Trade Liberalization and the Geography of Production: Agglomeration, Concentration and Dispersal in Indonesia's Manufacturing Industry

Örjan Sjöberg and Fredrik Sjöholm
Stockholm School of Economics.

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ABSTRACT. The effect of trade liberalization on the spatial concentration of economic activities is not straightforward. It has, on the one hand been widely argued that protectionism increase spatial concentration when firms locate close to the main domestic markets, but it has also been argued that trade expansion primarily favour existing industrial centres and therefore lead to increased regional inequalities. We examine the spatial concentration of manufacturing in Indonesia between 1980 and 1996, a period when Indonesia substantially liberalized its trade regime. The high concentration has not decreased and establishments engaged in international trade are actually comparably concentrated. We discuss some possible explanations to the spatial concentration in Indonesia and conclude that a host of factors including the spatial configuration affects the outcome of trade liberalizations.

Keywords: trade policy, geography, agglomeration, manufacturing, Indonesia

JEL classification: F13, O10, R12

INTRODUCTION

To the economist, the beneficial effects of trade liberalization are next to a truism. It has long been recognized that trade improves allocative efficiency and, as a result, provides welfare gains. More recently, it has been argued that the expansion of trade also helps mitigate some other problems typically associated with the developing economy, namely the excessive concentration of population, economic activities and wealth in one or a few urban centers. Urban primacy and industrial concentration, or so Paul Krugman and Raul Livas Elizondo contend,[1] are likely to decrease as a result of trade liberalization.

Not everyone would concur. Elisenda Paluzie, for instance, suggests that global trade expansion might serve to increase, not decrease, urban concentration within developing economies.[2] Long the view of heterodox economics and radical political economy approaches – often subsumed under the headings dependent[3] or interdependent urbanization[4] – the novelty of Paluzie's results rests with their origin within the orthodoxy. Recognizing that market failure is likely to occur, we are at a considerable remove from the precepts that long formed the backbone of the modernization paradigm within development studies.

Also the results of Krugman and associates, however, derive from the same insight, namely the existence of increasing returns. Using developments of a basic model introduced by Avinash Dixit and Joseph Stiglitz in the late 1970s,[5] both outcomes share an intellectual origin within the so-called new economic trade theory and subsequent developments within the new economic geography. The difference between the two, therefore, is primarily one of the assumptions made; in terms of modeling approach both are one of a kind.

Given this background, it would be of considerable interest not least from a policy point of view to be able to empirical discriminate between the two outcomes. This contribution is addressed to this issue. More specifically, it attempts to add more meat to the bone by sorting out some critical conceptual issues and then applying the resulting insights to a case that has attracted considerable attention in the past. As such it also adds to, rather than negates, previous research on its chosen case, Indonesia. The empirical part of the paper, built around an analysis of district and province level manufacturing data, sheds additional light on the presumed connection between trade liberalization and spatial concentration. It does so by examining economic concentration of the Indonesian manufacturing sector between 1980 and 1996, a period during which Indonesia substantially liberalized its trade regime. We investigate establishments with different ownership and with different involvement in international trade. We do not find the high concentration to have decreased. More surprisingly, establishments that are engaged in trade are actually more spatially concentrated than establishments that are not engaged in trade. The paper discusses some possible explanations why trade liberalizations have failed to decrease concentration.

PREVIOUS RESEARCH

Following the line of argument of Krugman and Livias, when firms produce for domestic customers they will minimize transport cost by locating close to the main markets. Suppliers and workers will find it attractive to locate in the same region, which in turn strengthens the agglomerative effects. When foreign trade is liberalized, more domestic producers will have their main markets abroad and more of the required inputs will be imported, which reduces the centripetal forces. Furthermore,

high wages and land costs in the industrialized center provide an incentive for firms to locate at the periphery.[6]

However, the hypothesis that trade liberalization decreases economic concentration has been disputed. Paluzie shows in a modified version of Krugman's new economic geography model that protectionist policies do not cause regional inequalities when labor is mobile within countries. Conversely, regions with some initial advantage may be the ones that benefit the most from trade liberalization with the result of reinforced regional inequalities.[7] If so, this is commensurate with the outcome of an analysis by Diego Puga, which suggests that European urbanization had a distinctly different trajectory than does that of present-day developing economies. The reason is that the cost of spatial interaction was higher a century ago, while economies of scale were weaker and the supply of labor to the urban sector was less elastic. As these have now changed, polarization rather than dispersal may occur.[8]

Hence, there are conflicting theoretical results suggesting that trade liberalization may either decrease or increase spatial concentration, which stress the need for empirical clarification. Unfortunately, the empirical literature is rather scarce. Gordon Hanson finds that the formation of the North American Free Trade Area (NAFTA) led to a less concentrated spatial distribution in Mexico, because firms found it more profitable to locate along the border to U.S. rather than in the old industry belt centered on Mexico City.[9] In related work, the shift north is interpreted as consistent with the prediction that trade liberalization will induce industry to disperse. One reason for this shift, or so it is suggested, is the existence of linkages and the influence of transport costs, the north of Mexico benefiting from shorter distances to the US market.[10] Similarly, some earlier studies have found population to be relatively concentrated when tariffs are high and trade participation low.[11] Yet

others find less evidence of an effect on the spatial distribution of economic activity from trade liberalization.[12]

As a recent survey of the state of the art notes, the results are quite possibly influenced by the choice of case study.[13] Reminding their readers of Williamson's now classical work of the regional Kuznets curve,[14] as likely as not the outcome of the analysis depends on the position along the trajectory suggested by the inverted U. In addition, that kind of reasoning presupposes that there is a strong link between the concentration of industrial activity and urban growth. While there it is not a one-to-one relationship, the assumption is a reasonable approximation of reality. If anything, in developing countries population growth often runs ahead of non-agricultural employment. Over-urbanization results and examples of pronounced primacy abound.[15]

Although the phenomenon of distorted urban hierarchies has attracted, at least from the early work by Bert Hoselitz onwards,[16] more than its fair share of critique and alarmist pronouncements, it is now recognized that high levels of concentration, in addition to economizing on transportation, may facilitate increased knowledge spillovers and linkages.[17] As such, it is not something that economies intent on economic growth and development should necessarily shy away from.[18] Yet it remains true that the spatial concentration of economic activity has obvious, and presumably large, social costs. Pollution and congestion will typically plague the economic center whereas the hinterland may feel marginalized with emerging regional and social tensions. Hence, efforts have been made to work out policies to reduce large spatial concentration of economic activity, trade liberalization ranking prominent among them.

As for Indonesia, previous studies suggest that the liberalization has not had any marked effect on the degree of concentration. For instance, despite substantial liberalization of the trade regime it has been found that Java over the period from the late 1970s to the early 1990s continued to host most manufacturing.[19] It is perhaps not surprising, then, that others have found historical patterns to be important in location of new firms; as Vernon Henderson and Ari Kuncoro note, firms tend to locate in areas on Java with an accumulated knowledge of production.[20]

Rather than implying that polarization is more likely than convergence, it has been pointed out, the findings on Indonesia may simply reflect that economy's current position with respect to the typical trajectory of development.[21] To find out, a cross-country study controlling for the level of development would come across as appropriate. This has done by Servet Mutlu, and finds parallels in subsequent work, where the existence and consequences of urban primacy are related to the level of development.[22] Such an approach does not, however, enable the analyst to control for other factors that are best subsumed under the heading context and contingency and that may be important to the outcome of the analysis.

For one thing, the composition, size and maturity of individual industries have to be taken into account. For another, and relatedly, reason agglomeration effects could produce the same type of outcome, irrespective of the level of development. To this could be added not only historical factors but also the spatial configuration of existing urban centers and manufacturing locations. There is, after all, a difference between cases such as Mexico and Indonesia in that, in the former, the traditionally dominant center was at a considerable remove from the border to its main trading partner. As for Indonesia, it could be argued that Jakarta and Western Java fulfill both

these functions and any change in policy would only serve to strengthen the position of the center rather than resulting in the dispersal arguably seen in Mexico.

As importantly, our ability to identify trends of concentration and dispersal are partly hostage to the administrative units of statistical accounting used, but results may provide some clues as to the processes at work. This is so as concentration may indicate that agglomeration economies are at work. These localized external effects come in different forms, however, and they may be differentially linked to conceivable patterns of change. It is therefore of some consequence how we conceive of these effects and how we link them to patterns of concentration and dispersal. Traditionally, agglomeration economies are often subdivided into those external effects that are specific to an industry (localization advantages) or those that are of a more general character (urbanization economies). The new economic geography paradigm has, however, in effect cut up the pie somewhat differently, in that the "sources of industry localization" early on were identified as a pool of labor in possession of specialized skills, the availability of intermediate inputs and technological spillovers.[23]

These three inducements for firms to cluster are well known – they were, after all, introduced by Alfred Marshall at the beginning of the last century[24] – but can all be either of the industry-specific or generalized variety. What is more, it typically leaves out the infrastructure, physical and institutional, specialized or general, that often has been seen as important to agglomeration. The traditional view, then, is of a somewhat broader compass than is the new economic geography variety that in fact has come to focus primarily on pecuniary spillovers. This is perhaps somewhat ironic in that previous research on Indonesia has, on the one hand, found the empirical support for the existence of agglomeration economies rather weak and, on the other,

that factors such as context and contingency may be of considerable importance and therefore need to be given their due.[25]

TRADE POLICY AND MANUFACTURING IN INDONESIA

Indonesia pursued an inward oriented development strategy for most of the period between independence in 1949 to the beginning of the 1980s.[26] The reasons were a suspicion of international trade and foreign direct investment as well as windfall gains from the large increase in oil prices, which gave Indonesia large freedom in their economic policy. In 1982 oil prices started to decline. Additionally, Indonesia faced falling terms of trade of other traditional primary exports. The result was severe balance of payment difficulties, which forced through a policy change, starting around 1983 with changes in the tax system and financial institutions and a devaluation of the Rupiah by 28 percent. In 1985, custom routines were deregulated and a Swiss company took over the operation of Indonesian customs, which substantially reduced the time and cost of clearing goods. A second – and more substantial – phase of deregulation started in 1986. The reforms included reductions in import licensing restrictions, liberalization of foreign investment rules, replacement of non-tariff barriers with tariffs as well as a reduction in tariffs.[27] Furthermore, the Rupiah was once more devalued, this time by 31 percent. The liberalization has continued throughout the 1990s; import monopolies of domestic manufacturers of competing goods were phased out, various export bans were abolished and tariffs were lowered. Some important reasons behind the various reform packages has either been because of requests from external actors, such as the Asean Free Trade Area (AFTA) or the International Monetary Fund (IMF), or because of an attempt to counter economic difficulties, such as the slowdown in exports between 1992-94. Average nominal tariffs in the manufacturing sector decreased from 21 per cent in 1987 to six percent in

1995, and real effective rate of protection from 59 per cent to 16 per cent.[28] Accordingly, non-tariff barriers covered 80 per cent of gross output in the manufacturing sector in 1986, which decreased to 24 per cent in 1995.

The various reform packages had a large impact on manufacturing in Indonesia. For instance, average growth of manufacturing output was more than 10 per cent annually between 1986 and 1995. Exports grew with more than twice that rate and the share of manufacturing in total exports went from about two per cent in 1980 to about 50 per cent in the mid 1990s.[29] Moreover, there were large structural changes within the manufacturing industry when the relative size of, for instance, tobacco and rubber products decreased and the relative size of products such as transport goods and electronics increased.

Again, the trade reforms led to large structural change of the Indonesian manufacturing sector: the size of the sector has increased together with the importance of international trade. We will continue in the next section with some descriptive statistics on the spatial distribution of the Indonesian manufacturing sector.

THE SPATIAL DISTRIBUTION OF INDONESIAN MANUFACTURING

Data

The empirical analysis is based on establishment data supplied by Biro Pusat Statistik, the Indonesian Central Bureau of Statistics. An industrial survey is conducted yearly and covers all Indonesian establishments with more than 20 employees. The exclusion of small establishments has some implications for our study. Most importantly, the degree of concentration may be exaggerated if small establishments are relative important in rural areas. Data for three years – 1980, 1991 and 1996 - were supplied. The sample includes 8,807 establishments in 1980, 16,494 establishments in 1991,

and 22,997 establishments in 1996. The first year in our sample is before the liberalization of the Indonesian trade regime started. Moreover, 1996 is the last year before the economic crisis. The crisis, with its large turbulence and decline in manufacturing production, may have made our long-term analysis more difficult to pursue if later years were to be included. Finally, 1991 is the first year with information on manufacturing production at a district level.[30]

Manufacturing is spatially divided in provinces and districts. As previously mentioned, data on the district distribution of manufacturing is only available for 1991 and 1996. We use the regional division of 1991 in our study when Indonesia was divided into 27 provinces and 298 districts. Whereas the provincial division has remained during the studied time period, the number of districts increased between 1991 and 1996.[31] New districts in 1996 have been allocated back to their 1991 classification. Finally, we will use two measures on economic activity – employment and value added. By using both measures we hope to avoid conclusions that are biased by different spatial distribution of different industries. In other words, employment is likely to give a large share of manufacturing to regions with a proportionately large share of labour intensive manufacturing whereas value added will give large shares to regions with more capital intensive production.

Table 1 shows the geographic distribution of manufacturing in Indonesia at a province level. The figures show a high concentration of the manufacturing sector, with a strong domination of Java (Jakarta, Yogyakarta, West, East and Central Java). Java hosted about 85 per cent of manufacturing employment and value added in 1980. The share declined slightly to about 80 per cent in 1991 but has remained on this level since. However, there have been large changes within Java; the relative shares of Jakarta, East and Central Java have decreased whereas the share of West Java has

increased substantially. West Java hosted about 36 per cent of manufacturing employment and 40 per cent of value added in 1996. There are several explanations to the observed pattern. Firstly, structural changes of the manufacturing sector explain part of the decrease where the relative importance of traditional industries located on East Java, such as food products and tobacco, has decreased and the importance of new industries located on West Java, such as electronics and textiles, has increased. Secondly, the expansion of manufacturing has forced through an out-localization from Jakarta to the bordering province – West Java. The suburbanizing of the Indonesian industry is fueled by a search for lower land prices and wages, and the process is enhanced by infrastructure improvements.[32] The importance of industries "growing out" of Jakarta can be seen in that the largest district on West Java is Terangganu, which borders Jakarta, hosting about 24 per cent of the province's manufacturing employment and value added (not shown). Accordingly, another district bordering Jakarta, Bekasi, has shown the fastest growth between 1991 and 1996 with its share of employment increasing from 9 to 13 percent and its share of value added going from 11 to 16 percent. On the contrary, the largest relative decline is found in Bandung, an old industrial center but that is not in the immediate vicinity of Jakarta. Bandung's share decreased from 13 to 8 percent of employment and from 9 to 7 percent of value added.

Besides Java, there are only two provinces with any more substantial amount of manufacturing: North Sumatra with about 4-5 per cent and Riau with about 3-5 per cent of total manufacturing. The former province is relatively populated – almost six per cent of total Indonesian population in 1996 - and the latter province includes the export processing zone Batam Islands which is part of the Singapore-Riau-Johor growth triangle.

Hence, manufacturing in Indonesia is highly concentrated in a few provinces. The pattern within the provinces is examined in Table 2. The figures show the largest district within the province and the district's share of manufacturing employment and value added. For instance, Medan was North Sumatra's largest district in 1991, hosting about 25 per cent of the province's manufacturing employment and value added. In 1996, it was Deli Serdang that had the largest share of employment, about 31 per cent, but Medan was still the largest district in terms of value added. A few conclusions can be drawn from the table. Firstly, the largest districts are not necessarily the same for employment and value added. This is a reflection of different spatial distribution of different industries. Secondly, the largest district sometimes changes over the period; 13 out of 27 provinces see a change in the largest district in employment and/or value added. Finally, the share of total province's employment and value added in the largest district decreases in 16 out of 27 provinces. Finally, there are several cases were industries grow out of traditional centers. For instance, Pauruan and Sidoarjo, that are located close to the traditional industrial center of Surabaya, are the fastest growing districts on East Java (not shown). Accordingly, it is primarily the districts around the industrial center of Semarang that has expanded on Central Java. This type of expansion of industries over provincial or district borders has some implications for our study. Most importantly, whereas as assessed by administrative units concentration will decrease by this expansion pattern, one cannot conclude that the forces of concentration or agglomeration have decreased.

To sum up, there are signs of industrial dispersals within some provinces, but other provinces where the concentration of manufacturing seems to increase. In order to make a more rigorous analysis, we continue in the next section with calculations of various measures on spatial distribution.

Methodological considerations

In measuring concentration of manufacturing in Indonesia we will use the Herfindahl index:

$$Herfindahl = \sum_{i=1}^{M} x_i^2 \qquad (1)$$

where x is the region's share of total manufacturing. The higher the value on the index the more concentrated is manufacturing.

There are some drawbacks with the Herfindahl index as a measure of spatial concentration, as is also the case with its main alternative, the locational Gini coefficient. The first problem is the failure to account for relationship between regions, in particular spatial association and interdependence.[33] For instance a growing industry in a specific location might expand into a new region, for example from Jakarta to West Java or from Surabaya to Sidoarjo. Although the industry is now present in more provinces or districts, it is questionable whether concentration can be said to have decreased. Hence, if we observe a decrease in the Herfindahl index we have to continue with a closer examination to see whether this decrease is caused by a geographically contiguous expansion of the industry. If such organic growth is at hand, we cannot conclude that concentration and agglomeration effects (if any) have decreased.[34]

A second problem arises if we want to compare the Herfindah index between different industries. Production in some industries occurs only in a few establishments and they will by definition be regarded as concentrated if one uses the Herfindahl index. An alternative measure that controls for factors that might affect the concentration, such as the size of the industry and the size distribution of the

establishments, is the Ellison and Glaeser index.[35] Let *M* the number of regions, *s* the share of an industry in each region and *x* the region's share of total manufacturing. Geographic concentration is defined as,

$$G = \sum_{i=1}^{M} (s_i - x_i)^2 \ . \tag{2}$$

We construct an industry concentration measure as,

$$H = \sum_{j=1}^{N} z_j^2 \tag{3}$$

where *N* is the number of plants in the industry and *z* is the share of each plant in the industry. The Ellison-Glaeser index (EG) is defined as,

$$EG = \left[G - \left(1 - \sum_i x_i^2 \right) H \right] / \left[\left(1 - \sum_i x_i^2 \right) (1 - H) \right]. \tag{4}$$

The EG index will be zero if there are no agglomeration forces, and the larger the value the stronger the concentration and hence the forces of agglomeration.

Results

Table 3 shows the Herfindahl index for the total manufacturing sector. The figures reveal a constant or increasing degree of concentration. For instance, using employment at the province level as the unit of observation, we find that the Herfindahl index was about 0.19 in 1980 and 1991 and increased to about 0.21 in 1996. The figures for value added confirm the picture of an increased concentration although they suggest a slight decrease in the first part of the period. Accordingly, if we use the district level as unit of observation, the figures suggest that concentration has increased between 1991 and 1996.

Table 4 examines the change in Herfindahl index in the provinces between 1991 and 1996. Concentration is typically high in provinces with little manufacturing and lower in provinces with a large amount of manufacturing. For instance, East, Central and West Java have the lowest degrees of concentration and some of the outer islands have very high degrees of concentration. However, one should be aware that the number of districts within the province affects the measured degree of concentration; provinces with many districts will tend to score low on any measure of concentration, which biases a comparison between provinces.[36] It is more relevant to examine the change in concentration. However, there is no clear pattern on how the concentration of manufacturing within provinces has developed; a decreased concentration is observed in 18 provinces for employment and 15 provinces for value added. Moreover, in all provinces with more substantial amounts of manufacturing - the Java provinces, Riau and North Sumatra - there is a clear trend of increased concentration. Only Central Java has seen a decreased concentration and this only for value added.

The figures above show that, despite substantial trade liberalization, concentration of the Indonesian manufacturing sector has not diminished over the full period investigated here (1980-96). There are several possible explanations for this. Firstly and as previously said, there has been a substantial change in the structure of the Indonesian manufacturing sector where some industries have grown rapidly and some have been stagnant. One would, perhaps, expect that trade liberalization in Indonesia would favor industries with low scale intensities, which in turn would lead to a less concentrated spatial distribution. However, there might be other factors that cause emerging industries to be more concentrated than contracting industries. For

instance, new industries will per definition be concentrated when they start in a few locations, which could explain the observed pattern of increased concentration.

We continue therefore in Table 5 with concentration at an industry level with manufacturing at a province-industry level as unit of observation.[37] Two measure are used, the Herfindahl index and the measure devised by Ellison and Glaeser (EG). The first conclusion that can be drawn from the figures is that the result is sensitive to the choice of variables and measures; few industries show a consistent pattern for the Herfindahl index and the EG measure and for the two variables employment and value added. Secondly, Ellison and Glaeser define, rather arbitrary, industries with a value above 0.05 to be regionally concentrated and industries with a value below 0.02 to be regionally dispersed. According to this definition, most industries are concentrated. Tobacco, Wood, Printing, Glass, and Clay products show an especially high degree of concentration, whereas Leather, Paper, and Machinery are spatially dispersed. Moreover, the change in the level of concentration differs substantially between sectors. Five sectors have clearly become more concentrated -Textiles, Leather, Industrial chemicals, Pottery, and Machinery – and six industries have become less concentrated – Wood, Printing, Plastics, Non-Metal Products, Electrical goods, and Transport equipment. It is difficult to observe any clear difference between the two groups; industries that become less concentrated are not in general industries that have seen the largest tariff reductions or industries that have grown the fastest (not shown). Firstly, all industries mentioned above have shown stable or increased shares of total manufacturing, for both employment and value added.[38] In other words, there is no major difference in their growth rates. Secondly, there are industries in both groups that have seen increased as well as decreased protection. For instance, the real effective rate of protection of Leather products, Wood products, and Plastics have

seen sharp increases, whereas Textiles, Non-Metal products and Electrical goods have faced decreased protection.[39]

Hence, a conclusion from the industry figures is that there are about as many sectors that have become more concentrated as sectors that have become less concentrated and that there is no obvious relation between concentration and protection or growth of the industry.

One possible explanation for the observed rigid pattern of concentration is that other types of deregulations have accompanied the trade liberalization, the most important one of which is relaxed ownership restrictions. Indonesia has traditionally relied on capital inflows through external borrowing rather than through FDI. However, the FDI regime has been gradually liberalized since the mid-1980s. FDI rose sharply in the first half of the 1990s, with the number of foreign owned establishments increasing by more than 120 per cent between 1990 and 1996.[40] There are reasons to expect foreign firms to be more spatially concentrated than domestic ones.[41] When a domestic entrepreneur establishes a company he will probably do so in the region where he lives.[42] Only when business activities have expanded will the entrepreneur consider alternative production sites. The reason is familiarity with home locations and the advantages this brings to the entrepreneur. For instance, the entrepreneur has relatively good knowledge about consumer preferences in the home area. Moreover, it is easier to raise capital or to find suitable labor in areas where you have a personal network to rely upon.

There exist no such determinants for the location of FDI; if anything, for lack of familiarity or limited information, foreign investors are more likely to be concentrated than local firms, all else equal.[43] Besides, since there is likely to be few foreign firms in a given industry in the first place, they are prone to be more

concentrated by force of larger size and smaller numbers (i.e., exactly the same type of phenomenon the EG index was designed to compensate for). In addition, foreign affiliates are sometimes part of larger networks that collaborate in the host market. Such networks of producers and suppliers are particularly important among Japanese firms (the largest foreign investors in Indonesia), and will for logistic reasons favor a clustering of FDI. Finally, availability of international schools and other facilities for foreign staff and their families, might be additional determinants to a clustering of foreign firms. To sum up, FDI has increased in Indonesia and foreign firms are likely to be more spatially concentrated than domestic ones. Hence, the observed concentrated pattern could be caused by increased FDI inflows.

Table 6 examines concentration in domestic and foreign establishments.[44] As expected, foreign establishments are more concentrated than domestic establishments and the difference seems rather large; the Herfindahl index is about 0.19 for domestic establishments and 0.30 for foreign establishments in 1996. The two groups have shown a similar change of concentration with a small decrease between 1980 and 1991 and then an increase up until 1991. Hence, neither group has become less concentrated over the time period.

In other words, there are no signs of decreased concentration in Indonesian manufacturing despite substantial trade liberalization. One may therefore question whether firms that engage in trade are relatively likely to locate in peripheral areas. Tables 7 and 8 show the concentration among establishments with and without participation in international trade. Figures on imports of intermediate products are available since 1980 but export figures are only available since 1991. The figures show, surprisingly, that establishments that are engaged in international trade are relatively spatially concentrated. For instance, the Herfindahl index calculated at the

province level for establishments that did not engage in international trade in 1996 was about 0.18-0.19 and the coefficient for traders was about 0.22-0.24 (Table 7). The result is similar for calculations with observations at a district level as units of observations (Table 8). It is especially establishments that import some of their intermediate inputs that are spatially concentrated. The results for exporters are more uncertain. For instance, in 1996 employment is more spatially concentrated in establishments that export part of their production but value added is more concentrated in establishments that are only producing for the domestic market.

DISCUSSION: IN SEARCH OF POSSIBLE EXPLANATIONS

This paper examines spatial concentration in Indonesia between 1980 and 1996. Concentration has been rather stable between as well as within provinces. When a decreased concentration was observed, it often seems to be caused by an expanding industry growing out of traditional industrial centers. The clearest policy conclusion from our analysis is that trade liberalization in Indonesia has not decreased spatial concentration. Even establishments that are engaged in international trade – that have some of their inputs imported and some of their output exported – are spatially concentrated.

One can only speculate about possible reasons to the maintained high concentration. The most likely reason is that other effects favoring concentration dominates centrifugal forces, if any, from trade liberalization. For instance, there are advantages to locate in regions with a large supply of skilled workers and a large number of suppliers of inputs. Once these agglomerative forces have started its cumulative causation process, it requires more than a change of trade policy to reverse

the concentration. In fact, trade liberalization may increase concentration as predicted by those that suggest that polarization rather than dispersal may occur.

The literature supplies a number of plausible hypotheses. For instance, it is possible that the effect from trade liberalization on concentration differs between developed and developing countries. Diego Puga suggests that developing countries are more likely to become spatially concentrated since there is a larger pool of agricultural labor that are available to migrate to industrial centers, compared to, for instance, the situation of 19th century Europe.[45]

Another plausible hypothesis is that establishments engaged in international trade are likely to locate close to big coastal ports, since good overland transport to major export points in Indonesia is lacking.[46] If this is the reason, infrastructure investments have to accompany trade liberalization to make establishments engaged in trade locate in the periphery. However, even if establishments that engage in international trade would become more spatially dispersed from such policy, the overall spatial concentration may remain unchanged. The reason is that those establishments that supply the domestic market may become more concentrated from improved infrastructure. With segmented markets – poor infrastructure – such establishments have to be present in several locations, but when the infrastructure is improved they may supply the whole economy from one or a few locations and thereby take advantage of economies of scale.

Other advantages that might be conferred on firms searching out the prime location of a country might be access to financial capital and the need to be close to the bureaucracy and government.[47] With Indonesia specifically in mind, Ari Kuncoro argues that firms have to pursue loan applications and develop their bank contacts in a few metropolitan areas. In addition, there is clear evidence that banks favor lending to

firms located on Java, which foster a concentrated spatial distribution. [48] There has also been a need to locate close to the central government and bureaucracy in order to obtain various licenses and to compete for various contracts. This factor might change with the ongoing decentralization of Indonesia.

Finally, dictatorship and political instability might result in spatially concentrated distribution of economic activity.[49] Dictators, located in the capital, are argued to freely exploit the wealth of the hinterland and distribute it in the center. Instability forces actors to be located in the center to look after their interests. These explanations for concentration do not seem to bear much relevance to Indonesia. Whereas President Suharto's regime was authoritarian, the time period examined in our study was also characterized by a high degree of political stability. Moreover, there was probably no deliberate attempts to "plunder" the hinterland, primarily because the rural population was highly politicized and President Suharto wanted to avoid the rise of a leftist challenge as had happened in the early 1960s.[50]

There is a related argument, however, that has been applied to Indonesia[51] and which links to a sizeable literature on urban primacy.[52] This is the notion that the political system as such may matter. For instance, federal systems are less likely to display patterns of primacy in the first place, and hence provide less incentive for the concentration of industry on the basis of market potential and scale effects, than do non-federal polities. Similarly, factors such as the ethnic set-up may play a role, in particular in a polity as centralized as Indonesia was until very recently.[53]

IN LIEU OF A CONCLUSION: TRADE LIBERALIZATION, CONCENTRATION AND SPATIAL CONFIGURATION

This is all to suggest, as have Henderson and Kuncoro done before us,[54] that the power of history is strong in determining location of economic activity and changes of centrifugal forces is likely to require a host of various policy measures far beyond mere trade liberalization. This said, it should be recognized that there is another factor which may play a role here, a factor that previous literature has taken little note of: spatial configurations. For, while some previous studies suggest that national land area and population size may influence the degree of urban concentration,[55] spatial layout and related geographical features do not figure prominently. This is perhaps a tinge surprising, given the surge of interest in economic geography, not least among economists and trade theorists. The new economic geography, however, has tended to equate concentration with the existence of agglomeration economies. Thus stated (and unlike the use of *agglomeration* in French, for instance, which simply refers to urban concentration as such), there is a presumption that localized external economies are at work.

While such effects, including both urbanization (i.e., general) and localization (i.e., industry specific) economies, are likely indeed, their existence and impact are typically assumed rather than proven. This is equally true of localized pecuniary and knowledge spillovers. As the above discussion has shown, however, a multitude of other factors may also be at work, some of which affect the extent to which external economies occur, some of which are unrelated.

At first sight our analysis of the empirical data at hand suggests that agglomeration economies may in fact be at work. Why else would industrial expansion take the form of increasing sprawl and suburbanization? It suggests that

despite a lack of space or high costs – both problems of which can be solved by locating either at the peri-urban fringe or further a field – firms will expand in or be attracted to established centers of manufacturing. Given the observed mode of spatial expansion, the attraction of established centers have to be reckoned with.

Yet, this might be to jump to the conclusion. This is so for at least two reasons. The first one relates to the mode of expansion itself and the means employed here to capture it. Although we have been careful to express ourselves in terms of spatial association – something that the Herfindahl and EG indices used do not typically allow on their own – this type of approach does not necessarily capture alternative forms of dispersal. What we have in mind is the diffusion of manufacturing down the urban hierarchy. This is especially so since such a dispersal of employment or output, if any, may conceivably take different forms as manufacturing shifts from larger to smaller centers at the national or regional level. The former would see dispersal from the largest to the second to the next largest city. The latter would combine this with dispersal across the local urban system, first in the one focused on the largest city, subsequently down those centered on the second, third, etc. largest center. There is evidence to suggest that the former of these two forms of dispersal may happen first, the latter coming into its own at later stages of development.[56] It is also conceivable that the process stops short of moving down the urban hierarchy. In such a case, the continued growth focused on a national or regional center is best characterized, to use a term borrowed from the geographical literature, as concentrated dispersal.

As it happens, the suburbanization of manufacturing found in Western and Central Java is not only congruent either of the above two alternative channels of dispersal; it may in fact be the underlying pattern that our data, organized not by urban centers but by administrative units as it is, picks up. Suggestions that a spatial

differentiation of FDI within the Jakarta Metropolitan Region is taking place – services predictably targeting Jakarta City, manufacturing investment increasingly favoring peripheral location[57] – is congruent with such an interpretation, but cannot be used to discriminate between outcomes and their determinants. To firmly establish which of the alternative forms of dispersal it takes would call for a rather different approach to track down the pattern and the underlying process at work. The concentration indices typically employed in new economic geography studies, and also made use of here, will not be able to capture it unless it is explicitly addressed and data reported in a distinctly different fashion is made use of.

Even if such developments can be traced, there are still competing hypotheses as to why it may happen. These are the "competitive model of large-scale land developers operating in land markets and the self-organization model of agglomeration."[58] In the case of Indonesia, for example, there is ample evidence to suggest that developers do play a considerable role.[59] Whether or not they would have their way unless it combines with elements of agglomeration economies (that is, is congruent with the rationality underpinning the self-organization paradigm) remains a moot point, but the fact that land developers are a striking feature of the politicized economic landscape of the Jakarta Metropolitan Region should warn us not to equate it with *laissez-faire* outcomes as modified by market imperfections pure and simple. There is considerable scope for political economy variables to play a role.

More generally, the reason why we should be careful not to invoke the existence of powerful agglomeration economies on the basis of our findings here is that the spatial configuration of Indonesia may play a part – and especially so as we go about comparing it with, say, Mexico. The very location of the main urban center is such that it may condition the outcome of any comparative analysis of the two. As

in fact already been alluded to in the previous sections,[60] Jakarta fulfills, and has long fulfilled, the function of Indonesia's main gateway to the rest of the world. Clearly, that function is of continuing, if not increased, use in the case of an opening up to the outside world and its markets. This is not merely a question of market potential or linkage effects, which are typically thought of as driving forces in the clustering of manufacturing, but also a question of accessibility and infrastructure that has little to do with size or the concentration of other industrial activities *per se*.[61] In at least equal measure, therefore, it is a question of geography and relative location. In Mexico (and conceivably in Hungary, the Czech Republic, Kenya, Ethiopia, and a host of other countries across the development spectrum), the main industrial center and major repository of demand or aggregate purchasing power is not the ideal entry or exit point for traded goods. The effect on that kind of economy, displaying a rather different spatial configuration, is quite likely to be different from that in Indonesia (or Ghana, Tanzania, Estonia, and others), as indeed Gordon Hanson's studies on the effects of NAFTA suggest. In the former case, trade liberalization provides a countervailing force to those that favor concentration, in the latter it serves to reinforce established patterns.

In both instances, spatial configuration becomes the intervening variable that reflects the historical legacy, the physical geography and other expressions of context and contingency that will impact on any empirical study of this nature. By implication, future work will benefit from taking such factors into account. Until that is done, we should be careful not to suggest that a particular regional outcome will necessarily follow from trade liberalization.

Table 1. Spatial distribution of manufacturing in Indonesia – Province level (share of total Indonesian manufacturing, %)

Province	Share of total labour force			Share of total value added		
	1980	1991	1996	1980	1991	1996
Aceh	0.3	0.5	0.4	0.2	1.7	0.7
North Sumatra	3.9	5.2	4.3	4.0	3.8	4.9
West Sumatra	0.6	0.5	0.4	0.8	0.6	0.5
Riau	0.6	1.7	2.9	0.4	3.2	4.8
Jambi	0.5	0.7	0.7	0.3	0.7	0.5
South Sumatra	2.0	1.5	1.2	3.2	1.0	1.6
Bengkulu	0.0	0.2	0.1	0.0	0.1	0.0
Lampung	0.4	1.0	0.9	0.4	1.3	0.9
Jakarta	17.4	12.4	10.6	23.8	17.1	16.7
West Java	19.7	32.8	36.3	18.6	28.2	40.2
Central Java	19.1	13.7	12.9	12.7	10.3	7.1
Yogyakarta	1.6	0.9	0.9	0.9	0.5	0.6
East Java	28.3	21.0	20.9	28.9	22.9	14.5
Bali	0.6	0.9	0.7	0.3	0.3	0.2
West Nusa tengara	0.2	0.2	0.2	0.1	0.0	0.1
East Nusa tengara	0.1	0.1	0.0	0.0	0.0	0.0
East Timor	0.0	0.0	0.0	0.0	0.0	0.0
West Kalimantan	1.5	1.2	1.0	2.1	1.4	1.3
Central Kalimantan	0.7	0.5	0.4	1.2	0.4	0.4
South Kalimantan	0.7	1.2	1.2	0.6	1.9	1.2
East Kalimantan	0.6	1.6	1.4	0.6	2.5	1.6
North Sulawesi	0.2	0.3	0.3	0.1	0.2	0.2
Central Sulawesi	0.0	0.2	0.1	0.0	0.2	0.0
South Sulawesi	0.7	0.9	0.8	0.7	0.7	0.8
South East Sulawesi	0.1	0.1	0.1	0.0	0.0	0.0
Maluku	0.1	0.6	0.6	0.0	0.9	0.4
Irian Jaya	0.1	0.1	0.4	0.0	0.1	0.3

Table 2. The largest district within provinces and its share of total province manufacturing (%).

Province	No of districts	Share of province employment		Share of province employment		Share of province value added		Share of province value added	
			1991		1996		1991		1996
Aceh	4	East Aceh	51.4	East Aceh	38.1	North Aceh	76.5	North Aceh	50.5
North Sumatra	17	Medan	24.9	Deli Serdang	30.8	Medan	27.2	Medan	30.9
West Sumatra	14	Padang	61.8	Padang	59.4	Padang	80.6	Padang	79.9
Riau	7	Bengkalis	36.4	Batam	53.6	Bengkalis	39.1	Batam	64.0
Jambi	6	Batang Hari	36.1	Batang Hari	41.7	Tanjung Jabung	40.1	Batang Hari	39.6
South Sumatra	10	Palembang	50.1	Palembang	39.2	Palembang	50.8	Palembang	61.4
Bengkulu	4	North Bengkulu	65.3	South Bengkulu	35.4	North Bengkulu	95.5	North Bengkulu	53.2
Lampung	4	Bandar Lampung	33.8	Central Lampung	31.3	Bandar Lampung	53.8	Central Lampung	37.6
Jakarta	5	North Jakarta	40.2	North Jakarta	46.0	North Jakarta	40.7	East Jakarta	43.9
West Java	24	Tanggerang	25.8	Tanggerang	26.7	Tanggerang	24.1	Tanggerang	23.4
Central Java	35	Semarang	14.2	Semarang	13.2	Semarang	43.3	Kudus	20.8
Yogyakarta	5	Sleman	44.1	Sleman	42.0	Sleman	50.9	Yogyakarta	61.3
East Java	37	Surabaya	18.9	Sidoarjo	20.5	Kediri	29.1	Sidoarjo	27.7
Bali	8	Badung	54.5	Badung	56.2	Badung	75.8	Badung	71.5
West Nusa tengara	6	West Lombok	47.1	West Lombok	35.1	West Lombok	42.8	West Lombok	61.2
East Nusa tengara	12	Kupang	44.8	Kupang	52.0	Kupang	76.9	Kupang	86.4
East Timor	13	Dilli	100	Dilli	92.6	Dilli	100.0	Dilli	91.6
West Kalimantan	7	Pontianak	63.7	Pontianak	65.6	Pontianak	67.7	Pontianak	56.3
Central Kalimantan	6	East Kotawaringin	54.6	East Kotawaringin	51.5	East Kotawaringin	53.5	West Kotawaringin	58.3
South Kalimantan	10	Barito Kuala	39.9	Banjarmasin	41.4	Banjarmasin	49.6	Banjarmasin	39.4
East Kalimantan	6	Samarinda	60.8	Samarinda	56.7	Samarinda	39.1	Samarinda	47.1
North Sulawesi	7	Minahasa	50.3	Bitung	39.9	Minahasa	74.2	Bitung	55.4
Central Sulawesi	4	Donggala	63.1	Donggala	61.8	Donggala	57.7	Donggala	64.4
South Sulawesi	23	Ujung Pandang	42.5	Ujung Pandang	51.9	Ujung Pandang	39.0	Ujung Pandang	47.9
South East Sulawesi	4	Kendari	67.8	Kendari	57.2	Kendari	76.1	Kendari	70.4
Maluku	5	North Maluku	48.5	Central Maluku	32.9	North Maluku	64.1	Central Maluku	32.7
Irian Jaya	9	Sorong	46.9	Sorong	42.4	Sorong	45.7	Sorong	41.6

Table 3. Concentration of manufacturing – National level (Herfindahl index).

Year	Employment		Value added	
	Province level	District level	Province level	District level
1980	0.188	ne	0.194	ne
1991	0.190	0.027	0.177	0.033
1996	0.207	0.030	0.222	0.039

Table 4. Concentration of manufacturing – Province level (Herfindahl index)

Province	Employment		Value added	
	1991	1996	1991	1996
Aceh	0.333	0.254	0.609	0.347
North Sumatra	0.168	0.201	0.179	0.191
West Sumatra	0.409	0.373	0.663	0.646
Riau	0.238	0.337	0.273	0.446
Jambi	0.316	0.330	0.330	0.298
South Sumatra	0.383	0.300	0.354	0.428
Bengkulu	0.496	0.311	0.914	0.380
Lampung	0.288	0.258	0.376	0.282
Jakarta	0.287	0.333	0.344	0.375
West Java	0.153	0.150	0.137	0.141
Central Java	0.062	0.064	0.214	0.102
Yogyakarta	0.333	0.331	0.374	0.466
East Java	0.091	0.109	0.157	0.170
Bali	0.365	0.365	0.595	0.535
West Nusa tengara	0.295	0.265	0.273	0.415
East Nusa tengara	0.269	0.315	0.624	0.751
East Timor	1	0.860	1	0.844
West Kalimantan	0.447	0.465	0.492	0.393
Central Kalimantan	0.404	0.378	0.393	0.429
South Kalimantan	0.324	0.312	0.415	0.313
East Kalimantan	0.409	0.371	0.322	0.315
North Sulawesi	0.335	0.257	0.580	0.359
Central Sulawesi	0.470	0.435	0.423	0.470
South Sulawesi	0.238	0.298	0.286	0.293
South East Sulawesi	0.508	0.401	0.604	0.529
Maluku	0.352	0.267	0.477	0.274
Irian Jaya	0.304	0.248	0.295	0.240

Table 5. Concentration of manufacturing in Indonesia – Industry level.

Sector	ISIC	Herf. 1980 Empl.	Herf. 1996 Empl.	Herf 1980 VA	Herf 1996 VA	EG 1980 Empl.	EG 1996 Empl.	EG 1980 VA	EG 1996 VA
Increased Concentration									
Textiles	321	0.29	0.43	0.30	0.52	0.11	0.12	0.15	0.15
Leather	323	0.26	0.26	0.30	0.51	-0.01	0.02	0.02	0.07
Industrial chemicals	351	0.20	0.21	0.36	0.41	-0.01	0.00	-0.04	0.04
Pottery	361	0.21	0.41	0.23	0.59	-0.05	0.05	-0.02	0.12
Machinery	382	0.25	0.28	0.23	0.42	-0.02	0.00	-0.07	0.01
Decreased Concentration									
Wood products	331	0.10	0.07	0.13	0.09	0.19	0.17	0.27	0.15
Printing	342	0.27	0.21	0.45	0.35	0.34	0.13	0.68	0.14
Plastics	356	0.29	0.24	0.44	0.27	0.13	0.01	0.23	0.01
Non-metal products	369	0.47	0.20	0.50	0.24	0.15	0.02	0.18	0.10
Electrical goods	383	0.44	0.29	0.52	0.32	0.29	0.08	0.28	0.04
Transport equipment	384	0.40	0.26	0.68	0.41	0.26	0.02	0.49	0.13
Ambiguous									
Food	311	0.30	0.17	0.28	0.12	0.07	0.10	0.06	0.13
Other food	312	0.24	0.22	0.22	0.25	0.03	0.01	-0.05	0.12
Beverage	313	0.35	0.22	0.30	0.31	0.16	-0.01	-0.15	0.02
Tobacco	314	0.49	0.52	0.42	0.36	0.19	0.44	0.03	0.27
Clothing	322	0.33	0.34	0.39	0.42	0.16	0.09	0.17	0.07
Footwear	324	0.34	0.53	0.60	0.52	0.08	0.14	-0.04	0.11
Furniture	332	0.17	0.22	0.23	0.22	0.06	0.02	0.07	0.04
Paper	341	0.28	0.29	0.27	0.24	0.02	0.02	-0.03	0.04
Other chemicals	352	0.23	0.23	0.46	0.27	0.02	0.05	0.18	0.04
Rubber products	355	0.12	0.17	0.16	0.31	0.16	0.04	0.22	0.02
Glass	362	0.42	0.27	0.69	0.50	0.20	0.16	0.20	0.28
Cement	363	0.17	0.19	0.20	0.17	0.01	-0.01	-0.07	-0.01
Clay	364	0.30	0.41	0.35	0.61	0.13	0.11	0.22	0.19
Iron and steel	371	0.32	0.27	0.47	0.33	-0.06	-0.01	-0.08	0.13
Metal products	381	0.28	0.26	0.27	0.30	0.08	0.01	0.05	0.01
Professional goods	385	0.22	0.33	0.30	0.35	0.01	-0.01	-0.14	-0.05
Other	390	0.20	0.33	0.44	0.41	0.02	0.03	0.02	0.01

Table 6. Concentration in domestic and foreign establishments (Herfindahl index).

Year	Domestic Establishments				Foreign Establishments			
	Employment		Value added		Employment		Value added	
	Province Level	District level	Province level	District level	Province level	District level	Province level	District level
1980	0.190	--	0.197	--	0.259	--	0.304	--
1991	0.185	0.025	0.170	0.032	0.277	0.065	0.240	0.065
1996	0.194	0.027	0.191	0.034	0.313	0.067	0.304	0.066

Table 7. Concentration among establishments with and without trade (Herfindahl index – observations at a province level).

Year	No trade		Trade		No-Import		Import		No-Export		Export	
	Empl.	Va	Empl.	Va	Empl.	Va	Empl.	Va	Empl.	Va	Empl.	Va
1980	---	---	---	---	0.178	0.119	0.204	0.230	---	---	---	---
1991	0.172	0.154	0.208	0.197	0.160	0.154	0.243	0.225	0.191	0.196	0.198	0.177
1996	0.191	0.179	0.225	0.237	0.170	0.150	0.270	0.276	0.206	0.245	0.219	0.211

Table 8. Concentration among establishments with and without trade (Herfindahl index – observations at a district level).

Year	No trade		Trade		No-Import		Import		No-Export		Export	
	Empl.	Va	Empl.	Va	Empl.	Va	Empl.	Va	Empl.	Va	Empl.	Va
1991	0.021	0.041	0.034	0.039	0.020	0.045	0.044	0.046	0.026	0.038	0.035	0.047
1996	0.021	0.031	0.039	0.043	0.021	0.024	0.050	0.053	0.028	0.049	0.037	0.039

ENDNOTES

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[14] Jeffrey G. Williamson, "Regional Inequality and the Process of National Development: a Description of the Patterns," *Economic Development and Cultural Change* 13 (July 1965): 3-84. Cf. William C. Wheaton and Hisanobu Shishido, "Urban Concentration, Agglomeration Economies, and the Level of Economic Development", *Economic Development and Cultural Change* 30 (October 1981): 17-30.

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[21] Henderson *et al.*, "Geography and Development."

[22] Servet Mutlu, "Urban Concentration and Primacy Revisited: an Analysis and Some Policy Conclusions," *Economic Development and Cultural Change* 37 (April 1989): 611-639, and more recently Henderson, "The Effects of Urban Concentration."

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[24] Alfred Marshall, *Principles of Economics, Book IV: the Agents of Production, Land, Labour, Capital and Organization* (London: Macmillan, 1920, 9th ed.), Ch. X.

[25] E.g., Philip McCann, "Rethinking the Economics of Location and Agglomeration," *Urban Studies* 32 (1995): 563-577, and Steven Pinch and Nick Henry, "Paul Krugman's Geographical Economics, Industrial Clustering and the British Motor Sport Industry," *Regional Studies* 33 (1999): 815-827, respectively.

[26] The exception was a few years after 1967 when President Suharto launched the "New Order", including various deregulations of the economy, in an attempt to secure foreign capital for the economy (Jeffrey A. Winters, *Power in Motion: Capital Mobility and the Indonesian State* (Ithaca, N.Y.: Cornell University Press, 1996). However, increased oil prices and domestic resistance to foreign investment and trade resulted in a new inward-looking period from around 1973.

[27] See, e.g., Thee Kian Wie and Mari Pangestu, "Technological Capabilities and Indonesia's Manufactured Exports" (Working Paper, Centre for Strategic and International Studies, Jakarta, 1994); General Agreement on Tariffs and Trade, *Trade Policy Review: Indonesia* 1995, vols. 1-2 (Geneva: GATT, 1995); and George Fane, "The Trade Policy of Indonesia," *The World Economy* Special issue (1996): 101-117.

[28] George Fane and Timothy Condon, "Trade Reform in Indonesia, 1987-95," *Bulletin of Indonesian Economic Studies* 32 (December 1996): 33-54.

[29] See Aswicahyono *et al.*, "What Happens to Industrial Structure When Countries Liberalise?" and Fane, "The Trade Policy of Indonesia."

[30] The statistical office started to report the district location of establishments in their 1990 survey. However, typing as well as reporting errors plague the data.

[31] There have been changes of the provinces after 1996: Irian Jaya and the Moluccas are now divided in three and two provinces respectively. Banten, Bangka and Belitung, and Gorontalo are all new provinces, and East Timor has received independence.

[32] Piet Rietveld, Daniel Kameo, Youdi Schipper and Niels Vlaanderen, "Infrastructure and Industrial Development: the Case of Central Java," *Bulletin of Indonesian Economic Studies* 30 (August 1994): 119-132, and J. Vernon Henderson, Ari Kuncoro and Damhuri Nasution, "The Dynamics of Jabotabek Development," *Bulletin of Indonesian Economic Studies* 32 (April 1996): 71-95.

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[34] One way to correct for spatial relationships between regions is to use the methodology employed by Marc L. Busch and Eric Reinhardt, "Industrial Location and Protection: the Political and Economic Geography of U.S. Nontariff Barriers," *American Journal of Political Science* 43 (October 1999): 1028-1050.

[35] Glenn Ellison and Edward L. Glaeser (1997), "Geographic Concentration in U.S. Manufacturing Industries: a Dartboard Approach," *Journal of Political Economy* 105 (October 1997): 889-927.

[36] See Table 2 for figures on the number of districts in each province.

[37] Only figures for 1980 and 1996 are shown in the table for sake of clarity. However, using figures for 1991 or using district-industry level as the unit of observation does not change the main results.

[38] The exception is Textile's share of employment, which decreased from 23% in 1980 to 15% in 1996. However, Textile's share of value added increased over the same period from 11% to 13%.

[39] Fane and Condon, "Trade Reform in Indonesia, 1987-95."

[40] Yumiko Okamoto and Fredrik Sjöholm, "Technology Development in Indonesia," in "Techology in East Asia", eds S. Lall and S. Urata, manuscript (Washington, D.C.: World Bank, 2001).

[41] Fredrik Sjöholm, "The Challenge of FDI and Regional Development in Indonesia," *Journal of Contemporary Asia* (forthcoming 2003)

[42] See, e.g., Eva Mueller and James N. Morgan, "Location Decisions of Manufacturers," *American Economic Review*, Papers and Proceedings, 52 (May 1962): 204-217, esp. 206-210, for an early substantiation of this point.

[43] Sergio Mariotti and Lucia Piscitello (1995), "Information Costs and Location of FDIs within the Host Country: Empirical Evidence from Italy," *Journal of International Business Studies* 26 (1995): 815-841.

[44] Foreign establishments are defined as establishments with any foreign ownership. Most foreign establishments are joint ventures with a foreign majority share. For instance, the average foreign share in establishments with any foreign ownership is 72 percent in 1996.

[45] Puga, "Urbanization Patterns."

[46] Henderson and Kuncoro, "Industrial Centralization in Indonesia."

[47] Mutlu, "Urban Concentration and Primacy Revisited."

[48] Ari Kuncoro, "Regional Specialization, Industrial Concentration and Finance: The Case of Indonesian Manufacturing Sector," paper presented at the 2nd IRSA international conference on "Indonesian Regional Development Policy: Challenges in the New Millennium", Jakarta, Indonesia, February 2000.

[49] Ades and Glaeser, "Trade and Circuses."

[50] Wing Thye Woo, "Using Economic Methodology to Assess Competing Models of Economic Policy Making in Indonesia", *ASEAN Economic Bulletin* 7 (1991): 307-321; Hal Hill, "Regional Development in a Boom and Bust Petroleum Economy: Indonesia since 1970," *Economic Development and Cultural Change* 40 (1992): 351-379; Kai Kaiser, "Indonesia's Industrial Transformation Revisited Post-Trade Liberalization Manufacturing Agglomeration," paper presented at the 3rd IRSA international conference on "Indonesia's Sustainable Development in a Decentralization Era", Jakarta, Indonesia, March 2001.

[51] Mutlu, "Urban Concentration and Primacy Revisited," and Henderson, "The Effects of Urban Concentration."

[52] E.g., John Friedmann, "The Spatial Organization of Power in the Development of Urban Systems," *Development and Change* 4 (1973): 12-50; Nancy Ettlinger, "A Note on Rank-size and Primacy: in Pursuit of a Parsimonious Explanation," *Urban Studies* 21 (1982): 195-197.

[53] Mutlu, "Urban Concentration and Primacy Revisited."

[54] Henderson and Kuncoro, "Industrial Centralization in Indonesia."

[55] E.g., Ades and Glaeser, "Trade and Circuses," and Henderson, "The Effects of Urban Concentration."

[56] Henderson *et al.*, "Geography and Development," p. 96.

[57] Tommy Firman, "The Restructuring of Jakarta Metropolitan Area: a 'Global City' in Asia," *Cities* 15 (1998): 229-243, at p. 233.

[58] J. Vernon Henderson and Randy Becker, "Political Economy of City Sizes and Formation," *Journal of Urban Economics* 48 (2000): 453-484, quote p. 453.

[59] Tommy Firman, "Land Conversion and Urban Development in the Northern Region of West Java, Indonesia," *Urban Studies* 34 (1997): 1027-1046.

[60] That is, as was noted by Henderson and Kuncoro, "Industrial Centralization in Indonesia."

[61] Note that Henderson, "The Effects of Urban Concentration," p. 23, sets out to capture this by including the category "primate city and port" as one of his geographical variables. While his results are telling, this is not, in our view, quite sufficient. It is, after all, possible to conceive of a set-up, such as in for example Latvia, where there are pre-existing major ports closer to foreign markets and/or in other respects superior (e.g., ice conditions or pre-existing infrastructure, which do matter in that particular case) to the port of the main metropolitan center. For another example, consider Mexico. An early impression is that the accession to NAFTA has induced manufacturers to put less emphasis, relatively speaking, not only on Mexico City but also the traditional centers of *maquiladora* production. Rather, they have come to favor urban areas in the northern and north-central parts of the country, including both major (Guadalajara, Monterey) and smaller (e.g., Torreon) ones, few of which are major ports or located right on the border. All in all, there appears to have been a northward shift in the point of gravity, not necessarily a scramble for the border zone itself. On the case of Latvia, see Alf Brodin, "Competing Port Cities – Going for Market Shares under a Dark Geopolitical Cloud," in *Baltic Cities: Perspectives on Urban and Regional Chang in the Baltic Sea Area*, eds Martin Åberg and Martin Peterson (Lund: Nordic Academic Press, 1997), pp. 74-96; on Mexico, e.g., Menno Vellinga, "Economic Internationalisation and Regional Response: the Case of North Eastern Mexico", *Tijdschrift voor Economische en Sociale Geografie* 91 (2000): 293-307.