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Surviving Trade Liberalization in Philippine Manufacturing

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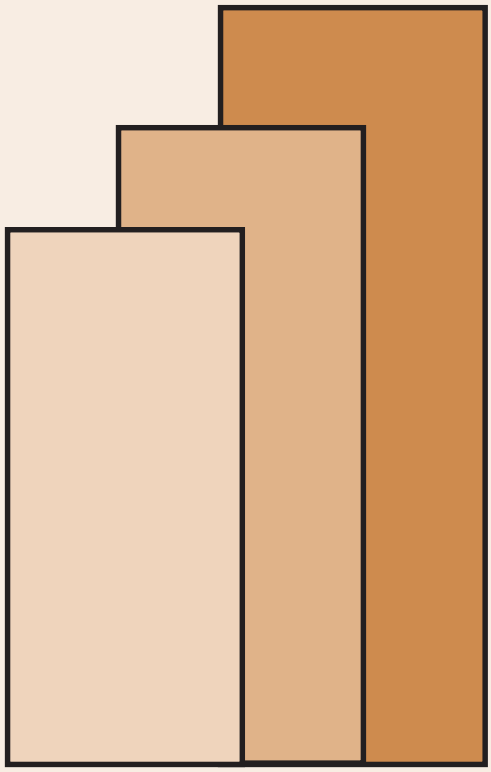

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Abstract

Firm entry and exit play a crucial role in spurring a reallocation of resources across firms as tariffs are reduced. In the light of the substantial trade reforms implemented in the Philippines over the last two decades, the paper examines the impact of trade reforms on the exit of domestic firms controlling for firm characteristics that may affect firm death likelihood. The results provide some evidence that tariffs have a highly significant negative impact on firm exit suggesting that trade liberalization increases the probability of exit of a given firm. These effects are, however, mitigated by the characteristics of individual firms, particularly by productivity. Firms with high productivity are more likely to survive as tariffs are reduced. This seems to be consistent with Melitz' (2003) finding that trade liberalization induces the exit of less productive firms. As the results show, exposure to trade forces the least efficient firms out of the industry. The results also show that apart from high productivity, other individual firm characteristics matter with larger, older, foreign-affiliated and export-oriented firms having a lower probability of exit. These indicate that in designing adjustment policies towards a more open trade regime, it is necessary to understand not only the process or mechanism of inter-firm reallocations taking place in the face of declining tariffs but also the factors hindering this process.

Keywords*:* firm entry, exit, survival, trade liberalization, Philippine manufacturing
JEL Classification*:* F10, D24

Surviving Trade Liberalization in Philippine Manufacturing

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INTRODUCTION

Trade policy has been the major policy tool for industrialization in the Philippines. After more than three decades of protection and import-substitution policy, the government implemented trade liberalization programs from the 1980s till the 1990s. While the trade reforms in the 1980s up to the early 1990s were unilateral, those carried out during the mid-1990s till 2000s were mostly in line with the country's commitments under the General Agreement on Tariffs and Trade-World Trade Organization (GATT-WTO) and the Association of South East Asian Nations Free Trade Area Common Effective Preferential Tariff Scheme (AFTA-CEPT).

With intense competitive pressures arising from the trade policy changes, understanding the impact on firm survival is crucial particularly since the death and birth of new firms and their survival in the market are often seen as closely intertwined with economic growth and competitiveness in a modern economy. The recent literature on trade liberalization and productivity shows that industries facing the greatest tariff reduction and import competition have faster productivity growth than relatively protected industries. As Melitz (2003) showed, the least productive firms will typically exit and resources will be reallocated to more productive firms leading to aggregate productivity increases. Resource reallocation drives the increase in productivity through the exit of inefficient plants and productivity improvements within existing plants (Pavcnik, 2002 for Chile; Amite and Konings 2007 for Indonesia; Fernandes 2003 for Columbia).This implies that declining trade costs (usually defined as tariffs and transportation costs) raise the probability of exit. With the entry of imports, increased competition from foreign varieties will lead to reduction in market shares of domestic firms. The empirical literature suggests that lower trading cost and higher import competition increase exit (Bernard, Jensen and Schott 2006; Baggs 2005).

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In the Philippines, the performance of the manufacturing industry shows that from the 1980s up to the 1990s, manufacturing growth was very slow; growing on the average by 1 percent in the 1980s and 2 percent in the 1990s. Growth picked up in the 2000s with manufacturing expanding by 3.4 percent on the average. However, its average share to total industrial output has remained stagnant and declined from 26 percent in the 1980s to 25 percent in the 1990s and to 24 percent in the 2000s.

In view of the manufacturing sector's weak performance and inability to contribute substantially to growth and employment creation as indicated by industry level indicators, the paper will examine the impact of trade liberalization on firm survival using micro level data. It will analyze the impact of trade reforms on the exit of domestic firms controlling for firm characteristics that may affect firm death likelihood. The study is relevant not only in the light of the substantial unilateral trade reforms implemented in the last two decades but also given the country's implementation of its liberalization commitments under the ASEAN Economic Community.

The paper is divided into four parts. After the introduction, section two focuses on the trade and investment reforms along with an analysis of the economic performance of the Philippine manufacturing industry based on industry level indicators. Section three presents the firm level manufacturing data along with the methodology and analysis of results. Section four concludes and discusses the implications of the paper.

2. REVIEW OF ECONOMIC REFORMS AND PERFORMANCE AFFECTING MANUFACTURING

2.1 Trade policy reforms

After more than three decades of protectionism and import substitution from the 1950s up to the 1970s, the government started to liberalize the trade regime by removing tariff and non-tariff barriers in the 1980s. In 1982, the country's first tariff reform program (TRP 1) substantially reduced the average nominal tariff and the high rate of effective protection that characterized our industrial structure. TRP I also reduced the number of regulated products with the removal of import restrictions on 1,332 product lines between 1986 and 1989.

In 1991, the second phase of the tariff reform program (TRP II) further narrowed down the tariff range with the majority of tariff lines falling within the three to 30 percent tariff range. It also allowed the tariffication of quantitative restrictions for 153 agricultural products and tariff realignment for 48 commodities. As such, the number of regulated products declined to about three percent in 1996 and by 1998, most quantitative restrictions were removed except those for rice.

In 1995, the government initiated the third round of tariff reform (TRP III) as a first major step in its plan to adopt a uniform five percent tariff by 2005. This further narrowed down the tariff range for industrial products to within three and ten percent range. In June 1999, Executive Order 63was issued to increase the tariff rates on textiles, garments, petrochemicals, pulp and paper, and pocket lighters and at the same time, froze tariff rates at their 2000 levels.

In 2001, another legislation (TRP IV) was passed to adjust the tariff structure towards a uniform tariff rate of 5 percent by the year 2004, except for a few sensitive agricultural and manufactured items. However, this was not implemented, instead, in October and December 2003, the government issued Executive Orders 241 and 264 which modified the tariff structure to protect selected industries. The twin Executive Orders restructured tariffs such that the rates on products that were not locally produced were made as low as possible while the tariff rates on products that were locally produced were adjusted upward. This resulted in tariff increases on a group of agricultural and manufactured products and signaled the government's selective protection policy.

Table 1 presents the tariff rates from 1996 to 2004 for the country's major economic sectors. Note that since 2004, no major most favored nation (MFN) tariff changes have been implemented. The tariff changes pursued were mainly those arising from the ASEAN Free Trade Agreement. It is evident from the data that the country's overall level of tariff rates are already low. As of 2004, the average tariff rate for all industries is 6.82 percent. Among the sectors, agriculture has the highest average tariff rate of 11.3 percent. Manufacturing rates are almost the same as the total industry average with an average tariff rate of 6.76 percent. Fishing and forestry has an average rate of six percent while mining and quarrying is the lowest at 2.5 percent.

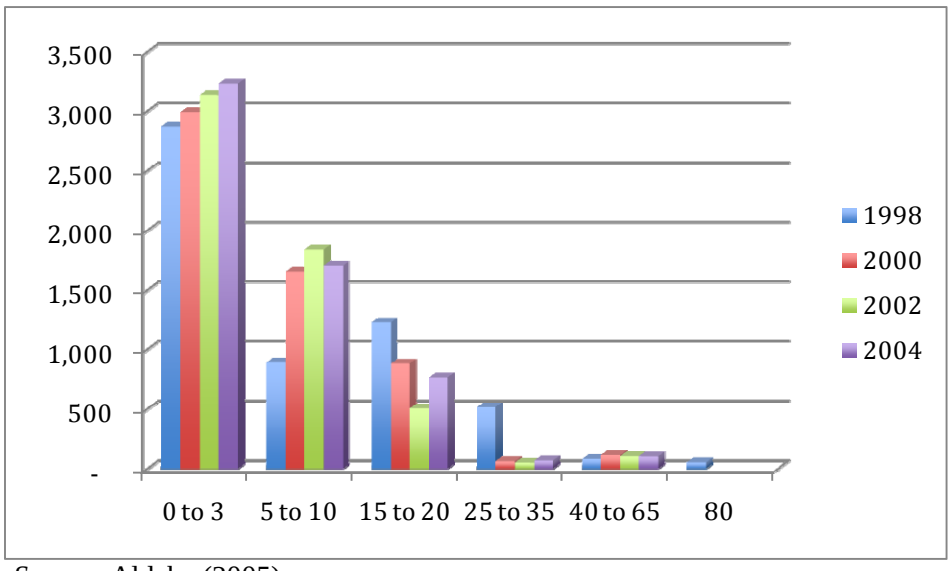
Table 1: MFN tariff structure

	Implementation of Major Tariff Policy Changes							
Major Sectors	1996	1998	1999	2000	2001	2002	2003	2004
All Industries	25.5	11.32	10.25	8.47	8.28	6.45	6.6	6.82
CV	1.02	0.96	0.91	0.99	1.04	1.17	1.06	1.07
% of tariff peaks		2.24	2.24	2.48	2.5	2.69	2.53	2.71
Agriculture	29	15.9	13.2	11.5	12.3	10.4	10.4	11.3
CV	0.81	1.07	1.14	1.3	1.23	1.31	1.22	1.17
Fishing & forestry	22	9.4	8.9	6.7	6.7	5.8	5.7	6
CV	0.95	0.63	0.7	0.66	0.62	0.45	0.48	0.57
Mining & quarrying		3.3	3.3	3.1	3.2	2.8	2.7	2.5
CV		0.42	0.41	0.24	0.23	0.38	0.4	0.48
Manufacturing	28	11.38	10.35	8.5	8.28	6.39	6.57	6.76
CV	0.97	0.93	0.88	0.95	1	1.13	1.03	1.03

Note: CV coefficient of variation (ratio of SD to mean). Tariff peaks are represented by the proportion of products with tariffs exceeding 3x the mean tariff.
Source: Aldaba (2005).

In terms of frequency distribution, Figure 1 shows that in 2004, more than 50% of the total number of tariff lines were already clustered in the 0 to 3% tariff range while 29% were in the 5 to 10% range. 13% were in the 15 to 20% tariff range, 1% in the 25 to 35% tariff range, and 2% in the 40 to 65% tariff range. Between 2002 and 2004, the number of lines in the 5 to 10% tariff range fell but those in the 15 to 20% range increased.

Figure 1: Frequency distribution of tariff rates



Source: Aldaba (2005).

Though average tariff rates seem to be low, tariff dispersion widened as the coefficient of variation went up from 0.96 to 1.07. The ad valorem tariffs for mining and quarrying as well as those for fishing and forestry show the most uniformity while those for agriculture and manufacturing exhibit the most dispersion. Table 1 also indicates an increase in the percentage of tariff peaks (tariffs that are greater than three times the mean tariff) from 2.24 in 1998 to 2.71 in 2004. The sectors with tariff peaks consisted mostly of agricultural products with in- and out- quota rates including sugarcane, sugar milling and refining, palay, corn, rice and corn milling, vegetables like onions, garlic, and cabbage, roots and tubers, hog, cattle and other livestock, chicken, other poultry and poultry products. Manufacturing sectors with high tariff peaks included slaughtering and meat packing, coffee roasting and processing, meat and meat processing, canning and preserving fruits and vegetables, manufacture of starch and starch products, manufacture of bakery products excluding noodles, manufacture of animal feeds, miscellaneous food products, manufacture of drugs and medicines, manufacture of chemical products, and manufacture and assembly of motor vehicles.

Compared to tariff rates, effective protection rates (EPRs)[2] provide a more meaningful indicator of the impact of the system of protection. EPRs measure the net protection received by domestic producers from the protection of their outputs and the penalty from the protection of their inputs. Figure 1 shows that average effective protection rates for all sectors declined from 49% in 1985 to 36% in 1988. In 1995, this further dropped to around 25%, to 15% in 1998 and to 10.9% in 2004.For manufacturing, EPR fell from 73% in 1985 to 55% in 1988 and to 28% in 1996. This further declined to 11.4% in 2000 to about 10% in 2004.

[2]EPRs are rates of protection of value added, are more meaningful than actual tariff rates and implicit tariff rates (representing excess of domestic price of a product over its international price) since it is value added rather than the value of the product that is contributed by the domestic activity being protected.

Figure 2: Effective protection rates (1985-2004)

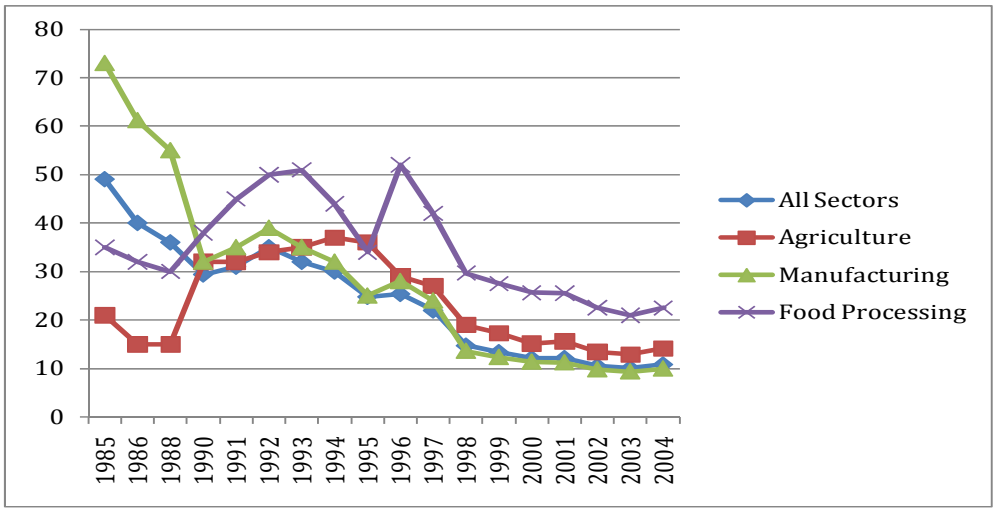


Table 2: Average effective protection rate

	1996	1998	1999	2000	2001	2002	2003	2004
All Sectors	**25.5**	**14.75**	**13.41**	**12.13**	**12.18**	**10.55**	**10.11**	**10.88**
CV	1.02	2.82	2.91	3.21	2.19	2.13	2.23	2.27
Agriculture, Fishing, & Forestry	**22**	**18.98**	**17.29**	**15.12**	**15.63**	**13.38**	**12.86**	**14.15**
CV	0.95	0.75	0.71	0.77	0.83	0.88	0.82	0.77
Mining	**-**	**2.52**	**2.6**	**2.65**	**2.67**	**2.41**	**2.36**	**2.28**
CV		0.79	0.76	0.68	0.66	0.68	0.69	0.69
Manufacturing	**28**	**13.61**	**12.34**	**11.37**	**11.23**	**9.79**	**9.36**	**9.96**
CV	0.97	3.27	3.4	3.68	2.54	2.45	2.58	2.64

Note: CV or coefficient of variation is the ratio of the standard deviation to the mean.
Source: Manasan, R. & V. Pineda (1999), Aldaba (2005).

However, within manufacturing, wide disparities in effective protection have also been present due to the relatively high protection that the food processing has continued to enjoy in the last twenty years. Table 2 shows that the manufacturing industry exhibited the highest coefficient of variation, although it declined from 3.27 in 1999 to 2.45 in 2002, this went up again to 2.64 in 2004.

Note also that effective protection rates calculated at a more disaggregated level show relatively high effective protection for some manufacturing product sectors. For instance, in 2004, coffee roasting and processing and manufacture of pesticides and insecticides have very high EPRs. The manufacture and assembly of motor vehicles also

has a relatively high protection with its EPR of 76 percent. Meat and meat processing and rice and corn milling have EPRs slightly above 40 percent (see Appendix 1).

2.2 Economic performance the manufacturing industry: 1980s-2000s

The overall performance of the overall manufacturing industry in terms of output and employment generation has been weak. Table 3 shows that from the 1980s up to the 1990s, manufacturing growth was very slow; growing on the average by 1 percent in the 1980s and 2 percent in the 1990s. Growth picked up in the 2000s with manufacturing expanding by 3.4 percent on the average. However, there seems to be very little movement of resources in the manufacturing industry as its share to total industrial output declined from 26 percent in the 1980s to 25 percent in the 1990s and to about 24 percent in the 2000s. Like manufacturing, growth in the agriculture sector remained sluggish up to the 1990s posting an average growth rate of 4 percent during the most recent period. The services sector has been the best performer in all three decades. On the average, its growth rate went up from 2.3 percent in the 1980s to 5 percent in the 2000s.

Table 3: Average value added growth rates and structure

	Average Growth Rate			Average Value Added Share		
Year	81-89	90-99	00-09	81-89	90-99	00-09
Agric, Fishery, &Forestry	1.3	1.5	3.5	23.5	21.6	19.2
Industry Sector	0.9	2.1	3.9	27.6	26.4	25.4
Manufacturing	0.9	2.3	3.4	25.9	25.1	23.8
Service Sector	2.3	3.7	5.2	48.9	52	55.4
TOTAL GDP	1.7	2.8	4.6	100	100	100

Source: National Statistical Coordination Board, National Income Accounts (NIAS), various years.

In terms of employment generation, the manufacturing industry failed in creating enough employment to absorb new entrants to the labor force. Table 4 indicates that its share to total employment remained stagnant at 10 percent in the 1980s till the 1990s and this dropped to 9.2 percent in the 2000-2009 period. The services sector is the most important provider of employment in the recent period with its average share increasing from 40 percent in the 1980s to 47 percent in the 1990s. Currently it accounts for an average share of almost 54 percent. Agriculture's share in total employment dropped

continuously from 50 percent in the 1980s to 43 percent in the 1990s and to 37 percent in the current period.

Table 4: Employment growth rates and structure

Economic Sector	Average Growth Rate			Average Share		
	81-89	90-99	00-09	81-89	90-99	00-09
Agriculture, Fishery, & Forestry	1.2	0.7	1.4	49.6	42.8	36.6
Industry	2.5	1.7	0.8	10.6	10.6	9.6
Manufacturing	2.5	2.1	0.6	9.9	10.2	9.2
Services	4.8	4.2	3.6	39.8	46.6	53.8
TOTAL EMPLOYED	2.7	2.5	2.5	100	100	100

Source: NIAS

Table 5 shows the distribution of value added in the manufacturing industry. Consumer goods comprised the bulk of manufacturing value added, although its share declined from 57 percent to 50 percent between the eighties and the 1990s. In the current period, its share remained at 50 percent. Food manufacturing represented the most important subsector accounting for an average share of 39 percent of the total in the current period. Intermediate goods followed with a share of 27 percent in the 2000s, a decline from 35 percent in the 1990s and 31 percent in the 1980s. Petroleum and coal had the highest average share of 14 percent in the 2000s. With the growing importance of electrical machinery, the share of capital goods increased steadily from 10 percent in the 1980s to 13 percent in the 1990s and 19 percent in the 2000s. Electrical machinery posted an average growth rate of 3 percent in the 1980s, 6 percent in the 1990s, and 12 percent in the 2000s.

Table 5: Manufacturing value added structure and growth Rate

Industry Group	Average Growth Rate			Average Value Added Share		
	1980-89	1990-99	2000-08	1981-89	1990-99	2000-08
Consumer Goods	**0**	**2**	**5**	**57**	**50**	**50**
Food manufactures	-1	2	6	44	36	39
Beverage industries	7	2	4	4	4	4
Tobacco manufactures	1	1	-6	3	3	1
Footwear wearing apparel	6	2	2	5	6	5
Furniture and fixtures	2	2	7	1	1	1
Intermediate Goods	**2**	**2**	**2**	**31**	**35**	**27**
Textile manufactures	0	-5	0	4	3	2

Wood and cork products	-5	-4	-4	2	2	1
Paper and paper products	4	-1	2	1	1	1
Publishing and printing	3	1	0	1	2	1
Leather and leather prod.	-3	5	0	0	0	0
Rubber products	1	-2	0	2	1	1
Chemical & chemical	-1	2	3	7	6	6
Petroleum & coal	6	4	3	12	17	14
Non-metallic mineral	2	2	3	2	3	2
Capital Goods	**2**	**6**	**6**	**10**	**13**	**19**
Basic metal industries	10	-2	13	3	2	2
Metal industries	4	0	7	2	2	2
Machinery ex. electrical	0	6	2	1	1	2
Electrical machinery	7	13	6	3	6	12
Transport equipment	-5	2	5	1	1	1
Miscellaneous manufactures	8	5	7	2	2	3
Total Manufacturing	1	2	4	100	100	100

Table 6 presents four-firm concentration ratio (CR4) calculations for the manufacturing industry adjusted for the presence of imports. In general, given the relatively low tariff rates in the manufacturing industry, the calculated ratios seem to indicate that the industry is already contestable. In most sectors, the concentration ratios are already below 35 percent such as in paper & paper products, rubber & plastic, medical & precision instruments, basic metals, and machinery and equipment nec. In the middle range are chemicals & chemical products, 41%; other transport equipment, 45%; and for motor vehicles, non-metallic and food products, the concentration ratios range from 54 to 57%. High ratios ranging from 60-82% are still prevalent in sectors such as refined petroleum, tobacco, beverages, and flat glass (non-metallic products).

Table 6: Four firm concentration ratios (CR4)

Description	CR4
Coke, Refined Petroleum and other Fuel Products	79.8
Tobacco Products	72
Beverages	62.4
Other non-metallic: flat glass	82.4
Motor Vehicles, Trailers, and Semi-trailers	57.2
Food	55.7
Other Non-Metallic Mineral products	54.3
Other non-metallic: cement	52.7
Tanning and Dressing of Leather; Luggage, Handbags and Footwear	45.1
Manufacture of Other Transport Equipment	44.8
Chemicals and Chemical Products	40.6

Publishing, Printing and Reproduction of Recorded Media	36.3
Fabricated Metal Products, Except Machinery and Equipment	35.8
Machinery and Equipment, n.e.c.	34.5
Basic Metals	30.5
Medical, Precision and Optical Instruments, Watches and Clocks	29.4
Paper and Paper Products	29
Rubber and Plastic Products	28.3
Manufacture and Repair of Furniture	22.7
Wood, Wood Products, Cork, Ex Furniture; Articles of Bamboo, Cane, Rattan, Plaiting Materials	20.4
Textile	4.4

Note: CR4 = 4-firm concentration ratio calculated as the value of output by the four largest firms to total for each 5-digit industry level. The CR4 calculations are adjusted for import penetration (MPR), i.e., (1-MPR)*CR4. Import penetration shares are estimated as the ratio of imports to output plus imports less exports.

Table 7 presents price cost margin (PCM) estimates with an average of 29% for the manufacturing industry. In a number of sectors, PCMs are low ranging from 8 to 19% for sectors such as leather, fabricated metal, transport equipment, garments, machinery excluding electrical, and printing and publishing. Moderate PCMs that range from 22 to 38% are found in food, plastic, wood, rubber, and furniture products. Meanwhile, PCMs are high in beverages, tobacco, non-metallic products (including cement), and glass and glass products. In these sectors, PCMs range from 45 to 62%. These sectors are also the most highly concentrated within the manufacturing industry.

Table 7: Price cost margins

Description	PCM based on Roeger method	Standard Errors	PCM based on simple method
Beverages	0.62***	0.06	0.53
Tobacco	0.59***	0.04	0.47
Pottery, cement & other nonmetallic	0.60***	0.1	0.57
Glass and Glass Products	0.50***	0.04	0.52
Other chemicals	0.45***	0.04	0.37
Paper and Paper Products	0.38***	0.03	0.36
Industrial chemicals	0.38***	0.03	0.35
Rubber products	0.34***	0.05	0.28
Furniture including Metal Furniture	0.32***	0.03	0.22
Professional and Scientific equipment	0.31***	0.29	-0.06

Wood and Cork	0.31***	0.02	0.26
Nonferrous metal	0.31***	0.05	0.21
Miscellaneous manufactures	0.30***	0.04	0.2
Plastic products	0.30***	0.02	0.25
Petroleum refineries	0.29***	0.11	0.21
Electrical machinery	0.28***	0.01	0.25
Petroleum and Coal	0.27***	0.12	0.21
Textiles	0.26***	0.02	0.27
Food processing & manufacturing	0.24***	0.03	0.28
Iron and Steel	0.22***	0.01	0.26
Printing and Publishing	0.19**	0.11	0.16
Machinery except Electrical	0.18***	0.04	0.11
Wearing Apparel except Footwear	0.16**	0.12	-0.01
Transport equipment	0.12***	0.04	0.14
Fabricated metal	0.10**	0.04	0.17
Leather & leather footwear	0.08***	0.04	0.16
All manufacturing	*0.29***	*0.02*	*0.3*

Source: Aldaba (2008).

Table 8 presents estimates of TFP growth. The growth figures are normalized and interpreted as growth relative to 1996. From 1996 to 2006, aggregate productivity gains are evident in leather, textile, furniture, other manufacturing, and basic metals and fabricated metal sectors. Leather grew by 9.5%, textile by 2.4%, other manufacturing by 2.9%, furniture by 1.9% and basic metals by 1.3%. Meanwhile, six sectors covering food, beverages, and tobacco; garments; wood, paper, and publishing; coke, petroleum, chemicals and rubber; non-metallic products as well as machinery and equipment, motor vehicle and other transport registered negative productivity growth rates from 1996 to 2006. On the whole, the manufacturing sector's aggregate productivity declined by 3.4% from 1996 to 2006.

Table 8: 2006 Total Factor Productivity growth

Sector	2006 TFP Growth relative to base year 1996
Food, beverages, & tobacco	-1.44
Textile	2.35
Garments	-0.99
Leather	9.54

Wood, paper, & publishing	-5.39
Coke, petroleum, chemicals & rubber	-4.76
Non-metallic products	-0.65
Basic metal & fabricated metal products	1.32
Machinery & equipment, motor vehicles & other transport	-0.86
Furniture	1.86
Other manufacturing	2.87
All Manufacturing	-3.37

Note: TFP growth figures are normalized and are interpreted as growth relative to base year 1996.

Source: Aldaba (2010)

2.3 A summing up

Since the 1980s, the Philippines has made considerable progress in opening-up the economy to competition by removing tariff and non-tariff barriers in both the manufacturing and agriculture sectors. From the 1980s up to the mid-1990s, average nominal tariff rates were reduced substantially from a range of 70 to 100% to within a three to 30% range. Overall, average effective protection rates declined from 53% in 1983 to 36% in 1988. In 1995, this further dropped to around 25% to 8.59% in 1998 and to6.8% in 2004.

As the preceding analysis indicated, the more than two decades of trade liberalization have not yet led to rapid industrial growth. From the 1980s up to the early 20s, manufacturing growth was very slow; growing on the average by 0.9 percent in the 1980s, by 2.3percent in the 1990s, and by 3.4 percent in the 2000s. Its share to total industrial output remained unchanged during the same periods accounting for 26 percent in the 1980s; 25 percent in the 1990s and 24 percent in the 2000s. In terms of employment generation, the industry failed in creating enough employment to absorb new entrants to the labor force as its share to total employment dropped from about 10 percent in the 1980s and the 1990s to 9 percent in the current period. The industry's total factor productivity growth declined by 3.4 percent from 1996 to 2006.

In the light of the lackluster performance of the manufacturing industry as indicated by the industry level indicators, an analysis of the role of trade liberalization and its impact on manufacturing performance based on micro data is crucial in

understanding the reallocation of resources, adjustment and restructuring process that have taken place in the manufacturing industry. The industry level indicators that were earlier presented might be masking or unable to fully capture the reallocation of activity across industries within manufacturing and across firms within industries. In the next section, the entry and exit of establishments will be examined to allow us a more in-depth analysis than is possible with industry-level data.

3. EMPIRICAL METHODOLOGY, DATA, AND ANALYSIS OF RESULTS

3.1 Trade and productivity literature

With the availability of micro data, the recent literature on trade liberalization and productivity has increased substantially. This body of literature shows that industries facing the greatest tariff reduction and import competition have faster productivity growth than relatively protected industries. This is due to resource allocation arising from the exit of inefficient plants and productivity improvements within existing plants. Empirical studies showing these results were pioneered by Pavcnik (2002) for Chile; Topalova (2003) for India; Muendler (2002) and Amite and Konings (2007) for Indonesia, Schor (2003) for Brazil and Fernandes (2007) for Columbia.

The empirical literature has shown that through competition and selection mechanisms, trade liberalization leads to productivity increases. Bhagwati (1968) emphasized that trade liberalization is seen as a powerful and administratively simple way to enhance competition. Krugman and Helpman (1989) further indicated that international trade increases competition. With trade liberalization, imports can discipline the market by forcing domestic firms to lower their prices and behave competitively.

Through the competition channel, trade liberalization also leads to selection effects. As trade liberalization squeezes price cost margins, some intra-plant efficiency gains and additional efficiency gains are induced due to the shutting down of weak plants. In the presence of within-industry firm heterogeneity, trade liberalization may lead to improved productivity through the exit of inefficient firms and the reshuffling of resources and outputs from less to more efficient firms. As Melitz (2003) points out, trade opening may induce a market share reallocation towards more efficient firms and

generate an aggregate productivity gain, without any change at the firm level[3]. Pavcnik (2002), Topalova (2003), and Tybout (2001) showed that trade liberalization induces the least productive firms to exit the market and the most productive non-exporters to become exporters.

In the case of the Philippines, Aldaba (2010) provided some evidence that trade liberalization leads to productivity increases. Following Pavcnik (2002), Aldaba decomposed aggregate productivity growth into two components: (i) unweighted productivity growth or within firm productivity and (ii) covariance growth or reallocation of resources and market shares from less to more efficient firms. The results showed that in sectors such as leather, textile, furniture, basic metals and other manufacturing, growth was driven mainly by the reallocation of market shares and resources from less productive to the more productive firms. The manufacturing sector was further divided into four groups: non-traded, purely importable, purely exportable, and mixed. Both the non-traded and purely exportable sectors posted positive growth rates from 1996 to 2006, most of which was contributed by growth in the covariance component. The non-traded sector grew by 3.9% during this period, of which 3.2% was due to the reallocation of market share from less efficient to more efficient firms. The purely exportable sector grew by 3.8%, of which 5% was contributed by the reshuffling of market shares towards more efficient firms.

Applying a regression framework to examine the impact of firm exit on productivity, the study showed that gains from trade liberalization could arise from reallocation effects with more efficient firms gaining market share and increasing average industry productivity. This is indicated by a negative and highly significant coefficient on the exit indicator for the mixed sector group implying that exiting firms have lower productivity than surviving or continuing firms.

3.1.1. Trade Liberalization and Firm Survival

As earlier indicated, trade forces the least productive firms to exit and reallocates market shares towards the more productive exporting firms while lower productivity firms only serve the domestic market (Melitz 2003). Empirical studies suggest that lower trading cost through tariff reduction or elimination and higher import competition

[3] In Melitz (2003), the channel through which selection happens is through the labor market, trade liberalization increases labor demand, this bids up wages and cost of production forcing least productive firms to exit the market.

will increase exit. In assessing the role of import competition from low wage countries on the survival of US plants, Bernard and Jensen (2002) showed that import penetration (measured by the share of imports from low wage countries) sharply increases the probability of plant death. Based on probit regressions, their results confirmed findings from previous research that plant size, age and productivity are important determinants of plant survival. As expected, the probability of plant shutdown is significantly decreasing in plant size, age, and productivity. Exporting plants are far less likely to shut down than non-exporters. Both capital and skill-intensive plants are also less likely to die and death rates are greater for plants with low capital-labor ratios and those with relatively low skilled workers.

To capture within industry heterogeneity, import measures were interacted with plant characteristics. The results indicated that high capital, high skill plants are better able to survive in the face of rising import shares from low wage countries. Although in terms of the interaction of plant productivity and low wage imports, the coefficient has the wrong sign but is not significant.

Bernard, Jensen and Schott (2003) examined the impact of changes in tariff and transport costs on industries and plants using disaggregated US import data and trade cost which is measured as the sum of ad valorem duty and ad valorem freight and insurance rates. The study focused on the following industry- and plant- level outcomes: industry productivity growth, plant death, new exporters, export growth, domestic market share, and changes in plant productivity. The following control variables were used in the model: plant productivity, size, age, plant capital intensity, wage level, export status, multiproduct indicator, multi plant status and multinational ownership. Based on probit regression, the results provided support for the predictions of the heterogeneous-firm trade models and highlighted the following: *first*, lower trade costs increase the probability of plant death, especially for lower productivity, non-exporting plants; *second*, surviving high productivity, non-exporters are more likely to enter the export market and expand their sales; and *third*, existing exporters see their exports grow more quickly as trade costs fall.

The results showed that the interaction of trade cost and productivity is negative and statistically significant, the probability of death is lower for high productivity plants in the face of falling trade costs. With respect to other plant characteristics, the study

indicated that larger, older, and more capital intensive firms are more likely to survive as are plants that pay higher wages or produce multiple products.

In another study, Bernard, Jensen and Schott (2006) again examined the role of international trade in the reallocation of US manufacturing within and across industries from 1977 to 1997. As trade variable, they used import penetration by low wage countries. In terms of plant characteristics, the following were applied: log total employment, age, log TFP, log capital intensity, and skill intensity. Based on logistic regression of plant death on levels of import penetration by low wage countries and plant characteristics; they found that across industries, plant survival and growth are disproportionately lower in industries with higher exposure to imports from low wage countries. Within industries, the higher the exposure to low-wage countries, the bigger is the relative performance difference between capital-intensive plants and labor-intensive plants in terms of survival and growth. The study also showed that some US manufacturing plants adjust their product mix in response to competition from low-wage countries. Plants facing higher shares of imports from low-wage countries are more likely to switch industries. When plants switch, they move towards industries that are on average less exposed to low-wage countries and are more capital and skill intensive. One issue that the study raised is while high productivity, like capital intensity, improves plant performance and survival; unlike capital intensity, it does not disproportionately benefit plants facing high exposure to low-wage country imports. Another puzzling result is that skill intensity does little to mitigate the effects of low-wage country imports.

Looking at the impact the Canada-US FTA tariff cuts on Canadian manufacturing firms; Gu, Sawchuk and Whewell (2003) showed that tariff reductions affected productivity growth through its effect on firm turnover. They found that the FTA tariff cuts increased the exit rate of Canadian manufacturing firms. The FTA-induced increase in the exit rate was bigger for small firms than for large firms which is consistent with the view that the FTA tariff cuts forced the least productive firms to exit. The authors concluded that productivity grows through a mechanism or restructuring process of market selection where low productivity firms exit and are replaced by higher productivity entrants while higher productivity incumbents gain market share.

In another paper using Canadian firm level data, Baggs (2005) also examined the impact of the Canada-US FTA by investigating simultaneously the effect of falling

Canadian tariffs and American tariff changes on Canadian firms. The results showed that both firm and industry level characteristics are important determinants of survival and while Canadian tariff reductions reduced the probability of survival, US tariff reductions exhibited the opposite effect. Falling Canadian tariffs decrease the probability of survival since declining domestic protection increase threats. Falling US tariffs increase the probability of survival among Canadian firms since opening foreign markets increase opportunities. The study also showed that more productive firms have an improved chance of survival. The Canadian tariff interaction with productivity is positive and significant suggesting that although falling Canadian tariffs decrease the probability of survival, this is smaller for firms with higher productivity. This is consistent with Melitz (1999) who finds that trade liberalization induces a net exit of low productivity firms. The interaction term for US tariff and productivity is negative and significant suggesting that although falling US tariffs are beneficial for firm survival, this effect is smaller for highly productive firms. Based on these results, the author concluded that higher productivity shelters firms from the effects of changing tariffs and firms that are highly productive are neither as adversely affected by falling domestic protection levels, nor as favorably affected by falling levels of protection for the foreign market.

Using Chilean manufacturing plant data, Alvarez and Vergara (2008) showed that more productive plants as well as larger and more capital intensive plants are less likely to exit. The authors also found a negative relationship between the probability of exit and tariffs, however, this was not robust to the inclusion of variables such as other structural reforms, economic growth, and real exchange rate.

Muendler (2002) assessed the impact of Brazil's trade liberalization on productivity using firm level data. One of his findings showed that increased foreign competition makes the least efficient firms to shutdown and enables the surviving, competitive firms to increase market share. This firm turnover and exit of the least productive firms contribute positively to productivity change in the aggregate.

Using a panel of Columbian manufacturing plants in evaluating the impact of trade liberalization on productivity, Fernandes (2001) showed that exit probabilities increase as tariffs decline. However, plant exit played a minor role in generating productivity gains in the face of lower trade protection.

3.2 The data and descriptive analysis of firm entry and exit patterns

The dataset consists of firm level information on sales revenues, employment, compensation, physical capital, exports (only for certain years) and production costs from the Annual Survey of Establishments and Census of Establishments of the conducted by the National Statistics Office (NSO). The firms are identified by unique establishment numbers that allows us to create a panel dataset. The dataset covered the period 1996 to 2006, with three missing years in between: 1999, 2001, and 2004. Surveys were carried out in 1996, 1997, 1998, 2002, 2003, and 2005 and census in 2000 and 2006. Note that one limitation of the dataset is it includes only firms with at least two observations and excludes all firms with only one observation during the eight-year period 1996-2006.Firms with missing, zero or negative values for any of the variables listed above were dropped as well as those firms with duplicates. These were mostly firms with less than 10 workers. The total number of observations is 20,815.

Entry and exit are traced based on the establishment numbers. However, there is no information whether exits are due to mergers and acquisitions. Entry and exit may be due to true entry and exit but also due to firms being included in the sample or not. Entry is defined as the year when the firm started its operations. This is based on information provided by the firm. Firm exit is indicated when the firm no longer appears in the dataset. Entry and exit also occurs when a firm's 2-digit PSIC code changes.

The firms are classified based on the following definitions:

- New Entrant: firm that enters a given industry sector in a given year t as indicated by the year when the firm started its operations
- Exitor: firm is present in a given year t but will not be present in subsequent year t+1
- Survivor: firm is neither a new entrant nor exitor, it is present in a given year t as well as in subsequent year t+1

Table 9 presents the number of firms in the dataset along with calculated annual entry, exit, and survival rates in the manufacturing industry. The exit rate dropped from 36% in 1997 to about 17% in 2000 (see also Figure 3). This went up to 22% in 2002 and to 24% in 2006. Entry rates are low relative to exit rates declining from 33% in 1996 to about 8% in 1998 and 6% in 2006. Firm entry could be attributed not only to the establishment of a new firm but also due to an existing firm changing its sector. In

recent years, entry was mostly due to sector change. The average turnover rate was 24% during the years under review.

Table 9: Summary of number of firm entrants, exitors, and survivors

Year	Total	Entrants (N)	Exitors (X)	Survivors (S)	Sector Change	Turnover Rate (in %)	As % of total		
							N	X	S
1996	2,576	858					33.3		
1997	2,599	9	927	1,663		36	0.4	35.7	64
1998	2,263	177	180	1,906	34	16	7.8	8	84.2
2000	2,043	28	344	1,671	0	18	1.4	16.8	81.8
2002	2,072	6	455	1,611	5	22	0.3	22	77.8
2003	2,031	32	359	1,640	13	19	1.6	17.7	80.8
2005	3,365	20	505	2,840	4	16	0.6	15	84.4
2006	3,866*	221	942	2,703	215	30	5.7	24.4	68.9
Total	20,815	1,351	3,712	14,034	271	24	6.5	17.8	67.4

**Note:* Firm exit and survival in 2006 were based on whether the firm operated in 2008 as reflected in the 2008 Survey of Business Establishments.

Figure 3 : Entry and Exit Rates

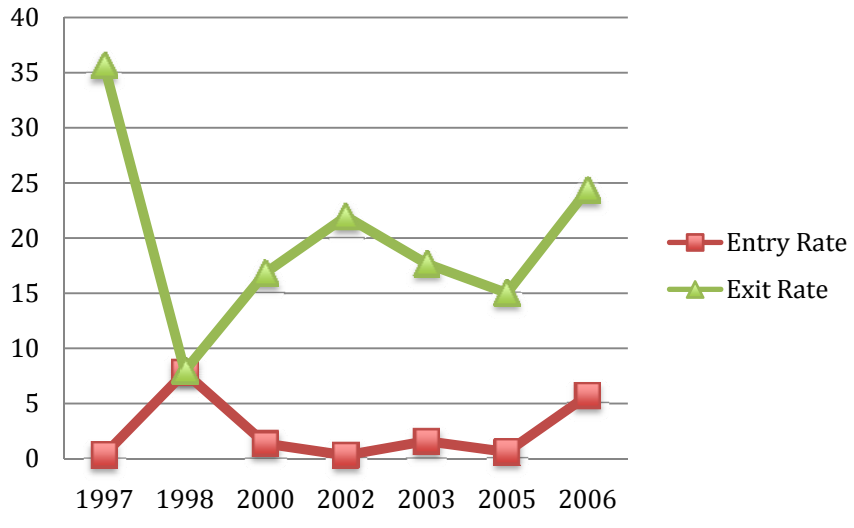


Table 10 contains the structure and distribution of the manufacturing firms by sub-sector. On the overall, the firms were dominated by food and beverage manufacturers with a share of almost 21% of the total during the period 1996-2006. Second was machinery, equipment and transport sector with a share of 19%. Coke, petroleum, chemicals and rubber products had a share of 12% closely followed by

wood, paper products and publishing with a share of 11% and garments with a share of 10%.

Table 10: Number of firms by sector, 1996-2006

PSIC2	1996	1997	1998	2000	2002	2003	2005	2006	Total	in %
1. Food, beverages, tobacco	608	614	483	502	410	400	643	754	4,414	21
2. Textile	141	143	133	103	117	104	151	165	1,057	5
3. Garments	265	266	223	101	232	219	368	364	2,038	10
4. Leather & leather products	71	70	68	58	45	42	78	87	519	2
5. Wood, paper products, & publishing	253	257	204	220	213	203	401	486	2,237	11
6. Coke, petroleum, chemicals, rubber & plastic	317	321	279	196	258	268	420	535	2,594	12
7. Non-metallic products	145	148	107	96	91	93	119	140	939	5
8. Basic metals & fabricated metal	175	176	188	169	186	168	335	379	1,776	9
9. Machinery, equipment & transport	434	439	431	466	389	413	618	672	3,862	19
10. Furniture	82	81	80	49	74	74	146	180	766	4
11. Other manufactured products	85	84	67	83	57	47	86	104	613	3
Total	2,576	2,599	2,263	2,043	2,072	2,031	3,365	3,866	20,815	100

Source: Author's calculation.

Table 11 shows the pattern of entry and exit rates by manufacturing subsector. In all sectors, exit rates are substantially higher than entry rates, with very low entry rates that remained almost flat in many of the manufacturing sub-sectors during the years covering 2000 to 2005. Some notable improvements in entry rates were observed in 2006 as manufacturing sub-sectors registered entry rates ranging from 8 to 10% in the following sectors: basic and fabricated metal products; coke, petroleum, chemicals, rubber and plastic products; machinery, equipment and transport; furniture, and other manufacturing. During the same year, the highest exit rates ranging from 30 to 38% were posted in the following sectors: garments, leather, and non-metallic products. For the entire period 1997 to 2006, the same sectors together with furniture and other manufactured products registered the highest exit rates.

Tables 12 and 13 present a comparison of the characteristics of firm entrants, exitors, and survivors in terms of mean levels of employment, age, total factor productivity, capital intensity, tariff rates, effective protection rates and export shares. The firms are also compared with respect to foreign equity participation.

Table 11: Patterns of entry and exit by manufacturing sub-sector

PSIC2	1997	1998	2000	2002	2003	2005	2006	Total
1. Food, beverages, tobacco								
entrants	0.16	3.93	1.39	0	0.75	0.31	0.8	1
exitors	36.16	6	15.34	23.17	16.25	10.42	25.07	19.55
2. Textile								
entrants	0.01	0.06	0.01	0	0.02	0	0.04	0.02
exitors	0.36	0.08	0.16	0.26	0.24	0.19	0.25	0.22
3. Garments								
entrants	0	11.66	0	0.43	2.74	0.54	1.65	2.31
exitors	39.85	10.76	15.84	20.69	21.46	13.04	38.46	24.2
4. Leather & leather products								
entrants	0	10.29	1.72	0	0	1.28	1.15	2.23
exitors	38.57	10.29	22.41	33.33	21.43	14.1	35.63	25.22
5. Wood, paper products, & publishing								
entrants	0.78	4.9	2.73	0.94	0	0.5	4.73	2.27
exitors	32.3	9.8	13.64	21.6	17.73	12.47	23.66	19.15
6. Coke, petroleum, chemicals, rubber & plastic								
entrants	0.62	7.17	1.02	0.78	1.49	0.48	8.97	3.51
exitors	30.84	8.6	17.86	15.89	18.28	14.05	20	18.18
7. Non-metallic products								
entrants	0.68	11.21	1.04	0	0	0.84	1.43	2.14
exitors	37.16	7.48	22.92	21.98	23.66	15.13	31.43	23.8
8. Basic metals & fabricated metal								
entrants	0	9.57	0.59	0	3.57	0.9	10.03	4.12
exitors	33.52	5.32	15.38	24.19	16.07	20.6	20.58	19.61
9. Machinery, equipment & transport								
entrants	0.46	9.51	1.5	0.26	2.42	0.97	9.82	3.88
exitors	33.71	8.58	17.81	22.11	14.77	18.93	18.6	19.17
10. Furniture								
entrants	0	8.75	2.04	0	1.35	0	8.89	3.65
exitors	46.91	6.25	20.41	17.57	16.22	11.64	27.78	21.2
11. Other manufactured products								
entrants	0	13.43	1.2	0	0	1.16	8.65	3.79
exitors	45.24	8.96	19.28	28.07	12.77	23.26	21.15	23.48
Total		7.82	1.37	0.29	1.58	0.59	5.72	
entrants	0.35	7.95	16.84	21.96	17.68	15.01	24.37	2.7
exitors	35.67							20.35

Source: Author's calculation.

Table 12: Firm characteristics (mean values)

	Exitors	Entrants	Survivors
NEWXSH	0.191	0.233	0.254
TFPindex	0.978	1.000	1.010
epr	15.931	18.718	15.798
tariff	12.234	17.401	12.158
age_variable	12.262	2.907	15.781
totworkers	189.261	267.109	297.115
kl	129591.1	146782.1	181049.3

Table 13: Firm characteristics by foreign equity (mean values)

	With Foreign Equity			Without Foreign Equity		
	Exitors	Entrants	Survivors	Exitors	Entrants	Survivors
NEWXSH	0.491	0.475	0.506	0.123	0.133	0.145
TFPindex	1.038	1.045	1.066	0.963	0.984	0.989
epr	13.685	15.270	12.989	17.007	21.077	17.680
tariff	10.342	15.660	11.035	13.463	19.573	13.469
age_variable	11.206	2.669	14.654	12.792	2.043	17.337
totworkers	463.811	501.580	574.399	124.935	188.997	189.309
kl	230340.3	293818.6	347400.9	105372.5	96483.2	121212.3

Exitors are, in general, relatively younger, smaller in terms of average size of employment, have lower productivity and are less capital-intensive than survivors. They seem to be more oriented towards the domestic market with their share of exports to output lower than survivors. In terms of tariff and effective protection, exitors have slightly higher tariff and effective protection rates. Entrants are younger than exitors and have larger number of workers. They are also more capital intensive, have higher productivity level and higher export ratio than exitors. In terms of protection, entrants have higher tariff and effective protection rates than exitors and survivors.

Exitors with foreign partners have higher export ratios, higher productivity level, more workers, and are more capital intensive than firm exitors without foreign partners. They are also younger and have lower effective protection rate than those without foreign partners.

Entrants with foreign partners are more export-oriented, have higher productivity, larger in terms of employment size, and are more capital intensive than

entrants without foreign partners. They are also slightly older and have lower tariff and effective protection rates.

Survivors with foreign partners are more export-oriented, have higher productivity level, and are more capital intensive than survivors without foreign partners. They are younger and have lower levels of tariff and effective protection than purely domestically-owned firm survivors.

3.3 Overall framework

There is already a large body of literature examining the determinants of firm exit and survival applying several types of regression analyses. In these studies, the importance of firm characteristics for firm demographic dynamics have been evaluated. These firm characteristics include age, size, wage, R&D as well as industry features such as capital intensity, productivity, industry growth and concentration (see Ferragina et al 2010) along with technology and innovation variables as well as ownership structure variables. Studies have also investigated the relevance of firms' globalization activities through exports or FDI (Kimura, F. and T. Fujii 2003; Perez et al 2004; Giovanetti et al 2007; Mata, J. and Portugal 2001). In estimating the relationship between explanatory variables and the continuing firm's conditional probability of exit (hazard rate), survival analysis specifications have included both probability-based survival/exit equations and more advanced analysis techniques (Ahn 2001).

To examine the impact of trade liberalization (*TRADE*) on firm exit, a probit model is estimated where the dependent variable is set to one if the firm exited and zero if it survives the next year. The model is specified as follows:

$$\Pr(exit_{it} = 1) = F\left(TRADE_{jt}, SIZE_{it}, TFP_{it}, FOREIGN_{it}, AGE_{it}, EXPORT_{it}, KL_{it}, Dummies\right)$$

equation 1

Where *i* indexes firms, *j* industry, and *t* year. The explanatory variables include firm-level controls such as size (*SIZE*), productivity (*TFP*), foreign ownership (*FOREIGN*), age (*AGE*), export (*EXPORT*), and capital intensity (*KL*) as well as industry and year dummies.

TRADE is the trade policy variable proxied by nominal tariff and effective protection rates (EPRs) in sector *j*. Effective protection rates take into account both the tariff on the firm's output and the tariffs on the inputs that the firm uses. EPRs are important because tariffs vary considerably along the production stage generally exhibiting an escalating structure with inputs having lower protection while final goods receive higher protection. The literature on liberalization, competition and productivity tends to suggest a negative effect on the exit rate and a positive effect on firm survival. This implies that a lower (higher) tariff increases (decreases) the probability of exit and reduces (increases) the firm's survival likelihood.

SIZE is the firm's size in terms of number of workers at time *t.* Studies indicate that firm size has a negative effect on the exit rate and positive effect on firm survival.

TFP is the firm's total factor productivity defined as the residual of a Cobb-Douglas production function and estimated using the methodology of Levinsohn and Petrin (2003). In estimating the production function, data on value added (output less cost of materials and energy) and two factors of production, labor and capital, were used. Fuel and electricity data were employed as proxy for productivity shocks.[4] A production function was estimated for 11 industry-sectors. The estimates of firm i's TFP is obtained by subtracting firm i's predicted y from its actual y at time t. To make the estimated TFP comparable across industry-sectors, a productivity index is created. Firms with higher productivity are expected to have higher survival rates.

FOREIGN is an indicator of firm ownership, it is equal to 1 if the firm has 10% or more foreign equity. A negative coefficient implies that a higher foreign equity participation decreases the probability of exit and has a positive effect on survival.

AGE is the difference between year t and the year the firm started its operations. It is expected that the probability of exit declines with the age of the firm.

EXPORT is a ratio of the firm's total exports to total output. A negative coefficient is expected indicating that a higher export ratio reduces the probability of exit.

[4]To address the simultaneity problem in input choice when estimating the production function by ordinary least squares (OLS), a semi-parametric estimator with an instrument to control for unobserved productivity shocks is applied. For this instrument, Olley and Pakes (1996) use investment while Levinsohn and Petrin (2002) suggest the use of intermediate inputs.

KL is capital intensity measured as the ratio of the book value of assets to total workers. It is expected that with high capital intensity, the probability of exit declines.

3.4 Analysis of results

Table 14 provides a descriptive summary of the statistics for all the firms in the dataset. MFN and ASEAN tariff rates are simple applied averages by manufacturing industry sub-sectors at the two-digit level. Tariff rates were linked to the manufacturing data by converting HS and AHTN Codes into their corresponding two-digit industry codes. MFN rates were from the Philippine Tariff Commission while the ASEAN rates were from the ASEAN Secretariat database.

Table 14: Descriptive statistics for all firms

Variable	Obs	Mean	Std. Dev.	Min	Max
TFP	20815	1.004	0.113	0.377	1.654
EPR	20815	16.011	20.398	-605.588	237.951
MFN Tariff	20815	12.511	8.992	1.073	71.667
ASEAN Tariff	20195	6.048	5.056	0.000	30.000
Age	20806	14.318	16.203	0.000	154.000
Size	20815	275.934	648.353	10.000	16190.000
EXPORT	13347	0.240	0.407	0.000	3.531
KL	20815	169648.5	830337	0.000668	5.59E+07

Based on equation 1 and using tariff rates as trade liberalization variable, the initial probit results explaining the probability of exit for a given firm are presented in Table 15. Year and two-digit level sector dummy variables are included in all specifications to account for macroeconomic fluctuations and industry effects that may affect firm survival. Model I is the basic specification that looks at trade and firm characteristics such as productivity, age, size, foreign ownership and export intensity. Model II introduces an additional variable, capital intensity while Models III, IV and V add interaction variables in which tariff is interacted with firm age, foreign equity participation, and productivity.

Table 15: Marginal effects: Firm exit (using tariff as trade indicator)

	I	II	III	IV	V
TFP	-.266*** (0.034)	-.262*** (0.034)	-.262*** (0.034)	-.261*** (0.034)	-.163 *** (0.060)
MFN Tariff	-.002*** (0.001)	-.002*** (0.001)	-.002*** (0.001)	-0.002*** (0.001)	0. 004 (0.003)
Age	-.001*** (0.000)	-0.001*** (0.000)	-.002*** (0.001)	-.002*** (0.001)	-0.002*** (0.001)
Size	-0.000** (0.000)	-.0005** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)
Foreign	-0.048*** (0.008)	-.048*** (0.008)	-0.048*** (0.008)	-0.015 (0.015)	-0.023 (0.016)
Export	-0.026*** (0.010)	-.026** (0.010)	-0.027*** (0.010)	.028*** (-0.010)	-0.028*** (0.010)
KL		-3.13E-09 (0.000)	-3.2E-09 (0.000)	-3.93E-09 (0.000)	-5.02E-09 (0.000)
MFN Tariff*Age			0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
MFN Tariff*Foreign				-.003*** (0.001)	-.002** (0.001)
MFN Tariff*TFP					-0.006** (.003)
Year	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-5147.308	-5147.109	-5145.837	-5142.223	-5140.288
No. of Obs	11972	11972	11972	11972	11972

Notes: The reported coefficients are marginal effects representing the change in the marginal probability of firm exit at the mean of the regressors. Robust standard errors in parentheses. *** significant at 1% level, ** at 5% level, and *10% level.

The results in Table 15 show that the coefficients of the firm level control variables are consistent with expectations. For all specifications, the productivity term is negative and highly significant, this is consistent with the literature that more productive firms have a better chance of survival. Larger and older firms are also found to have a lower probability of exit. The coefficient on Size, which is measured by number of employees, is negative and significant at 5% level for all specifications. The coefficient on Age is negative and highly significant for all specifications.

In terms of the impact of foreign ownership, the results show that the coefficient on Foreign is negative and highly significant for specifications I to III indicating that the higher the level of foreign equity participation, the lower the probability of exit for a given firm. It is widely accepted that multinational firms are an important source of international capital and technology. They have better technical and business know-how resulting in productivity gains and competitiveness and increased survival likelihood.

In terms of Export, which is measured as the share of exports to total output, the results show a highly significant negative coefficient on Export for all specifications. This indicates that the more export-oriented a firm is or the higher its level of exports to total output, the lower the probability of exit.

In terms of tariff, the coefficient is negative and highly significant for specifications I to IV indicating that the lower the tariff, the higher the probability of death. High tariffs tend to be associated with greater firm inefficiency and misallocation of resources away from efficient sectors towards less efficient ones by artificially raising the profitability rates of the latter. When the market is opened up for more competition from imports arising from trade liberalization, it becomes difficult for these firms to survive. Looking at the tariff interaction with productivity, the results in Table 15 show a negative and significant coefficient indicating that while reduced tariffs increase the probability of exit, this effect is smaller for firms with higher productivity. This seems to be consistent with Melitz' (2003) finding that trade liberalization induces the exit of less productive firms. Tariff reduction allows imports from other countries resulting in more import competition which implies a higher likelihood of death for firms with low productivity.

In terms of the other interaction variables, the results show that the tariff interaction with firm age is insignificant. However, the tariff interaction with FDI shows a negative and significant coefficient suggesting that although declining tariffs increase the probability of exit, this effect is smaller for firms with foreign partners or affiliates. Note that with the inclusion of the interaction terms for tariff and foreign ownership as well as for tariff and productivity in Models IV and V, respectively, the individual terms for tariff and foreign ownership lose their significance. Though the coefficient on capital intensity is negative, it is not significant for all specifications.

Table 16 presents the results of the same model using effective protection rate as trade liberalization variable. The coefficients of the firm level control variables are as

predicted; productivity, age, firm size, export intensity, and foreign ownership affect firm survival. The coefficient on EPR, however, is not significant and none of the interaction variables was found significant.

Table 16: Marginal Effects: Firm exit (using EPR as trade indicator)

	I	II	III	IV	V
TFP	-.254***	-.252***	-.252***	-.252***	-.219***
	(0.034)	(0.034)	(0.034)	(0.034)	(0.041)
EPR	0.000	0.000	-0.000	-.000	. 0015
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Age	-0.001***	-0.001***	-0.001***	-.002***	-.002 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.000**	-0.000**	-0.000**	-.000**	-.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Foreign	-0.047 ***	-0.047***	-0.047***	-.0500***	-.053***
	(0.008)	(0.009)	(0.008)	(0.009)	(0.009)
Export	-0.025***	-0.025***	-0.025***	-.025***	-.025***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
KL		-2.01e-09 (0.000)	-2.08e-09 (.000)	-2.09e-09 (.000)	-2.29e-09 (000)
EPR*Age			.000 (0.000)	.000 (.000)	. 000 (.000)
EPR*Foreign				0002 (.000)	. 000 (.000)
EPR*TFP					-.002 (.001)
Year	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-5155.485	-5155.396	-5154.270	-5154.083	-5153.274
No. of Obs	11972	11972	11972	11972	11972

Notes: The reported coefficients are marginal effects representing the change in the marginal probability of firm exit at the mean of the regressors. Robust standard errors in parentheses. *** significant at 1% level, ** at 5% level, and *10% level.

Table 17 summarizes the results based on ASEAN tariff rates as trade indicator. The results for specifications I to IV are the same as those obtained using MFN tariff rates. For models I to IV, the coefficient on ASEAN tariff is negative and highly significant indicating that ASEAN tariff reductions increase the probability of exit. The coefficient on productivity is negative and highly significant for all model specifications

suggesting that more productive firms have lower probability of exit and higher chance of survival. For all specifications, older and larger firms are also found to have a lower probability of exit. For models I to III, the coefficient on foreign ownership is negative and highly significant indicating that firms with foreign equity have lower probability of exit. The only difference is in terms of the interaction variable; while MFN tariff interacted with productivity is significant, ASEAN tariff interacted with productivity is insignificant.

Table 17: Marginal Effects: Firm exit (using ASEAN tariff rates as trade indicator)

	I	II	III	IV	V
TFP	-.259*** (.034)	-.256*** (0.035)	-.256 *** (0.035)	-.254*** (.035)	-.279*** (.059)
ASEAN Tariff	-.002*** (0.001)	-.002*** (0.001)	-.003*** (.001)	-.002** (.001)	-.005 (.006)
Age	-.001*** (.000)	-.001*** (0.000)	-.002*** (.000)	-.002*** (.000)	-.002*** (.000)
Size	-.000** (0.000)	-.000** (0.000)	-.000** (.000)	-.000** (.000)	-.000 ** (.000)
Foreign	-.046*** (0.009)	-.0456 *** (0.009)	-.046*** (.009)	-.011 (.015)	-.009 (.015)
Export	-.0258*** (.010)	-.026*** (0.010)	-.026*** (0.010)	-.027*** (.010)	-.027*** (.010)
KL		-2.39e-09 (.000)	-2.39E-09 (0.000)	-2.76e-09 (.000)	-2.59e-09 (.000)
ASEAN Tariff*Age			.000 (.000)	.000 (.000)	.000 (.000)
ASEAN Tariff*Foreign				-.005*** (.002)	-.005*** (.002)
ASEAN Tariff*TFP					.003 (.006)
Year	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-4981.682	-4981.559	-4980.858	-4976.247	-4976.096
No. of Obs	11569	11569	11569	11569	11569

Notes: The reported coefficients are marginal effects representing the change in the marginal probability of firm exit at the mean of the regressors. Robust standard errors in parentheses. *** significant at 1% level, ** at 5% level, and *10% level.

To examine the impact of the two tariff rates MFN and ASEAN, the same model is applied with both MFN and ASEAN tariff rates as trade indicators. Model 1 provides the basic specification, model II introduces capital intensity while models III, IV, and V introduce interaction terms where the two trade indicators are interacted with firm characteristics age, foreign equity participation, and productivity. In model VI, all the six interaction variables are included.

Table 18 shows that for all specifications, firm characteristics are important determinants of exit. The coefficients on productivity, age, size, and export intensity are as predicted and are highly significant for all specifications, except for age which is significant at 5% level. The coefficient on foreign ownership is negative and highly significant in models I to III as well as in V. In model IV, its coefficient is no longer significant, but is significant when interacted with Tariff and ASEAN.

Table 18: Marginal effects: Firm exit (using MFN and ASEAN tariff rates as trade variables)

	I	II	III	IV	V	VI
	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
TFP	-.269*** (0.034)	-.265*** (0.035)	-.265*** (0.035)	-.264*** (0.035)	-.161*** -0.063	-.201*** (-0.066)
MFN TARIFF	-.002*** (0.001)	-.002*** (0.00)	-.002*** (0.00)	-.002 *** (0.00)	.008** (-0.004)	.007* (-0.004)
ASEAN Tariff	-.002** (0.001)	-.002** (0.00)	-.002** (0.00)	'-0.002* (0.00)	-0.008 (-0.006)	-.011* (-0.006)
Age	-.001*** (.000)	-.001*** (.000)	-.002*** (.001)	-.001*** (.000)	-.001*** (-0.000)	-.002*** (-0.001)
Size	-.000** (.000)	-.000** (.000)	-.000** (.000)	-.000** (-0.000)	-.000** (-0.000)	-.000** (-0.000)
Foreign	-.047*** -0.009	-.046 *** -0.009	-.047*** -0.009	0.004 -0.017	-.0476*** (-0.009)	-.003 (.018)
Export	-.026*** -0.01	-.027*** -0.01	-.028*** -0.01	-.029**** -0.01	-.027*** (-0.010)	-.029*** (-0.011)
KL		-3.41E-09 (0.000)	-3.44E-09 (0.000)	-4.29E-09 (0.000)	-4.99E-09 (0.000)	-5.35e-09 (.000)
MFN Tariff*Age			.000 (.000)			.000 (.000)
ASEAN Tariff*Age			.000 (.000)			.000 (.000)
MFN Tariff*Foreign				-0.002* (0.001)		-.001 (.001)

ASEAN Tariff*Foreign				-0.003* (0.002)		-.004** (-0.002)
MFN Tariff*TFP					-.010** (-0.004)	-.009*** (-0.004)
ASEAN Tariff*TFP					0.007 (-0.006)	.010 (.006)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-4974.758	-4974.525	-4973.091	-4968.088	-4970.152	-4963.262
No. of Obs	11569	11569	11569	11569	11569	11569

Notes: The reported coefficients are marginal effects representing the change in the marginal probability of firm exit at the mean of the regressors. Robust standard errors in parentheses. *** significant at 1% level, ** at 5% level, and *10% level.

With respect to the trade indicators, both coefficients on Tariff and ASEAN are negative and significant for Models I to IV. In Model IV which introduces trade interaction variables with productivity, the coefficient on ASEAN is negative but insignificant while the coefficient on Tariff turns positive and significant at 5% level. The Tariff interaction variable with productivity remains negative and significant at 5% level. In Model VI which combines all MFN Tariff and ASEAN interaction variables, the coefficient on ASEAN tariff is still negative and significant while the coefficient on MFN Tariff remains positive and significant. The results tend to indicate two opposite effects of changes in tariffs on the likelihood of firm exit. While a reduction in ASEAN tariff tends to increase the probability of firm exit, a reduction in MFN tariff tends to reduce it. With respect to the trade interaction variables, the coefficient on Tariff interacted with productivity is negative and highly significant while the coefficient on ASEAN interacted with foreign equity is negative and significant at 5% level.

4. CONCLUSIONS AND POLICY SUGGESTIONS

This paper aims to examine the role of trade liberalization using micro level data to allow a more in-depth analysis than is possible based on an industry level analysis. With competitive pressures arising from trade liberalization, understanding the impact on firm survival is crucial particularly since the birth of new firms and their survival in the market are often seen as closely intertwined with economic growth and competitiveness in a modern economy.

Initial analysis of the micro level data indicated that during the period 2000 to 2005, exit rates in all sectors were substantially higher than entry rates. Entry rates were very low in many of the manufacturing sub-sectors. Some improvements in entry rates were observed in 2006 with entry rates that ranged from 8 to 10% posted in the following sectors: basic and fabricated metal products; coke, petroleum, chemicals, rubber and plastic products; machinery, equipment and transport; furniture, and other manufacturing. For the period 1997 to 2006; garments, leather, and non-metallic products, furniture and other manufactured products registered the highest exit rates.

Initial analysis indicated that exitors are, in general, relatively younger, smaller in terms of average size of employment, have lower productivity and are less capital-intensive than survivors. They seem to be more oriented towards the domestic market. In terms of tariff and effective protection, exitors have slightly higher tariff and effective protection rates. Exitors with foreign partners have higher export intensity, higher productivity level, more workers, and are more capital intensive than firm exitors that are 100% Filipino-owned. They are also younger and have lower effective protection rate than those without foreign partners.

Meanwhile, compared with exitors, entrants are younger and larger in terms of number of workers. They are also more capital intensive, have higher productivity level and higher export intensity than exitors. In terms of protection, entrants have higher tariff and effective protection rates than exitors and survivors. Entrants with foreign partners are more export-oriented, have higher productivity, larger in terms of employment size, and are more capital intensive than entrants without that are 100% Filipino-owned. They are also slightly older and have lower tariff and effective protection rates.

The results of the regression analysis provide some evidence that tariffs have a highly significant negative impact on firm exit suggesting that trade liberalization increases the probability of exit of a given firm. These effects are mitigated by the characteristics of individual firms, particularly by productivity and foreign equity participation. The interaction terms indicate that firms with high productivity and those with foreign partners are less likely to die as tariffs are reduced. This seems to be consistent with Melitz' (2003) finding that trade liberalization induces the exit of less productive firms. The results also show that individual firm characteristics matter with

highly productive, larger, older, foreign-affiliated and export-oriented firms having a lower probability of exit.

Looking at the effect of ASEAN tariff rates on firm death, in general, similar results are obtained. The coefficient on ASEAN tariff is negative and highly significant indicating that ASEAN tariff reductions increase the probability of exit. The coefficient on productivity is negative and highly significant suggesting that more productive firms have lower probability of exit. In terms of the firm control variables, older and larger firms are found to have a lower probability of exit. The coefficient on foreign ownership is negative and highly significant indicating that firms with foreign equity have lower probability of exit. The only difference is in terms of the interaction variable when tariff is interacted with productivity. The results show that while MFN tariff interacted with productivity is significant, ASEAN tariff interacted with productivity is not significant.

Combining the two tariff rates together, the same results are again obtained as indicated by thenegative and significant coefficients on both Tariff and ASEAN. However, the results differ when the trade-productivity interaction variables are introduced in the model. While the coefficient on ASEAN tariff is negative and significant; the coefficient on Tariff turns positive and significant. However, in terms of the tariff interaction variable with productivity, the coefficient still remains negative and highly significant while the coefficient on ASEAN interacted with foreign equity is negative and significant.

Regarding the use of effective protection rate as trade indicator, the results indicate that the coefficient on EPR is not significant and none of the interaction variables was found significant. However, the coefficients of the firm level control variables are as predicted; productivity, age, firm size, export intensity, and foreign ownership affect firm survival. With respect to capital intensity, the results also show that although its coefficient is negative, it remains insignificant.

According to Melitz (2003), trade liberalization drives the selection and reallocation among heterogeneous firms within an industry leading to changes in average productivity. Due to the presence of trade costs, only the most productive firms self-select into exporting. As trade costs decline, low productivity firms exit and this increases the level of aggregate productivity. Exposure to trade induces only the more productive firms to export while simultaneously forcing the least productive firms and

the additional export sales gained by the more productive reallocate market shares towards the more productive firms and contribute to an aggregate productivity increase.

In general, the results tend to provide support to Melitz' model where trade liberalization leads to aggregate productivity increase through the intra-industry reallocation across heterogeneous firms. As the results show, exposure to trade forces the least efficient firms out of the industry. This leads to reallocation towards more efficient firms that may generate aggregate productivity gains. In a related paper on the determinants of productivity of the Philippine manufacturing industry, trade liberalization was found to have a significant negative effect on productivity indicating that trade leads to productivity gains (Aldaba 2010). The results also showed that exiting firms have lower productivity than surviving or continuing firms. The analysis of the decomposition of aggregate productivity growth showed that productivity growth was driven mainly by the reallocation of market shares and resources from less productive to the more productive firms in sectors such as leather, textile, furniture, basic metals and other manufacturing.

The present paper emphasizes the importance of productivity and foreign ownership in mitigating the negative impact of trade liberalization on the probability of exit and survival of firms. The results also highlight firm characteristics that significantly affect survival such as export intensity, age, and size. The probability of exit will be highest among firms with low export intensity as well as firms that are younger, smaller, have low productivity and purely Filipino-owned.

In designing adjustment policies that would address the transition towards a more open trade regime, it is necessary to understand not only the process or mechanism of inter-firm reallocations taking place in the face of declining tariffs but also the factors hindering this process. It is important to emphasize the crucial role that firm entry and exit play in spurring a reallocation of resources across firms as tariffs are reduced. It is within this light that the focus of government policy be designed towards those measures that would enhance firm productivity as well as link domestic firms with multinational companies and attract more foreign direct investment in the manufacturing industry.

Economic theory suggests that foreign direct investment can generate positive spillovers to domestic firms in the host country. Since multinational corporations are an important source of international capital and technology, their entry can facilitate the

transfer of technical and business know-how resulting in productivity gains and competitiveness among local firms. These spillover effects develop through best practice demonstration and diffusion, or through the creation of linkages with foreign and domestic firms becoming either suppliers or customers, or through the movement of experienced workers from foreign to local firms. The entry of MNCs may also increase competition and force domestic firms to imitate and innovate.

Deepening linkages with multinational firms' international production networks would be important in increasing our gains from trade. Policies geared towards providing export assistance would also be necessary along with measures crafted to boost the survival of new entrants particularly small and medium enterprises. Making small and medium manufacturers internationally competitive is a major challenge that would require government support and close coordination between the government and the SME sector. Addressing financing issues including inadequate working capital, insufficient equity, difficulties of credit finding and prohibitively expensive credit cost since these have severely constrained the growth of SMEs. Improving the technological capabilities and strengthening supply chains are necessary to enable SMEs to move up the technology scale as well as to create and enhance existing linkages with production networks. Participation in regional/global production networks provides domestic firms not only access to export markets but to newer technologies as well. To increase their overall competitiveness in international markets, leading multinational firms provide their local affiliates and local suppliers with more rapid technological upgrading and greater attention to quality control, cost control and human resource development. In light of rising globalization and increasing economic integration in East Asia, SMEs are seen as potential suppliers of outsourced parts and services and could provide a link to the export sector and/or production networks which have increasingly grown in manufacturing sectors such as automotive, machinery, electronics and garments. To benefit from the opportunities arising from the ASEAN Economic Community and the on-going integration between ASEAN and East Asia, linking our SMEs with production networks would be crucial.

Finally, the selective protection policy of the government must be reviewed to address the distortions and inefficient resource allocation that it has created. The policy has not only shielded selected sectors from import competition, but has also led to disparities in protection particularly among finished goods that make use of these as

inputs. Favored sectors include sugar, petrochemicals, float glass, and steel which are inputs to a lot of products. Since the tariffs on inputs are greater than the tariffs on outputs, cost of production has remained high and negatively affected the user sectors' productivity and competitiveness.

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APPENDIX

Appendix I: Highly protected manufacturing and agriculture sectors

Sector	1998	2000	2002	2004	Ave	Classification
Coffee roasting & processing	*	*	*	*	*	Food processing
Pesticides, insecticides	109	-96	110	238	89	Chemicals products
Mfr and assembly of vehicles	97	77	78	76	82	Transport equipment
Meat & meat products	60	49	52	41	50	Food processing
Rice & corn milling	51	47	43	42	45	Food processing
Wire nails	74	44	28	32	43	Basic metals
Coffee	48	38	43	38	41	Agriculture
Carpets & rugs	52	43	32	33	39	Textile
Hog	40	37	36	35	37	Agriculture
Rebuilding of vehicles	43	33	34	33	36	Transport equipment
Motorcycles & bicycles	45	31	32	35	36	Transport equipment
Hardboard & particle board	38	40	29	29	34	Wood & wood products
Ready made clothing	45	37	28	27	33	Garments
Structural products	59	28	16	26	32	Non metallic mineral
Made up textile goods	40	32	26	29	32	Textile
Sugar milling & refining	36	31	31	30	31	Food processing
Corn	36	31	31	26	30	Agriculture
Radio and TV receiving sets	37	37	22	19	29	Machinery & electrical
Bakery products	35	29	23	28	29	Food processing
Furniture & fixtures, metal	37	31	23	24	28	Miscellaneous products
Hosiery, underwear	36	30	22	21	27	Textile
Other wearing apparel	35	29	22	22	26	Garments
Veneer & plywood	35	27	19	19	25	Wood & wood products
Leather & leather substitutes	37	23	14	23	24	Leather
Articles of native materials	31	25	20	22	24	Textile
Metal stamping, coating	36	24	16	20	24	Non metallic mineral
Rubber footwear	37	26	14	19	24	Rubber& plastic
Wire & cable prods	33	25	16	16	23	Non metallic mineral
Furniture	33	25	17	17	22	Furniture &fixtures
Flat glass	30	22	14	20	22	Non metallic mineral
Leather footwear	33	22	13	19	21	Leather
Commercial & job printing	36	21	14	10	21	Paper & paper products

The EPR formula is given by: $EPR = (V-V^*)/V^*$ where V is the domestic value added per unit of the final good (including the tariffs on that good and on its inputs) and V^* is the value added under free trade. Note that * refers to a negative free trade value added.