

Agglomeration and Manufacturing Activities in Indonesia



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Policy Note 6

Agglomeration and Manufacturing Activities in Indonesia

Abstract

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The importance of the agglomeration process in facilitating growth and productivity increases in Indonesia's manufacturing sector cannot be ignored. The agglomeration process is associated with improved productivity as firms enjoy external benefits from either urbanization or from the sharing of inputs available in certain locations. Evidence suggests that Java remains the main corridor for manufacturing activities, with large cities attracting manufacturers that are looking for externalities from urbanization. However, there are signs that some firms are shifting to new locations in other cities and forming new agglomerations in areas that these firms find more favorable. With regional autonomy, issues relating to local governance, infrastructure, and uncertainties in local regulations are increasingly important and can undermine the process of agglomeration. Some programs promoting certain locations as special economic zones (SEZs) are experiencing difficulties in attracting manufacturing investors. Understanding these challenges should help policymakers to strengthen the underlying factors that facilitate manufacturing agglomeration.



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Table of Contents

1. Introduction
 2. Agglomeration process in Indonesian manufacturing sector
 3. Impact of agglomeration on productivity
 4. Constraints that can slow down the process
 5. Conclusions and Implications for the Policy Framework
- References
- Annex

1. Introduction

Agglomeration is one of the key processes for facilitating growth in modern manufacturing activities. Unlike cottage industries that operate using traditional technology and serve small markets nearby, modern manufacturing industries thrive by serving larger customers. Besides adopting measures to improve internal efficiency, such as specialization and better technology, modern manufacturing firms choose to locate in places where they can tap into one of the following external benefits. The first type of external benefit comes from accessing a pool of inputs, such as labor and skills that exist in a certain location, and an exchange of knowledge from other manufacturers in a similar industry (i.e., localization economies).¹ The second type of external benefit comes from accessing diverse types of inputs, such as proximity to consumers and opportunities to exchange knowledge from diverse businesses in a certain location (i.e. urbanization economies).² The process, whereby new manufacturers tap into external benefits by choosing to locate in areas that other manufacturers are already operating in, is defined as agglomeration.

The process of manufacturing agglomeration is present in Indonesia. Manufacturing activities across Indonesia often started in certain major cities such as Jakarta, Bandung, and Surabaya. The process seems to reinforce itself as new manufacturers tend to locate in areas where there are already manufacturing activities. The process also seems to be associated with productivity gains and an increase in product variety. Market forces and associated externalities appear to be the main driver of the process. Manufacturing agglomeration, or clustering, of selected industries continues to take place today, such as in garments in the Bandung area, machinery and heavy industries in the Greater Jakarta and Surabaya areas, rattan in Cirebon and Jepara, leather and footwear in Sidoarjo, and ceramics in Plered (West Java).

Firm co-location can increase the productivity spillovers from foreign direct investment and exporting. Spillovers can occur through various transmission channels including changing market forces (such as increased competition and demonstration), labor turnover, and supply chains. Such channels are more likely to work when foreign and domestic firms are located close to each other. Empirical evidence suggests that spillovers to domestic firms seem to be constrained to regions where multinational firms are located.³ Empirical evidence for Indonesian manufacturing firms over the period 1990-2005 suggests that a higher share of exporters in a province (export spillovers) has a significantly positive effect on firm-level export propensity. In addition, a higher share of exporters in a province also significantly increases firm-level export intensity.⁴ In sum, spillovers from foreign direct investment and exporting seem to be more prevalent in agglomerations.

This policy note argues that the policy focus should be on facilitating the private-sector-led agglomeration process instead of on mandatory policies that distribute industrial development across regions. Organic growth of manufacturing activities is likely to be most effectively sustained by a private-sector-led agglomeration process. Agglomeration has benefits from the standpoint of production efficiency, as well as improving the general welfare of the population. An optimal strategy should be one that makes use of the forces of agglomeration to facilitate industrial development.

¹ Localization, in this respect firms learn about local inputs, output markets and technological conditions from their own industry, which in the dynamic form is often called Marshall-Arrow-Romer (MAR) externalities.

² These types of externalities are called urbanization or in the dynamic context are termed Jacobs' externalities (Jacobs [1969]). Firms learn from all firms in a city, whereby the diversity of local industries enhances the local information environment.

³ Girma and Wakelin (2007), Girma, S. and K. Wakelin (2007) "Local productivity spillovers from foreign direct investment in the U.K. electronics industry", *Regional Science and Urban Economics*, 37: 399–412.

⁴ Rodriguez-Pose, A., V. Tselios, D. Winkler, and T. Farole, "Geography and the Determinants of Firm Exports in Indonesia", The World Bank, forthcoming.

Policies should focus on lowering/eliminating congestion costs in agglomerations in order to increase the potential benefits from agglomerations in this respect, understanding the site selection criteria of firms in different industries is an important precursor to designing policies aimed at decentralizing economic activities from established agglomerations.

2. Agglomeration process in Indonesian manufacturing sector

From the outset, hinterland locations have had difficulties in attracting manufacturing industries, despite government policies encouraging decentralization, such as the creation of industrial zones in outlying regions. Many industrial zones remained largely empty until the mid-1990s. Later on, after another wave of economic liberalization in the mid-1990s and improvements in infrastructure in lagging regions, some movement of new manufacturing firms to areas further from Jakarta did take place.⁵ It seems that as congestion, and wage and price increases began to erode manufacturing competitiveness firms then started to move to new locations adjacent to the original metropolitan areas of Greater Jakarta and Greater Surabaya.

Early on, evidence suggested that manufacturing firms would locate to areas where wages were low, infrastructure was available and market size was adequate to sustain operations. Evidence suggested that in the 1980s until the early 1990s most manufacturing firms in Indonesia started their operations in locations where the above factors were available and where industries were already present.⁶ Firms began operating in areas close to large cities, such as Jakarta, Bandung and Surabaya, because of their proximity to markets and access to services, which tended to be concentrated in these cities. Better infrastructure access to the main ports of Jakarta and Surabaya also added significant benefits for firms locating along major arteries into Jakarta or Surabaya. In addition, a centralized bureaucracy that delivered public services on licensing and permits was also likely to influence the decisions of manufacturers to locate closer to large provincial capitals.⁷

Government policy also plays an active role in promoting manufacturing activities in locations outside Java. The establishment of a free-trade port in Batam, in the Riau islands, in 1978 attracted foreign direct investment in manufacturing that would benefit from Batam's proximity to Singapore as a financial center and a hub port. Recently, the Government has also started to offer incentives and special treatment to investors coming to Batam, Bintan, and Karimun as a special economic zone (SEZ). To reduce the gap in industrialization between eastern and western Indonesia, the Government has also established integrated economic development zones (KAPETs) in regions outside Java. The idea of KAPETs is to facilitate investment in processing activities based on local comparative or geographical advantages. Since 1993, the Government has introduced at least 14 KAPETs, such as in Biak (Papua), Bitung (North Sulawesi), and Sabang (Aceh).

Despite the Government's aspiration of spreading manufacturing development across regions in Indonesia, manufacturers have consistently chosen to locate around and near large cities in Java. A quick glance at Figure 1 suggests that new manufacturing firms (displayed in light green) still prefer to locate in districts on Java. This means that Java is still the manufacturing corridor in Indonesia. As shown in Table 1, in the period 2005-08, Java was home to 81 percent of medium and large manufacturing firms, producing 75 percent of total manufacturing output, and hosting 78 percent of total new medium and large manufacturers. In fact, in 2005-08 Sumatra and Sulawesi hosted fewer new firms than Java. Most of the entrants in Sumatra, as shown in light green shoots, were in food processing such as palm oil processing. Table 1 also reveals an interesting fact that, while Greater Jakarta, Bandung, and Greater Surabaya remain attractive to new manufacturers, more

⁵ Henderson and Kuncoro (1996).

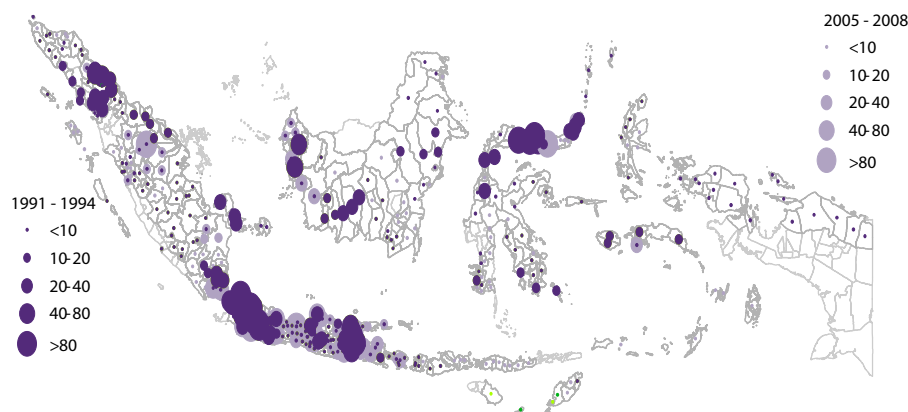
⁶ Kuncoro (2009).

⁷ Henderson and Kuncoro (1996).

new firms are establishing operations in districts considered “extensions” of these three cities. The percentage of new firms establishing operations in areas beyond the “traditional” industrial areas was 49 percent in 2005-08, up from 39 percent in 1991-94.

Figure 1: New manufacturers established operations in Java and a few other large cities in Indonesia

Number of new manufacturing firms across districts (kabupaten) in 1991-94 and 2005-08



Source: World Bank staff estimates from the BPS census of medium and large manufacturers.

There is also a decline in light manufacturing industries in Java. This decline is consistent with the national trend in which the share of value-added for light manufacturing industries declined to 43 percent in 2005-08, down from 54 percent in 1991-94 (Table 1).⁸ In Java, this decline is mostly because of the relative increase in output of machinery and other heavy manufacturing activities relative to the textile and garment industries. The boom in mining-related manufacturing and the decline in wood-based industries have reduced the importance of light manufacturing in Kalimantan and other Indonesian islands. Interestingly, Bandung is an exception, as the share of value-added from food, textiles and garments remains high. The boom in agriculture commodity prices is a likely factor that has sustained the share of value-added from light manufacturing industries in Sumatra, Sulawesi, and districts with KAPETs. Activities in agriculture and food processing have increased in those islands as processors find it more cost effective to locate closer to their main source of inputs.

Table 1: Distribution of medium and large manufacturing firms across Indonesia*

	% Number of firms		% Value-added		% Employment		% New firms	
	1991-94	2005-08	1991-94	2005-08	1991-94	2005-08	1991-94	2005-08
Java	78.6	80.9	81.1	74.8	79.8	81.0	69.7	77.9
Greater Jakarta	18.4	18.8	27.6	34.2	20.6	23.3	18.8	15.2
Bandung	8.1	8.0	5.3	4.8	10.3	9.6	4.4	6.8
Greater Surabaya	9.2	9.0	11.5	9.1	10.2	9.6	7.6	6.9
Other locations in Java	42.9	45.0	36.6	26.7	38.6	38.4	38.9	49.1
Sumatra	8.4	6.4	6.3	8.6	7.7	5.1	10.9	5.7
Sulawesi	2.3	2.3	0.8	1.3	1.4	1.4	4.3	2.0
Other islands	8.3	9.2	6.8	14.0	7.5	11.3	10.8	12.7
KAPET (selected)**		1.2		1.0		1.2		1.5

Source: BPS census of medium and large manufacturing firms.

Note: *Includes the following KAPETs: Biak, Bima, Bitung, Batulicin, Bukari, Mbay, Pare, Sasamba, Seram. **Excluding the oil and gas sector.

⁸ Light manufacturing consists of the following sectors in 2-digit ISIC: 15 – 20 (food and beverage, textiles, garments, leather products, and wood products).

Table 2: Share of value-added and average productivity of manufacturing industries across Indonesia

	% Value-added from light manufacturing		Labor productivity		TFP		TFP Growth %
	1991-94	2005-08	1991-94	2005-08	1991-94	2005-08	
Java	52	39	5.6	7.1	1.3	2.1	63
Greater Jakarta	32	18	6.0	7.8	1.4	2.0	42
Bandung	71	69	3.7	4.8	1.2	2.9	132
Greater Surabaya	49	43	7.3	8.4	1.2	2.6	112
Other locations in Java	66	59	5.2	6.2	1.2	1.8	53
Sumatra	44	48	6.4	8.3	1.1	1.9	64
Sulawesi	67	68	6.1	21.0	1.2	1.7	49
Other islands	80	51	5.4	9.6	1.2	3.1	154
KAPET (selected)*		69		10.7		2.6	

Source: BPS census of medium and large manufacturing firms.

Note: *Includes the following KAPETs: Biak, Bima, Bitung, Batulicin, Bukari, Mbay, Pare, Sasamba, Seram.

Evidence for the agglomeration process is apparent. Data reveal a pattern of new firms entering locations where other firms are already operating. Figure 2 presents the correlation between the concentration of existing firms across districts (kabupaten) and the concentration of incoming firms. The horizontal axis represents the proportion of firms residing in a district in the period 1993-96 as a percentage of the total number of firms. The vertical axis represents the proportion of new firms entering a district in 2005-08 as a percentage of total new entrants. Figure 2 suggests that there seems to be a positive relationship between locations with a larger firm population and the proportion of new entrants coming to those locations. Districts with a high presence of manufacturing firms in the 1990s tend to attract more new manufacturers. Nevertheless, there are also

districts that are not able to attract more new manufacturers despite a large presence of manufacturing firms in the 1990s but negative externalities due to congestion and urbanization or other issues might be behind this finding.

Core agglomerations in Indonesia are still attractive to new manufacturing entrants, as core regions perform better in terms of technology and worker availability, as well as infrastructure, transportation, and access to finance. Figure 2 shows that districts such as Bandung, Surabaya, North and West Jakarta remain attractive in attracting manufacturers. Analysis of 2009 Enterprise Survey data compares weighted averages across manufacturing firms of various indicators between core and non-core regions. The results reveal that firms in the core make significantly more use of technology, employ more workers, and offer more training. They also perform better in terms of infrastructure (e.g. number and duration of power outages, duration in obtaining electrical and water connection), transportation, and access to finance (both measured as share of firms with line

Figure 2: Agglomeration process in Indonesian manufacturing sector

Correlation between number of existing firms and subsequent entrants



Source: World Bank staff estimates from BPS census of medium and large manufacturers.

of credit, and percentage of firms using banks to finance expenses). These factors combined might still act as major drivers for firms to locate in established agglomerations.

Agglomerations tend to be characterized by a higher share of foreign investors and exporters. Enterprise survey analysis of Indonesian manufacturing firms for 2009 confirms that the share of foreign manufacturing firms in core regions (agglomerations) was 3.1 percent compared with only 0.9 percent in non-core regions.⁹ The percentage of direct exporters in core regions was 4.1 percent compared with 2.1 percent in non-core regions. These differences are statistically significant.¹⁰ Since foreign firms and exporters are generally more productive, their presence in agglomerations increases the possibility of productivity spillovers within the same industry (horizontal spillovers) or in upstream or downstream industries (vertical spillovers).

Box 1 Manufacturing Firms in “Core” and “Non Core” Provinces

Using 2009, recent World Bank study¹³ compares the differences in mean outcomes of various indicators for manufacturing firms based in core versus non-core provinces in Indonesia. Regions with the largest relative size in terms of total firm number (including both manufacturing and services firms) are defined as core regions. In some cases, the Enterprise Surveys defined regions around the country's capital very narrowly, resulting in a relatively small relative size of such regions. In such cases the capital is additionally defined as core regions. In the case of the provinces surveyed in the Indonesia Enterprise Survey, “core” includes DKI Jakarta and West Java, while “non-core” includes Central Java, East Java, Banten, Lampung, Bali, North Sumatra, and South Sulawesi.

The findings on firm characteristics in Table A1 are stark. Firms in the core are unambiguously younger, larger, and more foreign-owned. They are also more likely to export and import, to make use of technology and achieve international quality standards.

The findings on regional characteristics are also compelling. Specifically, we see in Table B.1 that firms in the core report better infrastructure, as measured by fewer disruptions for power outages and a better perception of the transport environment. Firms in the most peripheral province covered in the survey – North Sumatra – report more than 67 hours of power outages each month (5.5 times the national average), and more than one-quarter of them report transport as a severe constraint (more than 3 times the national average). Firms in the core also appear to have much better access to finance, another crucial aspect for new entrants.

On the other hand, firms in the core appear to suffer from congestion costs with respect to regulations, licensing, and governance. This is driven primarily by the responses of firms in DKI Jakarta. More than one-third of firms in Jakarta report corruption as a severe problem (three times greater than the national average). They also view the courts system as problematic and report management time spent on dealing with government regulations at three times the national average. By contrast, firms in neighboring Java Barat (also part of the definition of “core”) perceive a business environment better than the national average in most areas. At the other end of the spectrum, the most peripheral provinces – especially North Sumatra and South Sulawesi – covered in the survey also report a business environment that is substantially worse than the national average.

Source: Farole and Winkler (2012), Data: World Bank Enterprise Surveys- Indonesia (2009).

Nevertheless, there are signs of new firms locating to new locations beyond the “traditional” agglomeration areas. These traditional areas are Greater Jakarta, Bandung, Semarang, Greater Surabaya, Medan, and Makassar. The trend towards concentration went into reverse after the Asian financial crisis of 1997, with many manufacturers in the traditional agglomeration areas closing down. In addition, the incentives to search for lower production costs, the delegation of authority to local governments, and the improvements in infrastructure outside metropolitan areas, have been driving more firms to locate outside the traditional agglomeration areas. Districts such as Cirebon, Lampung, and Pekalongan are just a few examples of ordinary towns being transformed into dynamic cities. Access to land, proximity to markets, main ports, and traditional industrial areas in Greater Jakarta are likely to be the main drivers for new manufacturing firms to establish operations in these new areas.

⁹ “Core” includes DKI Jakarta and West Java, while “non-core” includes Central Java, East Java, Banten, Lampung, Bali, North Sumatra, and South Sulawesi.

¹⁰ Farole, T. and D. Winkler (2012), “Trade and Regional Characteristics in Indonesia”, in *The Internal Geography of Trade Competitiveness: Lagging Regions and Global Markets*, The World Bank, forthcoming.

¹¹ Farole, T. and D. Winkler (2012), “Trade and Regional Characteristics in Indonesia”, in *The Internal Geography of Trade Competitiveness: Lagging Regions and Global Markets*, The World Bank, forthcoming.

Figure 1 above suggests that a new manufacturing agglomeration has emerged around Bandar Lampung, about 200km west of Jakarta. Figure 3 below also confirms the trend of new firms locating outside “traditional” industrial areas.

The shift towards firms entering new locations is also accompanied by an agglomeration process. Figure 4 shows that an agglomeration process is also happening in locations outside the traditional agglomeration areas. The red cluster of dots in Figure 4 shows a positive relationship between the proportion of the number of firms already in districts and the proportion of the number of new entrants coming into districts outside traditional agglomeration areas.

Figure 3: Growing trend for new entrants to pick new locations...

Percentage of new firms coming into following locations

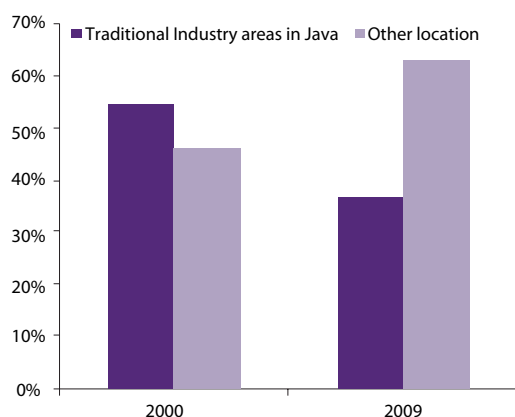
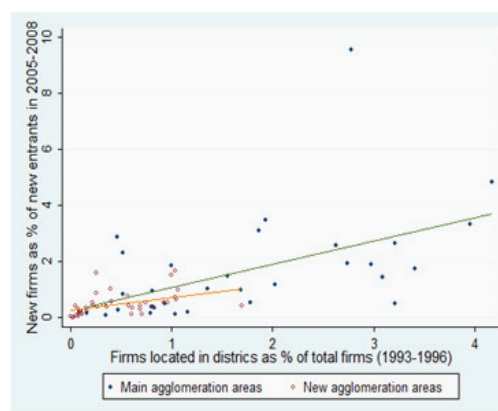


Figure 4: ... triggering an agglomeration process in new locations

Percentage of new firms coming to districts with cumulative presence of manufacturing firms



Source: World Bank staff estimates from BPS census of medium and large manufacturers.

Congestion costs in established agglomerations might have accelerated the shift to agglomerations in non-core regions. Core regions¹² in Indonesia show signs of congestion costs for manufacturing firms, such as longer time of senior management to deal with government regulations, a longer average time to obtain operating and other licenses and permits, and a higher incidence of corruption.¹³ In addition, minimum wages in DKI Jakarta are among the highest in the country, while they are still lower in new agglomerations such as Cilegon or Karawang. These factors might have driven firms to start locating outside of core regions.

The shift towards agglomeration outside traditional industrial areas is more prevalent among light manufacturing industries with constant internal returns to scale. Light manufacturing firms in clothing, textiles, footwear, food, and wood-based product industries are typically less dependent on size to achieve internal production efficiencies. In technical jargon, firms in these industries typically have constant internal returns to scale, and that being large or having large fixed costs are not necessarily required to sustain operations. The share of new entrants in industries with constant internal returns that chose to establish in traditional industrial areas in Java was 33 percent in 2009, down from 54 percent in 2000. Similarly, the proportion of new firms with increasing internal returns

¹² “Core” includes DKI Jakarta and West Java, while “non-core” includes Central Java, East Java, Banten, Lampung, Bali, North Sumatra, and South Sulawesi.

¹³ Farole, T. and D. Winkler (2012), “Trade and Regional Characteristics in Indonesia”, in *The Internal Geography of Trade Competitiveness: Lagging Regions and Global Markets*, The World Bank, forthcoming.

that came to traditional industrial areas was 44 percent in 2009, down from 58 percent in 2000. Lower rental prices for land and proximity to sources of inputs may be the incentives for new firms with increasing internal economies of scale to establish in new locations.

Despite their declining numbers, new FDI firms and exporters in Indonesia's manufacturing sector are also emerging in locations beyond the traditional industrial areas in Java. The boom in commodity prices and the decentralization of authority for issuing most investment permits to district governments are likely to attract FDI and exporting firms to locate beyond traditional industrial areas. Firms attracted by the boom in commodity prices may have also driven new processing facilities to move to be closer to their source of inputs, namely in non-industrial areas off Java.

Figure 5: New firms in industries with constant returns to scale have gone to other locations

Share of new firms locations by their internal economies of scale

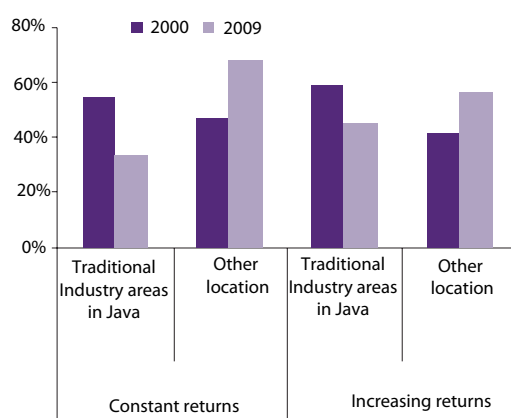
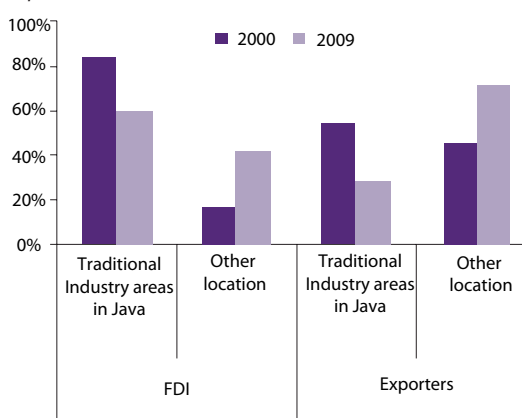


Figure 6: Rapid shift of new FDI and exporters entry to non-traditional agglomeration areas

Share of new firms based on whether they were FDI firms or exporters



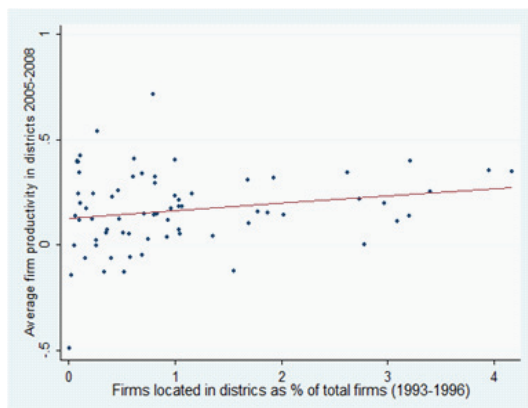
Source: World Bank staff estimates from BPS census of medium and large manufacturers.

3. Impact of agglomeration on productivity

The benefits of agglomeration are accrued first and foremost to the agglomerated firms themselves in the form of externalities that enhance productivity. External benefits from agglomeration come from proximity to markets, proximity to suppliers of inputs, access to a pool of labor at relatively low cost, and knowledge spillovers from interacting with other manufacturers. Also, close proximity to markets and suppliers often translates into lower logistics costs. Meanwhile, a variety of modern service providers sprawling around manufacturing clusters can facilitate innovation in products, marketing, and production processes.

Figure 7: Average productivity of manufacturing firms is higher in agglomeration areas...

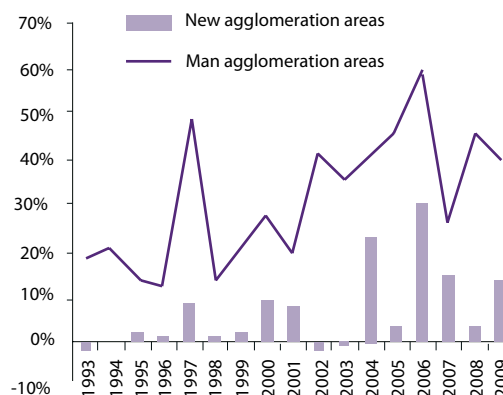
Average total factor productivity of manufacturing firms (y) and share of manufacturing firms located in districts (x)



Source: World Bank staff estimates from BPS census of medium and large manufacturers.

Figure 8: ... with an increasing productivity gap with firms operating in non-agglomeration areas

Gap in average total factor productivity with manufacturing firms located in non-agglomeration areas

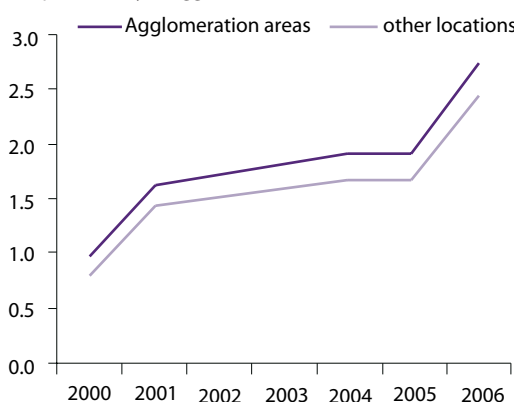


Evidence suggests that firms located in agglomeration areas enjoy 30 percent higher total factor productivity relative to those that are located outside agglomeration areas. Evidence from the BPS census of medium and large manufacturers confirms that average firm productivity tends to be higher in areas where the presence of existing manufacturing firms is higher (Figure 7). The productivity gap between firms operating in agglomeration areas to those that are not increases over time. Between 1993 and 2009, firms located in the main agglomeration areas on average were 30 percent more productive than those located outside agglomeration areas. Meanwhile, during the same period, firms located in new agglomeration areas were also on average 10 percent more productive than those located outside agglomeration areas. Although this does not prove a causal relationship between operating in agglomeration areas and firm productivity, the evidence appears consistent with expectations of a positive correlation between agglomeration and firms' performance.

An alternative indicator of potential benefits to manufacturers from locating in certain areas is agglomeration productivity. Agglomeration (site) productivity is unique in each location and reflects the level of the supporting environment in a particular location towards enhancing firms operating in that location. The supporting environment can capture governance, infrastructure, service industries, the local labor market, and the regulatory environment. Nevertheless, at a certain stage the supporting environment may start to deteriorate due to negative factors associated with high-density urban areas, such as congestion, pollution, and high property prices and labor costs.

Figure 9: "There is something special about agglomeration areas"

Site productivity of agglomeration areas and other locations



Source: World Bank staff estimates from BPS manufacturing census.

Agglomeration happens in certain locations in Indonesia because the necessary supporting environment is present. Our findings suggest that a district's unique environment has characteristics that contribute towards better performance of firms operating in that area and, therefore, is attractive to new firms. Figure 9 shows that agglomeration areas on average have inherent characteristics that are superior to other locations. Each line in Figure 9 connects points that are estimates of unique factors in agglomeration areas and other locations (see Box 1 for methodology).

Box 2: Calculating Agglomeration (Site) Productivity

The approach is to relate firm productivity as a function of local industry inputs and the external environment generating spillover (Kuncoro, 2009). The estimating equation to assess local externalities is based on firm production function with constant return to scale technology. In the intensive form the firm technology is represented by:

$$X_{hij} = A(S_{hij}(t)) f(k_{hij}(t)) \quad (1)$$

$X_{hij(t)}$ is real value added per worker in firm h , in city i in industry j in time t and $K_{hij(t)}$ is real capital per worker. The function $f(\cdot)$ represents firm technology based from the original — extensive form — production function $F(\cdot) = f(\cdot) L_{hij}(t)$ where $L_{hij}(t)$ is the number of workers.

To obtain the real value added, the nominal value-added is divided by the wholesale price indices at the appropriate three-digit industrial (ISIC) code for the relevant years. Firms' capital is constructed from the estimated market value of machinery and building. To convert into real terms, the nominal values are deflated by the wholesale import price of machinery (including electrical machinery). S_{hij} represent the shift in the production function that also includes measures of spillover externalities, time and industry dummies and firms' characteristics that are supposedly to affect productivity like legal status, ownership status (FDI versus non FDI) etc.

Localization (Marshall-Arrow-Romer) externalities will be measured by total employment in the industry in the respective districts. This measure is meant to capture interaction among firms within a district. Urbanization externalities are measured by a diversity index. For district i for example, the index of diversity is:

$$g_i^s = \sum_{j=1}^J \left[\frac{E_{ij}(t)}{E_i(t)} - \frac{E_j(t)}{E(t)} \right]^2 \quad (2)$$

$E(t)$ is total national manufacturing employment and $E_j(t)$ is total national employment in industry j . Meanwhile, E_i and E_{ij} are the corresponding local magnitudes. The measure of urbanization economies $g_{si}(t)$ has a minimum value of zero, where in a district, each industry's share of local manufacturing employment is exactly the same as its national share, so the district is completely unspecialized because its industrial composition is merely a copy of the nation. At the other end, the maximum value of $g_{si}(t)$ will approach two for a district completely specialized in one industry, while at the same time national employment is concentrated in another industry. The higher is $g_{si}(t)$ the lower is the diversity, thus a district becomes more specialized.

A log-linear form is used to estimate equation (1) with additional control variables such as firms' legal status, ownership type, and age.

$$\ln(X_{hij}(t)) = \alpha_j + \beta_j \ln(K_{hij}(t)) + \delta_j \ln(E_{hij}(t)) + \gamma_j g_i^s(t) + \rho_j(t) + \eta_{hij} + \mu_{ij} + \varepsilon_{hij}$$

The equation is estimated at the level of industry j . Localization externalities are represented by district's employment in the own industry E_{ij} . Urbanization economies are represented by the g_{si} index in the linear form.

For industry j the error terms comprises of four components; time fixed effects $\rho_{j(t)}$ which can be used to infer for productivity gain, district fixed-effect μ_{ij} , individual firm fixed-effect η_{hij} , and contemporaneous errors ε_{hij} which is assumed to be independent and identically distributed.

The unique characteristics of agglomeration areas are calculated by summing estimated coefficients of district fixed-effect μ_{ij} from relevant areas. This measure captures time invariant aspects which are perhaps unique to that particular location such as resource endowment, climate, urban lay out and internal infrastructure. Results of collecting μ_{ij} from relevant areas are presented in Figure 9 above this Box.

Overall, agglomeration has made regions less specialized in certain sectors, associated with more urbanization, and expanded the range of products. Assuming that the national economy is more diversified than local economies, the forces of agglomeration have made the structures of local economies more like the national economy, i.e., more diversified in terms of sector activities.¹⁴ Table 3 illustrates how manufacturing industries in Bandung and Greater Surabaya are increasingly less specialized, i.e., more diversified. This turns out also to be associated with the urbanization process that is taking place across Java. The urbanization process is associated with an increase in population diversity, a rise of the middle class, and more variety among service providers. These factors are important ingredients for creating larger markets and fostering the knowledge exchanges that can sustain more diversified manufacturing activities. However, this phenomenon is less prevalent in manufacturing industries in Sumatra and Sulawesi. The boom in commodity prices may have shifted resources to concentrate manufacturing more on resource-based manufacturing activities located in Sumatra and Sulawesi.

The increase in diversification of industries is also accompanied by a small increase in the range of products that firms produce. Not only do manufacturing activities in each region become more diversified, firms also produce a greater variety of products. Table 4 illustrates the “explosion” in the number of product varieties that firms produce across regions. Bandung stood out as a region with the highest increase in number of products produced by manufacturing firms, followed by firms in Greater Jakarta. However, in terms of the value of outputs, the share of new products produced is still relatively small compared with the main products that firms have already been producing for several years. The last three columns in Table 4 illustrate that the diversification index (one minus the Herfindahl index) tends to be stable or increases only marginally.

Table 3: Regional sector specialization index and urbanization

	Manufacturing specialization index*		Urbanization measured by population living in urban areas %	
	1991-94	2005-08	1993-94	2005-08
Java	0.0215	0.0143	43.2	50.2
Greater Jakarta	0.0255	0.0141	78.6	81.6
Bandung	0.0602	0.0426	50.2	81.9
Greater Surabaya	0.0213	0.0154	74.4	81.2
Other locations in Java	0.0091	0.0071	29.5	42.1
Sumatra	0.0432	0.0459	23.8	37.4
Sulawesi	0.0410	0.0455	22.8	29.7
Others	0.0871	0.0394	22.9	34.7
KAPET	0.3940	0.1458	33.0	50.0

Source: BPS census of medium and large manufacturing firms.

Note: * includes the following KAPETs: Biak, Bima, Bitung, Batulicin, Bukari, Mbay, Pare, Sasamba, Seram. The lower the index, the closer is region's manufacturing production structure to it's national manufacturing structure.

¹⁴ Formula (2) described in Box 1 is used to calculate the manufacturing specialization index.

Table 4: Product diversity

	Number of products			Product diversification index %*		
	1999-02	2005-08	% Change	1999-01	2005-08	% Change
Java	3,961	5,544	40	97.7	98.2	0.52
Greater Jakarta	1,265	1,834	45	98.9	98.4	-0.48
Bandung	369	602	63	97.0	98.0	1.04
Greater Surabaya	535	772	44	96.6	97.7	1.15
Other locations in Java	1,793	2,336	30	98.3	98.7	0.39
Sumatra	307	367	20	92.2	92.9	0.83
Sulawesi	107	95	-11	94.1	93.9	-0.17
KAPET	59	74	26	87.3	89.2	2.14
Others	456	667	46	95.4	93.1	-2.36

Source: BPS census of medium and large manufacturing firms.

Note: *Includes the following KAPETs: Biak, Bima, Bitung, Batulicin, Bukari, Mbay, Pare, Sasamba, Seram. It is 1 – Herfindahl index. Higher value suggests more diversified structure of production

This brings another challenge, namely supporting regional development in order to sustain those externalities that have important benefits for the manufacturing sector. Certainly, better infrastructure and an investment friendly local regulatory environment are common factors that help attract and sustain all types of manufacturing operations. Nevertheless, it is important for local policymakers to understand the types of externalities that firms need from locating in a certain area. If externalities are in the form of localization, smaller cities are more likely to specialize in just one industry or closely connected industries. Spatially, this means that manufacturing activities, such as light manufacturing industries, can locate to smaller more specialized cities. Regions that wish to attract such industries should consider focusing on improving infrastructure that allows firms to share inputs. Conversely, if the externalities happen to depend on urbanization, then in order to prosper an industry needs to find a location with a diverse and large urban environment. Policymakers should consider introducing policies to enhance diversity and the efficient functioning of urban areas.

4. Constraints that can slow down the process

With decentralization of authority from central to local governments, local governance and regulations are relevant issues for new manufacturing firms. As stated in Article 14 of Law No. 32/2004 on Local Government, the authority to facilitate investment permits and manage the use of land and natural resources is transferred to local governments. Nevertheless, private investors often still find the issuance of permits problematic. Most business licenses are issued on the basis of central government regulations, which themselves tend to overlap due to unclear boundaries between ministries and poor inter-agency coordination. Second, there is no clear built-in incentive that enables the central government to ensure that local governments implement an investment friendly regulatory environment in a consistent manner.

Investment in the manufacturing sector also faces hurdles from multiple and overlapping licenses and permits. New entrants in manufacturing, similar to other businesses, are subject to a sequential, rather than a parallel, process in obtaining business registrations and operating licenses. Assuming a new entrant has already obtained a Deed of Establishing a Company from the central government (Ministry of Justice and Human Rights), the new business then seeks to obtain a Letter of Domicile Information, and a Nuisance Permit from local authorities. For a new medium or large manufacturer, having these permits is a pre-requisite to obtaining a Principle Approval, which is a formal acknowledgment by the local authority of the new firm's intentions. Except for manufacturers locating in industrial estates or special zones, the Principle Approval is a pre-requisite

for commencing with establishing operations (i.e., construction, installation, etc.) and obtaining permits for land use and environmental permits from the relevant local authorities.¹⁵ Medium and large manufacturers are then granted an Industrial License (ijin usaha industri, or IUI). Since manufacturers typically sell their products to customers, they also need to obtain a Trading License (surat ijin usaha perdagangan, or SIUP) from the local office for trade and industry. Finally, after all of these licenses and permits have been issued by local authorities, new manufacturers still need to obtain a Business Registration Number (tanda daftar perusahaan, or TDP), also from the local office for trade and industry. Manufacturers are also required to obtain an expansion permit if they wish to expand more than 30 percent beyond their existing capacity.¹⁶

Other than proof of business legality and regulatory compliance, these various licenses and permits suggest that the Government desires to closely monitor business activities. Some of the permits are clearly intended to prevent misconduct, such as nuisance and environmental damage. Also, interviews with government officials hinted that these licenses were also intended to help the Government to maintain a database to monitor business activities in different sectors. However, in practice, the licensing process is not effective in achieving this goal. Experience from the TDP suggests that in practice the database is poorly managed and outdated. In addition, since decentralization, the central government has not been able to monitor the reporting system and the availability of the data is often restricted to local governments.

Costs for obtaining permits are a burden to manufacturers. Some of the licenses and permits have merit in protecting the public interest, such as public safety and environmental protection. However, although the procedures for obtaining licenses and permits are clear and can be obtained easily, manufacturers still often have to pay unofficial fees. If such fees act as “grease money” to speed up the process of complying with rules and regulations, then manufacturers could have internalized these costs. However, there is growing concern that such fees are a nuisance and not facilitating investment. Another issue with paying informal fees is the accountability of expenses. In order to circumvent this problem, most manufacturers hire a third party to help them to obtain the necessary permits.

A favorable licensing regime at the district level can increase the dynamism of the local manufacturing sector. In order to better understand the correlation between the regulatory environment at the local level and the performance of the manufacturing sector, a survey conducted by the Committee for Monitoring Regional Autonomy (KPPOD) was combined with the census of middle and large manufacturers. Figure 10 and Figure 11 below show the results of combining the 2005 survey with the subsequent years of census for middle and large manufacturers. Figure 10 shows a positive relationship between a favorable business licensing regime and the proportion of new firms in a district. The horizontal axis represents average perceptions by businesses on whether the licensing regime at the district level is favorable (on a scale of 1 to 9, with 1 for least favorable).¹⁷ Figure 10 suggests that there is a positive correlation between the licensing regime and the attractiveness of a district for new entrants, measured by the percentage of new firms out of total firms operating in each district. In other words, a favorable licensing regime attracts more new entrants.

Manufacturers are often confronted with uncertainties over labor policies at the local level. Access to a pool of inexpensive labor is certainly an important factor for new manufacturers in making decisions on where to locate. However, local governments can introduce policies that restrict

¹⁵ The number of licenses or permits varies depending on the manufacturing sector. Textiles and clothing are considered to have less requirements for licenses and permits than fertilizer factory.

¹⁶ Recently there has been initiative from various local governments to introduce a local One-Stop Shop (PTSP) to facilitate and speed up the issuance of permits at the local level. Nevertheless, it is not clear whether time and costs to obtain permits have been reduced in regions (provinces or districts) with PTSP.

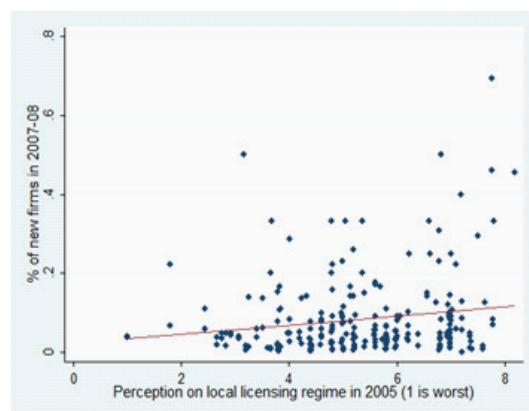
¹⁷ Questionnaire 6e of the 2005 survey asked business perception whether district governments have (i) made public all requirements for license and permit, (ii) simple bureaucratic procedure, (iii) time certainty in getting permits, (iv) cost certainty in getting permits, and (v) quality of local officials facilitating issuance of license/permits

labor mobility, such as insisting that firms hire locals, and impose levies on the hiring and firing of workers. Furthermore, despite a ministerial regulation that lays down the procedure for setting the local minimum wage, there have been cases where district governments have unilaterally set the local minimum wage rate higher than the rate that would have been set by the existing procedure.¹⁸ This ad-hoc implementation of minimum wage regulations raises concerns among manufacturers, particularly the manufacturing sector.¹⁹

The attitude of local governments towards labor issues also has a correlation with firms' productivity. We constructed a score based on perceptions of district government flexibility for firms hiring labor from other regions, restrictions on hiring locals, and levies for hiring and firing workers. Figure 11 suggests that average productivity was higher in districts where local governments were perceived as demonstrating flexibility over labor mobility and were less aggressive in collecting levies over workers' hiring and firing. Such an attitude can reduce congestion costs and seems to help firms that are seeking external benefits from agglomeration.

Figure 10: Districts with favorable licensing regimes had more new entrants in subsequent years

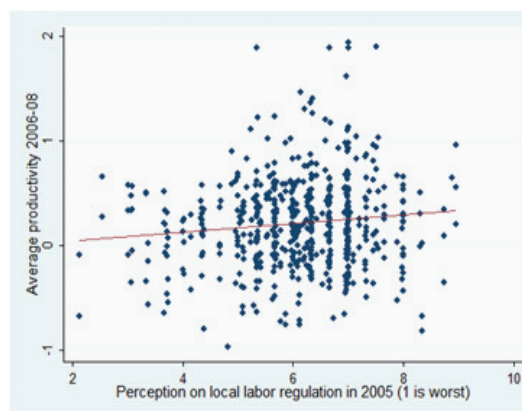
Correlation between past perception on local licensing regimes and share of new entrants in each district



Source: Calculated from BPS' Manufacturing Census and 2005 KPPOD survey.

Figure 11: Firms' productivity tends to be higher in districts that have certainty in labor regulations

Correlation between past perception on local labor regulations and average productivity of firms in each district



Source: Calculated from BPS' Manufacturing Census and 2005 KPPOD survey.

A favorable licensing regime at the district level also has a positive correlation with the productivity of manufacturing firms operating in the district. Districts with a more favorable licensing regime are likely to attract more businesses, including manufacturing suppliers and services that can increase the productivity of existing manufacturers in the district.²⁰ A favorable licensing regime can facilitate manufacturers in obtaining construction permits, security clearances, forklift-user permits, boiler-user permits, etc. in a predictable manner, which reduces congestion costs.

Establishing special economic zones (SEZs) in suitable locations could be an alternative way of overcoming barriers to attracting investment in manufacturing, particularly for FDI manufacturers. Indonesia set up an area of Batam island as a free trade zone (FTZ) that successfully attracted manufacturing investment aimed at using the island as an export platform due to its close proximity to Singapore.²¹ Exclusive management authority of the zone, provision of better

¹⁸ Ministry of Manpower and Transmigration Regulation No. 17/2005 states that local minimum wages are set by local wage committee, which is a tri-party committee (government, private sector, and workers union), taking into account latest result of local price survey.

¹⁹ Kompas, February 12th 2012, "Mekanisme Pengupahan dilanggar Elite Lokal".

²⁰ Total productivity used here is the same as that used in Policy Note 5.

²¹ Singapore signed a Free Trade Agreement (FTA) with the United States that qualifies products of Singaporean companies largely made in

infrastructure, access to land, and provision of public services combined with a special customs facility for importing inputs and exporting products were the ingredients that attracted private investment. The central government also provided clear authority to the Board of the Batam Industrial Development Authority (BIDA) in setting streamlined and simplified rules and issuing licenses and permits, empowering BIDA to facilitate private investment into the FTZ zone vis-à-vis other areas.

However, the challenge will be to ensure an SEZ has the right institutional set-up and incentive environment to ensure competitiveness for manufacturers. Although the issuance of Law No.39 /2009 on SEZs (Kawasan Ekonomi Khusus, or KEK) marked a renewed aspiration to promote SEZs as special zones for investors, issues may arise due to potential conflicts of interest at the local government level if local governments both invest in and monitor SEZs. Although the private sector is encouraged to invest and develop SEZs, the current arrangement seems to suggest that supervision of SEZs and administrative handling of investment approvals are done by local government. This could create risk of favoritism for SEZs owned by local government. Most countries with attractive SEZ environments avoid this conflict of interest by monitoring zones via a national agency. Another related issue that may arise is the potential underperformance of SEZs due to the fact that the SEZ regulator role and the SEZ operator role are not clearly separated for SEZs owned and operated by local governments. This situation creates the risk of weak and non-independent governance of SEZs. It is also not yet clear to what degree SEZs will be provided with a streamlined and simplified “smart” regulatory framework that would make them more attractive to invest in compared to the status-quo environment outside of the SEZs. Without this improved regulatory environment, it begs the question why would manufacturers locate in a SEZ if it is not “special” in some way.

Unclear authority, poor infrastructure, and weak capacity of local government are plaguing the progress of integrated economic development zones (KAPET) in lagging regions. The KAPET program was originally intended to narrow the growth gap between Java and outer regions by facilitating investment in processing in commodity producing regions. KAPETs theoretically offer potential investors fiscal incentives, such as exemptions on certain taxes and import duties, and other incentives such as availability of land, infrastructure, and investment friendly regulations. Although a KAPET may have a dedicated Board to facilitate the investment approval, it typically does not have authority to streamline approval process, and may create an additional step for investors by becoming a “one more stop shop” if it does not have in-house or delegated authority. Firms operating in KAPETs are still subject to local regulations that may hinder investment. Some KAPETs cannot offer investors clarity over land title. More seriously, the lack of infrastructure in most KAPETs and their poor connectivity with main markets in Indonesia or with the international market are creating a significant disincentive for private investment (see Box 3).

Box 3: (Not so) Special Zones?

Batam and exported to United States subject to zero tariffs.

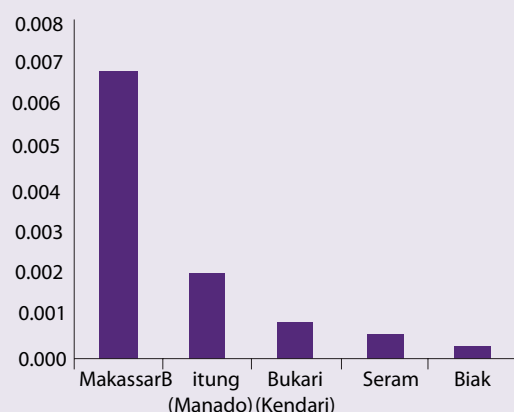
²² http://www.bpbatam.go.id/eng/Industry_economy/indicator.jsp

²³ Kam, Wahyuni, and Kee (2009).

Indonesia established Batam as a free trade zone (FTZ) in 1978 and was successful in attracting manufacturing investors. Strong support from the central government came with the establishment of the Agency of Batam Authority to manage the FTZ. At its peak in 2001-03, Batam FTZ contributed 14 percent of Indonesia's non-oil /gas exports and 11 percent of total FDI coming into Indonesia. Since then, however, the role of Batam in attracting manufacturing investment seems to have stagnated.

With the emergence of other SEZs in the region, Batam is under intense competition. After years of status as special zone, up to 2011 Batam had accumulated US\$14.7 billion in private investment.²⁴ Meanwhile, Ecer SEZ on the eastern coast of Malaysia accumulated US\$3 billion in investment since its inception in 2009. In other words, Ecer SEZ is accumulating private investment twice as fast as Batam SEZ.

Estimated accessibility of Makassar and selected KAPETs in eastern Indonesia to Jakarta



Source: World Bank staff estimates based on cost of full cargo load.

Overlapping authority and governance issues are often the source of potential decline or stagnation in manufacturing activities in special zones, and Batam-Bintang-Karimun (BBK) SEZ is no exception. Between 2004 and prior to the issuance of Law No. 39/2009 on SEZs there was a period of uncertainty about the legal status of Batam and hence this eroded investors interest and the competitiveness of Batam. Conflicting interests and poor capacity to manage SEZs are also potential problems. For example, the Batam SEZ Board included various government agencies such as the local attorney office, local audit agencies (BPK and BPKP), the army and police, and other institutions that had no experience in facilitating investment.

For manufacturers looking for efficiency and the use of Batam as an export platform, conflicting regulations are also an issue. Currently, it is unclear whether imported intermediate inputs for export by firms operating in BBK are subject to non-tariff measures such as technical barriers (i.e., standards). Skill constraints are also creeping in. While resentment against the use of expatriates is rising, most firms in BBK have weak links with local education institutions.²⁵ More flexibility for firms in BBK to use expatriates and allow FDI in education and services would help enhance competitiveness and maintain the "special" status of the area.

Meanwhile, the aspiration to attract processing activities through integrated economic development zones (KAPETs) is also facing challenges. In 2010, from 14 KAPETs, 11 were relatively dormant and attracted very little or even no investment. As mentioned above, conflicting interests and weak capacity of local governments in managing KAPETs are also preventing some KAPETs from taking off. The most serious problem is establishing KAPETs without taking into account factors that drive market forces, such as strategic location and infrastructure availability at the respective locations. Some KAPETs have poor access to connectivity and are located some distance away from the main markets.

5. Conclusions and Implications for the Policy Framework

Overwhelming evidence suggests that market forces largely drive private firms' decisions on where to locate. Manufacturers are private entities that respond to market signals, including the costs and benefits of locating in a certain area.

Firms in certain manufacturing industries have gradually shifted their locations, deconcentrating from large urban areas to smaller cities and forming new agglomerations. Rising property costs and wages in large urban areas may be pushing new firms to find new locations outside the old agglomeration areas. Congestion costs associated with infrastructure bottlenecks, licensing procedure, and poor governance are also driving firms out to look for new locations. But a new agglomeration process seems to accompany this shift. Light manufacturing industries relocate to smaller cities where access to land and wages is relatively cheaper. Meanwhile, firms in machinery and

electronics tend to stay in or close to urban areas, because they are more dependent on urbanization externalities.

Given that at some point the benefits of agglomeration may dissipate due to negative externalities, policy intervention is needed. Agglomeration will increase density, which in turn can increase the costs of coordination failures of private action, such as traffic congestion, pollution, and poor housing conditions. The provision of public infrastructure, better governance, and public support to ensure decent livelihoods in cities would help sustain firms seeking benefits from locating near to large urban areas. Meanwhile, improving infrastructure conditions in lagging regions will have a significant impact on stemming over-concentration in large urban agglomerations. At an initial stage, the most effective policy is road improvements/construction to cut travel costs and time between factory sites and markets/ports. The lessons from recent experience suggest that government policies should be designed not to interfere with private incentives (i.e. firms will always look for the most efficient sites in which to locate) but rather to complement them.

In order to facilitate growth in manufacturing, the Masterplan for Accelerating Economic Development (MP3EI) should consider implementing action plans that strengthen the agglomeration process. The existing government program within MP3EI to create economic corridors to speed up and to broaden economic development should take into account the dynamics of how firms locate and the agglomeration process in order to create both jobs and value that have a maximum impact on the well-being of the general population. The strategy of spreading industry should reflect this, taking into account the current agglomeration configuration. In order to exploit the benefits of agglomeration, it is essential to ensure connectivity within and between agglomeration areas. The logic of the economic corridor policy is to connect sprawling agglomerations to boost positive externalities.

Local governments should be an integral part of efforts to facilitate the agglomeration process. One important insight from the agglomeration process in Indonesia is that economic activities locate to sites that provide both inputs and infrastructure. The forces of local agglomeration move industries to re-concentrate in smaller, medium-sized cities. Under regional autonomy, local governments can have significant influence in facilitating investment in manufacturing through improving the certainty of local regulations and the provision of public services. Streamlining investment procedures and reducing uncertainties over local regulations will help attract manufacturing investment to the regions. It is also important for local governments to provide public support through investment in human capital and public infrastructure. Nevertheless, to achieve these goals, the central government should consider providing the right fiscal incentives to help improve the capacity and motivation of local governments.

But there is no such thing as a one-size-fits-all policy approach. The issues affecting the agglomeration process are complex and may require different interventions. One possible policy framework to sustain the agglomeration process is for the Indonesian manufacturing sector to focus on facilitating agglomeration process and enhancing competitiveness of agglomeration areas by:

- **Improving connectivity and quality of life in agglomeration areas**
 - **Improve connectivity within agglomeration areas through better road infrastructure and internet connection.** Some main agglomeration areas such Greater Jakarta and Bandung suffer from acute traffic congestion, while traffic volumes in other areas are increasing exponentially. Improvement in traffic congestion can increase the efficiency of transactions among firms within an agglomeration area. Increasing the use of the internet as a means of communication and transactions by private sector can also enhance time efficiency.
 - **Improve connectivity between agglomeration areas and ports.** Manufacturing firms located in medium-sized cities such as Pasuruan and Pandaan in East Java would benefit from better

connectivity to inputs and connectivity to markets. Improvement of district or rural road and rail facilities would enhance internal economies of scale of firms locating to those areas. Meanwhile, manufacturing firms in Greater Jakarta definitely needs better access to Tanjung Priok port to connect them with inputs/markets both locally and internationally.

- **Develop public transport systems and other services to sustain quality of life and the efficient functioning of cities/urban areas.** Maintaining and improving the quality of life in cities will attract people to live in cities and also increase the quality of urbanization. This in itself is an attractive factor for businesses and manufacturers that are seeking to benefit from the sharing of diverse knowledge (i.e., urbanization agglomeration).
- **Strengthening coordination to improve governance and certainty in regulations to minimize “congestion costs”**
 - **Streamline licensing process for manufacturing investment.** First, this can be done by eliminating duplicative licenses such as TDP (company registration) with the local office (Dinas) of trade and industry, collapsing equipment permits by type of equipment (not per equipment), and issuing only a single permit for trading products (SIUP) in a broad category. Second, simplify licenses by integrating the processing of several licenses at the beginning of the process of establishing a firm, such as Letter of Domicile with Nuisance Permit. Third, license for medium and large manufacturers (IUI) should be processed electronically.
 - **Budgetary incentives for local governments to improve the investment climate and the provision of public infrastructure.** The central government should consider alternative ways of allocating the General Allocation Fund (DAU) to district/city governments without linking this too much to their fiscal capacity. This would encourage district/city governments to maintain favorable regulatory environments that would facilitate the growth of private businesses, which in turn would also contribute to higher local tax revenues.
 - **Maintain flexibility for labor mobility and certainty in determining the local minimum wage.** Imposing restrictions on labor mobility creates implicit protection of local workers and artificially increases local nominal wages, undermining competitiveness of the location. Local governments should adhere to the agreed mechanisms for setting local minimum wages in order to avoid confusion and uncertainty among investors.
 - **Streamline investment processes for SEZs and enhance their special status.** This would include a better screening process for private investment to build and manage SEZs, including one-stop services for SEZ development approvals. It is also important to consider addressing conflicts of interest to ensure that SEZ operators act in the best interests of firms operating in their zones. Finally, it is important to retain special status for firms operating in SEZs by exempting their trade activities from restrictive non-tariff measures and allowing more flexibility in their employment decisions.
- **Facilitating knowledge transfers among manufacturers and strengthening the dynamism of industry clusters in certain locations**
 - **Local trade and industry offices (Dinas) should consider promoting joint innovation and knowledge-sharing across firms within a cluster.** This could lead to higher output growth and, hence, increased demand for all firms in the cluster. An example of this would be facilitating joint innovation and learning events in furniture clusters in Cirebon and Jepara.
 - **Promote stakeholder-led technical training.** This approach could potentially increase the effectiveness and quality of training because of the incentive to implement a minimum set of criteria for trainees before they become employees of manufacturing firms.

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Annex

Annex 1 Statistical Test for Differences in Characteristics of Firms in “Core” and “Non Core” Provinces

	Core	Non-Core	p-value	Core/Non-Core
Export and trade outcomes				
Direct exports (% of sales)	2.3	0.8	0.063*	2.93
% of firms that export directly	4.1	2.1	0.096*	1.92
% of firms that use material inputs and/or supplies of foreign origin	5.8	4.0	0.255	1.46
Firm characteristics				
Age and ownership				
Average age (years)	13.4	16.5	0.000***	0.81
Private domestic ownership (%)	96.9	84.0	0.000***	1.15
Private foreign ownership (%)	3.1	0.9	0.034**	3.32
Technology				
% of firms with internationally-recognized quality certification	3.1	1.4	0.08*	2.25
% of firms using technology licensed from foreign companies	4.4	4.1	0.839	1.08
% of firms using their own website	3.2	3.0	0.883	1.05
% of firms using email to communicate with clients/suppliers	13.3	5.0	0.000***	2.64
Workforce				
% of firms offering formal training	6.3	4.3	0.307	1.45
Average number of seasonal/temporary, full-time employees	2.3	1.4	0.086*	1.61
Average number of permanent, full time employees	23.3	15.3	0.008**	1.52
Average share of skilled production workers (% of production workers)	70.6	84.1	0.000***	0.84
Average experience of the top manager working in the firm's sector (years)	11.4	15.0	0.000***	0.76
% of firms identifying labor regulations as a major constraint	1.2	2.5	0.24	0.49
% of firms identifying labor skill level as a major constraint	1.4	4.0	0.054*	0.36
Regional characteristics: investment climate				
Infrastructure				
Number of power outages in a typical month	1.5	2.5	0.020**	0.62
Duration of power outages (hours)	1.8	2.7	0.008***	0.67
Value lost due to power outages (% of sales)	2.1	2.2	0.908	0.94
Delay in obtaining an electrical connection (days)	9.4	23.5	0.008***	0.40
Average electricity from a generator (%)	2.3	1.5	0.323	1.58
Average number of incidents of water insufficiency in a typical month	3.8	5.5	0.387	0.69
Delay in obtaining a water connection (days)	13.0	30.0	0.151	0.43
Delay in obtaining a mainline telephone connection (days)	20.2	14.0	0.391	1.44

<i>Transport and trade facilitation</i>				
Average time to clear direct exports through customs (days)	2.6	2.0	0.382	1.28
Average time to clear imports from customs (days)	3.5	3.6	0.923	0.97
Average time of inventory of most important input (days)	13.6	14.4	0.673	0.95
% of firms identifying customs & trade regulations as a major constraint	4.3	4.2	0.966	1.02
% of firms identifying transportation as a major constraint	4.8	10.7	0.005***	0.45
<i>Regulations and Tax</i>				
Senior management time spent in dealing with requirements of government regulation (%)	2.0	0.9	0.009***	2.09
Average number of visits or required meetings with tax officials	0.2	0.1	0.385	1.26
% of firms identifying tax rates as major constraint	1.2	5.1	0.012	0.24
% of firms identifying tax administration as major constraint	5.0	3.5	0.46	1.41
<i>Permits and Licenses</i>				
Average time to obtain operating license (days)	32.0	9.8	0.008***	3.28
Average time to obtain import license (days)	11.5	9.0	0.337	1.28
Average time to obtain construction-related permit (days)	54.1	22.8	0.203	2.38
% of firms identifying business licensing and permits as major constraint	7.7	4.6	0.179	1.70
<i>Corruption</i>				
% of firms expected to pay informal payment to public officials	18.8	10.7	0.013**	1.76
% of firms expected to give gifts to get an operating license	31.8	12.2	0.059*	2.61
% of firms expected to give gifts in meetings with tax officials	15.8	15.0	0.928	1.05
% of firms expected to give gifts to secure a government contract	42.7	35.5	0.817	1.20
% of firms identifying corruption as a major constraint	14.7	10.9	0.238	1.34
<i>Access to Finance</i>				
Finance from internal sources (%)	88.1	87.8	0.951	1.00
Finance from banks (%)	6.3	6.2	0.962	1.03
Finance from trade credit (%)	1.5	0.5	0.502	2.99
% of firms with line of credit or loans from financial institutions	25.4	13.8	0.001***	1.84
% of firms using banks to finance investments	12.3	11.2	0.849	1.10
% of firms using banks to finance expenses	18.0	11.0	0.027**	1.64
% of firms identifying access to finance as a major constraint	16.2	15.4	0.816	1.05

