Scrutinizing the FDI Spillovers Model: Do Foreign Firms Motivate Local Firms to Export?

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Abstract

We investigate the impact of foreign direct investment (FDI), particularly through multinational companies (MNCs), on the export behaviour and intensity of local firms. Focusing on the food and beverage subsectors in Indonesia from 2008–2015, we use the Heckman Selection model. We found a significant positive effect of FDI on the decision to export and the level of export intensity among domestic firms. The presence of MNCs in Indonesia appears to encourage local firms to both initiate and increase their export. Moreover, we observe a trend of export persistence, suggesting that firms active in exporting in one year are more likely to continue doing so in the following year. Other variables such as wages, import penetration, firm size, productivity, capital, and the presence of foreign firms were also included, with some influencing the decision to export more than the export intensity. Our findings provide some policy implications, namely for Indonesia's "Making Indonesia 4.0" strategy in the food and beverages sectors, emphasizing the need for government support and human capital development to maximize the benefits of these spillovers.

Keywords: foods and beverages industries, export spillovers, Indonesia
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1. Introduction

The debate on whether foreign direct investment (FDI), such as multinational companies (henceforth MNCs), benefits the host country's economy has motivated many studies to scrutinize further. There is a large number of studies examining the impact of FDI spillovers on efficiency and productivity (Sari, 2019; Suyanto et al., 2012,2014,2021; Yasin, 2022), although few studies simultaneously investigate both of these indicators (Sari et al., 2016; Sugiharti et al., 2022). Other studies examine the impact of FDI presence on the wage level offered by domestic companies (Lee & Wie, 2015; Tomohara & Takii, 2011; Yasin et al., 2022) or investigate its impact on the motivation to trade, i.e. exports and imports (Franco & Sasidharan, 2010; Rodríguez-Pose et al., 2013), both of which are also underdeveloped for the case of a specific subsector. In this study, we aim to fill the gap by identifying the FDI spillover effect on the firms' exports in the specific two-digit subsector, namely the foods and beverages industries in Indonesia, which has not been addressed well by prior studies.

The evidence of FDI spillovers to the exports of the foods and beverages industry in Indonesia deserves more attention. According to the data of Statistics Indonesia from 2008–2015, the foods and beverages industries have the largest number of exporter firms with 20.6% of the total exporter of the 24 subsectors. Similar data also revealed that 15% of the foreign firms stem from the foods and beverages industries. Most importantly, the foods and beverages industries have been prioritized by the Indonesian government following their largest market demand in Southeast Asia by 30% and the abundance of natural resources. In these regards, the presence of MNCs might stimulate local firms to export (so-called positive spillovers), although the negative spillovers can also occur when the local firms, conversely, get demotivated following inward MNCs.

A strand of literature has emphasized two primary hypotheses in the FDI spillovers and firms' exports: learning-by-exporting and self-selection. The hypothesis of learning-by-exporting is that when firms enter export markets, they learn new methods and technical knowledge, which allows them to improve their efficiency and productivity (De Loecker, 2007). Export-led growth theories also reveal a positive association between exports and economic growth at the country level, leading to policymakers boosting export growth through various incentives such as export subsidies (Franco & Sasidharan, 2010; Giles & Williams, 2000a,b). Meanwhile, more efficient and productive firms might also 'self-select' to enter international markets, according to the so-called self-selection hypothesis (De Loecker, 2013). In other words, the distinction between exporter and non-exporter existed even before exporting embarked (Pane & Patunru, 2021). Prior studies control this issue by employing models with sample selection, such as the Heckman selection model, to avoid selection bias when the analysis merely incorporates exporter firms (Franco & Sasidharan, 2010; Rodríguez-Pose et al., 2013). Simultaneously, the presence of MNCs may affect firms' decision to export through the information about their intensive international market

involvement, networks and distribution, and servicing facilities, all of which are commonly called demonstration effect channels, strengthening the effect of both learning-by-export and selection criteria (Franco & Sasidharan, 2010; Villar et al., 2020).

This study contributes to the literature by employing foods and beverages subsectors that have not been well addressed by prior studies. Even though there are a large number of papers examining the FDI spillovers and firms' exports, there are only a few that discuss the Indonesian case (see Rodríguez-Pose et al., 2013). Among the few, to the best of our knowledge, no comprehensive study has scrutinized FDI spillovers and firms' exports of foods and beverages in Indonesia. Therefore, the findings can enrich the literature on the food and beverage industries' exports, and they can be a policy suggestion for the government to intensify this subsector as the priority of development.

To answer the hypothesis, we employ Heckman's two-step selection model (Heckman, 1979), capturing two-step decision-making in export activities. This approach enables the export behaviour to be captured not only extensively but also intensively (Yasin & Esquivias, 2023). Moreover, Heckman's two-stage selection will prevent discrimination through which bias in accounting for self-selection in export activities is absent when the analysis involves exporter, importer or foreign-owned firms (Franco & Sasidharan, 2010; Rodríguez-Pose et al., 2013; Yasin & Esquivias, 2023). In this study, we found a significant positive effect of FDI on the decision to export and the level of export intensity among domestic firms. The presence of MNCs in Indonesia appears to encourage local firms to both initiate and increase their export. Moreover, we observe a trend of export persistence, suggesting that firms active in exporting in one year are more likely to continue doing so in the following year. Other variables such as wages, import penetration, firm size, productivity, capital, and the presence of foreign firms were also included, with some influencing the decision to export more than the export intensity. This finding is robust under three strategies by re-sampling the domestic firms only, large firms only, and Java-Sumatera-located firms only; all of these incorporate a similar export spillover variable.

The rest of the sections explain the data, empirical strategy, and econometric specifications to identify export spillover. Section 3 provides the study's findings and elaborates further discussion. Eventually, the conclusion and policy implications are addressed in Section 4.

2. Methodology

We use firm-level data from 2008 to 2015 collected from *Statistik Industri* by Statistics Indonesia (*Badan Pusat Statistik*), which contained large and medium-sized firms per year. Statistics Indonesia groups a firm as a large firm if it has more than 99 workers; otherwise, it is grouped as a medium-sized firm. In this study, we use an unbalanced panel dataset from the food and beverages firms.

The data management process was adapted to account for changes in indus-

trial classification between 2008 and 2015. Initially, data from 2008 and 2009 were aligned with the 2005 Indonesian Standard Industrial Classification (*Kelompok Baku Lapangan Usaha*, KBLI), which encompassed manufacturing industry classifications from 15 to 37. In contrast, data from 2010 to 2015 adhered to the 2009 KBLI, covering classifications from 10 to 33. To ensure consistency, observations from 2008 and 2009 were adjusted using the 3-digit concordance from the 2009 KBLI. Additionally, firms might be categorized into different subsectors during the study period, so the most frequently occurring subsector was chosen as the two-digit classification. Moreover, all monetary variables were adjusted for inflation using the 2010 Wholesale Price Indices of Indonesia as the base year. Ultimately, the study comprised 48,347 observations, with the number of firms ranging from a low of 5,556 in 2010 to a high of 6,680 in 2015.

In capturing the effect on the exports, we utilize two proxies: the dummy variable of the export decision to capture the extensive model (1 if a firm is an exporter, 0 otherwise) and the export intensity to capture the intensive model (the percentage of total output which is exported). We use Franco & Sasidharan (2010)'s proxy to capture within-industry export spillover from the share of foreign companies' exports to the total export. However, instead of using the total value of the share, we use the mean value to capture the average spillover power of the foreign firms. The formula for the export spillover is specified below.

$$ESpill_{kt} = \frac{1}{N_k^f}\left(\frac{Export_{it}^f}{Export_{kt}^T}\right) \times 100\% \quad (1)$$

Where $ESpill_{kt}$ denotes export spillovers of subsector k in the year t, $Export_{it}^f$ denotes foreign company's exporting output value (in Rupiah) i in year t, $Export_{kt}^T$ denotes total exporting output value (in Rupiah) of subsector k in year t. N_k^f is the number of foreign firms in the subsector k. Other variables utilized in our study are summarized in Table 1. The descriptive statistics of variables in Table 1 are then reported in Table 2 as follows.

Table 1: Variable Measurement

Variable	Proxy
ESpill	The average share of MNEs' exports on total exports of the two-digit subsector
DEXP	DEXP=1 if the firm exports during the year; 0 otherwise
DIMP	DIMP=1 if the firm imports raw materials during the year; 0 otherwise
Export Intensity (ExpIntensity)	The percentage of exported outputs
Capital Per-worker (Capital)	Ratio of fixed assets to the number of labours
FOR	FOR10=1 if the firm has larger than 10% foreign ownership
Total Factor Productivity (TFP)	Levinsohn & Petrin (2003)'s TFP Index
Wage (Absorptive Capacity)	The ratio of labour cost from non-production worker to the number of non-production workers
Firm Size (FSize)	FSize=1 if the firm has at least 100 labour, 0 otherwise

Table 2: Descriptive Statistics

Variable	Measurement	Observation	Mean	Std. Deviation	Min	Max
DEXP	Dummy	48,347	0.131	0.338	0.000	1.000
ExpIntensity	Percentage	6,351	0.683	0.342	0.000	1.000
ESpill	Ratio	48,347	0.782	2.279	0.226	18.945
DIMP	Dummy	48,347	0.120	0.325	0.000	1.000
Wages	Ratio (ln)	36,945	9.129	1.138	-1.544	18.373
TFP	Ratio	31,954	15.934	1.558	10.227	24.921
Capital	Ratio (ln)	32,155	20.297	2.240	7.242	34.630
FSize	Dummy	48,347	0.246	0.430	0.000	1.000
FOR	Dummy	48,347	0.052	0.222	0.000	1.000

Our empirical strategy to identify the decision to export as well as export intensity is set as follows.

$$DEXP_{it} = \alpha + \beta ESpill_{k,t-1} + \omega Z_{it} + \zeta D_i + \varepsilon_{it} \quad (2)$$

$$ExpIntensity_{it} = \varrho + \tau ESpill_{k,t-1} + \varphi DEXP_{i,t-1} + \Gamma D_i + \Lambda Z_{it} + \varepsilon_{it} \quad (3)$$

Where $DEXP_{it}$ denotes export of firm i in year t. $ExpIntensity_{it}$ denotes export intensity proxied from the ratio of exported output to the total production of firm i at period t. $ESpill_{k,t-1}$ is the within-industry export spillover of subsector k in year $t-1$ respectively. $DEXP_{i,t-1}$ is the export decision of firm i in year $t-1$. Z denotes the set of control variables, namely lagged of import dummy, wages intensity, total factor productivity, capital per labour, dummy for large firm (1 if the firm has worker more than 99, 0 otherwise), and dummy for foreign firm (1 if the firm has more than 10% foreign ownership, 0 otherwise). D_i denotes two-digits sub-sectoral dummy.

In the setting of (2) and (3), we arrange several lagged variables. First, the variable of $DEXP_{i,t-1}$ will capture the persistence of export: a firm exporting in the prior year will be more likely to export in the present year. Secondly, the variable of *ESpill* is also in the lagged form to tackle the endogeneity issue as in Franco & Sasidharan (2010). Thirdly, the dummy of import is included as lagged to reveal whether the decision to import in the prior year will enable firms to be exporters in the present year.

The parameters in (2) and (3) are estimated using the Heckman two-step selection model to accommodate the dataset to be not excluded from the selection mechanism. In the first step, this method estimates (2) with export decision variables as a dependent variable using the Probit model. The second step enables the exporter firms to be sampled from the first step. In this regard, only firms that export will be included in the equations (3). For the robustness test, we conduct three strategies by re-sampling the domestic firms only, large firms only, and Java-Sumatera-located firms only; all of these incorporate a similar export spillover variable.

3. Result and Analysis

The analysis is started by looking at the descriptive statistics in Table 2. There are approximately 13% of the firms in our observations that are exporters. Meanwhile, the export intensity is around 68%, with a maximum value of 100%. The average value of export spillovers is 0.782, while there are 12% importers in the foods and beverages firms. The average value of wages per worker in the natural logarithm is 9.129, while the average TFP value ranges between 10.227 and 24.921 and the average capital ranges between 7.2 and 34.6. Twenty-four per cent of the firms in our observations are classified as large firms, while 5.2% of the foods and beverages industries are owned by foreign affiliation.

We compare the composition of the exporter and non-exporter for the domestic and foreign firms by illustrating in Figure 1. Foreign firms perform a larger proportion of the exporter than domestic firms, although domestic firms have a larger number of firms. Exporter firms in the foreign affiliation experienced an increasing trend from 2008 to 2012, while it decreased afterwards.

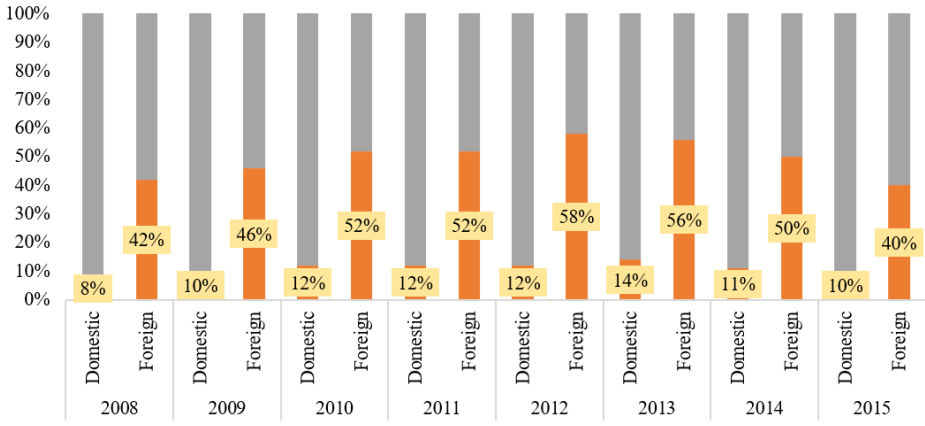

Figure 1: Exporter and Non-Exporter in the Domestic and Foreign Firms

Table 3 reports the regression result to examine the impact of export spillovers on the decision to export and export intensity. According to Table 3, there is a persistent trend of the export decision, shown by the positive coefficient from the variable of $DExport_{t-1}$ in columns (1) and (2). This finding implies that once the exporter firms enter the international market, they will be more likely to export in the next year. This finding is consistent with Sahminan & Kurniati (2009) and Rodríguez-Pose et al. (2013) for the case of Indonesian firms and Franco (2013) for the United States evidence. This finding also supports theoretical literature from Timoshenko (2015) postulating that export persistence might occur as profitability increases along with experience.

Our main attention is shown by the export spillover variable (*ESpill*) that

reveals a positive coefficient for both the export decision model and the export intensity model. This result indicates positive spillovers that occur in the foods and beverages industries in Indonesia: an increase in foreign firms' spillovers will enhance the probability of the firms (both domestic and foreign) to export. This finding is consistent when we exclude foreign firms from the observation (columns (2) and (4)), showing that FDI spillovers motivate firms to be exporter as well as increase their export intensity. Even though utilizing a more specific subsector, our finding supports the result that revealed positive spillovers of manufacturing exports from FDI presence in Indonesia. Moreover, the foods and beverages industries that are classified as low technology and labour-intensive groups enable local firms to likely imitate the sophisticated MNCs' strategy because this subsector applies less advanced technology and constitutes a narrowed gap between MNCs and local firms (Sugiharti et al., 2022). Hence, local firms can replicate the MNCs' products and export in the same international markets, concluding the demonstration effect occurred from the FDI spillovers.

Evidently, the presence of MNCs in the foods and beverages industries in Indonesia remains essential in the spillover process, notably for export decisions as well as export intensity that is projected to improve the global economy and the Southeast Asia region (Ragimun & Widoso, 2019). Following the Making Indonesia 4.0 of the Indonesian government strategy, which subsequently continued to the 5.0 Smart Society strategy, the presence of international exposure for manufacturing industries to encourage the knowledge transfer for local firms amplifies the role of MNCs in the Indonesian output markets. This is because MNCs remain affiliated with their parent company located abroad, which is primarily in developed countries. Accordingly, the Indonesian government has accelerated the strategy by facilitating fiscal incentive programmes such as tax holidays, tax allowances, super tax deductions, as well as import duty facilities. Furthermore, the non-fiscal incentive strategies have also been promulgated through human resource training and certification, which are not only prepared for both input and output markets' competition with MNCs but also arranged for capacity and skill enhancement from which sophisticated technology can be rapidly absorbed (Sari et al., 2016; Yasin, 2022; Yasin & Sari, 2022).

Imports positively affect firms' export decisions, indicating that being an importer enables firms to be more likely to export. This finding is not surprising as imports allow firms to access higher-quality materials (Esquivias & Harianto, 2020; Javorcik et al., 2012). However, being an importer is not associated with higher export intensity. A plausible reason for this finding is the evidence that the Indonesian economy is dominated by domestic consumption (Negara & Adam, 2012; Yasin, 2021). It also indicates that the foods and beverages industries, which contribute the largest in the manufacturing sector, might prioritize local markets to fulfil domestic demands. In this sense, the positive effect of the decision-to-export model is merely to provide high-quality materials as well as accommodate the exposure to the international market via export, but still, the larger intensity is not necessarily boosted by being an importer. In other words, once the local

Table 3: Regression Results

	(1)	(2)	(3)	(4)
	Export Decision		Export Intensity	
	All	Domestic	All	Domestic
$DExport_{t-1}$	2.978***	3.045***	-	-
	(0.105)	(0.110)		
$ESpill_{t-1}$	0.026**	0.023*	0.005**	0.009***
	(0.012)	(0.012)	(0.002)	(0.003)
$DImport_{t-1}$	0.254***	0.264***	-0.119***	-0.105***
	(0.072)	(0.075)	(0.029)	(0.020)
Wages	0.060***	0.052***	-0.014*	-0.012
	(0.018)	(0.018)	(0.008)	(0.010)
TFP	0.045***	0.047***	-0.017***	-0.019***
	(0.015)	(0.013)	(0.005)	(0.005)
Capital	0.052***	0.057***	-0.009	-0.013*
	(0.015)	(0.017)	(0.007)	(0.008)
FSize	0.378***	0.413***	0.026	0.026
	(0.045)	(0.048)	(0.019)	(0.022)
FOR	0.423***	-	0.059***	-
	(0.066)		(0.021)	
Constant	-5.022***	-5.139***	1.223***	1.296***
	(0.246)	(0.326)	(0.317)	(0.357)
Dummy 3 - digits Sectoral	YES	YES	YES	YES
N	19,581	18,467	3,142	2,497
P	-0.044	-0.064	-	-
Log-pseudolikelihood	-3105.744	-2539.278	-	-
Wald test of indep. eqns (df = 1): chi-square	3.42	6.53	-	-

Note: ***, **, * denotes significance of alpha 1%, 5%, and 10%.
Robust-clustered standard errors are in parentheses.

firms enter the international markets, raw materials might be switched into local oriented to enhance export intensity.

The variable of wages that represents absorptive capacity reveals a positive impact on the export decision. Because the wage variable stems from the skilled workers ' cost per worker, this finding implies that the wage level is linear to the workers' skills, which in turn encourages firms to enter international markets. Simultaneously, larger wages for skilled workers might also accelerate technology diffusion to be rapidly taken by local firms as labour cost per worker also consists of spending for training to develop human capital (Carbonell & Werner, 2018). Nonetheless, higher spending for skilled workers does not support export intensity in the foods and beverages industries.

The variable of Total Factor Productivity (TFP) positively affects the decision to export. This finding concludes the hypothesis of self-selection and promotes Rodríguez-Pose et al. (2013)'s finding for the general manufacturing evidence. It means only more productive firms that are more likely to enter export markets in the foods and beverages industries. This finding supports the prior argument that the decision to export might require long consideration, notably the sunk costs of being an exporter, which can only be overcome by productive firms (Bernard & Jensen, 2004). Furthermore, researching stringent international regulations and

ensuring the foods and beverages products fit the international demand and standard will enable less-productive to allocate more resources, which in turn demotivates them to be exporters. Nonetheless, even though more productive firms are more likely to be exporter, they do not enhance their export intensity once they enter international markets. This finding supports our prior arguments that food and beverage outputs are prioritized for domestic markets, notably from more productive firms.

The value of capital per-worker shows positively to the decision to export. This finding is not surprising as our prior arguments postulate that export decision requires high sunk cost, one of which can be covered by firms with large capital, although no robust result is shown in the export intensity model. This finding is also consistent with the result from the Firm Size variable, concluding that larger firms are more likely to be exporters, supporting prior literature arguing that larger firms have high allocation for international exposure, so they are more likely to be exporters. Nonetheless, no significant difference is found between large and medium firms in terms of export intensity.

Finally, an intriguing finding shows that foreign firms (FOR) are more likely to be exporters rather than domestic firms. They also tend to export more than those local firms. Evidently, there are two possible purposes following incoming foods and beverages MNCs in Indonesia. First, as the foods and beverages industries are classified as low-skilled labour-intensive subsectors, foreign companies might benefit from redundant labour with low wage levels so that they can enlarge their output exporting proportion. However, in the second purpose, when they decide to export to the international markets, local firms can dominate domestic markets.

We also conducted a robustness test from the results in Table 3 by re-sampling the observation into large firms and those firms located in Java and Sumatra islands (the two largest populated islands of foods and beverages firms). The result is reported in Table 4. We found robust findings for the positive export spillover variable in both the Export Decision and Export Intensity Models. An intriguing result for this robustness test is that most of the significant positive effect stems from the Export Decision model, while the Export Intensity model only reveals a positive coefficient from the Export Spillover variable and dummy of foreign firms. Accordingly, we might conclude that our control variables merely promote firms in the foods and beverages industries to enter export markets but do not support their larger intensity of exports, a plausible finding from empirical evidence of foods and beverages firms in Indonesia that primarily prioritizes domestic demands although they have entered international markets.

4. Conclusion and Implication

We have demonstrated the effect of FDI spillovers from the channel of export in affecting firms' decision to export as well as firms' export intensity in the foods and beverages industries in Indonesia. We found a significant positive

Table 4: Robustness Test

	Export Decision			Export Intensity		
	All Sample	Large Firm	Java and Sumatra	All Sample	Large Firm	Java and Sumatra
$DExport_{t-1}$	2.978***	2.792***	3.103***			
	(0.105)	(0.094)	(0.091)			
$Espill_{t-1}$	0.026**	0.020**	0.033**	0.005**	0.007***	0.005*
	(0.012)	(0.009)	(0.013)	(0.002)	(0.002)	(0.002)
$DImport_{t-1}$	0.254***	0.207***	0.226***	-0.119***	-0.086*	-0.117***
	(0.072)	(0.064)	(0.066)	(0.029)	(0.046)	(0.033)
Wages	0.060***	0.045*	0.061***	-0.014*	-0.015	-0.017*
	(0.018)	(0.026)	(0.020)	(0.008)	(0.011)	(0.009)
TFP	0.045***	0.025	0.029	-0.017***	-0.023***	-0.023***
	(0.015)	(0.021)	(0.019)	(0.005)	(0.009)	(0.005)
Capital	0.052***	0.024	0.055***	-0.009	-0.013*	-0.008
	(0.015)	(0.017)	(0.018)	(0.007)	(0.007)	(0.008)
FSize	0.378***	-	0.421***	0.026	-	0.013
	(0.045)		(0.034)	(0.019)		(0.021)
FOR	0.423***	0.334***	0.446***	0.059***	0.075***	0.060***
	(0.066)	(0.090)	(0.075)	(0.021)	(0.019)	(0.020)
Constant	-5.022***	-3.650***	-4.966***	1.223***	1.326***	1.034***
	(0.246)	(0.355)	(0.299)	(0.317)	(0.386)	(0.173)
N	19581	5036	17244	5568	3297	4471

Note: ***, **, * denotes significance of alpha 1%, 5%, and 10%.
Robust-clustered standard errors are in parentheses.

effect of FDI on the decision to export and the level of export intensity among domestic firms. The presence of MNCs in Indonesia appears to encourage local firms to both initiate and increase their export. Moreover, we observe a trend of export persistence, suggesting that firms active in exporting in one year are more likely to continue doing so in the following year. Other variables such as wages, import penetration, firm size, productivity, capital, and the presence of foreign firms were also included, with some influencing the decision to export more than the export intensity. Our findings lead to several policy implications. First, as the priority of Making Indonesia 4.0, the foods and beverages industries require substantial support from the governments, notably in terms of human capital development. The facilitation of training and certification to generate more skilled workers is essential to amplify the spillover effect, as the MNCs have been shown to significantly stimulate domestic foods and beverages firms to export. As the skilled workers grow, domestic firms might rapidly penetrate their outputs in the international markets. Secondly, in the era of market liberalization, the Indonesian government might not be able to impose restrictions on inward FDI. In this regard, selective decisions should be implemented, such as delivering more incentives to the MNCs that source inputs from local suppliers or generate positive spillovers to the local firms while limiting inward FDI when there is potential market stealing to avoid overweight of negative spillovers over the total benefit from FDI.

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