Plant entry in a more liberalised industrialisation process: an experience of Indonesian manufacturing during the 1990s

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Plant Entry in a More Liberalised Industrialisation Process: An Experience of Indonesian Manufacturing during the 1990s*

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Abstract: Some major policy changes towards a more open trade and investment regime occurred in Indonesia during the 1980s and 1990s. The impact of these policy changes on the country's industrialisation has been generally favourable. However, little is known about the impact on the dynamics of plant in the country's manufacturing. This study addresses this subject, examining the extent and determinants of plant entry in Indonesian manufacturing over the period 1993-96, and asking how the policy reforms affected plant entry. The key finding suggests that the policy reforms increased the extent of competition within industry. This, however, does not seem to be very strong, and the study puts forward some possible explanations. The discussion reaches a consensus that maybe, during the period under this study, the process of the reform had not really been completed and, at the same time, the (predicted) positive impact of the liberalisation had not been fully realised.

***Keywords*:** Firm-level data; Globalization; Productivity.

***JEL Classification*:** F15; F23

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1. Introduction

Some major policy changes towards a more open trade and investment regime occurred in Indonesia for about a decade over the late 1980s and early 1990s, in response to various events experienced by the Indonesian economy. After about 15 years of an import substitution policy, sheltered by large oil revenues, the policy direction shifted dramatically towards outward orientation. The policy changes took place in a series of bold and comprehensive reforms aimed at liberalising the economy, increasing investment and promoting exports.

The impact of the policy changes on industrialisation is apparent. The Indonesian manufacturing sector transformed rapidly during this time and had become an important source of growth by the mid 1990s. The share of the sector in GDP increased from 12 per cent in 1975 to 24 per cent in 1995, manufacturing exports increased substantially in the 1990s, and there was also an increase in foreign participation over the reform period.[1]

Notwithstanding the favourable industry performance, little is known about the impact of the policy reforms on the dynamics of plant in Indonesian manufacturing. This study addresses this subject, by examining the extent and determinants of plant entry in the Indonesian manufacturing sector over the period 1993-96. It addresses the question of how the reforms affected the entry of plants, the importance of the reforms in determining the extent of the entry, and the role of other industry-level factors – if any – in explaining the level of entry over the period.

The rest of this paper is organised as follows. Section 2 briefly reviews the policy reforms in that occurred in the decade of 1980s and 1990s. Section 3 describes the impact of the policy reforms on the extent of plant entry over the period 1993-96. Section 4 briefly reviews some theoretical consideration on the determinants of plant/firm entry, which provides some basis for the econometric component of the study. Section 5 presents the hypotheses. Section 6 describes the statistical framework and

[1] See Hill (1996) for a presentation of the favourable Indonesian manufacturing performance during the 1990s.

variable measurements used in the econometric exercise, and section 7 present the results of the exercise. Section 8 summarises and concludes the findings of the study.

2. Policy Changes Affecting the Manufacturing Sector during the 1980s and 1990s

The key policy direction governing the Indonesian manufacturing since early 1970s to mid of 1980s had been an import substitution strategy. Within this period, the government implemented tariff and non-tariff barriers (NTB) to support the strategy. According to Thee (1994), tariffs were implemented to support the earlier stage of import substitution which focused on the downstream industries (i.e. final consumer goods) and NTB were used to support the second stage of import substitution, which focused on upstream industries (i.e. intermediate and capital goods). As in other developing countries, this policy had a 'cascading effect', which sets higher tariff rates for consumer goods compared to intermediate and capital goods (Ariff and Hill 1985).

The government implemented a wide range of measures. The most significant were the restrictions on foreign investment and imports. In 1973 the government established the Investment Coordinating Board (*Badan Koordinasi Penanaman Modal, BKPM*). The board was given discretionary authority to approve both foreign and domestic investment. BKPM published an annual Priority Investment List that detailed the economic sectors in which investment was allowed, for both domestic and foreign investors. The number of industries that were closed to foreign investors continuously increased during this import-substitution period.

Despite the inward orientation of the industrial strategy, some reforms were introduced in the early 1980s in response to falling oil and commodity prices. Exchange rate devaluation and banking sector deregulation were undertaken. The latter included removal of the interest rate ceiling, the credit ceiling and a reduction in liquidity credits. Apart from the macroeconomic and financial sector reforms, the government also introduced tax and trade reforms during this period.

Two other major trade reforms were undertaken in 1985. The first was the rationalisation of tariffs, in the form of an across-the-board reduction in the range and

level of nominal tariffs. The range of tariffs was reduced from an initial 0-225 % to 0-60 %, with most tariffs ranging from 5-35 %. The second reform was the improvement of customs and port procedures. All operations relating to import and export goods by the customs department were handed over to private companies.

The continuing threat of falling oil prices between 1982 and 1986 forced the government to initiate an export promotion policy objective. The government reacted quickly by devaluating the Rupiah by a massive 45 per cent in 1983, while at the same time controlling inflation using monetary and fiscal policies. In addition, a series of deregulation packages aiming to liberalise trade and investment regimes, and the financial sector, were introduced.

For trade liberalisation, bold measures were taken to reduce the export bias. Included in these were measures to reduce the costs of exports and to increase the flow of investment. In May 1986, a new and improved duty drawback scheme was introduced. Unlike the old system, this scheme allowed exporters to source imported input at international prices and exempted them from all duties and regulation on imported inputs. Moreover, the scheme also allowed exporters to import directly without having to deal with import licensing.

The measures to reduce protection included the reduction of the general level of tariffs and the removal of many NTBs. These were undertaken in a series of deregulation packages from 1987 to 1997 before the 1997/98 crisis. The NTB removal was done by transforming them to equivalent tariffs and export taxes. One example was the removal of the import monopoly on plastics. Before the reform, the right to import plastic raw materials had been awarded to a single government trading company, which then appointed a sole agent from a well-connected group. All of the imports had to be undertaken by the agent, who charged a fee and took a longer time to deliver the goods than would have happened if they had been imported directly.

Concerning the liberalisation in the investment regime, equity restriction and divestment rules were gradually removed in a series of deregulations between 1986 and 1995.

As noted by some (e.g. Hill 1996; Pangestu 1996), policy governing foreign direct investment (FDI) before mid 1980s was very restricted, reflecting the conflict between establishing foreign links to accelerate industrialisation and some possible 'foreign

domination' resulting from such links. Essentially, the perception at that time was foreign investment supplements domestic investment. All these were translated into some restrictive provisions in laws and/or regulations governing direct investment before mid 1980s, and these are reflected in the following characteristics of multinational operation during that time (Pangestu 1996):

i. Multinationals operation are restricted in only some sectors of the economy;
ii. Multinationals are subject to many operating licences and strictly controlled in accessing domestic capital market;
iii. Multinationals are not entitled to benefit of the government incentive programs;
iv. Multinationals are subject to some specific regulations in regard to minimum capital requirement, minimum share of domestic ownership, and eventual transfer of the foreign share of the investment to domestic investors (i.e., the 'phasing-out provision').[2]

As results of the restrictive policy approach, Indonesia had become substantially less competitive than its neighbouring countries for hosting multinationals.

Significant reforms were undertaken between 1992 and 1994 to respond to the perceived decline in the investment climate in Indonesia (Pangestu 1996). Several policy changes were important during this period. Firstly, the obligation for foreign firms to establish joint ventures with Indonesian partners was relaxed. In particular, joint venture with a maximum of 95 percent of foreign ownership was allowed, which had not been the case earlier. In addition, and more importantly, the government also allowed 100 percent of foreign ownership albeit this is only applied to only nine public sectors which are now opened for foreign investment. Secondly, the minimum capital for foreign investment was reduced from about $1 million to $250,000 in 1992 and finally removed in 1994. Thirdly, the government finally opened up nine sectors which had previously been closed for foreign investment, which are ports, electricity generation, telecommunications, shipping, air transport, drinking water, railway, automatic generation plants, and mass media.

[2] As stated in Pangestu (1996), the minimum capital requirement for FDI was set to be $1 million based on the 1967 Investment Law. Meanwhile, the phasing-out provision, as defined in the Law, requires that foreign investors must transfer their shares to Indonesian investors in a certain period of time after a (generally 30 years), otherwise the company is subject to mandatory liquidation.

Fourthly, the obligation to divest the majority of capital over a certain period of time was substantially relaxed. The divestment rule for a joint-venture with at least 5 percent domestic ownership is not longer mandatory, and the divestment decision is left to shareholders. Meanwhile, for companies with 100 percent of foreign ownership, there is still phasing-out provision, but it is relaxed significantly, and that is, the amount of the divested investment is not officially ruled and left to the investors' decision. Lastly, the provision governing the foreign investment license was made greatly less restrictive. The 30-years of license is now automatically be renewed as long as the Investment Board acknowledges that the investment brings positive benefit for the economic development in general. Earlier, under the 1967 Investment Law, the 30-years license is non-renewable, and at the end of 30-years limit, foreign ownership must all be transferred to domestic investors, or else the company will be mandatory liquidated.

The government introduced a major financial sector reform in 1988, which principally removed entry restrictions for new banks. Foreign banks could enter Indonesia as joint ventures, with equity up to 85 % and without any product or geographical restrictions. As a result of this reform, the banking sector boomed and funds available to firms were greatly increased.

Although economic reforms supporting export orientation were the dominant feature of policy changes between 1985 and 1995, there were remaining regulations that preserved the protectionist industrial policy. Some sectors remained closed to foreign investors and untouched by the reforms. In terms of NTBs, some industries continued to be assisted by restrictive licensing, administratively determined local-content requirements, restrictive marketing arrangements and export taxes (WTO 1998).

3. Plant Entry over the Period 1993-96

3.1. Key Hypothesis

This section attempts to gauge the impact of the policy reforms described in the previous section on the extent of plant entry over the 1993-96 period. Before presenting

the description, it is useful to seek some guidance from theory on the likely impact of the policy reforms.

Theory, unfortunately, does not give a clear-cut prediction of this impact. On the one hand, the change towards a more open trade and investment regime could increase plant/firm entry, and this is for the reason of the profit expected by potential entrants. The classical firm entry model of Orr (1974) postulates that entry occurs as long as there is a positive difference between the expected – or short-run – profits and the long-run – or competitive-level – profits.

On the other hand, a more open trade and investment regime could deter entry. This prediction comes, however, as a potential 'second-round' effect of the increased extent of entry due to an exposure of the expected profits of the potential entrants. The rationale for this entry-deterrence effect comes from theories on the relationship between collusive behaviour and business cycles. These are, in particular, the models put forwards Rotemberg and Saloner (1986) and Rotemberg and Woodford (1992), which hypothesise that the likelihood of collusion break-down is small when demand is low. The firm that lowers its price relative to another is not likely to capture a large portion of the market since the market price has already been lowered. Meanwhile, "punishment" from the deviation could be large if the demand resumes to its normal state. The benefit from deviating may be exceeded by its costs. Thus, based on these models, because expected profits would be likely to attract entry, the incumbents should predict a fall in demand – since the entry increases the number of firms in the industry – and when this happens, incumbents could increase the extent of their collusive behaviour, hence deterring entry.

3.2. Data and Measurement of Entry

The main data are drawn from the annual manufacturing surveys of medium- and large-scale establishments (*Statistik Industry*, or SI) from 1992 to 1996. The surveys are undertaken by the Indonesian Statistics Agency (*Badan Pusat Statistik,* or BPS) and the establishments are defined as those with 20 or more employees. The data cover a wide range of information on the establishments, including some basic information (ISIC classification, year of starting production, location), ownership (share of foreign, domestic and government), production (gross output, stocks, capacity utilisation, share

of output exported), material costs and various type of expenses, labour (head-count and salary and wages), capital stock and investment, and sources of investment funds.

The sample consists of 72 manufacturing industries at the four-digit level. The number of industries is smaller than the number of industries available in the data base. Oil and gas industries (ISIC 353 and 354) were dropped because they are largely monopoly state-owned companies. Some other industries were also dropped because of the difficulty in matching the ISIC code with SITC (the classification used in trade statistics) and because of the unavailability of average tariff rates. Despite these eliminations, the sample still represents a large variety of industries in Indonesian manufacturing.

It is worth mentioning here that in its first draft, this study considered the other period of data, namely the period post the 1997/98 economic crisis. The inclusion of this period should have been very useful in the context of this study, owing to the accelerated trade and investment reforms during the crisis period (1997-2000). A close examination of the data for this period, as well as many econometric experiments using the period's data, however, revealed a major weakness of the data, which results in unreliable results. The examination indicates that the number of observations (i.e., plants) for the period is significantly under-enumerated, resulting in a continuously declining plant entry rate over the period 2001-05. While the declining entry could reflect the real-world situation (i.e., plant entry does not seem to recover post the crisis), it could also be the result of statistical error, in the form of under numerated observations. The latter seems to have some support based on the most recent data published by BPS, the SI data of 2006, whereby the number of plants enumerated in this data set jump by about 30 per cent of the average number of the plants over the 2001-05 period. Because the 2006 data were only very recently available to the author, the assessment of the data, and, therefore, the assessment of the entry for the post crisis period are not covered in this study.

As commonly adopted in other research (e.g. Davis et al. 1996), this study defines entry rate in terms of the number of plants and employment. The entry rate in terms of number of plants is labelled as $EN1$, while the entry rate in terms of employment is labelled as $EN2$. $EN1$ for industry j between t and $t-1$ is defined as

$$EN1_{j,t} = \frac{NEP_{j,t}}{NTP_{j,t-1}} \ ,$$

where: $NEP_{j,t}$ = total number of plants that enter industry j between t and $t-1$,

$NTP_{j,t-1}$ = total number of plants in industry j in year $t-1$.

EN2 for industry *j* between t and *t*-1 is defined as

$$EN2_{j,t} = \frac{EMPL\_EN_{j,t}}{EMPL\_T_{j,t-1}} \ ,$$

where: $EMPL\_EN_{j,t}$ = total employment of plants that enter industry j between t and $t-1$,

$EMPL\_T_{j,t-1}$ = total employment of plants in industry j in $t-1$.

As applied in some other studies, this study also includes the measurement of entry in terms of output, as another alternative measure of entry in addition to measurement in terms of employment. Entry rate in terms of output is labelled as *EN3*, for industry j between t and $t-1$, it is defined as

$$EN3_{j,t} = \frac{VA\_EN_{j,t}}{VA\_T_{j,t-1}} \ ,$$

where: $VA\_EN_{j,t}$ = total value added of plants that enter industry j between t and $t-1$

$VA\_T_{j,t-1}$ = total value added of plants in industry j in year $t-1$

Here, plants' value added is adopted as the basis for computing the entrants' output, instead of plants' output. This approach is adopted to avoid the 'double-counting' issue in computing output at aggregated industry level.

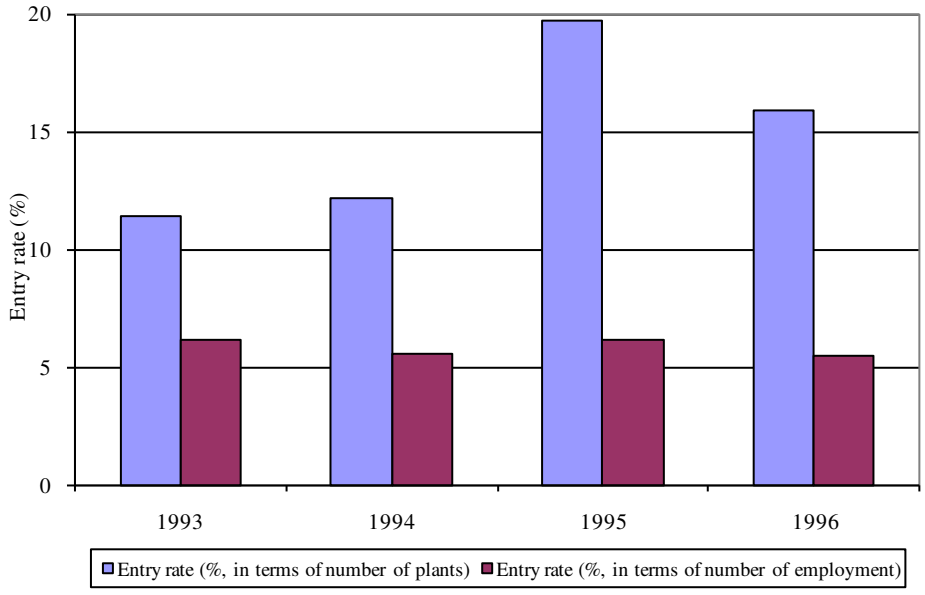
There are different types of entry. Within the entry category, entry can occur through acquisition of the established production units or creation of new ones

(greenfield entry). There is a substantial difference in the effect of these types of entry. A greenfield entry affects industry's supply directly and immediately, while it is not clear whether or not the effects of acquisition entry are immediate (Baldwin 1998). This difference would, ideally, lead to separation of the analysis according to each type of entry. The separation, however, cannot be done, because the information needed (i.e. the reasons for firms entry and exit) is unavailable. Consequently, this study assumes that the entry is greenfield entry.

3.3. The Impact of the Trade and Investment Reforms on Plant Entry over the Period 1993-96

Figures 1 shows the extent of plant entry in terms of number of plants and employment, respectively. It seems to suggest a positive impact on the extent of plant entry resulting from the trade and investment policy reforms undertaken by the government during the 1980s and early 1990s. The entry rate (EN1) increased substantially over the four years from 1993; as described in Section 2, the early 1990s was the period when the government implemented bold liberalisation measures on the trade and investment policy front. The entry rate peaked in 1995, and it was very high, reaching almost about 20 %, which was about twice the rate in 1993.

Figure 1. Entry Rate in the Indonesian Manufacturing (%), 1993-96



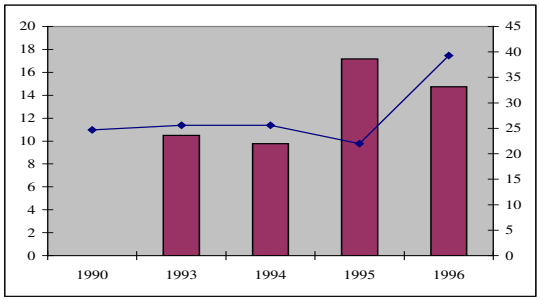
A quite different picture, however, is shown when the entry rate is measured in terms of employment, and that is, that the extent of entry had moved up and down over the period. It declined in 1994, increased in 1995, but declined again in 1996. Therefore, the indication from Figure 1 of a positive impact does not seem to have been quite robust.

It is worth mentioning here that the difference between EN1 and EN2 is quite high. This indicates that many of the entries over this period were of relatively small plants. While this indication might not be favourable in terms of industrialisation – because large plants tend to perform better than smaller ones, due to the advantage arising from economies of scale – it is consistent with the general characteristics of entry drawn from empirical studies of entry in other countries.

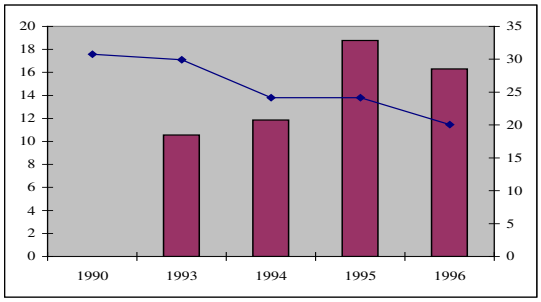
Figure 2 (a) to (h), which show the entry rate (in terms of number of plants) for the period by broad industry group, and the trend in the nominal tariff rate over the 1990-96 period, provide a more detailed picture of the effect of the reforms on the extent of plant entry. Here, as the key observation, however, the comparison of the rate of entry and the tariff rate over the period, and across the groups, , does not seem to show a consistent picture of the impact, i.e., whether it is positive or negative. Looking at the comparison for the industry group of ISIC 32, 33, 34, and 35 (i.e., textile-garments, wood products, paper products, and chemical products, respectively), the policy reforms are suggested to have increased plant entry, and hence indicate a positive impact. The declining trend in the tariff rate is accompanied by a pattern of increasing entry for these industries.

Figure 2. Entry Rate (in terms of Number of Plants) in the Indonesian Manufacturing and Nominal Tariff Rate by Broad Industry Group, 1993-96

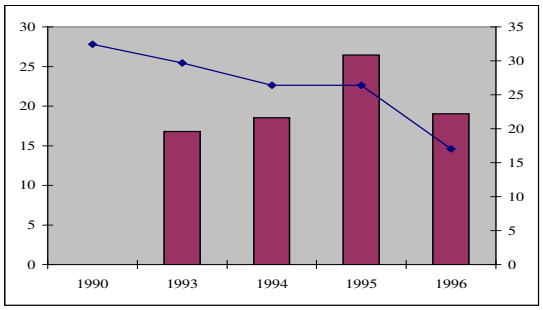
a. ISIC 31 Food and beverages



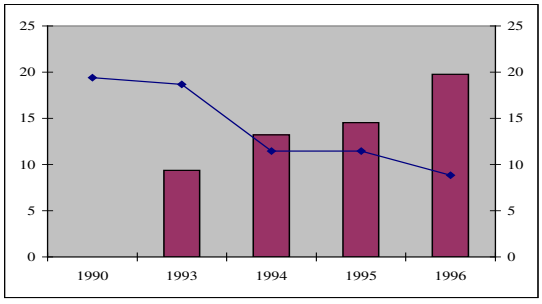
b. ISIC 32 Textiles and garments



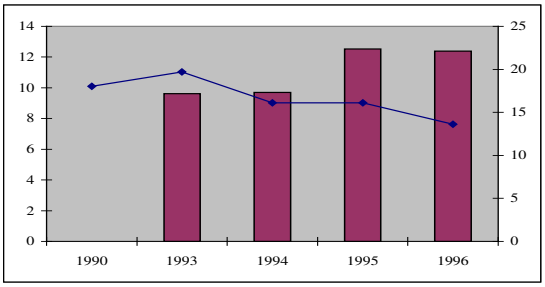
c. ISIC 33 Wood products



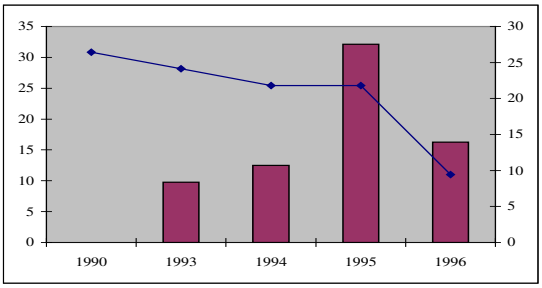
d. ISIC 34 Paper products



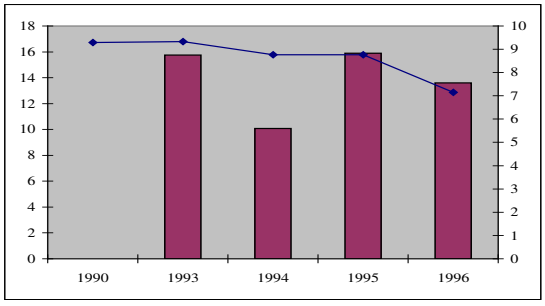
e. ISIC 35 Chemical, rubber, and plastics



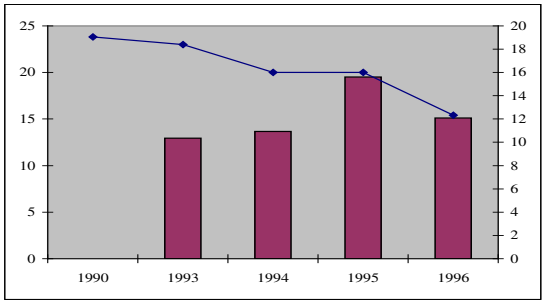
f. ISIC 36 Non-metallic minerals



g. ISIC 37 Basic metal



h. ISIC 38 Machinery and transport equipment



Legend:
: Entry rate (%, in terms of number of plants)
: Nominal tariff rate (%, simple average)
X-axis (left) : Entry rate
X-axis (right) : Nominal tariff rate
Y-axis : Year

In contrast, the comparison for the industry group of ISIC 36, 37, and 38 (i.e., non-metallic minerals, basic metal, and machinery-and-transport equipment, respectively) suggests that the reforms deterred entry, and hence indicate a negative impact. For these industries, the declining trend in the tariff rate is matched by either declining or relatively low entry rate.

All in all, the description above indicates that indeed the reforms create some impact on the extent of plant entry, and this is recorded in the period covered by this study. The description, however, clearly shows a varying impact, particularly in terms of the direction of the impact (i.e., whether it is a positive or negative impact). Another variable impact is in terms of the magnitude. In other words, there is no robust answer on how the reforms affected plant entry.

Given the varying impact, few immediate questions can be asked. These include, for example, did the reform really have some impact on the entry? If indeed the reforms played some role in shaping plant entry in the period, in which direction were these reforms really affecting the entry rate? Were they increasing, or decreasing the entry rate? Equally important is the question of what other factors shaped the dynamics and variation of entry across industries in the period. This question assumes the importance of the other factors in determining entry, as suggested by the literature.

In an attempt to find some answer to these questions, this study proceeds with an econometric exercise that gauges the determinants of entry over the period 1993-96. To facilitate the search for answers, some variables that can be associated with the policy reform variables are included in the exercise.

4. Some Theoritical Considerations

To facilitate the rest of the empirical analysis, this subsection briefly reviews the theoretical framework that explains firm entry.

4.1. Prevailing Views about Firm Entry

There are two major approaches to the analysis of the determinants of entry. These are the limit-price model and the stochastic-replacement process.

4.1.1. Limit Price Model

This approach assumes entry is an equilibrating process which is attracted by, and serves to bid away, the excess profit. Entry is hypothesised to occur whenever the expected post-entry profit exceeds the level of profit in the long run. The approach adopts the concept of a limit-price model (Bain 1949), which posits that there exists a limit price which is low enough for incumbents to be able to deter entry.

The extent to which the limit price deters entry is determined by two factors, namely the size of the market and the entrant's average costs curve. The latter gives rise to a cost advantage for incumbents over new entrants who may have to pay a substantial fixed entry cost. This implies the average cost curves of entrants and incumbents are not the same. According to Bain (1956), the cost advantages of incumbents over entrants are determined mainly by economies of scale, product differentiation and some absolute cost advantages.

4.1.2. Stochastic Replacement View

This approach considers entry as a stochastic process which does not necessarily respond to profit and may occur even if price equals marginal cost (Baldwin and Gorecki 1987). Baldwin and Gorecki argue two situations in which profit is irrelevant to the entry process. The first is related to how easily entrants can enter and capture a market share. This is governed by market demand growth. In a growing market, additional firms entering the market are unlikely to depress the market price. Hence incumbents are less threatened by entrants and are therefore less likely to act aggressively. The second is a situation where entrants simply replace some existing firms, even when long run profits are zero.

4.2. Interdependence between Entry and Exit[3]

As in the limit price approach, entry takes place when profit is positive. Accordingly, exit should occur when profit is negative and entry andexit are expected to be negatively correlated. In contrast, several studies found the correlation to be positive (e.g. Dunne et al. 1988; Dunne and Roberts 1991; Austin and Rosenbaum 1991; Lay 2003). For example, Dunne and Roberts found that entry and exit are positively correlated with the price-cost margin for US manufacturing, implying that higher profit encourages both entry and exit. Lay documented that the correlation coefficient of instantaneous entry and exit for Taiwan manufacturing was positive and relatively high (about 0.5).

The literature records several explanations for the positive correlation, often termed as "interdependence". Geroski (1995) argues that entry and exit seem to be part of an evolutionary process in which a large number of new firms displace a large number of existing firms without much changing the total number of firms in an industry. This argument is similar to the 'stochastic-replacement' view of entry (Baldwin and Gorecki 1987) which posits that entry can still be expected even when industry's profitability is zero. Entry in this view simply replaces some existing firms.

Shapiro and Khemani (1987) offer two reasons for the interdependence. First, to the extent that cost heterogeneity exists, there might be some high-cost incumbents who can be displaced by low-cost entrants. Second, to the extent that barriers to entry are also barriers to exit (Caves and Porter 1976; Eaton and Lipsey 1980), potential displacement is limited and incumbents are deterred from exiting. The symmetrical relationship between entry and exit barriers arises from investments with sunk cost characteristics (i.e. investment in durable and specific assets). Sunk cost creates barriers to entry because it represents a higher opportunity cost that has to be met by entrants, and higher risk owing to the large losses associated with unsuccessful entry. At the same time, sunk cost also creates barriers to exit because incumbents are limited by inability to divest, owing to the non-recoverable nature of the assets (Shapiro and Khemani 1987, p.16).

[3] A useful review of the interdependence is provided by Fotopoulus and Spence (1998).

Shapiro and Khemani's displacement effect implies that entry is responsible for exit. Fotopoulus and Spence (1998) consider that the process could be the other way around. That is, exit creates room for new entry. If the two directions hold, entry and exit are causally related and the interdependence may be due to some 'displacement-replacement' effect.

5. Model Specification and Hypotheses

5.1. Model Specification

This study follows a specification of entry model similar to those in the literature. An exit model is also specified for the reason that entry and exit might be causally related, as discussed in the previous section. Ignoring industry and time subscripts, these are

$$EN = f_1(X_1, Y_1, Z_1, REPL) \quad (1)$$

$$EX = f_2(X_2, Y_2, Z_2, DISP) \quad (2)$$

where EN (EX) is entry (exit) rate, X_1 (X_2) is a vector of incentives for entry (exit), Y_1 (Y_2) is a vector of entry (exit) barriers, Z_1 (Z_2) is a vector of other relevant variables, $REPL$ is replacement entry and $DISP$ is displacement entry. $DISP$ and $REPL$ are included to represent displacement and replacement behaviour, respectively.

As is commonly done in the literature, $REPL$ and $DISP$ are assumed to be a function of exit and entry, respectively. Thus, equations (1) and (2) can be expressed as

$$EN = f_1(X_1, Y_1, Z_1, EX) \quad (3)$$

$$EX = f_2(X_2, Y_2, Z_2, EN) \quad (4)$$

Having specified displacement and replacement behaviour, the discussion now turns to the specification of other vectors. Consider, first, X_1. The specification of X_1 is derived from Orr's (1974) model, which posits that entry (E) is expected to occur whenever expected post entry profits (π^e) are above the entry-precluding level (π^*).

The entry-precluding level refers to profits which would be earned by incumbents in the long-run after all entry has ceased. Orr's model is

$$E = f(\pi^e - \pi^*) \qquad (5)$$

Adopting the concept of a limit-price model (Bain 1949 and 1956), Orr assumes π^* depends on a vector of entry barriers (ENB) and market risk (R), that is

$$\pi^* = f(ENB, R) \qquad (6)$$

Substituting (6) into (5), Orr's model becomes

$$E = f(\pi^e, ENB, R) \qquad (7)$$

To incorporate the stochastic replacement view of entry, industry growth (GR) is added to equation (7).[4] So that it becomes

$$E = f(\pi^e, GR, ENB, R) \qquad (8)$$

This study uses pre-entry profitability to proxy π^e and price-cost margin to proxy profitability (PCM_{t-1}). Market risk is proxied by the variability in industry profitability, defined as the standard deviation of PCM ($SDPCM$). Following Shapiro and Khemani (1987), GR is deflated by the minimum efficient scale (MES) to reflect a situation that there must be sufficient growth to justify additional capacity in an industry. The deflation is defined as $ROOM$ variable.

The use of pre-entry profitability as a proxy for π^e has been the usual procedure in empirical studies. However, the procedure is unlikely to proxy π^e properly. The (naïve) entrants neglect the effect their entry may have on profits because profitability between post- and pre-entry is assumed to be the same (Geroski 1991). Moreover, employing the naïve expectation may open up the possibility for incumbents to manipulate pre-entry profit and hence could discourage entry. An alternative approach is to assume that entrants form rational expectations to make the entry decision. The

[4] Baldwin and Gorecki (1987) introduced market size to capture replacement entry. This study does not follow this approach since replacement entry has been assumed to depend on exit.

rational expectation assumption leads to the procedure of forecasting profit based on an autoregressive model of profit. Several studies, e.g. Highfield and Smiley (1987) and Jeong and Masson (1991), provide evidence that using forecasted profits performed better than pre-entry profits. Although the alternative approach is more reasonable, it is not possible in this study because there are not enough time-series observations in the data base.

Two variables are included to represent barriers to entry: economies of scale (ES) and capital requirement (KR). Economies of scale acts as an entry barrier if industry output accounted for by minimum efficient scale (MES) constitutes a significant part of the quantity demanded at a competitive price. Potential entrants could enter on a large scale but would trigger retaliation by incumbents. Capital requirement is included to capture the extent of cost disadvantages faced by entrants. According to Bain (1956), borrowers' lack of information about potential entrants provides incumbents with an absolute cost advantage over entrants, which results in difficulties for entrants in raising investment funds.

Seller concentration is included in Y_1 to capture the strategic deterrence actions by incumbents. These are likely to occur in the post-entry period. Examples of these actions include predatory pricing, aggressive advertising campaigns and credible threats to compete hard against new rivals (Evans and Siegfried 1992). However, seller concentration may also attract entry. It facilitates collusion that in turn provides a higher survival chance given that entry has occurred. Chamberlin's (1933) model predicts that once concentration levels reach a certain point, oligopolies recognise their interdependence and that together they produce a monopoly output for the market.

The specification of vector X_2 in equation (4) follows earlier empirical work on the determinants of exit (e.g Deutsch 1984; MacDonald 1986; Shapiro and Khemani 1987; Flynn 1990; Doi 1999) and is similar to that of vector X_1 and Y_1 in the entry equation.

According to models of firm bankruptcy (e.g. Schary 1991), a firm decision to shut down depends on a short-term cash flow problem and assessment of long term prospects. Therefore, profitability (PCM) and industry growth (GR) are included in X2.

As noted earlier, exit barriers arise from sunk costs. The relationship between sunk costs and the probability of exit relates to the 'duration' view of sunk costs (Rosenbaum

and Lamort 1992, p.299). That is, a longer production time is needed to recover sufficient returns from investment as the resale value of the non-recoverable assets cannot be added to the stream of income generated by these assets. The implication is that firms with high sunk-capital costs are forced to stay in an industry longer than firms with low sunk-capital costs.

Therefore, the ideal proxies for exit barriers are those that can represent the extent of sunk costs. The strategy commonly applied in empirical studies is to create some proxies based on characteristic sunk costs, which are durability and specificity in assets. The only problem here is that it is often difficult to obtain such proxies as a result of the specificity characteristics. Despite this, Caves and Porter (1976, p.44) argue that each source of entry barrier identified by Bain can also be erected as a barrier to exit. In this argument, the durability and specificity of assets can to some extent be captured by Bain's entry barriers. For example, it is often argued that incumbents must have some resources which are at least temporarily specific to allow them to create some cost advantages over potential entrants. Otherwise, potential entrants could easily duplicate the resources and enter. Following Caves and Porter, Y_2 is specified to be identical to barriers to entry.

$CR4$ is also included in Y_2. Seller concentration facilitates collusion, which could increase the probability of survival and hence may discourage exit. Despite this, low exit rates in highly concentrated industries may also be possible simply because firms are likely to be the established firms (Flynn 1990).

Vectors Z_1 and Z_2 are specified to include variables related to trade and international competition. The first is foreign ownership (FOR). The impact of concentration of foreign ownership on entry is ambiguous. On the one hand, it could discourage entry, for the reason that foreign firms are usually large, and therefore, they tend to have economies of scale in their production, which raises some barriers to entry into the industry. Moreover, a strong chance of survival for foreign firms in the presence of economic shocks, vis-à-vis domestic firms, implies a greater likelihood that foreign firms will stay in the industry in the event of an economic shock. This, in turn, suggests a negative relationship to entry. On the other hand, high concentration of foreign ownership in an industry could also encourage entry, and this could simply be

due to the signalling effect activities "must" be highly profitable in an industry with such a high foreign ownership concentration.

The second variable is export orientation (EXP). The greater profit opportunities provided by the export market are likely to attract entry and hinder exit. In contrast, a higher degree of export orientation could also discourage entry and encourage exit, because it signals a greater intensity of competition in the industry. Nevertheless, the pressure for higher exit is likely to be weak since established firms must have paid substantial costs for participating in export markets.

This study includes import penetration (IMP) and trade protection ($TARIFF$) to represent the effect of international competition on entry. At the same time, these variables also represent the variables that are related to, or can be associated with, the reforms which are the focus of this study. It is often argued that greater trade protection tends to facilitate non-competitive behaviour, such as collusion, and protects less efficient firms. Therefore, incumbents in a protected industry could collude and deter entry. However, entry could also be encouraged because the trade protection which allows incumbents to behave non-competitively could also be a more important incentive than the profit incentive.

Meanwhile, the effect of import competition on entry and exit is ambiguous. Higher import competition could be expected to reduce entry unless it widens the domestic market. However, it could also encourage exit as more firms increase competition and reduce the survivability of incumbents.

The other variables considered in the model aim at capturing the industry factor-intensity (FI) effect. It could be predicted that the extent of entry should be higher in the industries where the country has some comparative advantage . In this study, a set of dummy variables representing industry factor intensity is considered, and these are the dummy for labour-intensive industries, resource-based but labour-intensive industries, resource-based but capital-intensive industries, and footloose capital-intensive industries.

To sum up, the entry and exit equations can be specified as follows

$$EN = f(PCM, ROOM, SDPCM, ES, KR, CR4, FOR, EXP, IMP, TARIFF, FI, EX) \quad (9)$$

$$EX = f(PCM, GR, ES, KR, CR4, FOR, EXP, IMP, TARIFF, FI, EN) \quad (10)$$

The definition of the variables in these equations is given in the next section.

5.2. Hypotheses

The following paragraphs present the hypotheses to be tested in the econometric exercise, based on the theoretical discussion of the previous sections.

5.2.1. Trade Protection and Import Competition

This is the key hypotheses to be tested. Based on the brief theoretical discussion in Section 3.1, the effect of trade protection (*TARIFF*) in attracting entry might not have been clear. It could have increased entry, for the reason that lowered tariff and other international trade barriers reveal the positive expected profits for potential entrants. Lowered tariff protection, however, could have also deterred entry. As discussed, the threat from potential entrants could increase the extent of collusive behaviour, which in turn could increase the strength of entry barriers. This reasoning also suggests that higher import competition (*IMP*) could have been negatively related to entry – higher competition from imports could trigger or increase the extent of collusive behaviour, hence raising the entry barriers.

5.2.2. Symmetrical Relationship between Entry and Exit

The symmetrical relationship between entry and exit might hold. This is because, for any potential entrant, the opportunity cost for any new investment is likely to have been relatively low during the period. As noted, there was a bold banking sector deregulation that increased the role of financial intermediaries in the sector. In addition, the period covered by the study was a rapidly growing period in the Indonesian economy, and, therefore, there should be a favourable profitability for doing business in this period. Meanwhile, for the established firms, the role of sunk costs as exit barriers may not have been very important, since many firms were unlikely to find themselves in depressing situations during this period.

5.2.3. Displacement and Replacement Entry

Displacement entry should not have been more important. This is because favourable economic conditions tend to shelter the inefficient firms, helping them to

survive. This situation therefore reduces the opportunity for low-cost potential entrants to enter and successfully compete with the incumbents.

5.2.4. Demand Situation

In theory, profitability (*PCM*) and market growth (*ROOM*) are expected to have been important in attracting entry. Even so, they may not have been vitally important. In a developing country like Indonesia, a situation that creates the expectation of a stable profit – instead of the expected profit itself – could have been the determining factor. It is often argued in the literature that the existence of imperfect markets, low levels of competition, and trade protection are the major source of this situation. Given these contrasting arguments, there could have also been the conflicting effect of market risk (*SDPCM*) in determining entry.

5.2.5. Entry Barriers

According to the limit-price model, economies of scale (*ES*) and capital requirements (*KR*) should be negatively related to entry.

Meanwhile, the effect of strategic entry deterrence behaviour, proxied by $CR4$, is difficult to predict a priori. Strategic behaviour might have been positively related to entry (i.e. it encouraged entry), for the reason that retaliatory behaviour is unlikely to occur when demand is growing, which was the situation for the period covered by this study.

However, as discussed earlier, there are models that predict that the probability of collusion is lower in a high demand situation (e.g. Rotemberg and Saloner 1986; Rotemberg and Woodford 1992). This implies that the effect of industry concentration can be expected to have been negative.

5.2.6. Foreign Ownership

The effect of foreign ownership (*FOR*) is also difficult to predict a priori. As noted, the economies of scale effect raised by high concentrations of foreign ownership suggests a negative relationship, but the signal of a profitable industry that the high concentration provides could also result in a positive relationship.

5.2.7. Export Orientation[5]

Export orientation (EXP) is expected to have strongly attracted entry. The reasoning is clear, and that is that higher export orientation provides higher expected profitability. Export orientation, however, could also imply a higher competitive threat from firms in the global economy, and this could in contrast lower the expected profitability. The effect of export orientation, therefore, could have also been negative.

5.2.8. Factor Intensity

Given the comparative advantage that Indonesia has, labour-intensive industries are predicted to encourage more entry than any other industry, particularly the capital-intensive industries.

6. Methodology

6.1. Statistical Framework

Equations (9) and (10) form the basic equations to be estimated. Before outlining the estimating equations, it is important to discuss several relevant issues.

First, the literature does not clearly indicate whether EX in the entry equation or EN in the exit equation should enter as current or lagged variables. Several studies, e.g. Austin and Rosenbaum (1991), Evans and Siegfried (1992) and Fotopoulus and Spence (1998), specified EX and EN as their current variables. In other words, EX and EN are assumed to be endogenous in entry and exit equations, respectively. Other studies, such as Sluewagen and Dehandschutter (1991) and Lay (2003), specified EX and EN as their lagged variables, treating them as weakly exogenous variables.[6] Because the literature is silent on which approach is more appropriate, this study experimented with both.

[5] The inclusion of foreign ownership and factor intensity as two determinants of entry were motivated and suggested by a participant in the workshop of this research project.

[6] In one of their specifications Shapiro and Khemani (1987) include the lagged exit in the entry equation but include the current entry in the exit equation, rendering equations (3) and (4) a recursive system model.

Secondly, it might not be reasonable to assume the effect of profitability and growth in the entry equation is exactly mirrored in the exit equation. Following previous studies, *ROOM* is assumed to have one lag structure in the entry equation while *PCM* and *GR* are assumed to have no lags in the exit equation.[7] This approach follows Shapiro and Khemani (1987), who assume that exit responds more quickly to profit and growth than entry. However, the approach does not mean the exit process is instantaneous. Shapiro and Khemani were aware that there are lags between the time when exit is considered and when it actually occurs. The assumption simply tries to capture the idea that entry is likely to be a better-prepared action than exit.

The third issue relates to the specification of entry and exit barriers. Certain types of barriers are likely to be omitted from the regression based on equations (9) and (10). For example, Geroski (1991) noted it is difficult to measure the control of incumbents over some strategic resources. Further, and as noted, specificity implied by sunk cost suggests many exit barriers are unlikely to be captured in the structural variables in the equations. To solve this problem, fixed effects – in the form of industry dummy variables – are introduced into equations (9) and (10) to capture the unobserved entry and exit barriers. This introduction is justified because entry and exit barriers tend to be constant over time, at least in the short and medium term.

This study assumes all structural variables are exogenous. To secure this assumption, lagged values are used instead of current ones.

Finally, as entry and exit are measured in relative terms (i.e. proportion), the dependent variables in theory and practice are bounded between zero and one. Therefore, it is reasonable to assume that the sample is not drawn from a normal distribution and this may lead to bias and inconsistent least square estimates. To solve this problem, logistic transformation on the dependent variables was carried out. With EN and EX (entry and exit rates) as the observed variables, the transformations are

$$EN' = \ln(EN/1-EN) \text{ and}$$
$$EX' = \ln(EX/1-EX),$$

[7] Rosenbaum and Lamort (1992) also adopt a similar approach.

where EN' and EX' are the logistic transformation of EN and EX, respectively. These transformations allow the dependent variables in the regression to be drawn from a normal distribution and the estimations by a least squares approach.

While useful, this transformation approach has two limitations (Wooldridge 2002, p.662). First, it cannot be used when EN and EX take the boundary values of either zero or one. As is commonly done in other cases, this study manipulated the boundary values by substituting the value zero with 0.1111 and value one with 0.9999. The data manipulation is a common approach adopted both in general empirical studies (Wooldridge, 2002) and studies on firm entry (e.g. Khemani and Shapiro 1986; Mata 1993).

The second limitation is that the parameters are difficult to interpret. According to Papke and Wooldridge (1996), further assumptions on the distribution of errors are needed to obtain the expected value of dependent variable conditional on the explanatory variables and, even with these assumptions, it is still non-trivial to obtain the expected value. Notwithstanding this limitation, this study proceeds with the transformation approach, because the focus here is on the change in the effect of the explanatory variables between two periods of time rather than on the magnitude of the effect.

The discussion has established two pairs of estimating entry and exit equations, specified as follows:

Model I:

$$\begin{aligned} EN'_{j,t} = {} & \alpha_1 PCM_{j,t-1} + \alpha_2 ROOM_{j,t-1} + \alpha_3 SDPCM_{j,t-1} + \alpha_4 ES_{j,t-1} + \alpha_5 KR_{j,t-1} + \\ & \alpha_6 CR4_{j,t-1} + \alpha_7 EXP_{j,t-1} + \alpha_8 IMP_{j,t-1} + \alpha_9 TARIFF_{j,t-1} + \\ & \alpha_{10} EX_{j,t-1} + \alpha_j + \mu_{j,t} \end{aligned} \tag{11}$$

$$\begin{aligned} EX'_{j,t} = {} & \beta_1 PCM_{j,t} + \beta_2 GR_{j,t} + \beta_3 ES_{j,t-1} + \beta_4 KR_{j,t-1} + \beta_5 CR4_{j,t-1} + \beta_6 EXP_{j,t-1} + \\ & \beta_7 IMP_{j,t-1} + \beta_8 TARIFF_{j,t-1} + \beta_9 EN_{j,t-1} + \beta_j + \varepsilon_{j,t} \end{aligned} \tag{12}$$

Model II:

$$\begin{aligned} EN'_{j,t} = {} & \alpha_1 PCM_{j,t-1} + \alpha_2 ROOM_{j,t-1} + \alpha_3 SDPCM_{j,t-1} + \alpha_4 ES_{j,t-1} + \alpha_5 KR_{j,t-1} + \\ & \alpha_6 CR4_{j,t-1} + \alpha_7 EXP_{j,t-1} + \alpha_8 IMP_{j,t-1} + \alpha_9 TARIFF_{j,t-1} + \\ & \alpha_{10} EX_{j,t} + \alpha_j + \mu_{j,t} \end{aligned} \tag{13}$$

$$EX'_{j,t} = \beta_1 PCM_{j,t} + \beta_2 GR_{j,t} + \beta_3 ES_{j,t-1} + \beta_4 KR_{j,t-1} + \beta_5 CR4_{j,t-1} + \beta_6 EXP_{j,t-1} + \beta_7 IMP_{j,t-1} + \beta_8 TARIFF_{j,t-1} + \beta_9 EN_{j,t} + \beta_j + \varepsilon_{j,t} \quad (14)$$

where, t = 1994, 1995, 1996
j = industry j
EN' = logistic transformation of the entry rate
EX' = logistic transformation of the exit rate
EN = the entry rate
EX = the exit rate
PCM = price-cost margin
$ROOM$ = industry room
GR = annual industry growth
$SDPCM$ = standard deviation of PCM
EOS = economies of scale
KR = capital requirement
$CR4$ = seller concentration
EXP = export intensity
IMP = import penetration
$TARIFF$ = trade protection
α_j, β_j = industry fixed effect of industry j

Model I and II are different in the way right-hand-side EX and EN are specified.

The equations in Model I were first considered as independent, assuming no interdependence between entry and exit, and estimated by OLS. Next, the equations were estimated by the SURE method to account for the interdependence. The SURE method is considered because it is able to take into account the non-zero contemporaneous correlation in the error terms between the two equations. The equations in Model II were estimated by the 2SLS method. This is because $EN_{j,t}$ and $EX_{j,t}$ can be thought to be determined simultaneously.

6.2. Measurement of Variables

6.2.1. Dependent Variables (Entry and Exit Rates)

The entry rates have been presented earlier. As for the exit rates, this study adopts two exit rate measures, in terms of number of plants, employment and value added, labelled as $EX1$, $EX2$, and $EX3$, respectively.

$EX1$ for industry j between t and $t-1$ is defined as

$$EX1_{j,t} = \frac{NXP_{j,t}}{NTP_{j,t-1}} \ ,$$

where: $NXP_{j,t}$ = total number of plants that exit industry *j* between *t* and $t-1$

$NTP_{j,t-1}$ = total number of plants in industry j in year $t-1$

EX2 for industry *j* between t and *t*-1 is defined as

$$EX2_{j,t} = \frac{EMPL\_EX_{j,t}}{EMPL\_T_{j,t-1}} \ ,$$

where: $EMPL\_EX_{j,t}$ = total employment of plants that exit industry between t and $t-1$

$EMPL\_T_{j,t-1}$ = total employment of plants in industry j in $t-1$

EX3 for industry *j* between t and *t*-1 is defined as

$$EX3_{j,t} = \frac{VA\_EX_{j,t}}{VA\_T_{j,t-1}} \ ,$$

where: $VA\_EX_{j,t}$ = total value added of plants that exit industry j between t and $t-1$

$VA\_T_{j,t-1}$ = total value added of plants in industry j in year $t-1$

6.2.2. Independent Variables

All of the variables are defined for industry j, which is defined at the four digit level.

- Price-cost margin (PCM)

PCM is defined as the ratio of gross profit to sales, and for industry *j*, it is defined as:

$$PCM_j = \frac{output_j - inputs_j - wages_j}{output_j}$$

Gross profit is computed as the value of output minus inputs and wages and salary. Included in inputs are raw material, fuel and electricity.

- Seller concentration ($CR4$) and Herfindahl Index (HHI) to proxy the extent of competition

  CR4 for industry *j* is defined as

$$CR4_j = \frac{\sum_{i=1}^{4} VA_i}{\sum_{i=1}^{n} VA_i}$$

  While *HHI* for industry *j* is defined as

$$HHI_j = \sum_i \left(\frac{VA_i}{\sum VA_i} \right)^2$$

where VA_i is the value added of plant i in industry j.

- Import penetration (IMP)

  IMP for industry j is defined as

$$IMP_j = \frac{M_j}{Q_j}$$

where Q_j and M_j are the domestic production and imports in industry j, respectively.

- Industry growth (GR)

GR is measured as the percentage change in real value added of industry j between t and $t-1$

$$GR = \frac{RVA_{j,t} - RVA_{j,t-1}}{RVA_{j,t-1}}$$

where *VA* is the value added of industry j. The industry value added is deflated by the wholesale price index (*WPI*) at the three digit ISIC level.

- Industry room (*ROOM*)

ROOM is measured as *GR* divided by *MES*. *MES* is defined as the average plant size accounting for 50 percent of industry output (Caves et al. 1975). Plant size is measured by total number of workers.

- Standard deviation of profitability (*SDPCM*)

SDPCM is measured by the standard deviation of *PCM* , defined at the three digit level of ISIC.

- Economies of scale (*ES*)

ES is defined following (Caves et al. 1975) as a compound variable using *MES* and cost-disadvantages ratio (*CDR*), that is

$$ES = (1 - CDR) * MES$$

CDR is defined as

$$CDR = \frac{(VA / L)^{\text{smallest}}}{(VA / L)^{\text{largest}}}$$

where $(VA/L)^{\text{smallest}}$ is the value added per labour for the smallest plants accounting for 50% of industry output and $(VA/L)^{\text{largest}}$ is the value added per labour for the largest plants accounting for the largest 50% of industry output.

- Capital requirement (*KR*)

KR is measured following Caves et al. (1980) as

$$KR = \frac{K}{Q} * MES$$

where K/Q is the ratio of capital to labour. In the absence of reliable capital stock estimates, K/Q is proxied by the ratio of energy expenditure to production labour. This proxy follows the approach taken by Globerman et al. (1994), which was motivated by some previous studies which show that capital and energy are complementary inputs in production. Thus,

$$KR = \frac{\text{energy expenditure}}{\text{L}^{\text{prod}}} * MES$$

where L^{prod} is the number of production workers.

- Export intensity (*EXP*)

  EXP is measured as the ratio of export to industry output.

$$EXP = \frac{\text{exports}}{\text{output}}$$

- Trade protection (*TARIFF*)

  This study uses the average nominal tariff rate to proxy *TARIFF*. The data for the tariff rate are derived from WITS database for the period of 1994-96.

7. Some Descriptive Analysis and Estimation Results

Before presenting and analysing the estimation results, it is useful to briefly present some descriptive analysis of the impact of tariff on some of the entry determinants.[8]

[8] The description is provided in the light of a comment made during the workshop of this research project.

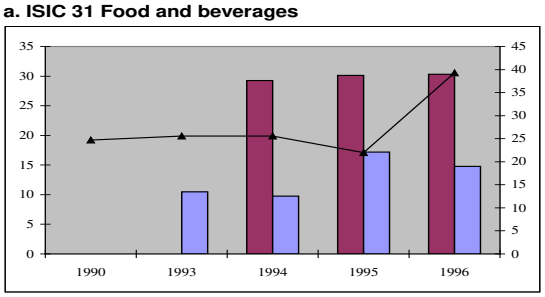
Here, based on the discussion in the theoretical background, we selected some of the determinant variables for the description, namely price-cost margin (*PCM*), industry concentration variables (*HHI*), and industry export share (*EXP*).

Consider, first, the impact of the declining tariff rate on price-cost margin, of which the picture is presented in Figure 3 for the entry rate in terms of number of plants. While the Figure does not seem to show any obvious pattern, the decline of tariff rate over the period 1990-96 seems to have increased price-cost margin in the non-metallic and basic metal industry (i.e., ISIC 36 and 37, respectively) and decreased the price-cost margin in textile-and-garments, paper products, chemical products, and transport-and-machinery equipments (i.e., ISIC 32, 34, 35, and 38, respectively).

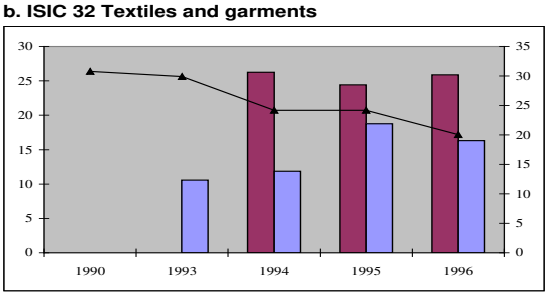
The decline in price-cost margin, along with the declining trend in the tariff rate, indicates an increase in the extent of competition from a more open economy. As for the increase in the price-cost margin, however, it suggests two scenarios. Either there is still a substantial market opportunity that had not been explored until the industry experienced the decline in the tariff rate, or some firms in the industries engaged in some collusive behaviour which could be triggered by more open industries. The pictures based on entry rate in terms of employment and output, which are not shown here, also deliver the same message, and in fact show very similar pictures across the industry groups.

Figure 3. Entry Rate (in terms of the Number of Plants) and Price-cost Margin (*PCM*) in the Indonesian Manufacturing and Nominal Tariff Rate, by Broad Industry Group, 1993-96

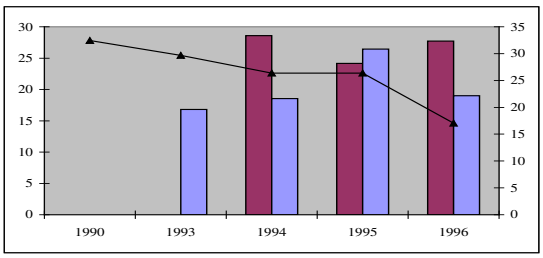
a. ISIC 31 Food and beverages



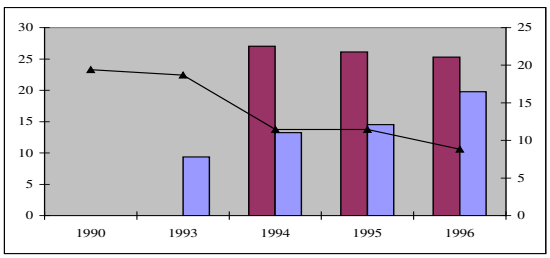
b. ISIC 32 Textiles and garments



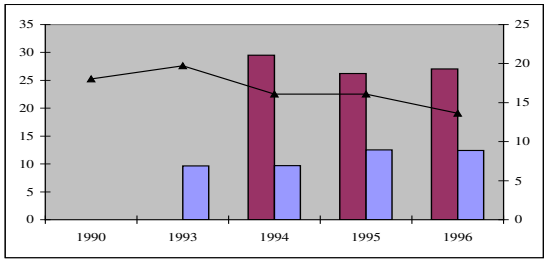
c. ISIC 33 Wood products



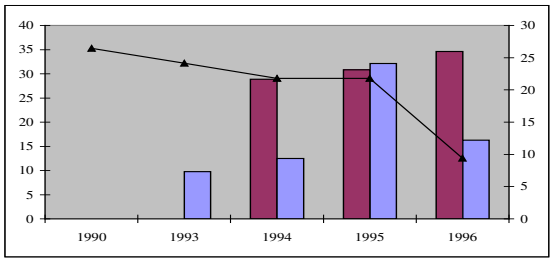
d. ISIC 34 Paper products



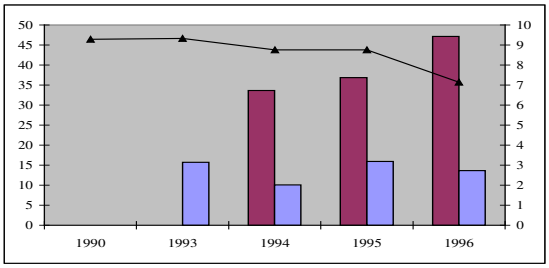
e. ISIC 35 Chemical, rubber, and plastics



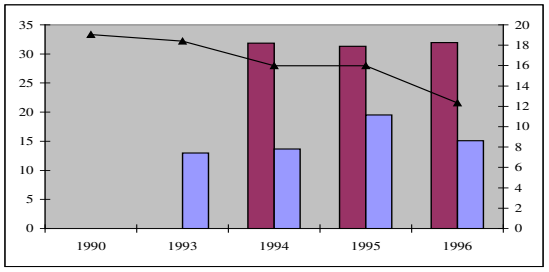
f. ISIC 36 Non-metallic minerals



g. ISIC 37 Basic metal



h. ISIC 38 Machinery and transport equipment



Legend:

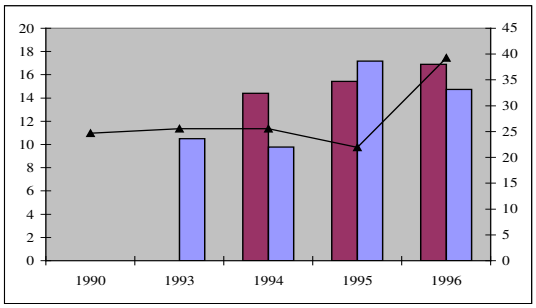
: PCM (%, simple average)
: Entry Rate (%, in terms of the number of plants)
: Nominal Tariff Rate (%, simple average)
X-axis : Year
Y_1-axis (left) : Entry Rate, PCM
Y_2-axis (right) : Nominal Tariff Rate

Turning to the impact of the declining tariff rate on the seller concentration, as noted in Figure 4 for the *HHI* measure of the concentration and entry rate in terms of number of plants, again there is a mixed picture and no clear pattern for the impact. The Herfindahl Indexes for the food-and-beverage, basic metals, and transport-and-machinery equipment industries (i.e., ISIC 31, 37, and 38) show an increase in the Index over the period 1994-96. This is in contrast to the decline in the Index for the textile-and-garments, paper products, non-metallic minerals, and transport-and-machinery equipment industries. At the experimental stage, some graphs for CR4 were also derived and show similar results, although they were not as robust as those produced by the Herfindahl Index.

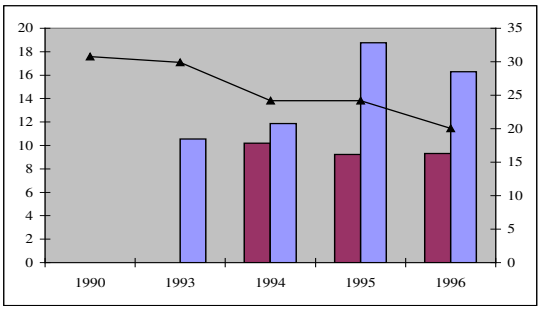
Figure 4 gives the message that for industries experiencing an increase in seller concentration over the period – and at the same time looking at the trend in the tariff rate – there is a possibility that the extent of collusive behaviour, or the motivation for it, in these industries could have been wiped out by the more open industries, indicated by the declining trend of the tariff rate. Using the same rationale, it is suggested that the extent of or motivation for collusive behaviour could have strengthened in some industries that experienced an increasing trend in seller concentration. The two contrasting possibilities are consistent with the previous graph on the impact of the declining tariff rate on price-cost margin. Although they are not shown here, the inference drawn from the picture of the impact when using entry rate in terms of employment and output is the same.

Figure 4. Entry Rate (in Terms of the Number of Plants) and Herfindahl Index (*HHI*) in the Indonesian Manufacturing and Nominal Tariff Rate, by Broad Industry Group, 1993-96

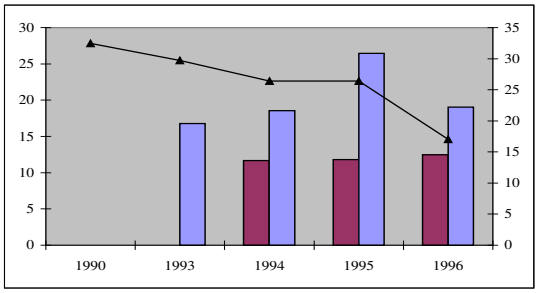
a. ISIC 31 Food and beverages



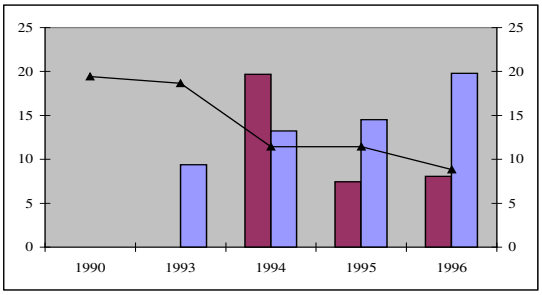
b. ISIC 32 Textiles and garments



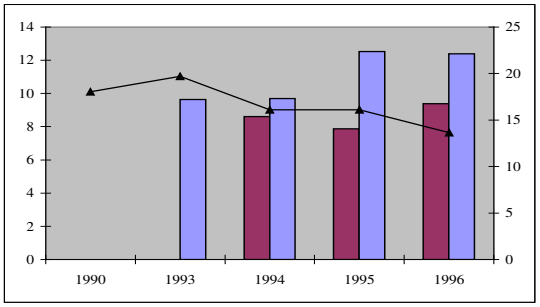
c. ISIC 33 Wood products



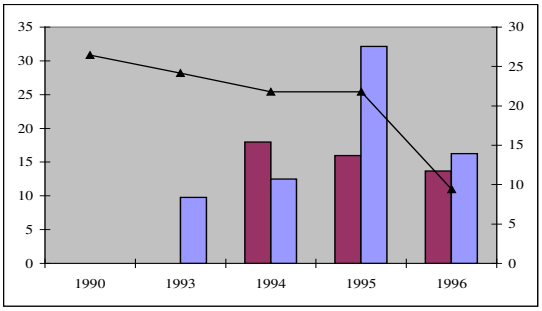
d. ISIC 34 Paper products



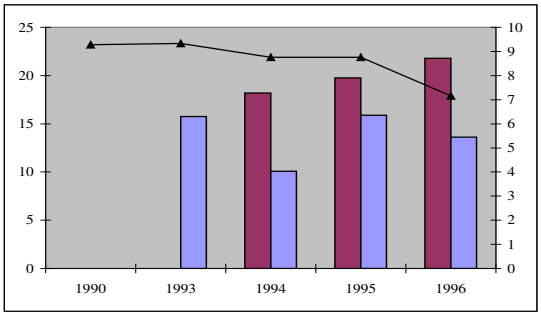
e. ISIC 35 Chemical, rubber, and plastics



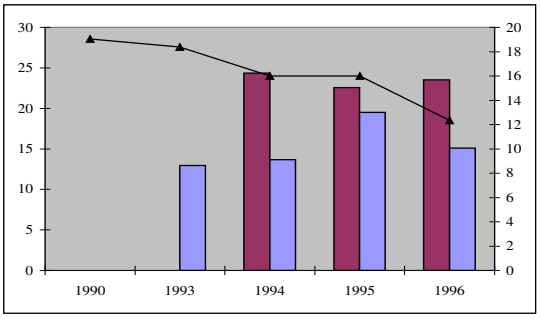
f. ISIC 36 Non-metallic minerals



g. ISIC 37 Basic metal



h. ISIC 38 Machinery and transport equipment



Legend:

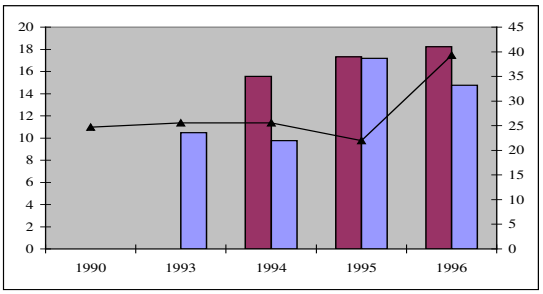
: HHI (simple average)
: Entry Rate (%, in terms of the number of plants)
: Nominal Tariff Rate (%, simple average)
X-axis : Year
Y_1-axis (left) : Entry Rate, HHI
Y_2-axis (right) : Nominal Tariff Rate

Figure 5 provides a picture of the impact of the declining tariff rate on industries' export share. Unlike the previous two tables, there is a clearer picture of the impact. In particular, the declining tariff rate is suggested to have increased the export share of some industries, namely textile-and-garments, wood products, chemical products, non-metallic mineral products, and transport-and-machinery equipment. The impact is not so clear in the case of the paper and basic metal industries.

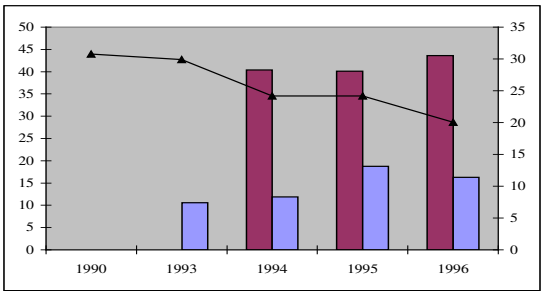
This rather solid finding suggests that trade liberalisation benefited some sectors substantially. While encouraging, in terms of entry, this does not necessarily mean that increased exports could immediately result in an increase of the entry rate, although it is worth noting that the pattern in the entry rate over this short time period seems to follow the trend in industry export share. In short, here the key point is that the positive impact of the declining tariff rate on an industry's export share is not suggested to have fully 'transferred' to an equally higher entry rate. Thus, the increase in the export share should partly come from some firms that have already established themselves in the industry (i.e., the incumbents).

Figure 5. Entry Rate (in Terms of the Number of Plants) and Industry Export Share (*EXP*) in the Indonesian Manufacturing and Nominal Tariff Rate, by Broad Industry Group, 1993-96

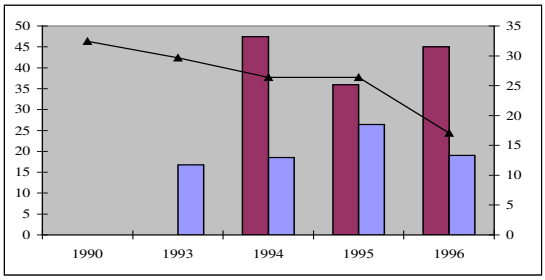
a. ISIC 31 Food and beverages



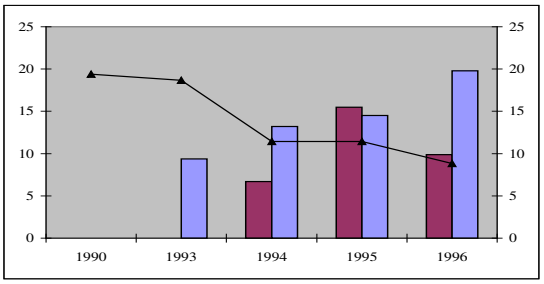
b. ISIC 32 Textiles and garments



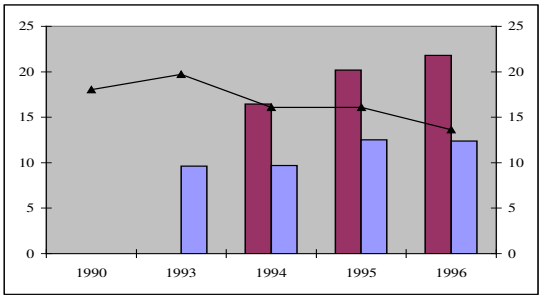
c. ISIC 33 Wood products



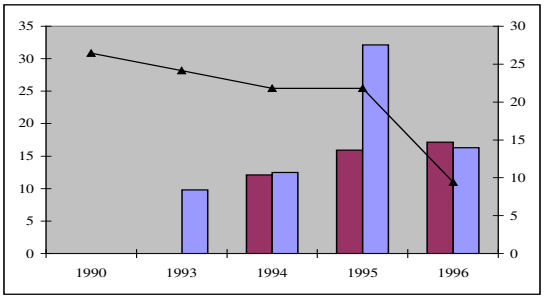
d. ISIC 34 Paper products



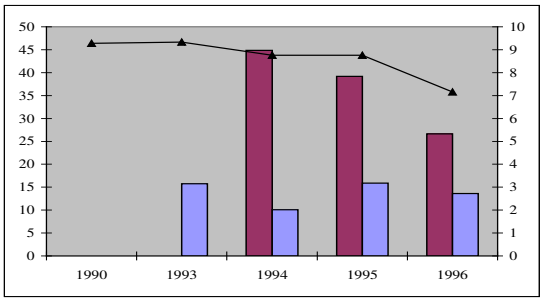
e. ISIC 35 Chemical, rubber, and plastics



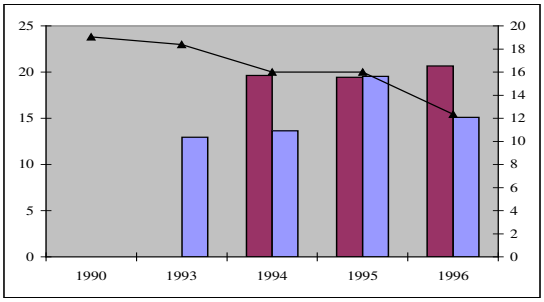
f. ISIC 36 Non-metallic minerals



g. ISIC 37 Basic metal



h. ISIC 38 Machinery and transport equipment



Legend:

: EXP (%, simple average)
: Entry Rate (%, in terms of number of plants)
: Nominal Tariff Rate (%, simple average)
X-axis : Year
Y_1-axis (left) : Entry Rate, EXP
Y_2-axis (right) : Nominal Tariff Rate

7.1. The Estimation Results

Equations in Models I and II are estimated using entry and exit rates in terms of number of plants and employment (*EN1, EX1,* $EN2$, $EX2$, *EN3*, and *EX3*). Model II was dropped from the analysis because the estimation results of model II using the 2SLS method rendered almost all the variables in the equations insignificant. Although this is obviously not a good result, several studies have obtained similar results (e.g. Shapiro and Khemani 1987; Austin and Rosenbaum 1991; Fotopoulus and Spence 1998).

Several industries were identified as outliers using the Hadi (1992) method. This study controls the outliers by removing them from the sample. The usual approach of introducing dummy variables that identifies them was not adopted because it results in a perfect collinearity with the fixed industry effects (the industry dummy variables).

Table 1 presents the estimation results for Model I using the SURE method, with $EN1'$ and $EX1'$ as the dependent variable.[9] Breusch-Pagan Lagrange Multiplier (LM) statistics are employed to test whether the error terms of the entry and exit equation in Model I are contemporaneously correlated. The null hypothesis of equal error terms in the entry and exit equation is rejected at the 1 per cent significance level.[10] Therefore, it can be concluded that entry and exit in the period were correlated. Accordingly, the results obtained by the SURE method provide the basis for the analysis (Table 7.4), and the OLS results are not reported here. The coefficients produced by the SURE method are similar to those obtained by OLS and have the same signs. However, the t-statistics improve in some estimated coefficients, which indicates the improvement in efficiency and justifies the reference to the SURE results.

[9] Three alternative specifications of entry were experimented with. The first was as in equations (11) or (13), the second was where *ROOM* was replaced by *GR* and the third was where *ROOM* was retained but *ES* was dropped. The specifications are motivated by the way *ROOM* is generated, which raises possible colinearity with *ES*. As presented, *ES* is measured as *ES*=(1-*CDR*)**MES*, where *CDR* is the cost disadvantage ratio. The experiment shows that the results did not differ greatly from one specification to the other. But because the first specification performed better in terms of F-statistics, it was chosen as the basis for the analysis.

[10] The degree of freedom for the LM tests is one.

Table 1. The Determinants of Entry and Exit, 1994-96: Regression Results of Model I

Dependent variable	Method: SURE	
	$EN1'_{j,t}$ (1)	$EX1'_{j,t}$ (2)
$PCM_{j,t-1}$	0.638	
	(1.13)	
$SDPCM_{j,t-1}$	0.002	
	(0.00)	
$PCM_{i,t}$		-0.581
		(1.21)
$ROOM_{j,t-1}$	-0.139	
	(0.38)	
$GR_{j,t}$		0.055
		(0.75)
$ES_{i,t-1}$ [a)]	-0.005	-0.036
	(0.18)	(1.36)
$KR_{j,t-1}$ [a)]	0.0185	2.811
	(0.09)	(1.50)
$CR4_{j,t-1}$	0.251	0.656
	(0.94)	(2.81)**
$FOR_{j,t-1}$	-0.560	-0.283
	(1.73)+	(0.96)
$EXP_{j,t-1}$	0.502	0.666
	(1.95)+	(2.76)**
$IMP_{j,t-1}$	-0.018	-0.012
	(1.88)+	(1.44)
$TARIFF_{i,t-1}$	0.014	0.002
	(1.90)+	(0.21)
$EN1_{j,t-1}$		1.058
		(2.42)*
$EX1_{j,t-1}$	2.888	
	(2.66)**	
DUMMY LABOUR INTENSIVE INDUSTRIES	0.099	0.064
	(1.53)	(0.77)
DUMMY RESOURCE-BASED, LABOUR INTENSIVE INDUSTRIES	0.002	0.163
	(0.01)	(0.92)
DUMMY FOOTLOOSE, CAPITAL INTENSIVE INDUSTRIES	0.061	0.004
	(1.86)+	(0.08)
YEAR DUMMY 1995	-2.499	0.000
	(9.64)**	(.)
YEAR DUMMY 1996	-2.654	0.336
	(10.90)**	(3.49)**
Constant	0.000	-3.394
	(.)	(10.28)**
Observations	165	165
R-squared	0.26	0.30

Note: 1) t-statistics in parentheses

2) Significance level: ** significant at 1%; * significant at 5%; + significant at 10%

a) The coefficients were multiplied by 103 to improve presentation.

This study employs an analysis based on the fixed-effect panel estimation approach.[11] This approach assures that a large portion of the unobserved variables is taken into account and hence we are more confident that the results are unbiased, although it perhaps does not give satisfactory results in terms of statistical significance. Adopting this approach is particularly important because large variables representing entry and exit barriers can be unobserved or industry specific (Geroski 1991).

The results presented in Table 1 include all entry-barrier variables in one regression model. At the experiment stage, there were three other sets of estimations which were done by including the entry-barrier variables one-by-one.[12] The results of these experiments did not give substantially different results compared to those presented in Table 1, and because the F statistics of the estimations in Table 1 are substantially higher than those drawn from the experimental estimations, the experimental estimations were not used for the discussion. Partial correlations between the dependent and all independent variables are presented in Appendix 1.

7.2. The Structural Determinants of Entry

7.2.1. Entry

Of the trade-related variables, $TARIFF_{t-1}$ is positively related to entry and is statistically significant. Therefore, trade protection seems to have attracted entry in this period. However, this impact cannot confidently be applied across all industries, because the estimated coefficient is only marginally statistically significant (i.e., at the 10 per cent level). This marginal importance is emphasised by a rather low correlation between the dependent variable and $TARIFF_{t-1}$, which is 0.29 (see Appendix 1). Meanwhile, the coefficient of IMP_{t-1} shows a negative sign but is only moderately significant (i.e. significant at the 10 per cent level). Thus, a higher extent of competition from imports seems to have discouraged entry during the period under the

[11] This is different from other studies (e.g. Fotopoulus and Spence 1998) who based their analysis on results without inclusion of fixed industry effects.

[12] These experiments respond to the comment made by a participant of the workshop of this research project.

study. This result is also consistent with an earlier finding by Anagnostaki and Louri (1995) that import penetration is negatively related to entry and exit.

None of the entry barrier variables appears to explain entry. The coefficient of all of these variables is statistically insignificant. Moreover, while not significant, the coefficients are all positive, which contradicts the theoretical prediction.

While it does not seem statistically to explain entry, it is worth discussing the result of $CR4_{t-1}$ as an entry barrier variable. Its positive coefficient implies that seller concentration induced, rather than impeded, entry. A possible explanation is that this finding supports the argument that concentrated industries provide a higher survival chance once entry has occurred. This comment is further supported by the coefficient of KR_{t-1} which also shows a positive correlation, although, again, it is not statistically significant.

The coefficient of FOR_{t-1} is negative, and statistically significant at the 10 per cent level. Therefore, a high concentration of foreign ownership in an industry is expected to reduce the extent of entry. This finding thus provides some support for the argument of the superiority of foreign firms in terms of economies of scale, which provides some insulation of these firms from potential entrants, through the ability of the firms to charge a competitive level of industry price by exercising their economies of scale.

The result of EXP_{t-1} is encouraging in terms of entry. The coefficient of EXP_{t-1} is positive and statistically significantly, although only at the 10 per cent level. This finding reflects the descriptive analysis presented earlier on the rather clear positive impact of the declining tariff rate on industry export share, and to some extent on the trend of firm entry. Supporting this even further, the partial correlation of this variable to the dependent variable is small, that is, 0.23 (see Appendix 1).

The results on the dummy variables for industry groups, by their factor intensity, do not give satisfactory results. The extent of entry in the labour-intensive industry group does not seem to have been high, compared to that in the resource-based capital-intensive industry group which acts as the base-dummy variable.

7.2.2. The Determinants of the Interdependence between Entry and Exit

This section seeks evidence concerning the validity of the displacement-replacement effect and the symmetry hypothesis implied by entry and exit determinants.

The results provide some support for the symmetry hypothesis. All entry barrier variables (ES_{t-1}, KR_{t-1} and $CR4_{t-1}$) show the same sign in both the entry and exit equations. The estimated coefficients are similar across equations, indicating a similar effect from these variables in inducing or deterring entry and exit.

It is worth noting that the process involved with the symmetry hypothesis is unlikely to be the same as the one originally hypothesised by Caves and Porter (1976). Instead of a discouraging effect, entry barriers seem to encourage both entry and exit at the same time. Two of the entry barriers variables, $CR4_{t-1}$ and KR_{t-1}, show positive signs in both the entry and exit equations.

It is worth mentioning here the large impact of seller concentration on exit, indicated by the strong estimate of the $CR4_{t-1}$ estimate. This suggests an existence of collusive behaviour that warrants some profitable profit margin, based on the theory postulated by limit price model.

Some support for the symmetry hypothesis is also displayed by the other variables. IMP_{t-1} appears to moderately prevent both entry and exit. As argued by Fotopoulus and Spence (1997), one reason might be that expansion in markets with high import penetration is not enough to ensure new plant creation or capacity expansion at the minimum efficient scale while, at the same time, lack of expansion in the domestic market tends to sustain collusive behaviour among incumbents. EXP_{t-1} is positively related to entry and exit. This confirms earlier findings (e.g. Anagnostaki and Louri 1995; Sleuwagen and Dehandschutter 1991) that the extent of the external market encourages both entry and exit in domestic industries. While it seems to contradict a stylised fact from the micro exporting literature, which suggests that exit should have been lower in exporting industries – because firms in these industries tend to be more efficient than those in other industries –, the positive relationship on exit might occur if there was a co-existence of efficient and inefficient firms in the exporting industries (Anagnostaki and Louri, 1995). According to Anagnostaki and Louri, inefficient firms

are likely to be displaced by more efficient firms entering the industries, which are most likely be attracted by the profit opportunity provided by export markets.

Despite these findings, the results do not strongly validate the symmetry hypothesis. EXP_{t-1} is only statistically significant in the exit equation.

The results provide some indications on displacement and replacement entry. Both $EN1_{t-1}$ and $EX1_{t-1}$ in the exit and entry equation respectively, are positive. Moreover, the displacement effect is suggested to have been strong, indicated by a very high level of statistical significance of the $EN1_{t-1}$ and $EX1_{t-1}$ coefficient. This inference is also supported by a strong correlation of these variables to their relevant dependent variables, as written in Appendix 1 (i.e., 0.35 and 0.36 for $EN1_{t-1}$ and $EX1_{t-1}$, respectively). The estimated coefficient of $EX1_{t-1}$, which is about 2, suggests a rather large effect of replacement under a one year adjustment structure.

7.2.3. Estimation Results using the Alternative Entry and Exit Measure

In the preceding analysis, entry and exit rates are measured in terms of the number of plants. The equations in Model I are now re-estimated using entry and exit rates measured in terms of employment ($EN2'$ and $EX2'$) and output ($EN3'$ and $EX3'$) to provide robustness for the earlier findings. The results are presented in Table 2 and 3, for the entry-exit rate in terms of employment and output, respectively. The equations are estimated using the SURE method, as the LM tests conclude that the error terms in the entry and exit equations are correlated. In terms of model fit, the results are generally satisfactory. In the equations presented, the R^2s' do not deviate much from the ones in $EN1'$ and $EX1'$ equations and the F tests are significant at the 1 per cent or better level.

Table 2. The Determinants of Entry and Exit, 1993-96: Regression Results of Model I with EN2' and EX2' as the Dependent Variable

Dependent variable	Method: SURE	
	$EN2'_{j,t}$ (1)	$EX2'_{j,t}$ (2)
$PCM_{j,t-1}$	-0.473	
	(0.56)	
$SDPCM_{j,t-1}$	-0.571	
	(1.27)	
$PCM_{j,t}$		-1.004
		(1.19)
$ROOM_{j,t-1}$	0.139	
	(0.26)	
$GR_{j,t}$		0.116
		(0.90)
$ES_{j,t-1}$ a)	0.032	-0.041
	(0.73)	(0.87)
$KR_{j,t-1}$ a)	-0.624	-0.023
	(2.03)*	(0.07)
$CR4_{i,t-1}$	-0.216	0.271
	(0.54)	(0.65)
$FOR_{i,t-1}$	-0.278	0.097
	(0.57)	(0.18)
$EXP_{j,t-1}$	-0.354	0.782
	(0.92)	(1.83)+
$IMP_{j,t-1}$	-0.028	-0.025
	(2.04)*	(1.65)+
$TARIFF_{j,t-1}$	0.011	0.002
	(0.95)	(0.12)
$EN2_{j,t-1}$		1.525
		(2.00)*
$EX2_{i,t-1}$	5.681	
	(3.56)**	
DUMMY LABOUR INTENSIVE INDUSTRIES	0.004	0.150
	(0.04)	(1.02)
DUMMY RESOURCE-BASED, LABOUR INTENSIVE INDUSTRIES	0.103	0.208
	(0.57)	(0.67)
DUMMY FOOTLOOSE, CAPITAL INTENSIVE INDUSTRIES	0.039	0.069
	(0.79)	(0.88)
YEAR DUMMY 1995	-2.787	-4.153
	(7.20)**	(7.17)**
YEAR DUMMY 1996	-2.914	-3.964
	(8.01)**	(7.12)**
Constant	0.000	0.000
	(.)	(.)
Observations	165	165
R-squared	0.22	0.19

Note: 1) t-statistics in parentheses

2) Significance level: ** significant at 1%; * significant at 5%; + significant at 10%

a) The coefficients were multiplied by 10^3 to improve presentation.

Table 3. The Determinants of Entry and Exit, 1993-96: Regression Results of Model I with EN3' and EX3' as the Dependent Variable

Dependent Variable	Method: SURE	
	$EN3'_{j,t}$ (1)	$EX3'_{j,t}$ (2)
$PCM_{j,t-1}$	-2.926	
	(2.19)*	
$SDPCM_{j,t-1}$	-0.007	
	(0.01)	
$PCM_{j,t}$		-2.915
		(2.28)*
$ROOM_{j,t-1}$	-1.65	
	(1.92)+	
$GR_{j,t}$		0.328
		(1.38)
$ES_{j,t-1}$ a)	-0.034	-0.041
	(0.48)	(0.57)
$KR_{j,t-1}$ a)	0.202	0.091
	(0.41)	(0.18)
$CR4_{j,t-1}$	-1.938	-0.393
	(3.04)**	(0.63)
$FOR_{j,t-1}$	0.339	-0.739
	(0.44)	(0.93)
$EXP_{j,t-1}$	-0.243	0.946
	(0.40)	(1.45)
$IMP_{j,t-1}$	-0.036	-0.033
	(1.63)	(1.44)
$TARIFF_{i,t-1}$	-0.006	0.018
	(0.35)	(0.83)
$EN3_{j,t-1}$		2.411
		(2.09)*
$EX3_{j,t-1}$	4.125	
	(1.63)	
DUMMY LABOUR INTENSIVE INDUSTRIES	0.055	0.075
	(0.36)	(0.34)
DUMMY RESOURCE-BASED, LABOUR INTENSIVE INDUSTRIES	0.481	-0.160
	(1.66)+	(0.34)
DUMMY FOOTLOOSE, CAPITAL INTENSIVE INDUSTRIES	0.124	0.079
	(1.60)	(0.66)
YEAR DUMMY 1995	-1.761	0.000
	(2.86)**	(.)
YEAR DUMMY 1996	-1.960	0.141
	(3.39)**	(0.55)
Constant	0.000	-4.183
	(.)	(4.78)**
Observations	164	164
R-squared	0.18	0.23

Note: 1) t-statistics in parentheses

2) Significance level: ** significant at 1%; * significant at 5%; + significant at 10%

a) The coefficients were multiplied by 10^3 to improve presentation.

In general, some results from the estimations using the alternative entry-exit measures are different from the previous results, and hence one could claim that the earlier results are not really robust. However, and as noted earlier, the results using entry rate in terms of number of plants (i.e., *EN1* and *EX1*) should be given more weight for the basis of analysis. This is theoretically justified since measures of market structure, which is one of the key determinants of entry, often stress the significance of the number of firms (Baldwin 1998, p.12).

Nonetheless, it is useful to mention the key differences between the previous results and the results presented in Tables 2 and 3.

Consider, first, the results of using the entry-exit rate in terms of employment. The coefficient of KR_{t-1} is negative and very statistically significant (i.e., at the 1 % level). This suggests that the initially required capital, which determines other aspects of firm size at entry, seems to have been material in determining entry in terms of employment. The other difference is that the coefficient of EXP_{t-1} is very disappointing, as is FOR_{t-1}. In particular, the coefficient of EXP_{t-1} is negative, which contradicts the earlier finding. But, more importantly, the coefficient of these two variables is statistically insignificant, which suggest that foreign ownership and export share does not seem to have attracted entry at all in terms of employment.

However, there are at least a few similar findings. First, the coefficients of $TARIFF_{t-1}$ and FOR_{t-1} are in accordance with the results of using the entry-exit variable measured by the number of plants. But these coefficients are statistically insignificant. Secondly, the same finding is also shown for the displacement and replacement effect. Moreover, the results based on employment entry-exit suggest that the replacement effect is very strong and large, since the coefficient of $EX2_{t-1}$ in the entry equation is very large, as well as highly statistically significant.

Turning to the estimation results based on entry-exit in terms of output, the first difference is that there seems to have been a strong displacement effect, but very weak replacement effect, since the latter is not statistically significant. $CR4_{t-1}$ in the entry equation now has a negative coefficient and is highly statistically significant. This indicates that much of the entry comprises many small firms in terms of output.

Meanwhile, EXP_{t-1} and FOR_{t-1} do not seem to have attracted entry when the entry is measured in terms of output. The t-statistics are very low, implying very low statistical confidence for the relationship. A disappointing result also applies to the key variables of the econometric exercise, which are the $TARIFF_{t-1}$ and IMP_{t-1}. The most unsatisfactory result is for the coefficient of $TARIFF_{t-1}$, which is statistically insignificant.

8. Summary and Discussion

This study examines the impact of major trade and investment reforms that took place in the 1980s and 1990s on the extent of plant entry in Indonesian manufacturing. The descriptive picture does not give a clear indication of the impact. Specifically, while for some industry groups the generally declining pattern of trade protection seems to have been followed by some increase in the extent of plant entry over the period covered by this study, which is 1993-96, this does not seem to have been the case for other industry groups. Industries that produce textile and garments, wood products, and paper products, for example, are those which recorded some increase in the plant entry rates, while the industries that produce machinery and transport equipment are those which evidently experienced lower plant entry rate over the time.

An attempt to further assess the importance of the reforms with an econometric exercise somewhat helps the study to provide a general hypothesis on the impact of trade and investment liberalisation. In particular, recalling the estimated coefficient of *TARIFF*, there is stronger guidance on the impact of the trade and investment liberalisation on the extent of firm entry in Indonesian manufacturing. As noted, the descriptive analysis earlier in this study was not able to clearly define the direction of the impact (i.e., either positive or negative). The results suggest that the trade and investment liberalisation occurring between the mid 1980s and the mid 1990s tended to deter entry. Based on the theory, this further indicates that the industry became more competitive, in terms of lower motivation to collude, although this comes with a lower profit margin. This message is consistent with the results that come from the import-

penetration ratio which suggests a negative relationship between increased competition from import, and firm entry.

Why was it that a more liberalised trade and investment regime did not lead to higher plant entry? As noted, this tends to conflict a conventional belief that the impact of such a regime would be positive. While clearly more research needs to be done, there are at least possible explanations for this, which may have been specific only to the case of Indonesia, at least during the period covered by this study. It could be the case that there was still a quite high level of trade protection during the period. The source of this high protection level is likely to have come from NTBs, owing to the fact that the nominal tariff rate declined substantially during the early 1990s. In fact, as reviewed, there were still some NTBs that were implemented during the period, despite the major trade reforms occurring at the same time. Moreover, as also reviewed, there were also some regulations that preserved a protective industrial policy.

This explanation thus implies that the Indonesian experience does not necessary conflict with the common prediction of the positive impact of trade and investment liberalisation; that is, some protectionist policies and measures that still existed at that time caused the (predicted) positive impact of the liberalisation not to be fully realised.

The explanation is also consistent with the finding from the estimation in regards to the interdependence between entry and exit. As presented above, displacement entry does not seem to have been as large as the extent of replacement entry. This implies that some inefficient plants were still able operate. At the same time, it also suggests that the decline in tariff protection at that time was perhaps not able to induce the level of competitive pressure that brings about strong competition between firms. Indeed, the revealed positive relationship between industry concentration and the entry level support this argument. This itself suggests that non-competitive behaviour, such as collusive action, tended to exist.

Appendix 1. Correlation Matrix

	$EN1'_{j,t}$	$EX1'_{j,t}$	$EN2'_{j,t}$	$EX2'_{j,t}$	$EN3'_{j,t}$	$EX3'_{j,t}$	$PCM_{j,t-1}$	$ROOM_{j,t-1}$	$SDPCM_{j,t-1}$	$ES_{j,t-1}$	$KR_{j,t-1}$	$CR4_{j,t-1}$	$FOR_{j,t-1}$	$EXP_{j,t-1}$	$IMP_{j,t-1}$	$TARIFF_{j,t-1}$	$EX1_{j,t-1}$	$EN1_{j,t-1}$	$EX2_{j,t-1}$	$EN2_{j,t-1}$	$EX3_{j,t-1}$	$EN3_{j,t-1}$	DUMMY LABOUR INTENSIVE IND.	DUMMY RESOURCE-BASED, LAB. INT. IND.	DUMMY FOOTLOOSE, CAPITAL INT. IND.
$EN1'_{j,t}$	1.00																								
$EX1'_{j,t}$	0.26	1.00																							
$EN2'_{j,t}$	0.68	0.18	1.00																						
$EX2'_{j,t}$	0.33	0.73	0.40	1.00																					
$EN3'_{j,t}$	0.39	0.11	0.75	0.33	1.00																				
$EX3'_{j,t}$	0.28	0.55	0.36	0.81	0.36	1.00																			
$PCM_{j,t-1}$	0.11	-0.07	-0.03	-0.07	-0.19	-0.22	1.00																		
$ROOM_{j,t-1}$	-0.06	0.00	0.01	0.02	-0.15	0.10	-0.03	1.00																	
$SDPCM_{j,t-1}$	0.02	0.08	-0.11	-0.02	-0.05	-0.03	0.13	0.10	1.00																
$ES_{j,t-1}$	-0.04	-0.05	-0.04	-0.09	0.01	-0.02	-0.19	-0.04	0.01	1.00															
$KR_{j,t-1}$	0.00	0.10	-0.16	-0.08	-0.03	-0.06	-0.04	-0.09	0.00	0.53	1.00														
$CR4_{j,t-1}$	0.12	0.21	0.02	0.09	-0.22	-0.04	0.19	0.14	-0.05	-0.06	0.15	1.00													
$FOR_{j,t-1}$	0.04	0.04	-0.02	0.11	-0.12	-0.04	0.30	0.00	0.00	-0.13	-0.15	0.40	1.00												
$EXP_{j,t-1}$	0.23	0.26	-0.01	0.23	0.03	0.25	-0.13	-0.10	0.07	-0.04	-0.01	-0.14	0.20	1.00											
$IMP_{j,t-1}$	-0.22	-0.10	-0.20	-0.13	-0.10	-0.12	-0.07	0.06	-0.02	0.01	0.06	-0.11	-0.09	-0.10	1.00										
$TARIFF_{j,t-1}$	0.29	0.09	0.11	0.11	-0.01	0.19	0.02	0.01	-0.02	-0.03	-0.02	-0.04	0.10	0.44	-0.19	1.00									
$EX1_{j,t-1}$	0.36	0.27	0.34	0.30	0.09	0.27	0.08	0.08	-0.02	-0.11	0.02	0.32	0.07	0.16	-0.12	0.20	1.00								
$EN1_{j,t-1}$	0.41	0.35	0.22	0.29	0.01	0.22	0.05	0.25	-0.03	-0.06	-0.07	0.13	0.07	0.23	0.05	0.05	0.20	1.00							
$EX2_{j,t-1}$	0.15	0.11	0.25	0.18	0.04	0.19	-0.02	0.22	-0.09	-0.10	-0.05	0.21	0.01	0.06	-0.05	0.16	0.75	0.10	1.00						
$EN2_{j,t-1}$	0.29	0.21	0.39	0.32	0.20	0.29	-0.07	0.43	0.02	0.03	-0.10	0.02	-0.04	0.01	0.02	0.00	0.14	0.67	0.13	1.00					
$EX3_{j,t-1}$	0.03	0.09	0.23	0.18	0.14	0.21	-0.05	0.24	-0.08	-0.07	-0.08	0.12	0.02	0.03	0.05	0.07	0.54	0.19	0.77	0.21	1.00				
$EN3_{j,t-1}$	0.06	0.01	0.17	0.16	0.14	0.19	-0.09	0.43	0.04	-0.02	-0.13	-0.06	-0.05	0.01	-0.02	-0.09	-0.01	0.29	0.07	0.58	0.10	1.00			
DUMMY LABOUR INTENSIVE IND.	0.12	0.11	-0.03	0.16	-0.06	0.12	-0.01	-0.01	0.04	0.00	-0.10	0.08	0.31	0.24	-0.02	0.17	0.06	0.11	0.07	0.00	0.02	-0.06	1.00		
DUMMY RESOURCE-BASED, LAB. INT. IND.	-0.08	0.06	0.03	-0.01	0.13	0.01	-0.12	0.05	-0.07	-0.04	0.07	-0.20	-0.36	-0.08	0.00	-0.02	-0.08	-0.10	-0.07	0.04	-0.12	0.12	-0.34	1.00	
DUMMY FOOTLOOSE, CAPITAL INT. IND.	0.08	-0.07	0.11	0.05	0.03	0.06	0.19	0.03	-0.02	0.06	-0.09	0.23	0.15	-0.23	0.02	-0.21	0.10	0.06	0.07	0.03	0.10	0.04	-0.21	-0.28	1.00

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