The Impact of Foreign Investment on Firm Performance: Indonesia After the 2007 FDI Reform

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The Impact of Foreign Investment on Firm Performance: Indonesia After the 2007 FDI Reform

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Abstract

Foreign Direct Investment (FDI) plays a crucial role in the economy of Indonesia. The new FDI law passed in 2007 serves as a new milestone in the FDI regime in Indonesia. As the country implements the new regulation, the impact of foreign investment on firm performance becomes an interesting subject. This paper aims to estimate the effect of foreign investment on the productivity and contribution of firms in relation to the new FDI law in Indonesia. This study employed a combination of Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methods to eliminate endogeneity problems and to examine causality. We discover that foreign investment increases the contribution of firms in terms of tax and employment yet drives no significant change in firm productivity after the new FDI law came into force. This result implies that foreign investors might have picked already productive domestic firms; and that other firms need to increase their level of attractiveness while policymakers need to improve the investment climate in order to attract more FDI.

Keywords: Foreign Direct Investment; FDI; foreign ownership; firm productivity

JEL classifications: F21; F23; F61

1. Introduction

Foreign Direct Investment (FDI) plays an important role in the economy. As the world becomes more open, capital flow is also increasing. At the global level, FDI has surged from merely USD204 billion in 1990 to USD1,530 billion in 2019 (UNCTAD 2021). The share of FDI in emerging countries has surpassed the share of foreign borrowing or international aid (Perkins et al. 2013). In the emerging markets alone, FDI inflow has grown 20 folds in the last 3 decades (UNCTAD 2021).

The positive contribution of foreign investment is also captured at the micro level. Foreign capital investment may come with spillovers for firms and industries (Blomström & Sjöholm 1999; Esquivias & Harianto 2020). An improvement in the technical aspect may increase production efficiency, and subsequently, firm performance. One important feature of foreign investment appears in the form of technological advances (Wang & Blomström 1992). Foreign investment also contributes to an improvement in organizational knowledge and integration into the global network (Arnold & Javorcik 2009). These positive contributions in macro and micro aspects have been used as justification for attracting foreign investors to domestic market.

However, the debate continues on the causality between foreign investment and firm performance. The relation between foreign investment and firm performance can be bidirectional (Hsiao & Hsiao 2006, p. 1083). For instance, an investor may acquire an existing firm and then improve its performance (Conyon et al. 2002). On the other hand, a foreign investor may also choose to acquire an

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already well-performing firm in the industry (Harris & Robinson 2002). Understanding the causality will help improve investment policies.

This study aims to estimate the impact of foreign investment on firm performance—measured by the productivity and contribution of firms—particularly after the 2007 FDI reform in Indonesia. We focus on Indonesia since it is the largest economy in Southeast Asia (World Bank 2022a). Indonesia has reached a new milestone after the implementation of Law 25/2007 on Capital Investment. By means of the new FDI law, the government of Indonesia has offered more features for foreign investors to invest their money, particularly to acquire the ownership of domestic firms (OECD 2010). However, most of the existing literature on this topic discusses the impact of foreign investment on Indonesian firms in the period before Law 25/2007 on Capital Investment came into force (e.g., Lipsey & Sjöholm 2004; Arnold & Javorcik 2009; Lipsey, Sjöholm & Sun 2013; Sari, Khalifah & Suyanto 2016). We believe it is important to revisit the empirical aspects in the context of the new law.

We used the annual survey of Large and Medium Firms (Statistics Indonesia, various years) from 2000 to 2015. The analysis employed a combination of Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methods. We applied PSM to solve the endogeneity problem by matching firms in the treated and the control groups across particular characteristics (Arnold & Javorcik 2009; Lipsey, Sjöholm & Sun 2013; Imbruno & Ketterer 2018). The causal inference is then estimated using the panel DiD method.

This paper contributes to the existing literature in four respects. First, it provides a causal impact analysis of foreign investment on firm performance following the 2007 FDI reform in Indonesia. Such analysis is important to understand the motivation of acquisition, whether foreign investors choose to acquire well-performing firms or to improve domestic firms. Second, it extends the analysis to measure the differences of the impact before and after the FDI reform. Third, it divides the impact of foreign investment into firm productivity (i.e., labor productivity) and contribution of firms (i.e., employment and tax payment). Lastly, it examines the opposite direction of ownership, i.e., the impact of the domestic acquisition of foreign-owned firms in Indonesia.

We find that foreign investment increases the contribution of firms in terms of tax payment and job creation, yet their productivity is not affected by the new FDI law. This result suggests that foreign investors might have selected the already productive domestic firms; and that other firms need to increase their level of attractiveness supposing they want to attract foreign investment. Similarly, the policymakers need to improve the investment climate, such as regulatory environment.

The remainder of the paper is organized as follows. The following section discusses the background of FDI in the context of Indonesia. The third section explains the theoretical framework and reviews the literature. The fourth section elaborates the empirical strategy and model specification. Finally, we report the results and robustness tests and end with a conclusion.

2. Literature Review

2.1. FDI in Indonesia

Foreign investment is an interesting topic, particularly in the context of Indonesia. As one of the emerging markets in Asia, Indonesia is considered an attractive market for foreign investors (OECD 2020). Indonesia represents the largest market in Southeast Asia, with a total population of more than 200 million people (World Bank 2022a). The economy grows steadily around 5% following the massive hit of the 1998 Asian Monetary Crisis (World Bank 2021). The net FDI inflow in Indonesia has surged in the last two decades, from USD4.55 billion in 2000 to USD19.22 billion in 2020 (World Bank 2022b). The efforts of the government of Indonesia to attract more foreign investment can be observed from the history of the FDI regime and its transformation.

The foreign investment regime in Indonesia started in the 1960s. The government passed Law 1/1967 on Foreign Investment as the first milestone of the FDI regime. Since then, foreign investment has started to penetrate the market. The FDI regime in the history of Indonesia are divided into several phases. Aswicahyono & Hill (1995) divide the pre-Asian financial crisis era into four different phases. First, foreign investment was allowed as a joint venture scheme. Second, the government interfered with the market as foreign investment suffered from the crowding-out effect. Third, the government imposed tariffs and other protection for domestic industries. Lastly, the government introduced a regulation that limited certain sectors from foreign investment. This FDI regime persisted until the reform in 2007.

The year 2007 is considered a new milestone for the foreign investment regime in Indonesia. The government has passed Law 25/2007 on Capital Investment, replacing the outdated regulation. The law serves as a new landmark for the FDI regime of Indonesia. Indonesia has established a more open and accountable attitude towards foreign investment since the 2007 FDI reform. This regulation improves the 1967 foreign investment law and the 1968 domestic investment law into one unified policy. OECD (2010) documents the main features of the new law. First, it ensures an equal legal status between foreign and domestic investors. The law also respects both foreign and domestic investors with similar treatment. Second, foreign investors are protected against expropriation. The law ensures that foreign investors receive their rights upon legal takeover. Third, disputes can be resolved by international arbitration. Fourth, the law maintains that all sectors are open for foreign investments, except those in the negative list. Fifth, foreign investors have stronger property rights. The law extends the period of land and building use into a more considerable period. Sixth, restrictions on the immigration process are loosened. The regulation allows more flexibility for foreign investors to enter and exit the countries. Seventh, the government offers tax incentives for industries providing contributions to the economy. The introduction of tax holidays and facilitation intends to attract more investment in potential sectors. Lastly, the law encourages the establishment of simpler investment applications and bureaucracy.

The efforts of Indonesia to attract foreign investment are not merely realized on a legal basis but also on the institutional aspects. Following the political reform taking place in 1998, Indonesia achieved several transformations to become a more accountable country. In 2002, a governing body to combat corruption, Corruption Eradication Commission (KPK), was established. In the same year, Financial Transaction Reports and Analysis Center (PPATK) was formed to tackle money laundering practices. In the following years, more efforts were taken to improve the transparency of Indonesia. Good corporate governance was implemented on the amendment of the Law of Company in 2007. Indonesia also introduced National Single Window (INSW) as the single body for licensing permits. Furthermore, to achieve cleaner governance, the Ombudsman and the whistleblower protection system were established in 2008 and 2009, respectively. As OECD (2010, p. 19) concludes, the efforts of Indonesia to pass the new law and reform the institutions are "bearing fruit in the form of stable growth and a renewed rise in inflows of foreign direct investment."

There is an ongoing debate concerning the new Law 11/2020 on Job Creation (popularly known as the Omnibus Law). One important aspect of the Omnibus Law is foreign investment liberalization. The law aims to lift conditions and restrictions on foreign investment, facilitate business licensing and land acquisition, and significantly reform the labor market of Indonesia (OECD 2020). On the other hand, the Omnibus Law also obtains strong rejection, particularly from labor unions. Critics claim that the law aims to reduce worker protection from existing regulations (Mahy 2021). Nevertheless, the Omnibus Law serves as a further milestone of investment reform in Indonesia, albeit the complications (Surianta & Patunru 2021).

2.2. Theoretical Framework

As the reform of the FDI regime in Indonesia has taken place, the debate on the correlation between foreign investment and firm performance continues. As more foreign investors acquire local firms, their motivation once again becomes an interesting topic. Do foreigners acquire already well-performing local firms? Or else, do they indeed provide improvement to domestic firms? These questions serve as basis for our analysis. This study formulates its analysis on the causal impact of foreign investment on firm performance—measured by their productivity and contribution—in the context of the 2007 FDI reform in Indonesia.

FDI is a well-known topic for empirical studies. A wide variety of literature contributes to this topic with various variables of interest across countries. For instance, Kimura & Kiyota (2006) use Japanese data to estimate the effects of FDI on firm productivity. They reveal that FDI has a significant positive impact. In the UK, Harris and Robinson (2003) estimate the effect of foreign investment on productivity. They find that foreign investment leads to more productive firms compared to local-owned firms. The link between foreign investment and labor performance is also well studied. Observing Portuguese firms, Almeida (2007) discovers that foreign acquisition of domestic firms has small effects on the human capital and average wages of the acquired firms. In Turkey, Gurbuz & Aybars (2010) study the impact of FDI on firm profitability. Their study shows that FDI increases operational profitability, in terms of financial earnings and returns on assets (ROA) ratio. Several studies, however, prove opposite results. The effect of FDI is not significant for Italian firm productivity (Benfratello & Sembenelli 2006). Meanwhile, Aitken & Harrison (1999) note that foreign investment eventually causes a negative impact on the productivity of wholly domestically-owned firms in Venezuela.

In the case of Indonesia, several studies estimate the causal impact of foreign investment on various variables of firm performance. Lipsey & Sjöholm (2004) examine the effects of foreign investment on average wages. They conclude that foreign-acquired plants pay higher average wages to their labor compared to domestic plants. Arnold & Javorcik (2009) study the effect of foreign acquisition on firm productivity. They find that foreign investment eventually increases labor productivity and total factor productivity of plants. Sari, Khalifah, & Suyanto (2016) examine the impact of FDI spillover on firm productivity and efficiency. They discover that foreign direct investment in Indonesia creates positive spillover, namely higher productivity and efficiency. Lipsey, Sjöholm, & Sun (2013) analyze the impact of foreign acquisition on employment growth rate. They reveal that foreign investment causes higher growth of labor employment. Although these findings provide a robust conclusion of the impact of FDI, most of the estimation is conducted before the 2007 FDI reform came into force.

More recent studies in this area mostly cover a different aspect of the impact of FDI. For instance, Genthner & Kis-Katos (2022) examine the effects of foreign investment on firm performance in Indonesia by focusing on negative list regulations. They find declining foreign capital shares as a result of a tighter regulation of foreign direct investment. However, they also discover no evidence to prove production shifting to the more regulated sectors. Esquivias & Harianto (2020) estimate the impact of foreign investment on industrial efficiency. The study reveals that FDI via horizontal spillovers has contributed to an increase in the efficiency of intra industry. However, the effect is decreasing for international trade channels. This fact leads to an interesting question to consider, whether a new FDI regime will lead to the same outcomes.

3. Method

This study used the data obtained from the annual Industrial Survey in Indonesia (Statistics Indonesia, various years), specifically on all large and medium manufacturing firms identified as having 20 employees or more. We observed the data for 16 years

from 2000 to 2015. The variables of interest on this study are labor productivity, employment, and tax payment, representing the productivity and contribution of firms to the economy.

We assigned the data into two different sets. The first dataset contains the period of 2008 to 2015 to estimate the impact of foreign investment after the new FDI law took effect in 2007. The second dataset contains the full period of 2000 to 2015 to provide a basic comparison and a more extended analysis of the treatment impact.

We used a dummy for foreign investment as a treatment variable with a value of 1 for foreign-acquired firms, and 0 for non-acquired firms. We define foreign-acquired firms as domestic firms which increase their share of foreign ownership for at least 20% following Arnold & Javorcik (2009). In practice, the 20% threshold does not really matter since most of the foreign-acquired firms in our dataset have 100% foreign ownership change. We excluded firms with multiple ownership changes from the analysis. Thus, we only considered foreign-acquired firms that remain under this 20% threshold for at least two years after the acquisition to exclude the multiple ownership effect. Domestic acquisition variable for further analysis follows the same procedure. The treatment variable of domestic acquisition was chosen to represent the ownership change from foreign-owned to private domestic-owned firms.

The acquisition decision of firms is not random. Therefore, the measurement of the causal impact of foreign investment per se may suffer from an endogeneity problem (Arnold & Javorcik 2009, p. 43). We tackled this problem using a combination of Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methods. The aim of imposing the PSM method is to provide a treated group with similar characteristics (e.g., similar PSM score on covariates) to a control group (Becker & Ichino 2002). The covariates in this study are output per labor, dummy import, the share of import, average wage, and energy used. Potential foreign investors rely on basic observable information on firms, such as production output, labor, global market, open-

ness, and energy intensity (Arnold & Javorcik 2009; Lipsey, Sjöholm & Sun 2013). Thus, we chose covariates to represent firm characteristics as per our data availability. Output per labor (loutlab) explains the production scale of firms. Dummy import (impor) and share of import (simpor) represent the capability of firms to import and their capacity in the global network. The average wage (lavgwage) shows the size of labor used by the firms. Finally, energy (lenergy) explains the energy intensity for the operation of the firms. By controlling these variables, we aim to create firm characteristics which reflect the consideration of foreign investors for acquisition. All control variables are lagged one year to represent the period before acquisition. Thus, PSM will provide a matching pair of the treated group and its counter factual. This approach uses the underlying assumption of conditional interdependence by assuming that selection into treatment is conditional on and determined by the observed variables taken from data (Arnold & Javorcik 2009; Imbruno & Ketterer 2018). To satisfy this assumption, we applied an empirical analysis for the prediction of foreign acquisition decision using a probit model, as presented in Equation 1.

$$
\begin{aligned}
\Pr(T_{it} = 1) \quad = \quad & F(\text{loutlab}_{it-1}, \text{impor}_{it-1}, \\
& \text{simpor}_{it-1}, \text{lavgwage}_{it-1}, \\
& \text{lenergy}_{it-1})
\end{aligned}
\tag{1}
$$

The probit model also serves as the basis for conducting the matching method (Arnold & Javorcik 2009; Imbruno & Ketterer 2018). We used Propensity Score Matching (PSM) with a one-to-one nearest neighbor and no replacement option. The matching procedure follows a cross-section-by-cross-section strategy to ensure that the matched firms come from the same period, minimizing the impact of different time effects. The matching is conducted in the pre-acquisition period to ensure the treated and control groups share the same characteristics before the treatment. The matched firms selected are only those present in the observation until the end of the period. The firms that have been matched are excluded for the following matching

procedure to ensure that each firm obtains only one match. The matched firms are compiled to form one panel dataset over the period of analysis.

A simple DiD model is then used to measure the causal impact of the treatment effect. This causal impact of foreign investment on firm performance is estimated by comparing the paired firms before and after the acquisition. The treatment variable for this DiD estimation is interaction of acquisition period and treated group, namely treatment interaction (TR). The treatment variable is assigned a value of 1 for all the acquisition period and the following year, and 0 for the non-acquired or for the period before acquisition. We estimated the DiD specification as expressed in Equation 2 using only the matched firms from PSM procedure, controlling for firm $(\mathrm{u_i})$, industry $(\mathrm{i_i})$, and year $(\mathrm{t_t})$ fixed effects.

$$y_{\mathrm{it}} = \alpha + \beta \mathrm{TR}_{\mathrm{it}} + \mathrm{t_t} + \mathrm{u_i} + \mathrm{i_i} + \varepsilon_{\mathrm{it}} \qquad (2)$$

The average treatment effect (ATE) of each outcome variable is defined from the difference between the respective outcome variable after firms are acquired and the outcome variable supposing they are not been acquired. The ATE of this analysis is expressed as follows.

$$\begin{aligned} \mathrm{ATE} \quad = \quad & \frac{1}{n} \sum_{1}^{n} (\mathrm{y_t^{treated}} - \mathrm{y_t^{control}}) \\ & - \frac{1}{n} \sum_{1}^{n} (\mathrm{y_{t\ preacq}^{treated}} - \mathrm{y_{t\ preacq}^{control}}) \quad (3) \end{aligned}$$

In the follow up analysis, we considered a dummy variable for reform, referring to the period after the FDI reform took place from 2008 to 2015. The year 2008 is chosen to represent the period when the new FDI law fully came into force. The dummy reform is assigned the value of 1 for the period of 2008 and after, and 0 for the period before 2008. This additional analysis is important to understand the difference in the foreign acquisition effect before and after the 2007 FDI reform in Indonesia.

4. Results and Analysis

4.1. Summary Statistics

We discover differences in our variables of interest between non-acquired and foreign acquired firms across time. Foreign acquired firms have higher productivity, more employment, and larger tax payment relative to non-acquired firms. This gap also presents in a different period between 2000 and 2015. The means of the variables of interest increase from 2000 to 2015, except for the employment rate, which is relatively steady across time. Table 1 shows these differences. Different firm characteristics might cause a higher rate of foreign acquisition. However, this difference does not explain the direction of the causality, hence the importance to estimate the causal impact of foreign investment on firm performance.

Table 1. Summary Statistics of the Main Variables

	Non-acquired		Foreign Acquired	
	2000	2015	2000	2015
Productivity	9.188	11.493	10.609	12.424
	(1.379)	(1.354)	(1.592)	(1.372)
Employment	4.172	4.165	5.479	5.308
	(1.172)	(1.152)	(1.241)	(1.341)
Tax payment	7.826	9.427	10.931	12.557
	(2.665)	(3.004)	(2.511)	(2.541)

Source: Authors' estimation
Note: The figure reports means followed by standard error in parenthesis.

4.2. Main Result

We first estimate the probability of foreign acquisition using the probit model, following Equation (1). The probit model aims to predict foreign acquisition by using the lags of covariates of firm characteristics. Table 2 shows the result.

Due to data limitation, this study only considers output per labor, dummy import, the share of import, average wage, and energy as covariates to explain firm characteristics. All covariates are lagged one year to represent the firm characteristics before the acquisition takes place. The probit estimation shows that all lagged covariates are significant, at

1% level, to acquisition decision.

The result from the probit estimation serves as a basis for our further analysis. The covariates in the probit model become firm characteristics for the matching method. In the matching procedure, the outcome variable is the dummy treated group, with a value of 1 for all firms included in the treated group and 0 for the non-treated group. We use PSM with a one-to-one nearest neighbor and no replacement option. Observed from the matching estimations, we obtain 1,092 matched firms (546 pairs) for the dataset from 2000 to 2015 (2000-15 dataset) and 768 matched firms (384 pairs) for the dataset from 2008 to 2015 (2008-15 dataset).

Table 2. The Probit Result Predicting Foreign Acquisition

	Coeff (Std Error)
Dependent variable: Dummy foreign acquisition	
Log output per worker$_{t-1}$	0.049***
	(0.100)
Dummy importer$_{t-1}$	0.328***
	(0.303)
Share of import$_{t-1}$	0.001***
	(0.000)
Log average wages$_{t-1}$	0.077***
	(0.019)
Log of energy$_{t-1}$	0.060***
	(0.005)
No. of observation	245,224
No. of group	38,378
Wald Chi^2 (Prob)	2025.22 (0.000)

Source: Authors' estimation
Note: The figure reports coefficient followed by standard error in parenthesis.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

In the next step, we compile the data and estimate the causal impact using the DiD method, following Equation (2) and using the matched firms. Our first estimation for the 2008-15 dataset shows that foreign investment has no significant impact on firm productivity (Table 3). Estimation 1 controls firm and time fixed effect while estimation 2 controls firm, time, and industry fixed effect. Both estimations yield insignificant impact.

Next, we measure the impact of foreign investment on employment and tax payment. The results show

Table 3. The Impact of Foreign Acquisition on Labor Productivity (2008-15)

	Matched firms	
	1	2
Outcome variable: Log of value added per worker		
Foreign acquisition	0.011	0.003
	(0.062)	(0.063)
Time fixed effect	Yes	Yes
Industry fixed effect		Yes
No. of observation	6,143	6,143
No. of group	768	768
R^2	0.114	0.127

Source: Authors' estimation
Note: The figure reports coefficient followed by standard error in parenthesis.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

that foreign investment brings a positive impact on the employment rate and tax payment of firms (Table 4). Controlling for firm, time, and industry fixed effect, our estimation shows that foreign investment increases the employment rate by around 13% and tax contribution by approximately 32%.

To conclude, our estimations using the 2008-15 dataset show that foreign investment after the new FDI law took effect causes a positive impact on the contributions of firms, measured by employment and tax payment. However, we cannot find significant effect on firm productivity, as measured by labor productivity.

4.3. Extended Analysis

This study further analyses similar estimations using an extended dataset from 2000 to 2015. This additional analysis provides a basic comparison of the previous estimation related to the different FDI regimes in Indonesia.

Table 5 shows the impact of foreign investment on firm productivity. The result indicates that foreign acquisition increases firm productivity by approximately 10% (see estimation 2). This result is different from the previous estimation using the 2008-15 dataset.

Furthermore, our estimation of the employment variable shows that foreign investment also causes a

Table 4. The Impact of Foreign Acquisition on Employment and Tax Payment (2008-15)

	Matched firms			
	1	2	3	4
Outcome variable:	Log of total workers		Log of tax payment	
Foreign acquisition	0.133***	0.127***	0.333**	0.316**
	(0.043)	(0.043)	(0.139)	(0.138)
Time fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect		Yes		Yes
No. of observation	6,144	6,144	4,206	4,206
No. of group	768	768	672	672
R^2	0.008	0.018	0.033	0.044

Source: Authors' estimation

Note: The figure reports coefficient followed by standard error in parenthesis.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Table 5. The Impact of Foreign Acquisition on Labor Productivity (2000-15)

	Matched firms	
	1	2
Outcome variable: Log value added per worker		
Foreign acquisition	0.106**	0.101**
	(0.048)	(0.048)
Time fixed effect	Yes	Yes
Industry fixed effect		Yes
No. of observation	17,472	17,472
No. of group	1,092	1,092
R^2	0.271	0.277

Source: Authors' estimation

Note: The figure reports coefficient followed by standard error in parenthesis.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

positive impact. On average, foreign acquisition increases the firm employment rate by around 10%, close to the previous result. Table 6 shows this estimation result. The estimation of tax payment also produces a similar effect. Table 6 estimation 4 reports that foreign acquisition increases the tax contribution of firms by 27%, again, similar to the previous estimation using the 2008-15 dataset.

To conclude, our analysis using the 2000-15 dataset shows that foreign investment causes a positive impact on firm productivity, employment, and tax contribution. These outcomes are similar to the existing literature on foreign investment using older datasets in Indonesia (Arnold & Javorcik 2009; Lipsey, Sjöholm & Sun 2013). However, the impact on firm productivity is different from what we obtain from using the 2008-15 dataset. This might

indicate that while in general FDI improves firm productivity, the new FDI law has not brought a further, significant boost. Considering this, we proceed by examining possible heterogeneity across different FDI regimes.

Table 6. The Impact of Foreign Acquisition on Employment and Tax Payment (2000-15)

	Matched firms			
	1	2	3	4
Outcome variable:	Log of total workers		Log of tax payment	
Foreign acquisition	0.091***	0.096***	0.266**	0.265**
	(0.034)	(0.033)	(0.122)	(0.121)
Time fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect		Yes		Yes
No. of observation	17,472	17,472	12,054	12,054
No. of group	1,092	1,092	1,027	1,027
R^2	0.011	0.029	0.084	0.091

Source: Authors' estimation

Note: The figure reports coefficient followed by standard error in parenthesis.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

4.4. Heterogeneity Treatment Effect Across FDI Regimes

We measure the differences in the impact of foreign investment across different FDI regimes using the 2000-15 dataset, applying a simple heterogeneity treatment effect test with a dummy variable for the FDI reform. This estimation is useful to assess whether the effect of foreign investment is heterogeneous across the FDI regimes.

Table 7 reports the result of the impact of foreign in-

vestment on firm productivity. It confirms that the effect of foreign investment is heterogeneous across the FDI regimes. Under the older FDI law, foreign acquisition causes a positive impact on firm productivity, significant at a 5% level. However, this effect becomes insignificant under the new FDI law after 2008. This result provides supporting evidence to our previous estimations. The impact of foreign investment on firm productivity is not significant after the new FDI regime.

Table 7. The Impact of Foreign Acquisition on Labor Productivity (2000-15)
Heterogeneity Treatment Effect

	FDI 2008 & before		FDI after 2008	
	1	2	3	4
Outcome variable: Log value added per worker				
Foreign acquisition	0.169***	0.167**	0.075	0.072
	(0.058)	(0.057)	(0.092)	(0.092)
Time fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect		Yes		Yes
No. of observation	8,736	8,736	8,736	8,736
No. of group	1,092	1,092	1,092	1,092
R^2	0.095	0.099	0.115	0.125

Source: Authors' estimation
Note: The figure reports coefficient followed by standard error in parenthesis.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

We also estimate the effect of foreign investment on firm employment and tax payment. Our estimation shows that the impact of foreign investment on employment is homogenous across the different FDI regimes. Estimations 2 and 4 in Table 8 indicate that foreign investment increases the firm employment rate before and after the new FDI law took effect. Likewise, as Table 9 shows, the effect of foreign investment on tax is homogenous; they are significant before and after the new FDI regime.

4.5. The Opposite Direction of Acquisition

Finally, we observe the domestic acquisition of foreign-owned firms. This estimation is useful to provide insights into the impact of acquisition in the opposite direction. We hypothesize that the change

Table 8. The Impact of Foreign Acquisition on Employment (2000-15)
Heterogeneity Treatment Effect

	FDI 2008 & before		FDI after 2008	
	1	2	3	4
Outcome variable: Log of total workers				
Foreign acquisition	0.079**	0.081**	0.196***	0.193***
	(0.033)	(0.032)	(0.062)	(0.063)
Time fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect		Yes		Yes
No. of observation	8,736	8,736	8,736	8,736
No. of group	1,092	1,092	1,092	1,092
R^2	0.007	0.018	0.019	0.031

Source: Authors' estimation
Note: The figure reports coefficient followed by standard error in parenthesis.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Table 9. The Impact of Foreign Acquisition on Tax Payment (2000-15)
Heterogeneity Treatment Effect

	FDI 2008 & before		FDI after 2008	
	1	2	3	4
Outcome variable: Log of tax payment				
Foreign acquisition	0.379***	0.376***	0.516**	0.524**
	(0.129)	(0.129)	(0.250)	(0.250)
Time fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect		Yes		Yes
No. of observation	5,897	5,897	6,157	6,157
No. of group	976	976	959	959
R^2	0.057	0.061	0.019	0.025

Source: Authors' estimation
Note: The figure reports coefficient followed by standard error in parenthesis.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

of ownership per se does not cause an increase in productivity. Rather, it is foreign acquisition that generates the positive impact. Thus, it is important to estimate the impact on firm performance when the change of ownership reverse the direction, from foreign-owned to domestic-owned. In this estimation, we focus only on the impact on firm productivity.

We select a similar approach to foreign acquisition estimation to measure the impact of domestic acquisition using the 2000-15 dataset. Firstly, we estimate a probit model to predict domestic acquisition. Table 10 shows that all variables are significant.

Using covariates from the probit estimation, we pro-

Table 10. The Probit Result Predicting Domestic Acquisition

	Coeff (Std Error)
Dependent variable: Dummy foreign acquisition	
Log total worker$_{t-1}$	0.057***
	(0.020)
Log tax payment$_{t-1}$	0.021***
	(0.007)
Share of import$_{t-1}$	0.003***
	(0.000)
Log of energy$_{t-1}$	0.034***
	(0.008)
Firm size$_{t-1}$	0.108**
	(0.054)
No. of observation	173,313
No. of group	31,223
Wald Chi^2 (Prob)	469.38 (0.000)

Source: Authors' estimation
Note: The figure reports coefficient followed by
    standard error in parenthesis.
    *, **, and *** indicate significance at the
    10%, 5%, and 1% levels respectively.

ceed to employ the matching procedure. Again, this estimation employs a similar strategy to our approach to foreign acquisition. The matching process provides 502 matched firms (251 pairs). The estimation of causal inference is measured by using the DiD method of the matched firms. Our estimation shows a negative effect of domestic acquisition on firm productivity (Table 11). It implies that domestic acquisition decreases firm productivity by approximately 13%. This outcome supports our previous estimation of foreign acquisition, only this time, in the opposite direction.

Table 11. The Impact of Domestic Acquisition on Labor Productivity (2000-15)

	Matched firms	
	1	2
Outcome variable: Log value added per worker		
Domestic acquisition	-0.127**	-0.129**
	(0.061)	(0.061)
Time fixed effect	Yes	Yes
Industry fixed effect		Yes
No. of observation	8,031	8,031
No. of group	502	502
R^2	0.294	0.301

Source: Authors' estimation
Note: The figure reports coefficient followed by
    standard error in parenthesis.
    *, **, and *** indicate significance at the
    10%, 5%, and 1% levels respectively.

One possible explanation of this negative impact is the change in foreign intangible assets. Upon being acquired by domestic investors, firms can lose their foreign intangible assets, such as foreign trade network, managerial system, or technological transfers. This change eventually decreases their productivity. Another possibility is that domestic investors tend to acquire the non-performing plants, thus ownership changes follow lapses of inefficiency. This is similar to a study by Balsvik & Haller (2010), revealing that domestic acquisition in fact decreases firm productivity in Norway.

This estimation result validates our previous analysis. Initially, foreign acquired firms have a higher productivity rate. Subsequent to a change in ownership to domestic investors, firm productivity decreases significantly. It proves that the treatment effect does not occur from the change in ownership per se, but rather the direction of ownership change.

4.6. Robustness Test

It is important to ensure that the matching procedure and DiD estimation provide balanced covariates across firms. We test these balancing covariates using standardized means for unmatched and matched firms. This estimation shows that the means of covariates between the treated and control group exhibit no significant difference. Table 12 in the Appendix reports the 2008-15 dataset estimation, while Table 13 reports the 2000-15 estimation.

The unmatched estimations show that covariates between the treated and control groups in both datasets exhibit statistically significant differences at 1% level. On the contrary, estimations on the matched firms produce no significant difference between treated and control groups on average. This result shows that our matching procedure yields balanced covariates.

Lastly, we conduct a Granger causality test, as suggested by Wing, Simon, & Bello-Gomez (2018, p. 460) for robustness check on the common trends assumption. This test aims to check the possibility that the causality happens before acquisition (antic-

ipatory effect). Table 14 in the Appendix shows that the causal impact for all outcome variables in the two datasets does not occur in the period before the acquisition. In other words, the Granger causality test proves no anticipatory effect in the matched datasets.

4.7. Discussion

We can conclude that the impact of foreign investment on the contribution of firms, measured by employment and tax payment, is positive and significant before and after the new FDI law. This result supports the existing literature, such as Lipsey, Sjöholm & Sun (2013). Furthermore, this positive impact is relatively greater after the new FDI regime came into force.

However, the impact on firm productivity, as measured by labor productivity, is heterogeneous. Foreign investment increases firm productivity only before the new FDI regime. After the new FDI law took effect, this positive impact becomes insignificant. The result of heterogeneous treatment effect on firm productivity shows an indication of change in investor behavior.

The increase in firm productivity may indicate that investors acquire the less-productive firms then improve them to be more productive. On the contrary, no significant increase in firm productivity can suggest that investors might 'cherry pick' the already-productive firms as their acquisition target. This indication is in line with the study by Gelübcke (2013) in Germany and supports the findings of Harris & Robinson (2002) in the UK. Our estimation of firm productivity indicates that foreign investors might have picked already productive domestic firms after the implementation of the new FDI law in Indonesia. This behavior is expected, as foreign investors will find a more productive firm an attractive investment destination.

Our findings imply that other domestic firms in Indonesia need to increase their level of attractiveness for foreign investors. Additionally, policymakers should support this effort by improving the in-

vestment climate in Indonesia. The FDI law offers changes in investment regulations, yet it does little improvement on the investment climate in general. Policymakers can attract more investors using both passive and active approaches.

The passive approach aims to increase investment by providing no additional burden in the regulation. One example of the drawback of the new FDI regime is the protectionism using negative investment list on several sectors from 2007 to 2014. Genthner & Kis-Katos (2022) reveal that negative investment regulation causes a decline in firm productivity two years after the implementation. This negative impact may indirectly correlate with our estimation result on firm productivity.

On the other hand, the active approach aims to improve the investment climate by providing incentives for investors. In this regard, we consider that the newly passed Omnibus Law is a policy in the right direction. Despite the rejection in many other areas, the Omnibus Law provides a regulation to liberalize foreign investment by lifting restrictions and facilitating business licensing. This regulation can be seen as an important effort to improve the investment climate in Indonesia.

5. Conclusion

Foreign investment is an essential aspect of the economy of Indonesia. It contributes to both macro and micro levels. However, the direction of the impact of foreign investment on firm performance is an interesting topic to study, particularly following the new FDI regime in Indonesia. We measure this effect of foreign investment on the productivity and contribution of firms after the implementation of the new FDI law.

Our sets of estimation show that foreign investment causes no significant impact on firm productivity after the FDI reform. However, foreign investment increases the employment rate and tax contribution of firms by 13% and 32%, respectively. Our further analysis using an extended dataset shows that the

impact of foreign investment on employment and tax payment is homogenous across different FDI regimes. Foreign investment significantly increases both employment and tax contribution before and after the new FDI law. However, we discover that the impact on labor productivity is heterogeneous. Foreign investment causes a positive effect before the new FDI law yet has no significant impact afterwards.

We also measure the impact in the opposite direction. The estimation shows that the domestic acquisition of foreign-owned firms causes a negative effect on firm productivity. This result indicates that the treatment impact is not merely determined by the change of ownership. The direction of the acquisition also plays an important role.

These findings prompt an interesting discussion. The government of Indonesia made considerable efforts to attract foreign investment. Following the implementation of the new FDI law, foreign investment positively contributes to the increase in the contribution of firms. However, the impact on firm productivity is not observed, as foreign investors might have picked already productive domestic firms. This result implies that other domestic firms need to increase their level of attractiveness for foreign investors. Furthermore, policymakers need to provide a supportive regulation to improve the investment climate in Indonesia. We consider the currently passed Omnibus Law as a policy in the right direction to improve the investment climate, particularly by lifting investment restrictions and facilitating business licensing—yet we are aware of its numerous limitations (Surianta & Patunru 2021). Additionally, it is also important to ensure that policymakers provide no additional burden in FDI regulation that can potentially discourage foreign investment in Indonesia.

This study raises several issues for further research. Our variable of interest to measure firm productivity is limited to labor productivity. Further research can explore the impact of foreign investment using a more advance Total Factor Productivity (TFP) variable, to include the impact on the technical aspects of firms. This paper also applies limited sets of covariates due to data restriction. Further study can elaborate the impact using more covariates to produce greater accuracy on firm characteristics. Our study suggests a different treatment effect across FDI regimes. Further research can analyze the causal impact of the FDI regulation on investor behavior to explain its correlation with our findings. Lastly, this study uses 2000 to 2015 dataset on the basis of the availability of variables of interest. Further study can use the latest dataset to provide a more recent and updated outcomes.

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Appendix

Table 12. Covariates Balance (2008-15)

	Unmatched		Matched	
	Treated	Control	Treated	Control
Treatment variable: Treated group foreign-acquired firms				
Log output per worker	12.848***	11.884***	12.738	12.656
Dummy importer	0.458***	0.199***	0.513	0.495
Share of import	27.408***	8.756***	27.201	24.120
Log average wages	10.100***	9.534***	9.964	9.971
Log of energy	12.801***	10.522***	12.782	12.834

Source: Authors' estimation

Note: Note: The figure reports means of treated and control group.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Table 13. Covariates balance (2000-15)

	Unmatched		Matched	
	Treated	Control	Treated	Control
Treatment variable: Treated group foreign-acquired firms				
Log output per worker	12.593***	11.341***	12.162	12.144
Dummy importer	0.532***	0.185***	0.538	0.557
Share of import	31.809***	8.231***	29.943	29.039
Log average wages	9.787***	9.097***	9.442	9.412
Log of energy	13.184***	10.632***	13.312	13.349

Source: Authors' estimation

Note: The figure reports means of treated and control group.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Table 14. Granger Causality Test

	2008-15		2000-15	
	F1	F2	F1	F2
Treatment variable: Foreign acquisition				
Log value added per worker	-0.054	0.046	-0.043	-0.058
	(0.060)	(0.066)	(0.048)	(0.053)
Log total workers	0.013	0.021	0.017	0.013
	(0.026)	(0.034)	(0.018)	(0.025)
Log tax payment	-0.190	0.247	-0.089	-0.066
	(0.135)	(0.158)	(0.100)	(0.121)

Source: Authors' estimation

Note: The figure reports coefficient followed by standard error in parenthesis.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.