Chapter 3

Linkages between Foreign and Local Firms in the Malagasy Garment Industry: Overview of the industry and analytical framework[*]

Takahiro Fukunishi, Helinjatovo Aime Ramiarison

Abstract

Foreign direct investment (FDI) played a critical role in the process of industrialization in developing countries. While it assisted technology transfer to local firms in countries with poor production knowledge in many countries, FDI in manufacturing sector is scarce in sub-Saharan Africa. One exceptional case is garment industry which accepted FDI since the 1990s in Madagascar, and since 2000 in some other continental African countries. Garment FDI has about 20 years of history in Madagascar, its impact on local economies is not very significant, and rather, detail has not been investigated yet. The study has been in process to explore linkages between foreign and local garment firms, and to demonstrate factors of the limited linkages, which is expected to provide insights for stagnated industrialization in sub-Saharan Africa.

Keywords: foreign direct investment, firm linkage, technology transfer, Africa

1. Introduction

Foreign direct investment (FDI) is widely regarded as an important channel for technology transfer from developed to developing countries. Literatures have argued that FDI has an advantage over other channels in that foreign affiliates make adjustments to technology and production knowledge so as to suit the circumstances in the host country, and that knowledge is directly transferred to local firms through transactions, and to local workers through training and work experience (Saggi [2002],

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Rodriguez-Clare [1996]). It is well documented that such transfers have improved productivity and/or have induced export activities among local firms, and have consequently led to the growth of local industries, such as textiles, automobiles, motorcycles and electric appliances in many developing countries (Lall and Urata [2003], UNCTAD [2002], Ernst et al [1998]). In contrast to the developing countries that exhibit sustained economic growth, most sub-Saharan African countries have received little manufacturing FDI since the 1980s except for South Africa and Mauritius; the former hosted FDI in the automobile industry and the latter received garment FDI. A lack of active FDI has been recognized as one of causes of prolonged stagnation in the African manufacturing sector (Pack [1993], Lall [1999], Biggs et al [1995]).

In the midst of a generally limited inflow of manufacturing FDI into the poor countries of sub-Saharan Africa, Madagascar stands out as one of the exceptions. Due to its proximity to Mauritius and the availability of low-cost labour, since the 1990s, garment firms in Mauritius, Mauritian as well as foreign owned, have shifted production sites to Madagascar. Provision of preferential access to the US market by the Africa Growth and Opportunity Act (AGOA) further accelerated the investment inflow into Madagascar from Asian countries. Meanwhile, exports of garment products have increased rapidly with only a temporary reduction during the political turmoil in 2001, and in 2008 amounted to $617 million, which accounts for 53% of Madagascar's total exports (UN Comtrade).

All around the world, the impact of garment FDI on local economies is not restricted to causing increases in exports and to the creation of employment. Garment FDI has facilitated the entry of local firms into export markets, this being especially true of developing countries that started garment exports after the 1980s. The growth of local garment industries in Sri Lanka, Mauritius, Indonesia, Bangladesh and Vietnam was preceded by FDI or by the deep involvement of foreign firms from East Asia and the developed countries (UNCTAD [2002], Ernst et al. [1998], Romer [1992], Rhee and Belot [1989], Lall and Wignaraja [1994]). It is argued in the literature that the presence of foreign firms in a host country reduces the fixed costs associated with exports, such as the costs of establishing distribution networks, learning about consumer demand, and building transportation infrastructures (Aitken et al. 1997, Greenway et al. 2004). It is notable that such positive impacts have been seen in low income countries (LICs), where the capacity of local firms tends to be poor, and where government support is often ineffective. For example, there was no significant garment industry in Mauritius

and Bangladesh before FDI was introduced, and Cambodia and Bangladesh are ranked in the lowest 25 percentile group of the world's countries in terms of governance indicators (World Bank Institute [2009]). The relative simplicity of the technology involved in the assembly process of garment production has made it possible for local firms in LICs to adopt technology and knowledge (Lall and Wignaraja [1994], Gereffi and Memedovic [2003]).

In some other poor African countries, for example, Lesotho, Kenya and Swaziland, garment FDI rapidly increased following the enactment of AGOA. Indeed African clothing exports to the American market grew by threefold between 1999 and 2004. [1] In contrast to the Asian LICs, however, the growth of local firms has been limited in the case of the new African exporters. This is partly because of the termination of the Multi-fiber Arrangement (MFA) in 2004. Under the MFA, an export quota was imposed on large exporters to the US and EU markets, and therefore competition among exporters was restricted. Elimination of the quota led to a rapid growth of exports from China and India, but also resulted in stagnation among small exporters including those in the African countries. The importance of internal constraints has been indicated by one of the authors of this paper: in Kenya, credit constraints and relatively small profits from garment exports discouraged local firms from participating in export markets (Fukunishi [2010]). Because of poor access to credit, most Kenyan local firms were not able to expand capacity to the minimum size required for supplying the export market. Besides, expected profits in export markets are smaller for Kenyan firms than for Bangladesh firms, mainly because even though productivity does not significantly differ between the two countries, labour costs are higher in Kenya.

The Malagasy garment industry differs from other examples of African industry in that it suffered from the termination of the MFA to a much lesser extent and its labor costs are substantially lower. Also, it has a longer history and larger size of exports. Considering such differences, development of local garment firms in Madagascar may differ from the other African countries, yet it is not clear due to insufficiency of information about the industry. In fact, despite dominant share of the industry in production in the secondary sector and in total export in Madagascar, coverage in the previous surveys is not sufficient in terms of number of firms and types of information collected.

This study attempts firstly to reveal situation of local garment industry and its

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[1] UN ComTrade Database.

relationship with FDI firms through the firm survey, which will be the most comprehensive garment firm survey in Madagascar. If we found that local development is small like the other African countries through the survey, we may be able to identify factors that preclude the development of local firms, which are likely to be different from the findings in our previous studies in Kenya given the difference of industry characteristics. If growth of local firms is observed, it will be a good opportunity to find different response between Malagasy and the other African industries. We expect that it will highlight problems in continental African countries. Through such investigation, this study attempts to demonstrate the potential of industrialization through FDI spillover in sub-Saharan Africa.

In this interim report, as a step towards arriving at final conclusions, we give an overview of the Malagasy garment industry. We have compiled information from a diversity of sources including preliminary results of our firm survey in 2009/10 covering 85 Export Processing Zone (EPZ) firms and 35 local firms. Also tentative analytical framework is presented, which is utilized to investigate development of local firms by modeling their behaviors toward participation in export markets.

2. Overview of the Malagasy Garment Industry

Though faster rates of economic growth have occurred in recent years, especially in the second half of the 2000s, Madagascar is still classified as a Least Developed Country (LDC), its income per capita being less than USD 350, and with 77% of its population living in absolute poverty[2]. This situation reflects an economic performance that in many ways has been chronically poor, and it shows, in particular, the disastrous effects of the country's shift into socialism and Soviet-style economic management in the mid-1970s. Large scale industrialization based on an Import Substituting strategy has proven to be inefficient, and in the mid-1980s, the country entered an unprecedented economic and debt crisis. Policy reforms supported by the Bretton Woods Institutions (BWIs) through a Structural Adjustment Program (SAP) aimed at putting the economy back on a growth track, did not yield significant improvements, as indeed was the case in many African countries. However as reforms got underway, Madagascar was encouraged to mobilize external financial resources, in addition to those provided by the

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[2] 4.9% in 2006, 6.5% in 2007

World Bank and IMF, to ease the financial constraints on growth. With the support of the BWIs, various policies were set up in order to attract FDI, and in this regard, the enactment of EPZ promotional laws in 1989 was one of the most important of several initiatives. Since then, there has been spectacular growth of manufacturing in the EPZ, in particular in the textile and garment industries. The contribution of the manufacturing sector to GDP has been around 12% during the last 15 years. A generally weak industrial performance tends to have hidden the impressive performance of the EPZ industries, and especially that of the garment industry.

2.1 EPZ firms: Trend, Pattern and Policies

A strong need for economic recovery and a severe balance of payment crisis compelled Madagascar, with the support of the BWIs, to promote inflows of FDI. Policies were basically focused on the liberalization of the investment regime and on a privatization program. The promotion of export-oriented FDI was also emphasized through the enactment of the EPZ promotional law (No 89-027, passed on December, 29th 1989), but the outcome was disappointing since during the following two years, only 20 firms registered in the zones.

Figure 1: Number of Registered EPZ firms, 1990-2008
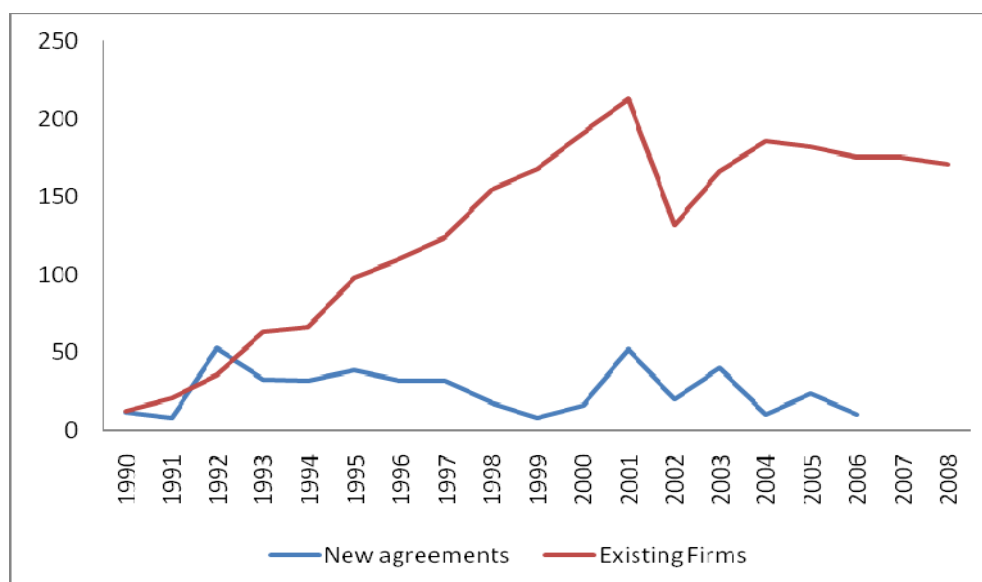
Source: Ralaivelo and Rabe [2009, p.10], Ministère de l'Economie et de l'Industrie [2009a, p.16].

Table 1: Annual Flows of Investment into Madagascar's EPZ (1000 US$)

	1994	1995	1996	1997	1998	1999
Textiles & garments	457.97	9,269.66	5,354.06	6,553.54	9,757.00	17,446.27
IT services	130.85	280.90	1,332.35	760.68	1,399.12	0.00
Food	228.98	725.66	2,837.40	955.72	515.46	0.00
Chemicals	0.00	3,043.07	394.77	409.60	0.00	0.00
Handicrafts	32.71	1,498.13	666.17	97.52	662.74	0.00
Others	196.27	7,865.17	2,072.54	838.70	2,301.18	0.00
Total	1,046.78	22,682.58	12,657.29	9,615.76	14,635.49	17,446.27

|	2000	2001	2002	2003	Total
Textiles & garments	11,363.30	80,650.06	5,915.08	31,180.36	177,947.30
IT services	0.00	0.00	614.93	629.74	5,148.57
Food	5,512.16	3,842.65	2,327.96	21,556.60	38,502.60
Chemicals	0.00	2,020.05	0.00	1,517.84	7,385.33
Handicrafts	0.00	15.19	351.39	0.00	3,323.85
Others	60,235.81	28,341.43	1,024.89	8,251.25	111,127.24
Total	77,111.27	114,869.38	10,234.26	63,135.80	343,434.89

Note: Amounts were initially given in FMG and were converted in US$ at the current exchange rate.

Source: ILO [2004, p.20]

Further attempts were then made to attract FDI using more positive methods, by amending the EPZ promotional law in 1991. As a result, the number of foreign firms receiving EPZ status increased almost sixfold from 1991 to 1992. This upward trend continued for the next ten years, reaching 213 EPZ firms in 2001, before falling to 132 after the political crisis of 2002 (fig.1). As of 2007 there are 175 EPZ firms in Madagascar, mostly located in Antananarivo (91%). Good infrastructure, abundant, diligent and relatively skilled labor, easy access to administrative services and to other sourcing have been the main determinants of location choice.

In terms of capital invested, annual inflows of FDI remained under USD 20 million in the earlier years. Substantial inflows got underway only after 2000, thanks to the eligibility of Madagascar to AGOA. This has also been the case for other African countries such as Mozambique, Kenya and Uganda, and in all of the countries concerned, a large part of FDI was in EPZs (UNIDO [2003]). As Table 1 shows, FDI inflows into Madagascar's EPZ increased almost sevenfold in one year, reaching a peak of USD 115 million in 2001. After a break due to political turmoil in 2002, important inflows continued to pour into the country and from 1994 through 2006, cumulative investment flows into the EPZ amounted to USD 430 million (ILO [2004, 2007]).

Figure 2: Sectoral Distribution of EPZ firms
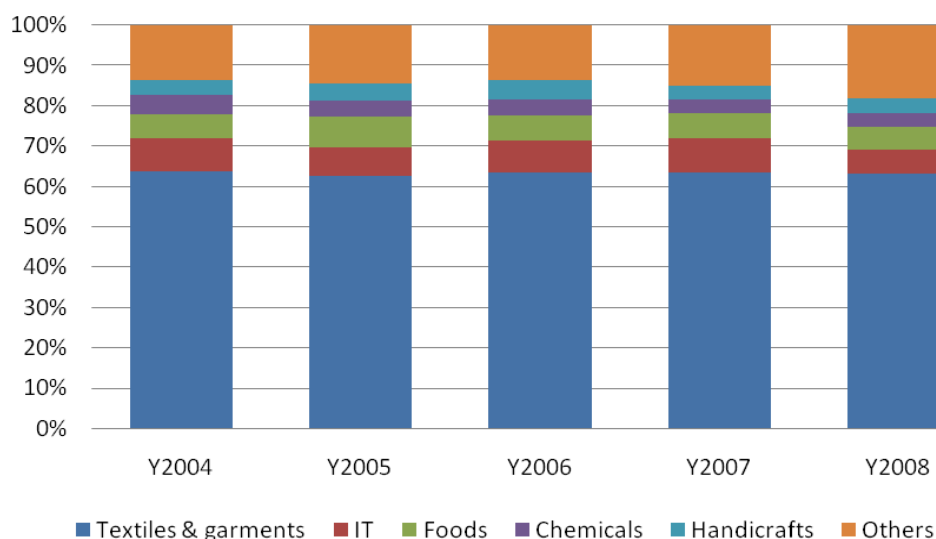
Source: Ralaivelo and Rabe [2009, p.10], Ministère de l'Economie et de l'Industrie [2009a, p.16].

A sectoral breakdown (see Table1 and Fig.2) shows the dominant position of the textiles and garment industry, followed by food, IT products, handicrafts and chemicals. Indeed more than 63% of the EPZ firms belong to the textiles & garment sector, or 46% of total FDI firms in Madagascar as a whole (Banque Centrale de Madagascar [2008, p18]). This pattern has been maintained for a number of years, the main exception being the wood processing industry, which has become increasingly attractive to foreign investors and which by 2007 accounted for 4.6% of the total number of firms.

Most EPZ firms in Madagascar are companies owned by individual shareholders (71.2% of the total), and by country of origin, French have been the main foreign investor in the EPZs, followed closely by Mauritian and Asian investors[3]. However, thanks to the attraction of incentives provided by the EPZ promotional laws, many local firms either invested in the EPZ, or altered their previous status into EPZ status. According to a survey conducted by the GEFP, Malagasy shareholders account for 20% of the total in EPZ firms[4]. A breakdown of ownership for 2006 shows that more than half of the FDI firms were wholly foreign owned, with joint ventures with less than

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[3] According to a survey conducted in 2008 by GEFP, an association of EPZ firms, French accounted for 29.32% of the total number of shareholders in EPZ firms, Malagasy ranked second with 19.9%, followed by Mauritian and Chinese with 15.7% and 11.5%, respectively.
http://www.gefp.com/statistiques.php?id=nationalites_proprietaires.

[4] http://www.gefp.com/statistiques.php?id=nationalites_proprietaires

50% of foreign shares accounting for only 14% (fig.3)[5].

Figure 3: Types of Ownership in Foreign Invested EPZ firms
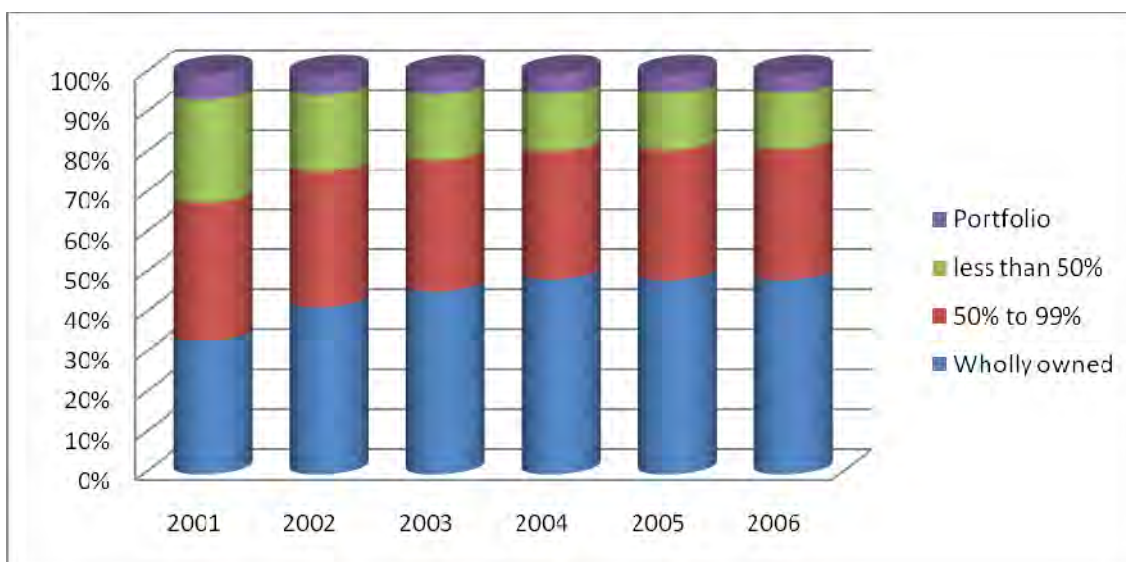
Source : Banque Centrale de Madagascar [2001, 2005, 2006, 2008]

2.2 Performance of EPZ firms in Madagascar

As we have seen earlier, investment in the EPZs started to grow in 1991, with faster expansion from 2000 onwards. During this time frame the Malagasy economy performed poorly, except for the 2006-2008 period during which large FDI inflows into the mining sector occurred. However, sectoral analysis of economic performance shows clearly the outstanding performance of the EPZ, a phenomenon that is largely attributable to the expansion of the garment industry, the most important category of manufacturing in the EPZ. Table 2 and Fig.4 clearly show the rapid growth of industry in the EPZ relative to the rest of the economy. Indeed, for the last three sub-periods, Value-Added (VA) in the EPZ grew at an average rate of 20% p.a, , while that of the secondary sector as a whole was low at around 4% p.a[6]. This situation has also been reflected in the EPZ's contribution to the country's GDP which has doubled after 1996, reaching 5.8% in 2008 (fig.4). In that year, at 15%, the secondary sector's contribution to GDP was highest in Madagascar's history, thanks to the EPZ which accounted for

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[5] Portfolio investment includes equity participation, obligations, mortgage bonds, and other financial market instruments such as stock options.
[6] Secondary sector includes the EPZ.

more than one third of production in the sector.

Table 2: Selected Economic Indicators

Indicators	1991-1995	1996-2000	2001-2005	2006-2008
Annual average economic growth rate	1.22%	3.84%	3.58%	6.06%
Annual growth rate of secondary sector	0.50%	4.60%	2.20%	6.70%
Annual average total export growth	9.84%	13.91%	4.74%	24.93%
Annual average EPZ's VA growth rate	105.34%	17.45%	23.76%	18.73%
Annual average EPZ export growth rate	39.32%	31.14%	29.55%	40.47%

Source: Calculated from the data of the Ministry of Economy and Industry[7]

The role of the textiles and apparel industry is particularly important as it accounts for more than 70% of EPZ's exports. In 2008, total textiles and garment exports amounted to $617 million, or 53.2% of the country's total exports[8]. Europe has been the largest destination for EPZ exports with more than 90% of the market share, reflecting the orientation of Mauritian firms to the European market. However, the American market has increasingly taken an important share of EPZ exports, especially following the enactment of AGOA. Between 1999 and 2008, the United States' share of the Madagascar export market increased from 18% to 48% to (figure 5).

Madagascar's EPZ export dynamism also reflects the strength of its competitiveness in US and EU markets. Whereas most leading African exporters suffered a decline in their exports after the MFA was phased out in 2004[9], Madagascar increased its exports from 2005 to 2007 (figure 5). Depreciation of the domestic currency in the first semester of 2004 also enhanced competitiveness[10]. A World Bank survey has commented on the high regional competitiveness of EPZ firms in Madagascar (Shah et al [2005]).
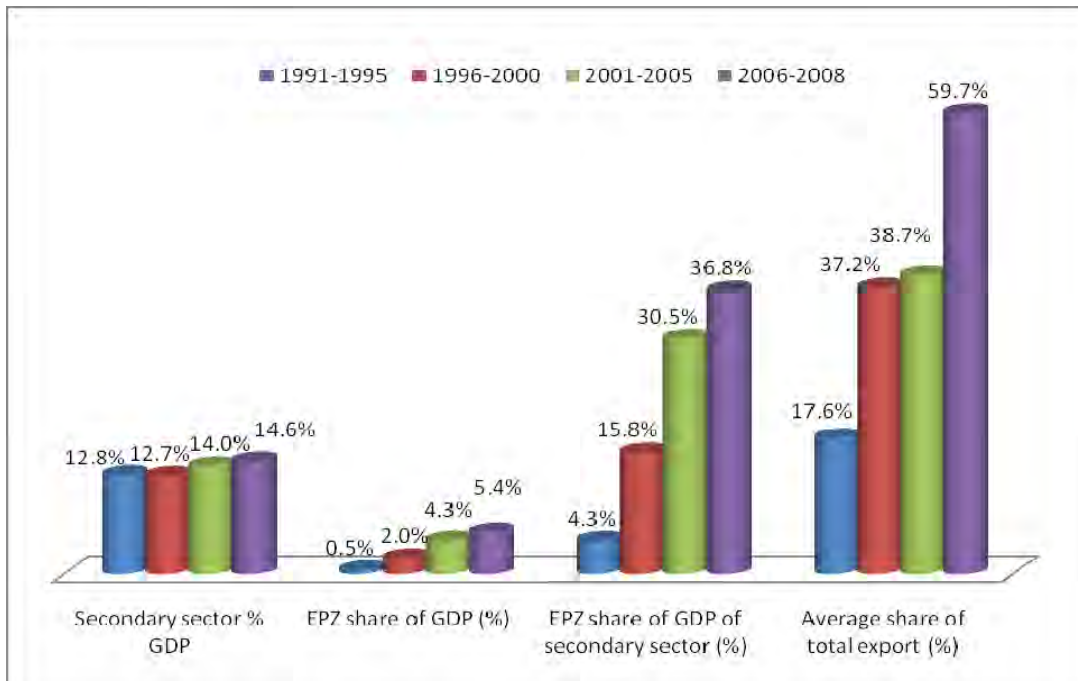
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[7] Ministère de l'Economie des Finances et du Budget [2005], Ministère de l'Economie, du Commerce et de l'Industrie [2008], Base des données Macroéconomiques 1969-2002

[8] Export value is derived from the US and EU reports in UN Comtrade, and the share in total exports is derived from the Malagasy report in the same publication. Though the Malagasy report occasionally shows discrepancies, the figure of 2008 is similar to the data issued by INSTAT, which showed 54.28%.

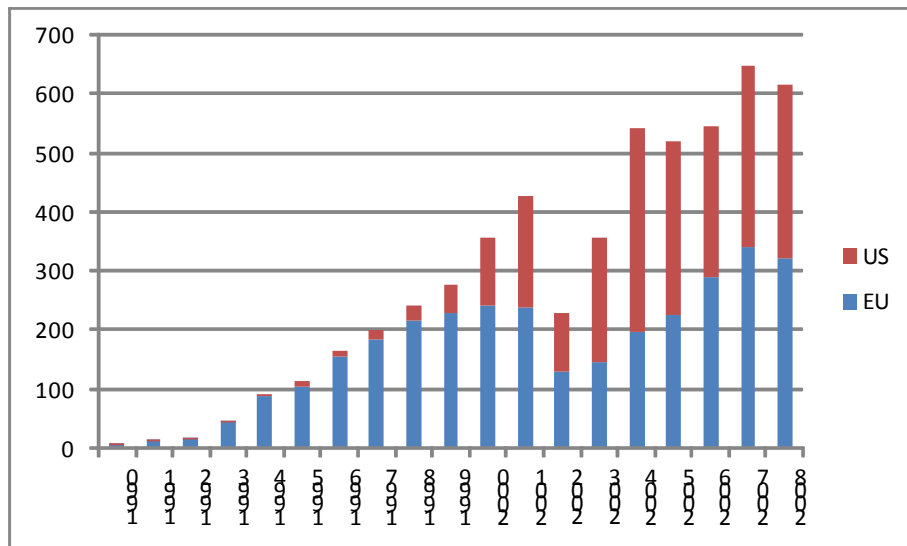[9] Madagascar, Lesotho, Kenya, Mauritius and South Africa.

[10] The depreciation was estimated to be 40%

Figure 4: EPZ Performance

Source: Calculated from the data obtained from Ministry of Economy and Industry[11]

Figure 5: Garment Exports from Madagascar (million US$)

Source: UN Comtrade (US and EU Report)

Another aspect of the performance of the EPZ is their contribution to employment. In 2008, the number of employees in the EPZ amounted to 133,545, with 107,530, or

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[11] Ministère de l'Economie des Finances et du Budget [2005], Ministère de l'Economie, du Commerce et de l'Industrie [2008], Base des données Macroéconomiques [1969-2002]

80.3% of these, working in the textiles and garment industries (Ministère de l'Economie et de l'Industrie [2009a, p.16]). Thus, the EPZ generates more than 20% of Madagascar's total formal employment and 85% of the jobs in manufacturing[12]. Moreover the role of the EPZ in alleviating poverty is far from negligible. Some 62.8% of workers are unskilled while 28.7% are semi-skilled[13]. Based on a survey by GEFP, the average monthly wage per worker is thus estimated to be US$ 72[14]. This figure is not so different from that given in a household survey of 2005, which found an average hourly wage of US$ 0.40 per worker, against US$ 0.28 for non-EPZ firms[15]. This survey also found that wages paid by EPZ firms represented about 20% of their sales while the figure was 8% for the formal sector as a whole. This information indicates the relatively important role of EPZ in alleviating poverty in Madagascar. Labor turnover is also very high at 11,134 workers in 2005, and about 7,000 in 2006, or 5.8% of the workforce (ILO [2007, p52]).

Since the African Growth and Opportunities Act (AGOA) is crucial to the growth of this sector, global economic crisis and the non-eligibility of Madagascar to benefit from AGOA could well result in a marked economic downturn and the rise of social problems. Indeed, economic growth for 2009 was low at 0.2% (against 7.1% in 2008) while in the same year, annual EPZ value-added and exports declined by 4% and 20.4% respectively (Ministère de l'Economie et de l'Industrie [2009b]). Projected job losses due to Madagascar's AGOA non-eligibility are 35,000 to which must be added at least 25,000 indirect job losses. More than 30 firms closed down in 2009 (Ministère de l'Economie et de l'Industrie [2009a]).

2.3 Linkages between Foreign and Local Garment Firms

As told in the previous section, local capital owners also invested in EPZ. Based on preliminary results from our firm survey, among 85 EPZ firms, 56 are fully foreign owned, 23 are locally owned and 6 are jointly owned by local and foreign capital, which consists 65.9%, 27.1% and 7.1% of all samples, respectively (Table 3). In terms of origin of foreign capital, France has the largest share with 31.4% of foreign and jointly owned EPZ firms followed by Mauritius with 27.5% and China including Hong Kong

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[12] The informal sector accounts for 86% of employment in Madagascar
[13] Survey by GEFP and ILO, 2008. http://www.gefp.com/statistiques.php?id=effectifs
[14] According to the survey, the total amount of wages paid to workers in 2007 averaged MGA 1.17 billion, or USD 558,764, per enterprise in 2007.
[15] ILO [2007, p.6]. legal working hours are 178h/month

with 23.5%. With respect to firm management, local presence becomes a little smaller than capital structure. Among EPZ firms, 18 firms responded that their most influential decision maker is Malagasy, while 65 firms replied that it is alien (two firms gave no reply). However, 4 fully foreign owned firms have Malagasy as a most influential decision maker.

Extent of local participation is compared with other garment exporting countries. We conducted a similar survey in Bangladeshi, Cambodia and Kenya in 2009. It revealed that local participation significantly differs among them. In Bangladeshi with the longest history of garment exports and the largest exporter among our four countries, the industry is highly localized. Among 209 firms with information, all firms are locally owned with 100% share. In more than 99% of the samples, a decision maker is Bangladeshi. In Cambodia and Kenya, where surge of export started in the late 1990s, local participation is rather limited. No locally owned firm is found in the both countries, and only 8.8% of firms are jointly owned with foreign capital in Cambodia. A local decision maker is seen in 4.9% of firms in Cambodia, while its share increases as high as 33.3% in Kenya. Local participation in terms of capital and top management in Madagascar is far behind Bangladeshi industry, though it is ahead of the new exporters, Cambodia and Kenya.

Analysis of transaction between EPZ and local firms are in process. We found that 45.1% of EPZ firms subcontract out part of their production, and on the other hand, 54.5% of local firms take subcontract orders. As this includes subcontract between EPZ firms, we will see how much of subcontract order is related with local firms through investigation of individual transaction.

Table 3 Local Participation in Export Firms (%)

		Madagascar	Bangladesh	Cambodia	Kenya
Capital Ownership	Foreign	65.9	0.0	91.2	100.0
	JV	7.1	0.0	8.8	0.0
	Local	27.1	100.0	0.0	0.0
	N	85	203	91	9
Nationality of Decision Maker	Foreign	78.3	99.1	95.1	66.7
	Domestic	21.7	0.9	4.9	33.3
	N	83	232	123	9

Source: Author's calculation from firm surveys.

3. Analytical Framework of Local Firm's Participation to Exports

In this study, we base our work on the framework developed by one of authors in a study of local firms' participation in the export market in the case of Kenya (Fukunishi [2010]). The study considers two aspects of a firm's decision on whether it enters into export markets, namely the learning of technology and knowledge, and investment. Entering export markets is not a simple choice of strategy because it requires a substantial change in the production process and an understanding of the export markets concerned. Thus, firms attempting to launch into exports, even in the form of subcontracting, need to learn the technology required as well as the market conditions. In the technology transfer literature, absorptive capacity is given considerable emphasis, reflecting the importance of the ability of firms to learn.

3.1 Absorptive Capacity

Absorptive capacity refers to the firm's ability to adopt, adjust and operate technology that is available in the world but new to the firm. A firm with poor absorptive capacity may not absorb new technology even under the presence of FDI, or may utilize new technology in an inefficient way. The concept is described in detail in the literature on technical capability, often with ample supporting evidence (Nelson and Winter [1982], Evenson and Westphal [1995]), and is employed in endogenous growth theory, technology choice model and the FDI spillover literature (Nelson and Phelps [1966], Keller [1996], Jovanovic and Nyarko [1996], Glass and Saggi [1998]). The literatures on technical aspects of African firms imply that African firms a have low capacity of absorption (Lall [1999], Biggs et al [1995]).

In the garment industry, subcontracting from FDI firms as well as movement of skilled workers from foreign to local firms have both encouraged learning among local firms. As shown in a Bangladeshi case, most technology and knowledge is embodied in a worker, and the shift of skilled workers to local firms can give such firms sufficient capacity for production and marketing (Rhee and Belot [1989]). Subcontracting from FDI firms provides learning opportunities through transactions, and also alleviates marketing problems for local firms with weak linkages to foreign buyers (Fukunishi [2010]). Hence, the movement of expatriate workers in FDI firms and the availability of subcontract opportunities are crucial for learning by local firms, a factor which will be investigated in detail in this study.

3.2 Investment Decisions

Generally, entering export markets entails investment. If a firm starts production for export markets, it needs to invest in physical capital and possibly in the creation of distribution channels, logistics infrastructure, human capital and the learning of market demand. Under uncertainty in the future profitability of the export market, it is an important issue in export decision whether or not such investment sunk. As Dixit and Pyndick [1994] have argued, if uncertainty is a Markov process and investment is irreversible, a firm may have an incentive to refrain from investment even when expected future profits are greater than the investment value. The standard model assumes that a firm needs to invest sunk cost I when it participates in an export market in cases where it has not exported in the period immediately before making the decision, and the profit from export market, π^f_t, is serially correlated. Let the profit from domestic market be π^d_t, and the decision of export participation be s_t where $s_t=1$ when a firm starts to export. A firm's value function can then be described as

$$V_t = \max_{s_{t+\tau}} \left(E_t \sum_{\tau=0}^{\infty} \rho^\tau \left[s_{t+\tau} \left(\pi^f_{t+\tau} - (1 - s_{t+\tau-1})I \right) + \pi^d_{t+\tau} \right] \right) ,$$

which leads to Bellman's equation

$$V_t = \max_{s_t} \left(E_t \left[s_t \left(\pi^f_t - (1 - s_{t-1})I \right) + \pi^d_t + \rho E_t \left[V_{t+1} | s_t \right] \right] \right) .$$

This characterization implies that a firm participates in exporting whenever

$$\pi^f_t + \rho E_t \left[V_{t+1} | s_t = 1 \right] \geq (1 - s_{t-1})I + \rho E_t \left[V_{t+1} | s_t = 0 \right].$$

This implies that non-exporting firms start exporting when the expected future profits from exports started now are greater than the sunk costs plus expected future profits involved in waiting instead. Since a firm can start exports after $t+1$, the second term in the RHS contains not only future profits of domestic supply but that of export supply, which is called the option value (Dixit and Pyndik 1994). As option value is greater than or equal to zero, a firm has an incentive to wait even if future expected profits in export ,market exceed fixed costs.

The above standard model was modified to fit with the garment industry and with the particular circumstances of the African context in Fukunishi [2010]. First, sunk costs may be negligible. In the case of the garment industry, initial investment is needed mostly for expansion of physical capital, given that subcontracting from foreign firms

does not require long logistics, distribution channels in foreign countries and custom clearance. Moreover, there is a secondhand market for equipment in Kenya.[16] If this holds true of Madagascar as well, the decision problem is static given the substantial reversibility of investment.

Second, however, if we consider credit constraints, the problem becomes more complicated. Credit constraints are significant among African firms, and it has received considerable attention in the FDI spillover literature. A firm suffering from credit constraints may find it difficult to finance investment for launching into the supply to export markets or to multinational firms (Javorcik and Spatareanu [2009]). There is a minimum production scale for export production, which is likely to be larger than the average scale of output of local firms. A firm unable to finance a minimum scale of production cannot participate in export markets. And given the exchangeability of equipment between domestic and export supply, moderately credit-constrained firms may manage to put together the minimum amount of capital by utilizing the capital currently used for supplying the domestic market, that is, they start export in exchange of domestic supply. On the other hand, those with good credit access can finance export production facilities in addition to domestic production facilities, as assumed in the standard model. It follows that the degree of access to credit substantially affects the resolution of the export decision problem. For purposes of convenience, we hereafter call the firm that is not able to finance minimum capital a Type 1 firm, the moderately constrained firm a Type 2 firm, and the firm with good credit access a Type 3 firm. For Type 2 firms, the export decision problem becomes in essence a matter of choosing between concentrating on either the domestic or the export market.

Fukunishi [2010] has introduced a positive sunk cost for the domestic market, insofar as reentrance to it requires rebuilding relationships with buyers due to the strong linkages between buyers and suppliers. Because the number of suppliers is small in the Kenyan garment market and because uniforms are the main products of the local producers, close and frequent contact with buyers is essential to satisfy customer-specific specification. This means that linkages between buyers and suppliers are relatively stable.

Let us assume a positive sunk cost for reentrance to the domestic market, $W>0$, no sunk cost for entering the export market, and reversible physical capital. Now cost of

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[16] Second hand machines can be found in retail shops in Kenya. In our survey, most respondents replied to the question about the resale value of equipment.

capital is incorporated in profit as a rental cost, and thus, Bellman's equation for a Type 2 firm is

$$V_t = \max_{s_t}\left(E_t\left[s_t\pi_t^f + (1 - s_t)(\pi_t^d - s_{t-1}W)\right] + \rho E_t\left[V_{t+1}|s_t\right]\right),$$

and a firm selects to export when the following condition is satisfied:

$$\pi_t^f \geq \pi_t^d + s_{t-1}W + \rho\left(E_t\left[V_{t+1}|s_t = 0\right] - E_t\left[V_{t+1}|s_t = 1\right]\right). \tag{1}$$

This condition differs from the one based on the standard model in several respects. First, given that sunk cost applies to the domestic market rather than to the export one, the critical profit level at which a firm opts for the export market is higher for exporters than for non-exporters. The critical value for exporters is

$$\pi_E^{f*} = \pi_t^d + W + \rho\left(E_t\left[V_{t+1}|s_t = 0\right] - E_t\left[V_{t+1}|s_t = 1\right]\right)$$ and they now take into account sunk

cost W, while one for non-exporters is $\pi_N^{f*} = \pi_t^d + \rho\left(E_t\left[V_{t+1}|s_t = 0\right] - E_t\left[V_{t+1}|s_t = 1\right]\right)$

and they do not. Second, as the problem is one of choice between two markets, the profit from exports is compared with the profit from the domestic market. It is noted that the third term in the RHS of (1) is the difference of expected future profit when $s_t = 0$ and $s_t = 1$, and it is necessarily positive for non-exporters at t. By remaining in domestic supply at t, a firm can avoid the possible loss that exporters will incur at $t+1$ in case $\pi_{t+1}^f < \pi_E^{f*}$, while it can switch to the export market without sunk cost whenever that becomes more profitable. Therefore, $E_t\left[V_{t+1}|s_t = 0\right] > E_t\left[V_{t+1}|s_t = 0\right]$ holds and the

last term in (1) is positive. A reservation needs to be made in cases where the future profit (π_t^f) follows an upward trend. Learning-by-exporting is a typical case: firms supplying the export market necessarily improve their productivity faster than non-exporting firms, and hence, future profits grow more quickly. [17] Then, the last term in (1) can be negative. If the learning-by-exporting effect is not substantial, the participation condition (1) indicates $\pi_t^f > \pi_t^d$, that is, a non-exporter does not switch to an export market unless current export profits exceed current domestic profits. On the other hand, given the small amount of sunk cost for export participation, the decision problem confronted by Type 3 firms is likely to be static, and they start exporting when the current export profit is positive.

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[17] The empirical evidence for learning-by-exporting is somewhat mixed.

The above model assumes risk-neutral firms, but the literature on Africa shows that firms are risk averse because of poor access to credit (Collier and Gunning [1999], Bigsten et al. [2003]). Because of stronger linkages between buyers and suppliers in the domestic market, it is reasonable to assume that domestic profits are more stable than export ones, and risk-averse firms prefer the domestic market if expected profit is the same. In that case, the critical profits level that triggers export participation (π^{f*}_N) raises by the amount of risk premium determined by the difference in perceived risks in the two markets and the degree of risk aversion of individual firms.

4. Concluding Remarks

Textile and garment industry is dominant in terms of production, exports and employment among the secondary sector in Madagascar. Also it is an only industry that foreign technology and knowledge is accessible. We expect that investigation of the industry will reveal impact of FDI on local firms, and potential problems and advantages that local firms have in order to realize technology transfer.

We expect that our firm survey will shed light on the linkages between FDI and local firms, which has not been explored yet. The survey also collects production information such as input, output and working days. This will enable us to estimate production function or cost function, and based on these functions, expected profits in export market will be estimated incorporating characteristics of local firms. Then, local firm's decision making will be investigated based on the estimated expected profits. Information about access to credit and absorptive capacity of local firms is somewhat qualitative, and will be collected through interviews with local firms.

Malagasy textile and garment industry is confronting the most serious downturn since 2001 due to the suspension of AGOA. This downturn as well as one in 2001 has been caused by political turmoil related to transition of regime. Not to mention, positive impact of FDI on local industry will be totally damaged in such situations. We hope that political stability will be retrieved soon and local entrepreneur will make decision under predictable environment.

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