Service	
Independent variables	(1)	(2)	(1)	(2)	(1)	(2)
Other plants	0.997**	0.997**	0.995+	0.995+	0.998	0.998
	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)
Listed company	1.461*	1.461*	1.366	1.367	1.603+	1.604+
	(0.232)	(0.231)	(0.287)	(0.288)	(0.390)	(0.388)
Percentage of share	0.997+	0.997+	0.996	0.996	0.998	0.998
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Economic Zone	0.999	0.999	1.023	1.025	0.955	0.958
	(0.148)	(0.148)	(0.186)	(0.186)	(0.246)	(0.246)
GDP	1.000	1.000	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Average wage	1.615	1.694	10.10**	9.882*	1.529	1.903
	(0.513)	(0.565)	(8.663)	(9.368)	(0.839)	(1.007)
Quality of local government_level	0.977		1.150		0.778	
	(0.123)		(0.208)		(0.151)	
Quality of local government_rank		1.017		1.016		1.065
		(0.051)		(0.073)		(0.072)
Fixed effect						
Province	✓	✓	✓	✓	✓	✓
Sector	✓	✓	✓	✓	✓	✓
Number of subjects	4,085	4,085	2,452	2,452	1,633	1,633
Number of Failure	247	247	139	139	108	108
Time at risk	27,762	27,762	16,694	16,694	11,068	11,068
Number of observations	27,762	27,762	16,694	16,694	11,068	11,068
Linktest						
Prediction squared	-0.075	-0.082	-0.010	-0.007	-0.242	-0.184
	(0.078)	(0.079)	(0.008)	(0.063)	(0.148)	(0.133)
Log pseudolikelihood	-1771.1758	-1771.1153	-921.9512	-921.2274	-671.9826	-672.3092

Notes: Robust standards errors are in parentheses for the Cox Proportional hazard estimation and standards errors are in parentheses for linktest. **, * and + indicate that the results are statistically significant at 1 percent, 5 percent and 10 percent respectively. The dependent variable is the hazard of divestments and it equals 1 if a firm divests and 0 otherwise. All specifications include year, province, and industry fixed effects. (1) uses level of the quality of local government and (2) includes rank of the variable respectively.

hypotheses 1 and 2. Next, we estimate the equation for the sample that includes only the bottom 75% of the firms regarding the other plant variable as the distribution is heavily left skewed.

Table 6 summarises the results for firms in the bottom 75% in terms of the other factories variable. Regarding the wage variable, it remains statistically significant for the estimation of manufacturing firms and

Table 6: Results for quantile analysis: bottom 75% with other plants variable

	All sectors		Manufacturing		Service	
Independent variables	(1)	(2)	(1)	(2)	(1)	(2)
Other plants	0.972*	0.972*	0.949**	0.948**	1.009	1.009
	(0.013)	(0.013)	(0.018)	(0.018)	(0.019)	(0.019)
Listed company	1.585**	1.586**	1.586*	1.585*	1.627+	1.631+
	(0.270)	(0.270)	(0.360)	(0.360)	(0.417)	(0.417)
Percentage of share	0.995*	0.995*	0.992**	0.992**	0.999	0.999
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Economic Zone	0.927	0.925	0.986	0.980	0.856	0.859
	(0.157)	(0.157)	(0.198)	(0.196)	(0.262)	(0.262)
GDP	1.000	1.000	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Average wage	2.002+	1.695	11.63*	5.767+	2.181	2.446
	(0.748)	(0.647)	(11.21)	(5.991)	(1.400)	(1.499)
Quality of local government_level	1.060		1.242		0.847	
	(0.141)		(0.234)		(0.185)	
Quality of local government_rank		0.943		0.923		1.031
		(0.0485)		(0.0649)		(0.0873)
Fixed effect						
Province	✓	✓	✓	✓	✓	✓
Sector	✓	✓	✓	✓	✓	✓
Number of subjects	3,073	3,073	1,859	1,859	1,214	1,214
Number of Failure	191	191	110	110	81	81
Time at risk	20,882	20,882	12,655	12,655	8,227	8,227
Number of observations	20,882	20,882	12,655	12,655	8,227	8,227
Linktest						
Prediction squared	-0.055	-0.010	-0.013	-0.004	-0.061	-0.042
	(0.097)	(0.091)	(0.096)	(0.093)	(0.143)	(0.142)
Log pseudolikelihood	-1311.4452	-1310.882	-694.1474	-694.1171	-482.5576	-482.7641

Notes: Robust standards errors are in parentheses for the Cox Proportional hazard estimation and standards errors are in parentheses for linktest **, * and + indicate that the results are statistically significant at 1 percent, 5 percent and 10 percent respectively. The dependent variable is the hazard of divestments and it equals 1 if a firm divests and 0 otherwise. All specifications include year, province, and industry fixed effects. (1) uses level of the quality of local government and (2) includes rank of the variable respectively.

the coefficient is positive. This can be interpreted as the possibility that Japanese manufacturing company divestments are mainly driven by local average wage in the period compared with firms in the service sectors. The results of the efficiency of local governments are the same as in the previous estimation. This might be because firms tend to choose locations with higher quality local public services. In terms of the other plants variable, there is a difference in the results between the entire sample and those in the bottom 75%. The coefficient on other plants is smaller in the latter (about 0.95) than in the former (about 0.99), which implies that the number of plants owned by the parent firm plays an important role mainly for companies whose networks are relatively small. The results show that if the variable of other plants increases by one, the probability that a firm will exit the market decreases by about 5% in the latter estimation (about 1% in the former estimation) among firms in manufacturing industries. In addition, the outcome is consistent with hypothesis 3, which states that network effects differ between the manufacturing and service sectors. Notably, we need to use more detailed sector classifications or conduct case studies in further research to explore the network effects more precisely.

Concluding remarks

In this paper, our review of related research and empirical work leads us to the following four conclusions. First, the efficiency of local government does not seem to have an impact on the divestment decision by Japanese firms. This may be a result of the fact that companies are highly likely to locate in regions with more efficient local governments. Second, as our hypothesis indicates, a higher average wage may increase the probability of Japanese firm's divestment. However, our findings also indicate that this might be true only for firms in service industries in our sample. Third, our empirical analysis proves that network effects exist when Japanese firms divest. These results are consistent with our hypothesis and the findings of Song (2014). Finally, our findings fill the gap in previous studies on different network effects among sectors. We find that the impact of firm's network on its divestment decision differs between the manufacturing and service sectors. This outcome is consistent with the hypothesis and answers questions in a previous study (Song 2014).

The following three points may be important for the future work. The first is that the dynamics of macroeconomic conditions, such as wage and market size, should be considered; this can be done by calculating the differences in the values. The second is that these results only reflect our sample, namely, Japanese divestment in China. Therefore, further studies need to include other countries for comparative research. The third is that our results are statistically averaged, thus we do not reference a divestment decision at the level of an individual firm. Thus, future research should conduct case studies that can consider actual settings.

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Appendix

Appendix A: Data

To construct our dependent variable, we employ the information from *Kaigai Shinshutsu Kigyo Souran, Toyo Keizai Shimposha*. The variable is equal to 1 if a firm divests and equal to 0 otherwise. This variable reflects both the number of plant closures and subsidiaries that are merged by a third company. The settings of our datasets for the Cox proportional hazard model are the left truncation and right censoring.

Province-level variables are obtained from the *China Statistical Yearbook*. GDP is the log of a sectoral GDP and Wage is the log of an average wage by sector for each province in China. Firm specific measures are collected from *Kaigai Shinshutsu Kigyo Souran, Toyo Keizai Shimposha*. The value of the Listed company is equal to 1 if the parent firm is a listed company in Japan. Percentage of share expresses the percentage of share of a parent company in Japan and Economic Zone takes the value 1 if a subsidiary is located in an economic zone and 0 otherwise. Finally, the measure of Other plants is the number of other subsidiaries owned by the parent company in other countries.

The calculation method for government efficiency(6) is based on Tang et al. (2014). We include 33 standardised variables and sum all of them by year and province to construct the measure. Also, we used two types of variables, namely level and rank measures.

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(1) See Helpman et al. (2004) for a survey.

(2) See appendix A for the definition of the variables.

(3) The definitions of the manufacturing and service sectors are shown in Table 2.

(4) See Cox (1972), Cleves et al. (2010), and Cameron et al. (2010) for more details.

(5) The Cox-Proportional Hazard model is estimated by *stcox* command in STATA. All specifications pass the linktest.

(6) The value consists of the following data: Rate of Products with Excellent Quality (%), Three kinds of patents applications granted (per 10,000 people), Transaction Value in Technical Markets (10,000 yuan), Student-Teacher Ratio at Primary School (reverse index), Student-

Teacher Ratio at Secondary School (reverse index), Illiterate Population rate (reverse index), State education budget as a proportion of GDP (%), Number of Books Published for Children and Textbooks (one per 10,000 people), Number of Beds (one per 100,00 people), Health personnel (one per 100,00 people), Three kinds of accident rates (one per 10,000 people) (reverse index), The loss of three accidents per capita (10,000 yuan) (reverse index), Status of Agricultural Meteorological Stations (one per 10,000 people), Earthquake monitoring stations (one per 10,000 people), Urban community service facilities (one per 10,000 people), Industrial waste treatment efficiency (%),Water supply capacity (100 million cubic meters per 10,000 people), Ratio of natural protection area (%), Coverage rate of urban population with access to gas (%), Number of public transportation vehicles per 10,000 people (unit), Per capita area of paved roads (square meters), Per capita public green area (square meters), Number of public lavatories per 10,000 people (unit), The proportion of administrative staff in the total population (one per 10,000 people) (reverse index), The proportion of administrative staff in total employment (one per 10,000 people) (reverse index), Ratio of government consumption and final consumption (%) (reverse index), Ratio of government consumption and GDP (%) (reverse index), Per capita net income of rural households (yuan), Per capita urban disposal income of households (yuan), Engel coefficient of rural areas (%) (reverse index), Engel coefficient of urban areas (%) (reverse index), The consumer price index (CPI) (previous year = 100) (reverse index), Per capita GDP (yuan).