

THE DEMAND CREATION EFFECT ON THE INDONESIAN MANUFACTURING INDUSTRY

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ABSTRACT

This study analyzes the impact of Foreign Direct Investment that creates a demand creation effect on domestic companies in the Indonesian manufacturing industry in 2010-2015. This study uses Input and Output data for 2010 and Industri Besar Sedang data in 2010-2015, both of which come from the Badan Pusat Statistik. The Fixed Effects model came out as the best model because it reflected different firm characteristics. The study concludes that the larger the foreign presence and the firm's size in an industry, the more demand-creating effect it will create. However, FDI enters highly concentrated industries and industries with high levels of imports, which will negatively affect the demand creation effect.

Keywords: FDI, Demand Creation Effect, Manufacturing Industry, Indonesia.

JEL : D01; F23; L10.

To cite this document: Lusi, S., & Machmud, T. M. Z. S. (2022). The Demand Creation Effect on the Indonesian Manufacturing Industry. *JDE (Journal of Developing Economies)*, 7(2), 354-364.

ARTICLE INFO

Received: July 17th, 2022
Revision: December 3rd, 2022
Accepted: December 6th, 2022
Online: December 6th, 2022

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Introduction

Investment activities originating from within or outside the country can encourage the acceleration of national economic development to manage economic strength in real terms (Republik Indonesia, 2007). Foreign Direct Investment (FDI) is considered more stable than indirect foreign investment or commonly referred to as a Foreign Portfolio Investment (FPI) (World Bank, 1999; Hattari & Rajan, 2013). Sarwedi (2002) said that the presence of FDI will also stimulate domestic investment in terms of technology, management, and increase in human capital.

Globalization has resulted in a significant increase in FDI worldwide (Anwar & Sun, 2012). In the industrial world, technological progress is an important driver of globalization that allows companies to reduce costs significantly by breaking the production process into several stages and carrying out production activities in various regions. This allows companies that initially produce in developed countries to take advantage of production costs such as natural resources and labor which are relatively cheaper in developing countries such as Vietnam, Indonesia, and Thailand.

The entry of FDI will bring various potentials for the host country, either directly or indirectly (Sari, 2019). Takii (2005) states that FDI in multinational companies (MNCs) is generally considered to contribute to the host country's economic growth by increasing capital

accumulation, production capacity, demand for labor, demand for semi-finished goods and exports, and tax revenues. In addition to the direct effect, the entry of foreign companies into the host economy also has an indirect effect on domestic companies in the form of increasing competitive pressure in the industry, thus motivating domestic companies to increase efficiency. On the other hand, the indirect effect of the entry of FDI is the diffusion of more sophisticated technology transferred by foreign companies. According to [Takii \(2005\)](#), these indirect effects are called spillovers.

Positive technology spillover which is an externality in the form of technology will occur if foreign companies bring in technology that is more advanced than domestic companies. [Blomstrom & Persson \(1983\)](#) says that this spillover effect occurs because 1) the process of imitation (demonstration effect) of domestic companies adopting technology used by foreign companies; 2) the process of transferring knowledge of workers who leave a foreign company and then work in a domestic company or establish their own company; 3) potential domestic companies that become suppliers or consumers by foreign companies so that technology transfer occurs. The spillover effect from the presence of foreign companies can create new business opportunities in the host country which has an impact on increasing domestic companies entering an industry ([Ayyagari & Kosová, 2010](#)).

Several researchers in various countries have conducted studies on the spillover effect of FDI on the entry-level of manufacturing industry. [Anwar & Sun \(2012\)](#), [Backer & Sleuwaegen \(2003\)](#), and [Ayyagari & Kosová \(2010\)](#) say that the spillover effect of FDI has a significant effect on entry-level of domestic companies. The presence of FDI can encourage the entry of domestic companies into the manufacturing industry resulting in a positive horizontal spillover. In addition, the horizontal spillover effect also occurs from the presence of FDI in the downstream industry, which has begun to enter the upstream sector. On the other hand, the vertical spillover effect will occur from the presence of FDI in the upstream industry, which begins to enter the downstream sector.

In the context of Indonesia, studies that discuss the spillover effect of FDI on the entry-level of domestic companies in the manufacturing industry are still very limited and have never been carried out. Research conducted by [Sari \(2019\)](#), [Sari et al. \(2016\)](#), and [Suyanto et al. \(2014\)](#) only focus on the analysis of the spillover effect of FDI on the productivity and efficiency of the manufacturing industry. Based on the formulation of the problem described previously, this study aims to identify the impact of FDI and the spillover effect on the entry-level of domestic companies in the Indonesian manufacturing industry.

Literature Review

Private capital flows include FDI, FPI, and other investments ([United Nations Conference on Trade and Development, 2012](#)). FDI occurs when investors in the home country acquire assets in the host country (other countries) with the aim of managing these assets ([World Trade Organization, 1996](#)). This management dimension distinguishes FDI from portfolio investments in foreign stocks, bonds, and other financial instruments. FDI can be considered as ownership of the common stock or voting rights of a company that investors consider a significant influence of 10 percent or more ([International Monetary Fund, 2004](#); [OECD, 2008](#)). However, the rules regarding limiting the level of foreign share ownership in local companies will be different because they are based on the policies of each country.

The most famous view of FDI is the OLI (Ownership, Location, and Internalization) theory by [Dunning \(1980\)](#). This theory explains that a company must meet three conditions simultaneously to be able to make FDI. First, companies must have specific and exclusive own-

ership advantages to minimize production costs so that they can compete with companies in foreign countries—these advantages such as trademarks, patents, information, and technology. Second, location factors are in accordance with economic geography and FDI institutions, such as the domestic market, labor, natural resources, transportation costs, and government incentives. Third, rather than selling or leasing them to other companies through licensing or management contracts (externalization). The company uses all these advantages and resources for itself (internalization).

Not only profitable for foreign companies, but FDI is also potentially profitable for domestic companies. Kokko (1994) explains that the so-called spillover effects are the transfer of technology to local suppliers and customers from foreign companies demonstrating new technologies and training workers who can then be transferred to local companies. In addition, the presence of foreign companies in the economy will increase competition in the domestic market. Competitive pressures can spur local firms to operate more efficiently and introduce new technologies earlier than they otherwise would.

Blomstrom & Persson (1983) divides spillover into two types: horizontal and vertical. Horizontal spillover will occur if the incoming foreign company can generate profits for domestic competitors in the same industry. Meanwhile, vertical spillover will occur if the incoming foreign company can generate profits for domestic competitors in different industries. The horizontal spillover can pass through two channels of the transmission mechanism. First, through the demonstration effect, where domestic companies can observe and imitate foreign companies' technology. Second, through labor mobility, former workers who previously worked in foreign companies then worked in domestic companies or set up their own companies by applying managerial skills that have been obtained from their previous workplaces. Furthermore, vertical spillover will occur through technology transfer from foreign buyers to domestic suppliers, referred to as backward spillover. On the other hand, forward spillover occurs when there is a transfer of technology from foreign suppliers to domestic buyers.

Ayyagari & Kosov (2010) say that the presence of FDI can encourage the entry of domestic companies and entrepreneurship into the market through (1) the movement of workers from foreign companies to domestic companies, (2) spillover of management-related knowledge arising from the demonstration effect, and (3) backward vertical linkages as well as forward vertical linkages that are built from time to time between foreign and domestic companies. Therefore, the presence of foreign companies can create new business opportunities in the host country, which can be described as a demand-creation effect (Anwar & Sun, 2012).

Data and Research Methods

This study uses data from Industri Besar Sedang (IBS) from 2010 to 2015. The data comes from the Annual Survey of Manufacturing Industry Companies conducted by the Badan Pusat Statistik (BPS). This study also uses the 2010 Input Output (I-O) Table from BPS. I-O table data is provided by BPS every five years. This is because BPS assumes that Indonesia's manufacturing technology is constant every five years. Therefore, it is assumed that technology is constant during the study period. From the data cleaning procedures that have been applied, 57,802 companies were obtained during the year of observation. The company-level data is then categorized into industry-level data, resulting in 432 ISIC (5-digit industry code) each year. During 2010 to 2015 (6 years of observation), 2,592 industries were observed in this study.

To estimate the effect of FDI on the entry-level manufacturing industry, this study begins by constructing the variables in Table 1 below.

Table 1: Variable Operational Definition

Variable Name	Definition
Entry Rate	The number of domestic firms i that have just entered industry j in year t is divided by the total number of firms i in industry j in year $t-1$
Foreign Presence	Number of foreign firms i divided by total firms i in industry j in year t . Foreign firms are companies that meet the foreign ownership threshold, which is equal to or greater than 10 percent
Horizontal Spillover	Horizontal spillover effects in the industry
Backward Spillover	Backward spillover effects in the industry
Forward Spillover	Forward spillover effects in the industry
Firm Size	Average firm size in the industry
HHI	Industry concentration level
Import	The amount of imported raw materials divided by the total raw materials in the industry
Export	Total export output divided by total output in the industry

The calculation of the spillover rate follows a study conducted by Sari (2016), considering total demand. Therefore, the calculation of the spillover rate is based on the Leontief inverse matrix. The following are the steps in building the Leontief inverse matrix based on the Input-Output (I-O) Table:

$$\begin{aligned}
 X &= A^d X + Y^d + Export, & (A^d &= [a_{kl}]), \\
 X - A^d X &= Y^d + Export & (1) \\
 X &= [I - A^d]^{-1} [Y^d + Export], & [I - A^d]^{-1} &= b_{kl}
 \end{aligned}$$

Where X is the total output column vector, A^d is the domestic output input coefficient matrix, a_{kl} is the domestic input-output coefficient matrix element, Y^d is the domestic demand column vector for domestically produced goods, $Export$ is the export demand column for domestically produced goods, b_{kl} is the Leontief inverse matrix that captures direct and indirect (inter-sectoral) linkages.

Backward linkages can occur if domestic companies supply their output to foreign companies (Anwar & Sun, 2012). Before calculating the backward spillover, the horizontal spillover must first be calculated with the following formulation:

$$HSpill_{jt} = \frac{\sum_{i \in j} FS_{it} * y_{it}}{\sum_{i \in j} y_{it}} \tag{2}$$

$HSpill$ is a horizontal spillover effect, FS is a foreign share, namely the percentage of company's share ownership from foreign investment. Y is the output produced, i denotes the i -th firm, and j denotes the j -th industry, where $i \in j$ denotes a firm in a particular industry. Corresponding to the level of horizontal spillover, the backward spillover calculation is obtained from the sum of each multiplication of elements in the Leontief inverse matrix b_{kl} . Therefore, here is the formula for calculating backward spillover:

$$BSpill_{jt} = \sum_k b_{kl} * HSpill_{jt} \tag{3}$$

$BSpill_j$ is the backward spillover effect of industry j , $HSpill_j$ is the horizontal spillover of industry j , and b_{kl} is the Leontief Inverse Matrix. Forward linkages occur when domestic companies buy inputs from foreign companies (Anwar & Sun, 2012). The calculation of for-

ward spillover is the same as calculating backward spillover and does not include the output produced by foreign companies for export ($Y_{it} - Export_{it}$). The purpose of this measurement is to capture the potential spillover from foreign firms to the productivity of domestic buyers. The following is the formula for calculating forward spillover:

$$FSpill_{jt} = \sum_I b_{kl} * \frac{\sum_{i \in j} (FS_{it} * (Y_{it} - Export_{it}))}{\sum_{i \in j} (Y_{it} - Export_{it})} \tag{4}$$

The vector column l in the Leontief Inverse Matrix, on each element, b_{kl} , represents the demand for k industrial outputs to be used as inputs to produce l industrial output units. When multiplying each element in the column vector l by each foreign share, production represents the intermediate input in industry l supplied by a foreign factory located in industry l .

HHI became the second control variable in this study. HHI describes the level of market competition by calculating the sum of the squares of market share in the industry (Sari, 2019). Therefore, HHI can capture the structure of the domestic market (Anwar & Sun, 2012). The greater the HHI value indicates a greater concentration of output sales in the industry and the market will become less competitive (towards a monopoly) and cause small firms to exit the market. Meanwhile, the lower HHI value illustrates the concentration of fewer output sales in the industry and the market will become more competitive (Sari, 2019). HHI is formulated as follows:

$$HHI_{jt} = \sum_{i \in j} s_{ijt}^2 \tag{5}$$

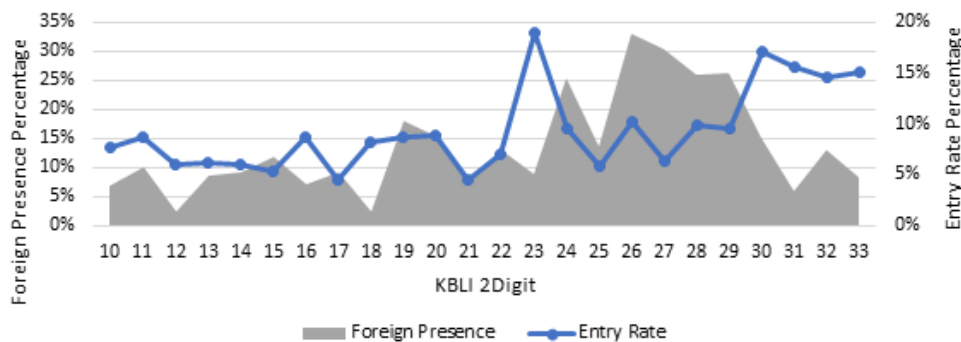
where s_{ijt} is the output share of firm i in industry j in period t so that s_i^2 is the market share of each company, and HHI_{jt} is the Herfindahl–Hirschman Index of industry j in year t .

Referring to the study conducted by Anwar & Sun (2012), the basic specifications of this research are as follows:

$$y_{jt} = \beta_0 + \beta_1 FS_{jt} + \beta_2 HSpill_{jt} + \beta_3 BSpill_{jt} + \beta_4 FSpill_{jt} + \beta_5 FSize_{jt} + \beta_6 HHI_{jt} + \beta_7 Import_{jt} + \beta_8 Export_{jt} + \varepsilon \tag{6}$$

Where y is entry rate; FP is foreign presence; $HSpill$ is a horizontal spillover; $BSpill$ is the backward spillover; $FSpill$ is a forward spillover; $FSize$ is firm size; HHI is the Herfindahl–Hirschman Index; $Import$ is the percentage of imported raw materials; $Export$ is the percentage of output exported; ε and ξ are error terms; and the subscripts j and t indicate the industry, and the year of observation, respectively.

Finding and Discussion



Source: Processing Results of Industri Besar Sedang Badan Pusat Statistik (2022) By the Author

Figure 1: Average Value of Foreign Presence and Entry Rate of Manufacturing Industry 2010 – 2015

Based on the figure above, FDI in an industry that is proxied with the highest foreign presence value during the year of observation occurred in the electronics and optical computer industry (KBLI 26) by 33 percent, the electrical equipment industry (KBLI 27) by 30.49 percent, and the motor vehicle, trailer, and semi-trailer industry (KBLI 29) by 26.26 percent. On the other hand, the three types of industries that have the lowest foreign presence are the printing and reproduction of recording media (KBLI 18) at 2.26 percent, the tobacco processing industry (KBLI 12) at 2.47 percent, and the furniture industry (KBLI 31) at 5.88 percent. With the average foreign presence in all industries of 13.14 percent, 38.12 percent (988 industries) are above the average value and 61.88 percent (1604 industries) are below the average value. During the year of observation, the highest average entry rate occurred in the non-metallic minerals industry (KBLI 23) at 18.9 percent and the lowest occurred in the pharmaceutical, chemical drug products, and traditional medicine industry (KBLI 21) at 4.4 percent.

Table 2: Statistic Summary

Variable	Obs	Mean	Std. Dev.	Min	Max
Entry Rate	2,592	0.09563	0.11518	0	0.83871
Foreign Presence	2,592	0.13138	0.14963	0	1
Horizontal Spill over	2,592	0.25607	0.27430	0	0.99545
Backward Spill over	2,592	1.72512	1.64523	0	8.48729
Forward Spill over	2,592	1.47351	1.27925	0.02184	6.84401
Firm Size	2,592	0.07240	0.08034	0.00053	0.33333
HHI	2,592	0.26233	0.21497	0.00416	0.99373
Import	2,592	0.14180	0.15565	0	0.86550
Export	2,592	0.11783	0.13208	0	0.93333

Source: Processing Results of Industri Besar Sedang [Badan Pusat Statistik \(2022\)](#) By the Author

The Table 2 above presents descriptive statistics of the observation variables used in this study. Based on Table 4.1, the variable entry rate of domestic companies has a value that varies from 0 to 0.83871 (the ISIC 23111 flat glass industry in 2010). The average value of the entry rate is 0.09563 and the standard deviation is 0.11518. The foreign presence variable as a proxy for the existence of FDI activities in the manufacturing industry has a value variation of 0 to 1 (non-ferrous metal extrusion industry ISIC 24204 in 2013). The average foreign presence value is 0.13138 and the standard deviation is 0.14963. The horizontal spillover variable in this study has a value variation between 0 to 0.995 (stationery and drawing industry, including ISIC 28179 equipment in 2011) with an average value of 0.206 and a standard deviation of 0.203, which indicates that the horizontal distribution of data values The spillover used in this study is relatively homogeneous. The backward spillover variable has a value variation between 0 to 8.487 (other equipment industry from metal ISIC 28180 in 2014) with an average value of 1.243 and a standard deviation of 1.159. The forward spillover variable has a value variation between 0.02184 to 6.844 (ISIC 18201 recording media reproduction industry in 2010) with an average value of 1.022 and a standard deviation of 0.909.

The manufacturing industry data used in this study uses panel data so the panel data regression model is selected which consists of 3 types, namely Pooled Least Square (LS), Fixed Effect (FE), and Random Effect (RE). Furthermore, the Chow test was performed to determine the best model between LS and FE, and Hausman test was performed to determine the best model between FE and RE. From the results of the two tests, it can be concluded that FE is the best model for estimating the spillover effect of FDI on the entry rate. The fixed effect

model can overcome differences in the nature of the company, in this case the managerial style of the company which may be different, the existence of industry effects that may not be observed, and other heterogeneities as different characteristics of each company. The next process is to test the Gauss-Markov assumption which must meet the homoscedasticity and non-autocorrelation of the panel data. The results of the Gauss-Markov assumption test show that the panel data in this study are indicated to have heteroscedasticity and autocorrelation. So, a clustered robust fixed effect is needed to overcome this. Table 3 displays the results of the STATA panel data regression output using a fixed effect with a robust standard error on the entry rate.

Table 3: Estimation Result

	(1)
	Entry Rate
FP	0.01224* (0.006918)
HSpill	-0.00262** (0.001199)
BSpill	0.00209*** (0.000389)
FSpill	-0.00411*** (0.001304)
FSize	0.00318** (0.001339)
HHI	-0.000631*** (0.000177)
Import	-0.06377** (0.027368)
_cons	0.11303*** (0.008557)
N	2592
R ²	0.374

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Source: Processing Results of Industri Besar Sedang [Badan Pusat Statistik \(2022\)](#) By the Author

Based on the regression results in Table 3, the foreign presence (FP) variable has a positive and significant impact on the entry rate. The coefficient value of 0.01224 indicates that if the ratio of foreign companies in an industry increases by 1 percent, it will have an impact on increasing the entry rate of an industry by 1.22 percent. These results are in accordance with the studies of [Anwar & Sun \(2012\)](#) and [Ayyagari & Kosova \(2010\)](#) which found that foreign investment entering the manufacturing industry in China (from all over the world) and the Czech Republic had a significant positive effect on the increase in entry rate of domestic companies into the industry. In the context of Indonesia, [Takii \(2005\)](#) said that the greater foreign investment that enters an industry will increase capital accumulation and industrial production capacity so that the demand for labor and demand for inputs (raw materials and semi-finished goods) will also increase. This then encourages the increasing number of domestic companies entering the manufacturing industry. Therefore, this study supports the

hypothesis that the foreign presence variable creates a demand-creation effect in the manufacturing industry.

Based on the regression results in Table 3, the horizontal spillover variable (H-Spill) has a coefficient value of -0.00262 and is significant to the entry rate with a value of $=5$ percent. These findings mean that the presence of foreign companies will provide a significant negative spillover to domestic companies in similar industries, thereby lowering the entry rate of an industry. This indicates the effect of competition between foreign companies and domestic companies in the same industry, where foreign companies keep their own information or knowledge that is considered important so that domestic companies do not know about it (Li & Luo, 2019; Ayyagari & Kosová, 2010). This is because the spread of important information will benefit domestic companies, thereby reducing the market share of foreign companies. As a result of the lack of dissemination of this information, it is difficult for domestic companies to enter the market, resulting in a decrease in the entry rate of domestic companies into the industry. Therefore, this study accepts the hypothesis that the horizontal spillover variable creates a negative demand-creation effect in the manufacturing industry.

Based on the regression results in Table 3, the backward spillover (B-Spill) variable has a coefficient value of 0.00209 and is significant to the entry rate with a value of $=1$ percent. These findings mean that the presence of foreign companies will provide a significant positive spillover to local suppliers, thereby increasing the entry rate of an industry. Javorcik (2008) said that foreign companies usually transfer new technology to local suppliers such as guaranteeing product quality (quality control) and increasing the managerial capabilities of domestic companies as local suppliers. Foreign companies do this to increase company profits through the suppression of input costs (Suyanto et al., 2014). Therefore, it can be concluded that the backward spillover from foreign companies (as buyers of raw materials) and domestic companies (as local suppliers) are complementary or complementary to each other so the impact on the entry rate of local suppliers into the industry is increasing. Therefore, this study accepts the hypothesis that the backward spillover variable creates a demand-creation effect in the manufacturing industry.

Based on the regression results in Table 3, the forward spillover variable (F-spill) has a coefficient value of -0.00411 and is significant to the entry rate with a value of $=1$ percent. These findings mean that the presence of foreign companies will provide a significant negative spillover to local distributors, thereby reducing the entry rate of an industry. Backer & Sleuwaegen (2003) in their study on the manufacturing industry in Belgium said that foreign-owned technological advantages can be a barrier to entry for local distributors to enter the market. With superior technology, foreign companies can produce higher quality output so that the productivity of their product users will increase (Ni et al., 2017). In addition to technology, foreign companies provide additional services that cannot be found in local distributors (Javorcik, 2008). Therefore, the positions of foreign companies and local distributors are mutually substitutive (replacing each other) or it can be said that there is a competitive effect between the two. Based on this phenomenon, it can be concluded that forward spillover reduces the entry rate of local distributors to enter the industry. Therefore, this study accepts the hypothesis that the forward spillover variable creates a negative demand-creation effect in the manufacturing industry.

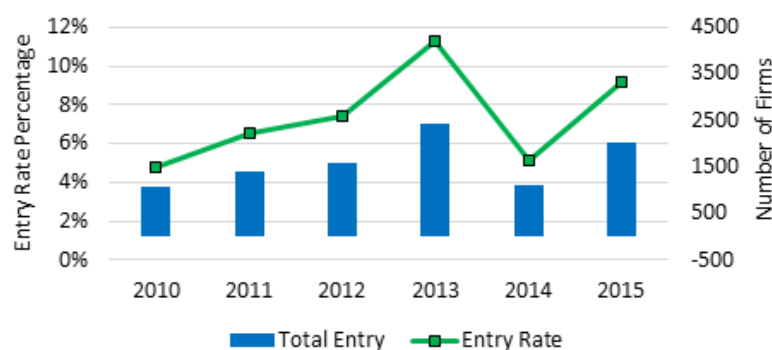
Based on the regression results in Table 3, the firm size (F-Size) variable has a positive and significant impact on the entry rate. The coefficient value of 0.00318 indicates that if the average company size in an industry increases by 1 percent, it will have an impact on in-

creasing the entry rate of an industry by 0.32 percent. This is in accordance with Choi’s (2018) study on the manufacturing industry in Korea, which concludes that the larger the company’s size in the manufacturing industry, the more domestic companies can enjoy a positive spill-over effect by increasing sales, thereby increasing sales and enabling entry into the industry. Harianto & Sari (2021) said that the larger the company’s size, the higher the productivity of domestic companies due to the use of more modern technology, large capital, and good managerial skills. Therefore, the larger company size has an impact on increasing the entry rate of domestic companies into an industry. Therefore, this study accepts hypothesis that the firm size variable creates a negative demand creation effect in the manufacturing industry.

Based on the regression results in Table 3, the HHI variable which describes the concentration of the industry has a negative and significant impact on the entry rate. The coefficient value of 0.000631 indicates that if an industry’s concentration increases by 1 percent, it will have an impact on decreasing the entry rate of an industry by 0.06 percent. This means that the more concentrated an industry is, the more the market leads to a monopoly and becomes less competitive. Industries with high concentration have a greater barrier to entry, which makes it difficult for new companies (in this case domestic companies) to enter the market (Sari, 2019).

Based on the regression results in Table 3, the import variable which describes the ratio of imported raw materials in an industry has a negative and significant impact on the entry rate. The coefficient value of -0.06377 indicates if the ratio of raw materials of an industry obtained from imports increases by 1 percent, it will have an impact on decreasing the entry rate of an industry by 6.37 percent. This means that the greater the number of imports of raw materials in an industry, will cause domestic companies to lose the opportunity to provide raw materials and other local input materials for the industrial production process, causing the entry rate to decrease significantly. The study of Backer & Sleuwaegen (2003) on the Belgian manufacturing industry concluded that the cheapness of imported raw materials can be a barrier to entry for new companies that will enter the manufacturing industry.

Based on the regression results in Table 3, the export variable that describes the ratio of output exported in an industry has a negative and insignificant impact on the entry rate, which means that the increase in the ratio of output in an industry is not significant in reducing the entry rate of an industry.



Source: Processing Results of Industri Besar Sedang Badan Pusat Statistik By the Author

Figure 2: Average Entry Rate and Number of Companies in the Indonesian Manufacturing Industry 2010 – 2015

Figure 2 depicts the entry rate as a percentage on the left axis of the graph. Figure 2 also depicts the number of firms entering the manufacturing industry on the right axis of

the graph. Based on Figure 2, the highest entry rate occurred in 2013 (11.3 percent) and the lowest entry rate occurred in 2010 (4.81 percent). Then, 2013 became the year with the most (2411 companies) and 2014 became the year with the fewest (1111 companies) for entry.

Conclusion

The entry of FDI into a manufacturing industry will increase the entry rate of an industry, especially if the industry has a large foreign presence and the average size of the company in the industry is large. However, if FDI enters highly concentrated industries and industries with high levels of imports of raw materials, the effect is not good because it will reduce the entry rate. The horizontal spillover effect also has an impact on the decline in the entry rate of an industry. Interestingly, vertical spillover has an impact on increasing the entry rate of an industry that invites local suppliers, but on the other hand it has an impact on decreasing the entry rate for local distributors to enter the industry.

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