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Chapter 7

Madagascar's Garment Industry: Success of Africa's Garment Exports? †

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Abstract

Madagascar is an exceptional case in sub-Saharan Africa in the development of its export-oriented manufacturing sector, namely its garment industry. This chapter aims to demonstrate its success in terms of exports and employment creation during the 1990s and 2000s and the difficulties that the industry has experienced since the political turmoil in 2009. This interim report presents the preliminary results of the original firm surveys as a step to the final version.

We found that production and employment underwent a considerable drop in 2009. Production for export decreased by 30.7%, the number of jobs fell by 19.5%, and real wages for low-skilled jobs fell by 12.7%. While these changes indicate the adverse effects of the turmoil on the poor, they also incorporate the effect of the financial crisis. A full analysis incorporating the effect of suspension of duty-free access to the US since 2010 will be presented in the final version.

Keywords: *exports, conflict, employment, wage, Madagascar*

† The description and statistics in this report are subject to change in the final version. Please contact the authors before citing this paper.

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1 Introduction

1.1 Purpose of the Study

In contrast to other developing regions around the world, the export-oriented garment industry has not grown in sub-Saharan Africa, with the exception of a few countries. The preferential access to the US market gained in 2000 through the African Growth and Opportunity Act (AGOA) stimulated substantial foreign direct investment in some African countries, particularly Lesotho, Kenya and Swaziland which experienced a drastic increase in garment exports, but the growth did not continue after the termination of the Multifibre Arrangement (MFA) in 2005. One of the few exceptions in Africa is Madagascar, which initiated garment exports in the early 1990s and sustained its export growth after the MFA phase-out. In the 2000s, apparel products accounted for more than 50% of commodity exports, and the garment industry employed more than 100,000 workers. Among the African countries depending heavily on primary commodity products for their exports, Madagascar is regarded as a successful case of industrialization (Sachs 2005, Collier 2007).

Diversification of industrial structure has been a central issue in economic development since the 1960s, underpinned by the Prebish-Singer Thesis, and particularly in Africa, it has recently been revived after decades of structural adjustment policy. The recent studies discussing development strategy for African countries stress the importance of diversification of industrial structure based on the serious concern of over-reliance on primary commodities (i.e., the “resource curse” argument), and some of the studies clearly identify development of labor-intensive industry as a trigger of industrialization (Collier 2007, UNCTAD 2008, Commission on Growth and Development 2008). Not only is Madagascar a successful case of industrialization, but its experience seems to inject reality into the argument for diversification. During the 1980s and 1990s, development of the manufacturing sector was not seriously pursued in Africa, partly because of the belief behind the structural adjustment policy that industrial structure follows comparative advantage. However, it was also regarded as unrealistic given the few successful cases of export-oriented manufacturing sectors in Africa. Therefore, the success of Madagascar suggests potential for industrialization in Africa.

One interesting issue that stands out among the others is the implications for poverty and economic growth. Until the termination of the MFA, Madagascar’s garment industry enjoyed growth except during the temporary decline caused by the political

conflict in 2002. However, after 2005, the industry experienced several significant shocks, namely trade liberalization in the apparel market and the growth of China, the financial crisis, and ongoing political turmoil since 2009. The political turmoil in Madagascar was triggered by a collision between the president and the former mayor of Antananarivo, which resulted in replacement of the president without elections. This not only caused a degradation of public services but also provoked the cancellation of the AGOA by the US government. The cancellation resulted in a massive reduction in exports to the US market and, accordingly, employment in the industry. Given those recent shocks, the sustainability of growth and employment may be adversely affected.

A few empirical studies analyzed industrial performance and the welfare of garment workers in Madagascar during the period before the MFA termination. Studies of industrial performance are limited to those using industry-level data which shows the growth of production until 2004 (Cling et al. 2005, Ralaivelo 2006). Using labor survey data, some studies investigated the impact of employment in the export processing zone (EPZ), which is comprised mainly of garment firms, and concluded that increased employment particularly benefited women who have few formal employment opportunities (Glick and Roubaud 2006, Nicita 2006, Cling et al. 2005). Study of firm-level performance is absolutely lacking due to absence of data, and the recent shocks due to the political turmoil have not yet been investigated.

The purpose of this chapter is twofold. Firstly, we provide an assessment of the Madagascar garment industry prior to the political turmoil in terms of its contribution to the economy and poverty reduction through employment, as an instance of a successful case in Africa. Secondly, we attempt to analyze the change in the garment industry caused by the political turmoil and cancellation of the preferential access to the US. Our focus is on changes in firm performance, firm turnover and influence on employment and wages, particularly for low-skilled workers. We expect that our analysis will reveal the adverse impact of political confusion on the export-oriented industry, and given the considerable role of the industry in poverty reduction, it will demonstrate how the turmoil dampened income opportunities for the poor. Also, from the view of industrialization, our analysis demonstrates the true competitiveness of Madagascar's industry without exclusive advantage, and on the flip side, evaluates AGOA's effect on export promotion and employment generation.

In this interim report, we present basic information and the results of the preliminary analysis as a basis for the final version. Despite the richness of firm-level information, a difficulty lies in the identification of causation between the political

turmoil and the observed changes in the industry (for example, reduction of exports) since all the garment firms are affected by it. We have better prospects for the identification of the impact of the AGOA cancellation given that the EU market continued to grant duty-free access to Madagascar. In this report, we do not explicitly tackle the first problem, leaving it for the final version. It is noted that the statistics in this report are based on our original firm data and are not yet finalized, and hence, the statistics are subject to change in the final version. We strongly advise readers to bear this in mind when reading this chapter.

1.2 Data

A series of firm surveys was conducted from 2009 to 2011 by the authors with the cooperation of the industrial association in Madagascar. Each survey collected information concerning the fiscal year that immediately preceded, i.e., FY2008, FY2009 and FY2010, and we used information from FY2008 and FY2009 (hereafter, survey 2008 and 2009) in compiling this report. The firm data for 2008 includes 98 factories of export-oriented garment firms regardless of EPZ status and 19 non-exporting firms which were randomly sampled from the firm list.[1] The factories visited in 2008 were followed in 2009, when we obtained information from 86 firms and found that 23 firms had exited.

It is noted that a non-negligible number of firms exited in between the surveys, and because of the gap between the timing of firm visits and the time that firm information represents, information on exiting firms pertaining to the year immediately before the exit is missing. For example, information concerning FY2009 was collected in mid-2010, and we could not contact 23 firms that had exited before mid-2010. We do not deal with a possible selection bias in this report, though in analysis of employment changes, we excluded exiting firms from the sample so that reduction due to missing observations is not reflected.

2. Success of Garment Exports: The 1990s and 2000s

2.1 History of Garment Exports: Trends, policies and economic outcomes

[1] There are exporting firms without EPZ registration. The EPZ list contained 131 firms in 2008, and our sample represents 64.9% of those firms.

Five decades after independence, Madagascar, like the majority of Sub-Sahara African countries (SSACs), falls in the category of Least Developed Countries (LDCs) as 76.5% of the population is living in absolute poverty.[2] The manufacturing industry has suffered greatly, as the low growth of value added (VA) in the secondary sector reveals (Table 1). It appears that various economic policies - ranging from large-scale industrialization based on an Import Substituting (IS) strategy in the 1970s, through the Bretton Wood Institutions (BWIs)-backed Structural Adjustment Program (SAP) in the 1980s, to liberalization policies since the 1990s – were unsuccessful. However, the period starting from the mid-1990s deserves special attention as the Malagasy economy began displaying positive outcomes, especially in the industrial sector. Indeed, Madagascar was encouraged to mobilize external financial resources, in addition to those provided by the World Bank and IMF, to ease financial constraints on growth. The enactment of the Export Processing Zone (EPZ) promotional laws in 1989 was one great initiative among others, leading to the spectacular growth of manufacturing activities in the EPZ, in particular in the garment industry.

In the garment and textile industries, COTONA, SOTEMA SUMATEX were the leading companies in Madagascar in the 1970s and 1980s. The local market for garments was shared by the informal sector and these three firms. A severe economic crisis and the further economic liberalization which accompanied SAP resulted in the decline of the textile and garment industry in Madagascar.[3] A strong need for economic recovery compelled the country to promote the inflow of Foreign Direct Investment (FDI). Thus, export-oriented FDI was particularly encouraged through the enactment of the EPZ promotional law (No. 89-027) which was enacted on December 29, 1989, and which was amended in 1991 to further boost its attractiveness. As a result, the number of foreign firms receiving EPZ status increased by 26 times within ten years, from 8 in 1991 to 213 in 2001 (Ralaivelo and Rabe 2009, 10; Ministère de l'Economie et de l'Industrie 2009, 16). The eligibility of Madagascar for the AGOA in 2000 was crucial to substantial flows of FDI into the EPZ.

It is worthy of note that the garment industry accounts for the majority of firms

[2] Seven percent higher than in 2005 (INSTAT 2011a).

[3] The two largest textile and garment companies (SOTEMA and SUMATEX) WENT bankrupt, while the third one (COTONA) became increasingly less competitive in fabrics and shifted gradually toward producing garments in partnership with Mauritian producers. Second-hand clothes from Europe, and later garment products from China, started invading the local market, thereby displacing informal producers.

and capital invested in the EPZ.[4] Just one year before the political turmoil, 63% of registered firms were in garment industry (Figure 1). Therefore, it is correct to assert that the EPZ's performance is largely attributable to the garment industry's performance.

Such substantial capital flows into the garment industry should generate significant economic outcomes for the country. As was stressed earlier, Madagascar is an LDC, and as Table 1 shows, its economy has performed poorly since 1991.[5] This may lead to the hasty conclusion thatEPZ (and garment)-focused export promotion policy failed. However, as will be shown, this is not the case, and the reasons for the country's poor economic performance can be found elswhere. Indeed, the EPZ's, and therefore the garment industry's, economic outcomes are thought to be very significant in many aspects.

Firstly, the EPZ is fast a growing sector, as shown by the fact that value added increased, on average, by 20% annually until 2008, or five times that of the secondary sector as a whole (Table 1).[6] Moreover, the EPZ was able to recover quickly from the 2002 political crisis and registered its highest growth in during 2001 to 2005, whereas growth in the secondary sector was significantly curtailed despite the fact that this crisis was shorter than the one of 2009 (Table 1). Thanks to the EPZ's extraordinary growth, the secondary sector's contribution to GDP increased from 12.8% in 1991-95 to 14.6% in 2006-08, with the EPZ supplying 36.8% of the value added in the whole secondary sector, representing an increase of about nine times from its level fifteen years prior (Figure 2). The highest economic growth Madagascar has ever known in its history occured during 2006 to 2008 when the secondary sector became more dynamic than it ever had been since independence.

Secondly, EPZ firms have the highest level of productivity within the manufacturing industry in Madagascar. According to a World Bank survey in 2005, with an average labor productivity of US$4,955, they are 1.7 times more productive than non-EPZ firms (Shah et al. 2005, 29).

Thirdly, the EPZ's high productivity is reflected in its competitiveness achieved through export dynamism. Except in 2002, the EPZ's exports grew at extraordinarily fast rates, reaching 40.4% annually a few years before the eruption of the 2009 political

[4] In 2001, the garment industry accounted for 70% of the total investment in the EPZ (ILO 2004, 20), whereas 90% of the total outputs of the EPZ consisted of clothing (Banque Centrale de Madagascar 2002).
[5] Exceptionally high rates of economic growth occurred during 2006 to 2008.
[6] The secondary sector includes the EPZ.

turmoil (Table 1). From 2004 onwards, manufactured products in the EPZ (mostly garments) overtook over primary commodities as the largest source of export earnings, and despite the global financial crisis, they accounted for 74.3% of total exports in 2008.[7] Therefore, Madagascar has been advancing successfully towards industrial transformation, which is greatly attributable to the strong dynamism of garment exports. Indeed, the garment sector accounted for more than 70% of the EPZ's exports and 54.3% of the country's total exports in 2008, or US$616.4 millions (Figure 3). Moreover, after becoming eligible for the AGOA in 2000, Madagascar accelerated its exports to the US market at the expense of the European market, whose share fell from 82.3% in 1999 to 52.5% in 2008. Madagascar became the second-largest garment exporter in Sub-Saharan Africa, just behind Mauritius (Cling et al. 2004). All these facts demonstrate the strong export dynamism as well as the increasing competitiveness of Madagascar's garment industry in the two leading markets of the US and Europe. It is also well understood that, unlike other leading African exporters, those of Madagascar have successfully dealt with the phasing out of the MFA, as substantiated by the fact that exports continued increasing after 2005 (Figure 3).

Fourthly, linkage effects - via demonstration along with the imitation process as well as subcontracting- are another aspect of the success of the garment industry in Madagascar. Since the EPZ promotional law is aimed primarily at attracting FDI, EPZ firms were, at the beginning, wholly foreign owned, essentially by French and Mauritian investors. Malagasy firms started investing in the EPZ, and they accounted for 11% of the total firms in 1997 (Cling et al. 2004). Linkage effects became more important throughout the 2000s as 23.3% of EPZ firms were owned by Malagasy in 2008 (Fukunishi and Ramiarison, 2011). Moreover, local firms accounted for 28% of exporting firms, meaning that linkage effects reached firms outside the EPZ.[8] Local exporters are as efficient as foreign ones in terms of capital intensity, labor productivity and profit share to value added, thereby demonstrating the effectiveness of the learning process.[9] The learning process was accomplished through imitation, subcontracting and labor mobility. Indeed, 70.4% of local exporters engage in subcontracting or hire foreign managers and workers in order to benefit from foreign knowledge and expertise (Fukunishi and Ramiarison 2011).

Unfortunately, the 2009 political turmoil, by creating uncertainties and leading

[7] Calculated from the data of INSTAT, www.instat.mg.
[8] This figure is higher than that of Cambodia and Kenya.
[9] For a detailed explanation, see Fukunishi and Ramiarison (2011).

to AGOA suspension, inflicted lasting damage on the garment industry, thereby jeopardizing its success and prospects. Indeed, as Table 1 shows, all selected indicators are red, and it appears that EPZ firms suffer the most. Whereas the secondary sector's value added growth averaged -2.6% annually during 2009 through 2011, that of EPZ firms regressed by 13.5% annually. The reason is that the extractive industry, which is included in the secondary sector, exhibited unusually high growth ranging from 14.3% in 2009 to 121.3% in 2010 (Ministère de l'Economie et de l'Industrie 2011). The EPZ's contribution to GDP decreased by about 20% (Figure 2). The most significant damaging effects were on exports. Thus, the EPZ's share of the country's total exports fell to 44.5% (Figure 2), and textile and garment exports amounted only to US$311.3 millions in 2010, about half of the 2008 level (Figure 3). Much of the decrease is attributable to the drop in exports to the US market, which dropped about 80.3% from 2008 to 2010, reducing the share of US market to a mere 18.7% in 2010.

2.2 Characteristics of Garment Firms

Due to lack of detailed micro data, firm-level characteristics for Madagascar's garment industry are unknown. In this subsection, firm characteristics are described based on our 2008 survey.

The majority of our sample consisted of foreign-owned firms, reflecting a large and sustained inflow of FDI into the garment sector. Among the 118 samples, 71 firms were owned by foreign owners and 47 firms were domestically owned, with firms jointly owned by foreign and domestic owners being classified based on the majority owner (Table 2). Most of the foreign firms were registered as EPZ, while local firms were split between EPZ and non-EPZ firms. In our random sample of EPZ firms, local firms constituted a 23.2% share. The share of local firms among exporters (both EPZ and non-EPZ) was 27.2%.[10] As for the origin of foreign firms, Mauritius accounted for the largest share, followed by France. While these two countries dominated the scene with about 56% of foreign firms, the next group consisted of those from East Asia, including China, Hong Kong, Korea and Taiwan (Table 3). About half (51.4%) of the foreign firms were subsidiaries of multinational firms based in other countries, and the

[10] EPZ and non-EPZ firms were randomly sampled from different lists, but we do not know the exact share of each in the population. This is because the latter list includes firms with fewer than 10 employees, which are not our focus, and those closed at the time of survey. Hence, if the share of local exporters differs by EPZ status, our results across EPZ status are biased.

remaining half were independent in terms of capital ownership. Most of these independent foreign firms were owned by Mauritian and French nationals who had a long-standing business relationship with Madagascar.

All EPZ firms produce garments for the export market since the products must be exported to maintain EPZ status. There were also a substantial number of exporting firms among the non-EPZ firms, and these firms constituted 40.6% of our non-EPZ sample (Table 2). Among the exporters, 37.4% of firms did subcontract work at least as a part of their production, and this indicates the prevalence of subcontracting. Although subcontracting does not entail logistics for delivery of products to foreign countries, the production system is similar to the one adopted in firms exporting directly, which is suitable for producing large volumes with short lead times and satisfying the quality requirements of foreign buyers. This is different from the production system for the domestic market, which is designed for small-volume production with domestic quality.

Exporting firms supply mostly to the EU and US markets. Table 4 shows the number of exporting firms by market orientation as of FY2008. It indicates that 46 exporting firms out of 99 (46.5%) supplied the EU market, while 21 of them (21.2%) supplied the US market. The number of firms supplying both markets was 15 firms (15.2%), and the remainder of the firms supplied Madagascar, Mauritius and China, which means that they subcontracted from assemblers in those countries.[11] Thus, the majority of firms supplied the EU market, and it is noted that a few exporters supplied both the EU and the US markets.

Market orientation is somewhat related to origin of capital. Firms supplying the EU market are mainly comprised of those owned by European, local and Mauritian capital. In contrast, the majority among firms supplying the US market consists of those originally from Asia. This reflects the fact that Mauritian and European firms maintain a stronger network with European buyers than with US buyers. On the other hand, the US is the top market for Asian firms. This implies that Asian firms invested to take advantage of the AGOA that allows use of Asian fabrics.

The age of firms is very similar among local and foreign firms. The average was 8.0 years for local firms and 7.1 years for foreign firms as of 2008 (age of holding companies is not considered). Half of the firms in both groups were less than five years old, and all firms except for two local firms were less than 20 years old. Considering the

[11] It is noted that respondents were requested to answer questions about the supply market by types of products, but subcontractors' replies could indicate either the country of the buyer or a final overseas market.

history of the garment industry, it is comprised of very young firms and this age profile implies a high firm turnover.

Firm size differs significantly by the owners' nationality. Average-size foreign firms produced US$4.0 million in gross products and US$2.4 million in value added, earned US$1.5 million in profits and employed 868 workers. The largest exporting firm employed 5,150 workers (Table 5). On the other hand, average-size local firms yielded US$980 thousand in gross products and US$646 thousand in value added, earned US$440 thousand in profits and employed 188 workers. Foreign firms were roughly four times larger than local firms in terms of sales, value added, profit and number of workers. It is noted that our profit estimates are obtained by subtracting all reported costs except tax from sales, and thus any costs not reported, for example rent for land used for a factory, are included in profits. Most firms made a positive profit before tax. The percentage of the firms posting positive profits was 91.4% of the exporters. Despite large gaps in firm size, it is noted that labor productivity does not differ significantly.

2.3 Impact on Poverty

The authors' previous paper provides a detailed analysis of the contribution of the garment industry to poverty reduction (Fukunishi and Ramiarison, 2011). It is well understood that the garment industry acts as non-negligible means to combat poverty through productive employment creation, which allows workers to earn income high above the poverty lines. Thus, the EPZ had so far created 107,530 jobs in 2008, the equivalent of 20% and 85% of jobs in the formal sector and the manufacturing sector, respectively (Ministère de l'Economie et de l'Industrie 2009, 16). It is worth noting that the garment industry accounted for 94% of total employment in the EPZ in 2008 (Ralaivelo and Rabe 2009, 14). From the 2008 survey, 76.7% of employment in the garment industry consists of non-skilled positions, namely operators and helpers, and semi-skilled positions or supervisors. The garment industry is thus an important source of employment, especially for unskilled persons.

The garment industry's potential for reducing poverty may be appreciated by looking at the wage levels and the accessibility of poor to employment in this industry. As for the wage level, it is argued in the authors' previous paper that average monthly wages in each of the above-mentioned positions in 2008, which ranged from US$54.2 to US$108.5, are higher than either the national or international poverty lines (Table 6).[12]

[12] In 2008, national and international poverty lines were 32,117 ariary (US$18.8) and 64,063

This is consistent with other empirical studies which revealed the high wages paid to workers in the EPZ, even higher than in other activities in the formal sector in some cases (Glick and Roubaud 2006; Cling et al. 2005). The EPZ's workers also received much higher income than those in the agriculture sector, which accounted for more than 80% of employment. Thus, employment in the garment industry provides income that can feed a family of three to six persons.

As for job accessibility, the 2008 firm survey revealed that poor people can easily secure high-paid jobs in the garment industry because, unlike in other industries, lack of relevant experience and education do not constitute a serious barrier to job seekers. Indeed, 74.7% of firms do not set any requirements in hiring helpers. In addition, helpers with less than one year of experience have a greater chance of being promoted to a higher position (operators) in 67.8% of firms, thereby receiving a raise from US$51 to US$80 per month. Moreover, the gender gap is not relevant either, and female as well as male workers have the same chance to access high-paid jobs in the garment industry. This is supported by previous studies by Glick and Roubaud (2006) who argued that EPZ firms offered higher income opportunities for vulnerable persons in the informal sector, namely those with a low level of education and women.

However, poverty not only involves wage issues. In most cases, critics of EPZ firms focused on working conditions. For example, Ralaivelo and Rabe (2009; 17) argued that employment is precarious, as indicated by high labor turnover in the EPZ. Indeed, workers with less than three years of experience accounted for 90% of workers in 2008, while those with less than one year of experience stood at 23%. The 2008 firm survey found a similar figure for operators (23.9%) and an even higher rate for helpers (41.8%). However, the same survey showed that this situation is more likely to be related to the garment industry as a whole than to the EPZ itself. In fact, the percentage of operators and helpers with less than one year of experience was higher in non-EPZ firms (26.7% and 50%, respectively) than in EPZ firms.[13] Ralaivelo and Rabe (2009; 18) stressed that firms usually utilize "technical unemployment" (laying off part of their workforce) during the off season (October-January), and 50 EPZ firms did so in 2008. In addition to high labor turnover, long working hours were singled out as another aspect of poor working conditions in the EPZ (Ralaivelo and Rabe 2009; Glick and Roubaud 2006).

Nonetheless, the garment industry offers accessible and effective earning

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ariary (US$37.5) per month, respectively (Fukunishi and Ramiarison 2011).

[13] 2008 firm survey.

opportunities for uneducated and inexperienced poor people, especially for the most vulnerable workers in the informal and agriculture sectors. In that sense, the garment industry in Madagascar has real potential to be a force for poverty reduction, though working conditions need to be improved to allow more secure employment. This finding is shared by the above-mentioned previous empirical studies. However, as was stressed in Section 2.1, political turmoil put a halt to this industry's outstanding and promising performance. Therefore, the garment industry's contribution to poverty reduction has been negatively affected as well.

3. Industry after the Political Turmoil in 2009

Political confusion erupted in 2008 due to the conflict between President Marc Ravalomanana and Andry Rajoelina, Mayor of Antananarivo. Rajoelina criticized Ravalomanana for his abuse of power in the political meetings in Antananarivo which attracted tens of thousands of citizens. Amidst increasing tension with violent attacks on public buildings, the army, supporting Rajoelina, attacked and occupied the President's House in March 2009, and this led to the resignation of Ravalomanana and to Rajoelina being inaugurated President in a transitional government. The United States and many other countries, as well as the African Union, did not recognize the change in the presidency, which took place without a democratic election, and thus the US government suggested the suspension of Madagascar's eligibility under the AGOA. Although eligibility was maintained through 2009, the US has suspended the AGOA for imports from Madagascar since 2010, given insignificant progress toward the holding of elections.

In this section, we describe the changes in industry following the political turmoil that began in 2009. We split the changes into those that occurred in 2009 and those after 2010, as the latter changes reflect the cancelation of the AGOA. The changes in 2009 were explored based on our firm data, while the changes after 2010 mainly rely on trade statistics because the firm data of 2010 is not yet available.

3.1 Changes between 2008 and 2009

3.1.1 Firm Performance

The second round of the survey for collecting FY2009 firm data took place in 2010, and

thus the number of the samples was significantly reduced, reflecting the exit of firms in 2010. The sample selection bias is likely to be significant because firms with bad performance in FY2009 were likely to exit in 2010. In this subsection, we simply present statistics without adjusting for sample selection bias.

Among our samples, reduction of production is substantial. The average gross product declined by 27.7% at foreign firms and by 39.5% at local firms (Table 7). Total gross product over all the samples fell by 39.9%, which is larger than the reduction in garment exports during 2009 (18.0%).[14] Though the data may contain measurement errors, there are some possible factors yielding the gap. Our data includes production through subcontracting between firms in Madagascar, which is not counted in trade data. The reduction of value added is also substantial. Compared with output, reduction in employment is far smaller, at 9.4% for foreign firms and 14.5% for local firms. Accordingly, labor productivity dropped.[15]

It is noted that these changes may reflect the financial crisis that substantially impacted the US and EU markets as well as the political turmoil. Garment imports in those markets fell by 10.6% in 2009 (UN Comtrade), and most exporters also experienced negative growth.[16]

3.1.2 Employment Changes

According to an estimate by the Ministry of Economy and Industry, there were about 33.3% direct job losses in the apparel industry in 2009 (Ministère de l'Economie et de l'Industrie 2009), and our surveys contain more detailed information. For more accuracy in assessing the employment change, our comparison is based on surviving firms because the second survey reflected firm exit in the first half of 2010. Data analysis found that employment in the garment industry had fallen by 19.5% in 2009, with the most important losses found at non-exporting firms (Table 8). Among exporting firms, those exporting to Europe were less affected by the crisis as the rate of job losses is only 8.2% of the 2008's level. The figure for US market-oriented firms is 20.8%. This differential in job losses is reflected in the change in exports in the two leading markets, which were down 12.1% for the EU and down 24.4% for the US

[14] Calculation of the total gross product is based on the sample that appears in the both surveys so that change does not incorporate exiting firms in the first half of 2010.
[15] A matched comparison based on the surviving firms showed similar trends. On average, gross production contracted by 30.5% at foreign firms and 34.5% at local firms, and labor productivity fell by 13.8% and 24.0%, respectively.
[16] See Table 2 in Chapter 1.

(Figure 3).

Post-analysis reveals firms' response to the crisis. Thus, it appears that firms cut relatively more jobs in semi-skilled positions (supervisors) than in non-skilled ones (operators and helpers). Moreover, this is especially the case for exporting firms, which accounted for more than 80% of our samples in the two surveys. As Table 8 shows, employment of supervisors at exporting firms fell by 31% whereas that of operators and helpers declined by 18% and 19.5%, respectively. By contrast, non-exporting firms favored relatively more job cuts in non-skilled positions, as displayed in Table 8, meaning that the crises were more severely felt by these firms, such that they had to lay off a significant number of operators and helpers as output fell drastically. Indeed, data on the output drop shows clearly that it had much more impact on non-exporting firms (-56.2%) than on foreign exporting ones (-20.2%). Economic data released by the Ministry of Economy and Industry also confirmed the differential impact of the crisis by export status, as indicated by the change in value added.[17] This suggests that the domestic market was adversely affected more than the export market by the political turmoil. Even in the export market, market orientation appears to be the determining factor in the significance of job losses. Unlike US market oriented firms, those exporting to the EU cut jobs for supervisors and helpers in the same proportion (-6.2%), and were even able to increase the number of operators.

Firms were more likely to lay off less experienced workers as most of the job cuts took place in the category of workers with less than one year of experience (Table 9). Possible explanations are the efficiency imperative as well as strict compliance with the country's labor law, which stipulates that if a firm has to lay off workers because of an economic crisis, it must start from the most recently hired workers for a given position. A comparison of the change in the number of unskilled workers (operators and helpers) with "one to five years" of experience, by export status, reveals that it was positive for exporting firms but regressed significantly for non-exporting ones (Table 9). This situation may reflect exporting firms' capacity to deal with adverse effects of crises. However, this was not the case for non-exporting firms, which not only cut employment for non-experienced workers but also had to lay off a significant number of those with relevant experience.

Firms' preference to retain more experienced workers is also observed for

[17] In 2009, value added in the local garment industry outside the EPZ regressed by 24.6%, whereas that of the EPZ (mostly composed of garment firms) declined by 16.2% (Ministère de l'Economie et de l'Industrie 2011).

supervisors. As noted earlier, firms significantly reduced the number of supervisors, but this was mostly at the expense of those who had less than six years of experience (Table 9). This is especially the case with US market oriented firms, which cut by 65.4% the number of supervisors with one to five years of experience while increasing more than twofold the number of those with more than six years of experience.

3.1.3 Wage Changes

The impact of the crises on the garment industry's potential to promote poverty reduction can also be appreciated through the wage change between FY2008 and FY2009. For the same reasons cited in Section 2.3.2 regarding employment change, wage comparison is based on firms that were still in operation during the period of the second survey.

In the industry overall, the monthly wage grew on average by 7.6% in real terms, whereas the wage median fell by 8.2% (Figure 4). The wage increase also concerned all types of firms, with US market oriented firms recording the highest wage increase (53.8%) and the highest change in the standard of deviation (Table 6 and 10). However, in order to accurately assess the impact of the crisis on the majority of workers, it is better to focus our analysis on the change in the wage of supervisors, operators and helpers.

Thus, real wages for the large majority of workers regressed over the course of the two fiscal years. The rates of change were, respectively, -12.7% and -5% for operators and helpers (Table 10). Their wage median also declined (Figure 4). Non-skilled workers were thus poorer in 2009, as each of them could then feed only two to four family members, compared to three to six members previously. Among non-skilled positions, operators' real wage cut was more significant than that of helpers (Tables 6 and 10).

It is worth noting that wages of non-skilled workers had become more homogenous in 2009, as indicated by the change in the standard of deviation (Table 6 and Figure 4). By contrast, those of semi-skilled workers experienced higher dispersion in 2009 relative to 2008 (Figure 4).

A recent study by INSTAT (2011b) which investigates the impact of the two crises on the capital city's labor market found that the EPZ is the only institutional sector that experienced an increase in real wages in 2010, and it is essentially explained

by significant firing of lower paid and more vulnerable workers.[18]

Statistical data on both wage and employment changes in non-skilled positions reflect firms' behavior for dealing with the crisis. Thus, exporting firms had cut relatively fewer non-skilled jobs while reducing their wages (Table 10) and working hours.[19] Indeed, during FY2009, firms worked 30 days less than in FY2008, while workers performed less overtime in 2008 than in 2009.[20] By contrast, non-exporting firms reacted in the opposite way, by more significantly cutting the number of non-skilled workers and increasing their wages, by 3.1% for operators and 4.8% for helpers. This may be explained by the fact that these firms tended to keep relatively more workers with more than six years of experience (Table 9).

As for semi-skilled positions, firms were found to have laid off relatively more supervisors, especially less experienced ones, and to have allowed a 2.5% average increase in real wages (Table 10). Therefore, after drastically cutting the number of supervisors and retaining the relatively more experienced ones, firms increased supervisors' wages. However, this was not the case at non-exporting firms where supervisors' wages fell by 3.8%.

EU market oriented firms, which seem to have been less affected by the crisis, had the lowest figure, with a 1.1% increase in supervisors' wages, whereas the US market oriented ones recorded the highest rate, at 50.6% (Tables 6 and 10). This difference may be explained by the fact that US market oriented firms retained relatively more supervisors with more than six years of experience, compared to EU exporting firms. Firms exporting to the US also display the greatest change in the standard of deviation, at more than 200% against 25.1% for all firms (Table 6).

To sum up, the adverse effects of political turmoil on the potential of the garment industry to reduce poverty are summarized in Table 10. The effects are mainly employment losses and wage cuts, notably in non-skilled positions (operators and

[18] Institutional sectors include public administration, public corporations, the formal private sector, EPZ and informal sector. This survey was conducted in the first trimester of 2010.

[19] Under Madagascar labor law, there is an obligation for employers to pay minimum wage and to increase wages according to the number of years of employment. In this case, the wage cut is implemented in other components of the salary, such as bonuses and payment for overtime. However, reduction of working days is another potential way to cut wages, especially when a firm utilizes a "technical lay-off" for economic reasons.

[20] According to a survey by the Friedrich Ebert Foundation, even though 68% of employees did work overtime in FY2009, they worked fewer hours than in FY2008 (Ralaivelo and Rabe 2009, 19-20).

helpers). In order to attenuate the impact of the crises, most of the firms maintained relatively more jobs in non-skilled positions than in semi-skilled ones and allowed relatively greater wage cuts. Social concerns about employment losses, strict compliance to Madagascar labor law which particularly favors workers over employers, and a disproportionately small drop in orders accompanying the fall in export prices are possible explanations for such behavior. However, further investigation is needed to determine the real reasons behind such behavior. Whereas the extent of employment losses was similar for operators and helpers, the latter experienced far smaller wage cuts, meaning that operators suffered more severely from the crises. It is also found that the differential impact of the crises on firms, in terms of employment losses and wage cuts, depends on export status as well as on market orientation.

3.2 Changes after 2010: Cancellation of the AGOA

3.2.1 Export Value and Price

It is evident that AGOA provided enormous benefits to garment exporters in Madagascar, and in fact, almost all exports to the US market prior to 2009 utilized the AGOA. For example, the share of exports under the AGOA exceeded 99% in 2009 and 2008. Therefore, cancellation of the AGOA has led to a substantial reduction of export value, by 74.0% in 2010 (Figure 3). Nevertheless, this reduction is not entirely attributable to cancellation of preferential access since buyers may have cancelled orders for Madagascar's products regardless of the AGOA cancellation. In fact, exports to the EU market from Madagascar that underwent no changes in market access contracted by 10.4% in the same period, while total imports to the US market and EU market increased by 13.7% and 3.0% (UN Comtrade), respectively, reflecting their recovery from the financial crisis. This implies that reduction in US exports is not solely attributable to the cancellation of the AGOA.

Somewhat surprisingly, the average unit price of Madagascar's products in the US market rose to reach the highest price in the last seven years, while that of all imports in the US market decreased to the lowest price since 1999 (Table 11). In contrast to this, the unit price of Madagascar's products fell by 29.0% in the EU market.

To identify effect of the AGOA cancellation on export value and unit price, we applied the difference in difference (DID) estimation using the trade data. Assuming that the political turmoil equally affected exports to the US and EU markets, a comparison of export value changes between exports to the US and EU indicates the impact of

cancellation of preferential access. Specifically, the DID estimate is expressed as follows.

$$DID = \left(\ln V_{2010}^{Mada,US} - \ln V_{2009}^{Mada,US}\right) - \left(\ln V_{2010}^{Mada,EU} - \ln V_{2009}^{Mada,EU}\right),$$

where $\ln V_{2010}^{Mada,US}$ is the log of export value from Madagascar to the US in 2010. The above DID estimate, however, contains the trends of the US and EU markets; for instance, if total import value in the US market decreases relative to that in the EU market, the above DID estimate incorporates reduction of exports due to reduced demand in the US market as well as the reduction caused by the AGOA cancellation. Triple difference in difference can rule out the effect of market trends.

$$\begin{aligned} TripleDID = &\left[\left(\ln V_{2010}^{Mada,US} - \ln V_{2009}^{Mada,US}\right) - \left(\ln V_{2010}^{Mada,EU} - \ln V_{2009}^{Mada,EU}\right)\right] \\ &- \left[\left(\ln V_{2010}^{World,US} - \ln V_{2009}^{World,US}\right) - \left(\ln V_{2010}^{World,EU} - \ln V_{2009}^{World,EU}\right)\right] \end{aligned}$$

where $\ln V_{2010}^{World,US}$ is the log of export value from all over the world to the US in 2010.

A standard estimation model for DID is

$$\ln V_{i,m,t} = \beta_0 + \beta_1 US_m * y2010_t + \beta_2 US_m + \beta_3 y2010_t + product_i ,$$

where US_m is a market dummy (=1 if observation represents export value to US), $y2010_t$ is a year dummy (=1 if observation is export value in 2010), $product_t$ is product fixed effect, and i, m, and t indicate product, market and time, respectively. The DID estimate is β_1. This specification is restrictive, however, since it imposes a single coefficient for all years except 2010 and the common difference by market is shared by all products. To allow flexibility in the base level, we apply the following specification.

$$\ln V_{i,m,t} = \beta_0 + \beta_1 US_m \times y2010_t + yeardummy_t + product * market_{i,m} ,$$

where $product*market_{i,m}$ is product-market fixed effect. Likewise, a standard specification for triple DID is

$$\begin{aligned} \ln V_{i,c,m,t} = &\beta_0 + \beta_1 US_m * y2010_t * Mada_c + \beta_3 US_m * y2010_t + \beta_4 Mada_c * y2010_t \\ &+ \beta_5 US_m * Mada_c + \beta_6 US_m + \beta_7 y2010_t + \beta_8 Mada_c + product_i \end{aligned},$$

where $Mada_c$ is a dummy for exporter (=1 if observation represents exports from Madagascar, and =0 if it represents exports from all over the world), and c indicates a country from which products are exported. Since this assumes that differences in export value by market and exporting country are common among products, we apply a more

flexible specification.

$$\ln V_{i,c,m,t} = \beta_0 + \beta_1 US_m \times y2010_t \times Mada_c + \beta_3 US_m \times y2010_t + \beta_4 Mada_c \times y2010_t + yeardummy_t + product * country * market_{i,c,m},$$

where *product*country*market*$_{i,c,m}$ is product-country-market fixed effect.

The results are indicated in Table 12. Coefficients for the *US*y*2010 dummy are negative and significant at the 1% level. The result indicates that the cancellation of the AGOA caused reduction of exports to the US by 80.1% (=exp[-1.612]-1) within the product defined by HS eight-digit. Except the AGOA effect, exports from Madagascar (regardless of market) increased, surprisingly, 68.4% (=exp[0.521]-1), though significance is marginal. These results indicate that cancellation of the AGOA exerted a drastic impact on Madagascar's exports, while the political turmoil itself did not have a significant affect.

The same estimation is carried out for the unit price of exports as well (Table 13). This shows that the coefficient of the triple interaction term is positive and significant at the 5% level, while that of the *Mada*y*2010 is not significant. The AGOA cancellation raised the unit price for the US market by 26.7% (=exp[0.237]-1), while no common price changes regardless of market were detected in Madagascar's garments.

These exercises demonstrate that impact of the AGOA cancellation was substantial, and in contrast, the impact of the political turmoil itself was not significant. Contrary to intuition, the unit price of Madagascar's garments exported to the US market rose. Since Madagascar's products enjoyed duty-free status in the US market until 2009, their prices could be higher than those from other countries by up to the amount of the tariff rates. Therefore, we expect that cancellation of the AGOA would have caused a fall in price so that the prices of Madagascar's products would remain equal to the prices of other countries' products. A possible explanation for why this did not occur is that the cancellation of duty-free access caused a shift in the product composition toward products with lower tariff rates. If such products are relatively more expensive than those that Madagascar exported under the AGOA, the overall unit price would rise. This is left for further research.

3.2.2 Firm Survival

The adverse impact of the crises accelerated the exit of exporting firms. About a quarter of exporting firms in our sample exited between August 2009 and November 2010, while no firms exited in the non-exporting sector (Table 14). Exit was far more frequent

among suppliers to the US market; among the firms exporting to the US market (and not to the EU market) as of 2009, 57.1% of them exited by November 2010, and in contrast, only 6.5% of firms exporting to the EU market (and not the US market) exited. The relatively high exit rate of firms supplying to neither market, shown in Table 14, may mean that their buyers in Madagascar and Mauritius exported mainly to the US market.

In terms of local-foreign ownership, local exporters exited less frequently than foreign exporters, and the difference is significant at the 10% level (Table 15). While this stands in contrast to our intuition that local firms are more prone to adverse shocks, there are possible factors to explain their high survival rate, such as their lower dependence on the US market and their lower exit value compared to foreign firms. The relationship between firm characteristics and exit will be demonstrated in the final version of this chapter.

4. Concluding Remarks

The export-oriented garment industry has contributed to the economy and created formal employment opportunities for the relatively poor people in Madagascar, where agriculture has been the dominant sector. Though it displayed robust growth, overcoming the liberalization in the apparel markets that has been ongoing since 2005, it experienced a critical situation after the political turmoil occurred in 2009. Through investigation of firm-level data in 2008 and 2009, we found a significant fall in production, employment and wages. Given the high intensity of low-skilled labor, those changes heavily impacted the poor. However, since the apparel industry was also hit by the financial crisis in 2009, those changes are not attributable solely to the political turmoil. Moreover, they do not reflect the impact of the AGOA cancellation in 2010, which is likely to impact the industry even more severely. The final version of this chapter will incorporate the impact of the AGOA cancellation and a more detailed analysis of changes in production, employment and wages using firm data from FY2010.

References

Banque Centrale de Madagascar (2002), *Rapport annuel 2001*, Antananarivo.

Cling, J.P., Razafindrakoto, M. and Roubaud, F. (2004) *Export Processing Zone in Madagascar: An Endangered Success Story*, Document de travail DT/2004/02,Paris, Développement , Institutions et Analyse de Long terme (DIAL)..

Cling, Jean-Pierre, Mireille Razafindrakoto and François Roubaud (2005) "Export Processing Zones in Madagascar: a Success Story under Threat?", *World Development*, Vol. 33, No.5, pp.785-803.

Collier, Paul (2007) *Bottom Billion: Why the Poorest Are Falling Down and What Can Be Done about It*, New York; Oxford University Press.

Commission on Growth and Development (2008) *The Growth Report: Strategies for Sustained Growth and Inclusive Development*, Washington D.C.; World Bank.

Fukunishi, T. & Ramiarison, H.A. (2011), *Export-Oriented Garment Industry in Madagascar: Implication of FDI to the Local Economy*, mimeo, Chiba; Institute of Developing Economies.

Glick, Peter and François Roubaud (2006) "Export Processing Zone Expansion in Madagascar: What are the Labor Market and Gender Impact?" *Journal of African Economies*, Vol.15, No.4, pp.722-756.

ILO (2004), *Les Entreprises Franches à Madagascar : Projet pour l'amélioration de la productivité par la promotion d'un emploi décent*, Antananarivo.

INSTAT (2011a), *Enquête Périodique auprès des Ménages 2010 : Rapport principal*, Antananarivo.

INSTAT (2011b), *Le marché du travail dans l'agglomération d'Antananarivo en 2010 : Une perspective décennale,* Policy Brief, Antananarivo.

Ministère de l'Economie et de l'Industrie (2009), *Situation Economique et Financière au cours des Trois premiers mois de 2009*, Antananarivo.

Ministère de l'Economie et de l'Industrie (2011), *Rapport Economique et Financier 2009-2010*, Antananarivo.

Ministère de l'Economie, des Finances et du Budget (2005), *Rapport Economique et Financier 2004-2005*, Antananarivo

Ministère de l'Economie, du Commere et de l'Industrie (2008), *Rapport Economique et Financier 2007-2008*, Antananarivo.

Nicita, Alessandoro (2006) "Export Led Growth, Pro Poor or Not? Evidence from Madagascar's Textile and Apparel Industry," *World Bank Policy Research Working Paper* 3841, World Bank.

Ralaivelo, M., Rabe, S.E. (2009) *Etude sur les Entreprises Franches textiles à*

Madagascar, Antananarivo: Friedrich Ebert Stiftung.

Ralaivelo, Maminirinarivo (2006) “The Textile and Clothing Industry of Madagascar”, in Herbert Jauch and Rudolf Traub-Merz eds., *The Future of the Textile and Clothing Industry in Sub-Saharan Africa*, Bonn: Friedrich-Ebert-Stiftung.

Sachs, Jeffrey (2005) *The End of Poverty: Economic Possibilities for Our Time*, New York; The Penguin Press.

Shah, M.K., Habyarimana, J., Cotton, L., Rossignol, I. (2005) *Investment Climate Assessment in Madagascar*, Washington D.C.: World Bank.

UNCTAD [United Nations Conference on Trade and Development] (2008) *Economic Development in Africa 2008: Export Performance Following Trade Liberalization*, New York and Geneva: United Nations.

Table 1. Selected economic indicators

Indicators	1991-1995	1996-2000	2001-2005	2006-2008	2009-2011
Annual Average economic growth	1.22%	3.84%	3.58%	6.06%	-2.40%
Annual Growth rate secondary sector	0.50%	4.60%	2.20%	6.70%	-2.60%
Annual Average Total export growth	9.84%	13.91%	4.74%	24.93%	-6.40%
Annual Average EPZ's V.A growth	105.34%	17.45%	23.76%	18.73%	-13.50%
Annual Average EPZ's export growth	39.32%	31.14%	29.55%	40.47%	-15.94%

Source: Calculated from the data of the Ministry of Economy and Industry (Ministère de l'Economie des Finances et du Budget 2005, Ministère de l'Economie, du Commerce et de l'Industrie 2008, Ministère de l'Economie et de l'Industrie 2011), and from macroeconomic database (1969-2002) of the Ministry of Finance and Budget.

Table 2. Local and foreign ownership and export status of the sample

	All Sample			Exporting Firms		
	Foreign owned	Locally owned	Total	Foreign owned	Locally owned	Total
non-EPZ	8	24	32	6	7	13
EPZ	65	20	85	65	20	85
Total	73 (62.4%)	44 (37.6%)	117 (100.0%)	71 (72.5%)	27 (27.6%)	98 (100.0%)

Source: Authors' firm survey 2008

Table 3. Origin of capital of foreign-owned firms

	Total	By Type of Ownership	
		Independent	Subsidiary
Mauritius	21	11	10
France	19	15	4
Hong Kong	6	0	6
China	5	2	3
Korea	3	0	3
US	2	1	1
India	1	1	0
Sri Lanka	1	0	1
Taiwan	1	0	1
Bangladesh	1	1	0
Other	1	0	1
Unknown	12	5	7
Total	73	36	37

Source: Authors' firm survey 2008

Table 4. Market orientation and origin of capital (Exporting firms)

	Total	Origin of capital					
		Local	Mauritius	Europe	East and South Asia	Other	Unknown
EU market	46	15	9	14	2	1	5
US market	21	3	4	1	7	2	4
Both	15	6	3	1	3	0	2
Neither EU nor US	14	3	5	1	4	0	1
n.a.	2	0	0	0	2	0	0
Total	98	27	21	17	18	3	12

Source: Authors' firm survey 2008

Table 5. Summary of statistics for production, factor use and profit

A. Foreign Exporting Firms (N=67)

	Mean	S.D.	Median	Min	Max
Gross production	4020311	5739465	2195075	54051	36483188
Value added	2420719	3355316	1307736	49135	22221504
Profit	1537814	2801732	732979	-896308	19663760
Total worker	868	1105	565	16	5150
Average wage	996	299	956	219	1976
Labour productivity	4043	5774	2320	762	43578

B. Local Exporting Firms (N=23)

	Mean	S.D.	Median	Min	Max
Gross production	980308	1096362	494978	14102	3633644
Value added	645662	790234	335381	3704	2639715
Profit	440787	585729	207028	-6558	1757082
Total worker	188	216	105	10	826
Average wage	995	393	973	239	2068
Labour productivity	3453	2793	2643	370	12097

Note: Outliers are dropped.
Source: Authors' firm survey 2008

Table 6. Average wage and median by type of firms and by post (Unit: 2008 Ariary)

Fiscal Year	**2008**			**2009**		
Supervisor wages	*Mean*	*Stand.dev*	*Median*	*Mean*	*Stand.dev*	*Median*
Exporting Firm	184,295	91,302	160,000	194,980	114,093	164,744
non-Exporting Firm	171,652	25,585	164,888	165,146	13,914	164,888
Exporting in USA	175,528	52,210	160,000	264,466	175,420	220,270
Exporting in USA only	180,806	55,768	160,000	234,313	88,354	220,270
Exporting in EU	183,088	98,856	160,000	185,048	124,706	151,436
All firms	**181,619**	**82,007**	**164,888**	**186,123**	**96,777**	**164,888**
All firms (US$)*	**108.5**	**52.9**	**93.6**	**95.14**	**49.47**	**84.29**
Operator wages	*Mean*	*Stand.dev*	*Median*	*Mean*	*Stand.dev*	*Median*
Exporting Firm	134,048	85,471	120,000	113,750	37,325	107,840
non-Exporting Firm	115,468	55,305	95,000	119,104	67,257	91,779
Exporting in USA	130,178	54,921	120,000	111,704	27,691	110,135
Exporting in USA only	135,808	55,894	120,000	95,283	23,921	87,190
Exporting in EU	132,185	55,920	120,000	112,574	32,882	110,135
All firms	**131,308**	**81,887**	**120,000**	**114,616**	**43,286**	**100,957**
All firms (US$)*	**76.8**	**47.9**	**70.2**	**58.59**	**22.13**	**51.61**
Helper wages	*Mean*	*Stand.dev*	*Median*	*Mean*	*Stand.dev*	*Median*
Exporting Firm	94,874	45,163	83,000	88,796	24,951	82,601
non-Exporting Firm	79,473	14,990	80,000	83,335	25,773	86,272
Exporting in USA	94,860	50,705	80,000	92,697	29,843	84,437
Exporting in USA only	81,321	13,738	80,000	78,405	15,556	78,930
Exporting in EU	101,976	55,999	85,000	90,577	27,634	81,683
All firms	**92,706**	**42,539**	**80,000**	**88,058**	**24,954**	**82,601**
All firms (US$)*	**54.2**	**24.9**	**46.8**	**45.01**	**12.76**	**42.23**

Source: Firm surveys 2008 and 2009.
Notes: Exporters to USA and to EU are partly duplicated
*Wages in US $ are calculated by applying current exchange rates (1$ = 1708.370 in 2008, 1956.21 in 2009

Table 7. Average production size, unmatched comparison

	Foreign Exporting			Local Exporting		
	2009	2008	Rate of Change†	2009	2008	Rate of Change†
Gross production	2908417	4020311	-0.277	592954	980308	-0.395
Value added	1377906	2420719	-0.431	400870	645662	-0.379
Profit	596824	1537814	-0.612	279539	440787	-0.366
Total worker	787	868	-0.094	161	188	-0.145
Labour productivity	2270	4043	-0.438	2097	3453	-0.393
Average wage	937	996	-0.060	848	995	-0.148
N	67	40		16	23	

†: Figures in the column "Rate of change" represent a rate of change of the mean from 2008 to 2009.
Source: Authors' Survey 2008 and 2009.

Table 8. Employment change by post and by type of firms in FY2009 (%)

Type of firms	**All positions**	**Supervisor**	**Operator**	**Helper**
Exporting Firm	-19.50%	-31.00%	-18.00%	-19.50%
non-Exporting Firm	-25.00%	-16.70%	-35.10%	-25.00%
Exporting to USA	-20.80%	-49.60%	-7.50%	-7.10%
Exporting to EU	-8.20%	-6.20%	0.30%	-6.20%
All types	**-19.50%**	**-30.90%**	**-18.10%**	**-19.50%**

Source: Firm surveys 2009&2010
Notes: (1) figures for all posts are calculated by comparing total employment in 2008 survey with that of 2009 survey; (2) figures for each post are obtained from firms appearing in both surveys.

Table 9. Employment change by experience and by posts (FY2008=100)

	Less than 1 year		**1-5 years**		**More than 6 years**	
Type of firms	***Non Exporting Firm***	***Exporting Firm***	***Non Exporting Firm***	***Exporting Firm***	***Non Exporting Firm***	***Exporting Firm***
Supervisor	N.A.	-68.00%	-100.00%	-32.80%	0.00%	-18.80%
Operator	-83.40%	-63.20%	-42.50%	7.90%	15.50%	5.40%
Helper	-16.70%	-46.00%	-66.70%	8.40%	N.A	98.50%
Type of firms	***Exporting to USA***	***Exporting to EU***	***Exporting to USA***	***Exporting to EU***	***Exporting to USA***	***Exporting to EU***
Supervisor	-100.00%	-61.60%	-55.40%	-1.70%	133.30%	11.50%
Operator	-41.00%	-46.20%	11.00%	-3.70%	108.10%	31.80%
Helper	-28.80%	-31.30%	4.80%	36.90%	-30.00%	100.00%

Source: Firm surveys 2008 and 2009.

Table 10. Employment and wage changes by post and by type of firms

	Supervisor		Operator		Helper		All posts	
	Job change	*wage change*	*Job change*	*Wage change*	*Job change*	*wage change*	*Job change*	*wage change*
Exporting Firm	-31.00%	5.80%	-18.00%	-15.14%	-19.50%	-6.41%	-19.50%	7.71%
non-Exporting Firm	-16.70%	-3.79%	-35.10%	3.16%	-25.00%	4.86%	-25.00%	9.32%
Exporting to USA	-49.60%	50.67%	-7.50%	-14.19%	-7.10%	-2.28%	-20.80%	53.87%
Exporting to EU	-6.20%	1.07%	0.30%	-14.84%	-6.20%	-11.18%	-8.20%	2.47%
All firms	-30.90%	2.48%	-18.10%	-12.71%	-19.50%	-5.01%	-19.50%	7.64%

Source: Firm surveys 2008 and 2009.

Table 11. Change of unit price (%)

	US		EU	
	World average	Madagascar	World average	Madagascar
2000	2.47	87.68	-25.68	1.01
2001	-5.83	-29.99	12.64	3.81
2002	-7.26	-31.46	-2.52	-0.43
2003	-0.66	-14.50	7.58	31.45
2004	2.07	-2.67	4.75	11.95
2005	0.19	-7.52	-2.34	9.54
2006	2.20	7.90	4.07	14.65
2007	-1.37	-12.26	6.30	-1.05
2008	1.99	7.66	10.21	-16.01
2009	-8.63	-0.42	-5.64	11.98
2010	-1.31	6.76	0.81	-28.96

Note: Price per dozen. Products reported in unit other than dozen are excluded.
Source: World Trade Atlas

Table 12. Difference in difference estimation on export value

DID			Triple DID		
USx2010	-1.536***	(0.371)	USx2010xmada	-1.612***	(0.418)
y2006	0.196	(0.210)	USx2010	0.076	(0.193)
y2007	0.491**	(0.239)	madax2010	0.521*	(0.300)
y2008	0.726***	(0.250)	y2006	0.048	(0.083)
y2009	0.491*	(0.256)	y2007	0.096	(0.154)
y2010	0.775**	(0.310)	y2008	0.192	(0.159)
_cons	-7.046***	(0.168)	y2009	-0.037	(0.159)
			y2010	-0.067	(0.233)
			_cons	-1.792***	(0.105)
Fixed Effect	Product*Market		Fixed Effect	Product*Country*Market	
R2	0.012		R2	0.004	
rho	0.619		rho	0.740	
N	3156		N	9096	

Note: Robust Standard Errors are reported.
Source: Authors calculation

Table 13. Difference in difference estimation on export price

DID			Triple DID		
USx2010	0.201 *	(0.105)	USx2010xmada	0.237**	(0.108)
US			USx2010	-0.037	(0.024)
unitdummy	0.234 ***	(0.045)	madax2010	-0.090	(0.064)
y2006	0.091*	(0.050)	unitdummy	0.185	(0.123)
y2007	0.266 ***	(0.051)	y2006	0.092 ***	(0.017)
y2008	0.182 ***	(0.060)	y2007	0.165 ***	(0.019)
y2009	0.310 ***	(0.053)	y2008	0.210 ***	(0.021)
y2010	0.159 **	(0.074)	y2009	0.202 ***	(0.019)
_cons	3.364 ***	(0.067)	y2010	0.212 ***	(0.020)
			_cons	3.325 ***	(0.108)
Fixed Effect	Product*Market		Fixed Effect	Product*Country*Market	
R2	0.034		R2	0.036	
rho	0.917		rho	0.961	
N	1897		N	7153	

Note: Robust Standard Errors are reported.
Source: Authors calculation

Table 14. Exit and survival between 2009 and 2010 by supply market

	Exporting Firms					Non-Exporting Firms	Total
	Sub-total	EU market	US market	Both	Neither		
Exited	23	3	12	1	5	0	23
%	(23.2)	(6.5)	(57.1)	(6.7)	(33.3)	(0.0)	(19.5)
Survived	76	43	9	14	10	19	95
%	(76.8)	(93.5)	(42.9)	(93.3)	(66.7)	(100.0)	(80.5)
Total	99	46	21	15	15	19	118
%	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

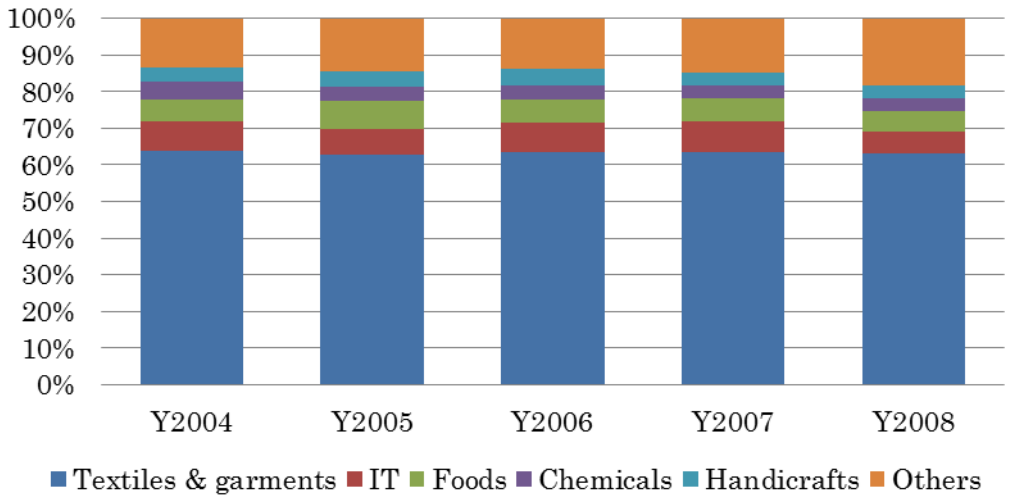
Note: Market information was not available for two exporting firms.
Source: Firm surveys 2008 and 2009.

Table 15. Exit and survival between 2009 and 2010 by ownership (Exporters only)

	Foreign	Local	Total
Exited	19	4	23
%	(26.4)	(14.8)	(23.2)
Survived	53	23	76
%	(73.6)	(85.2)	(76.8)
Total	72	27	99
%	(100.0)	(100.0)	(100.0)

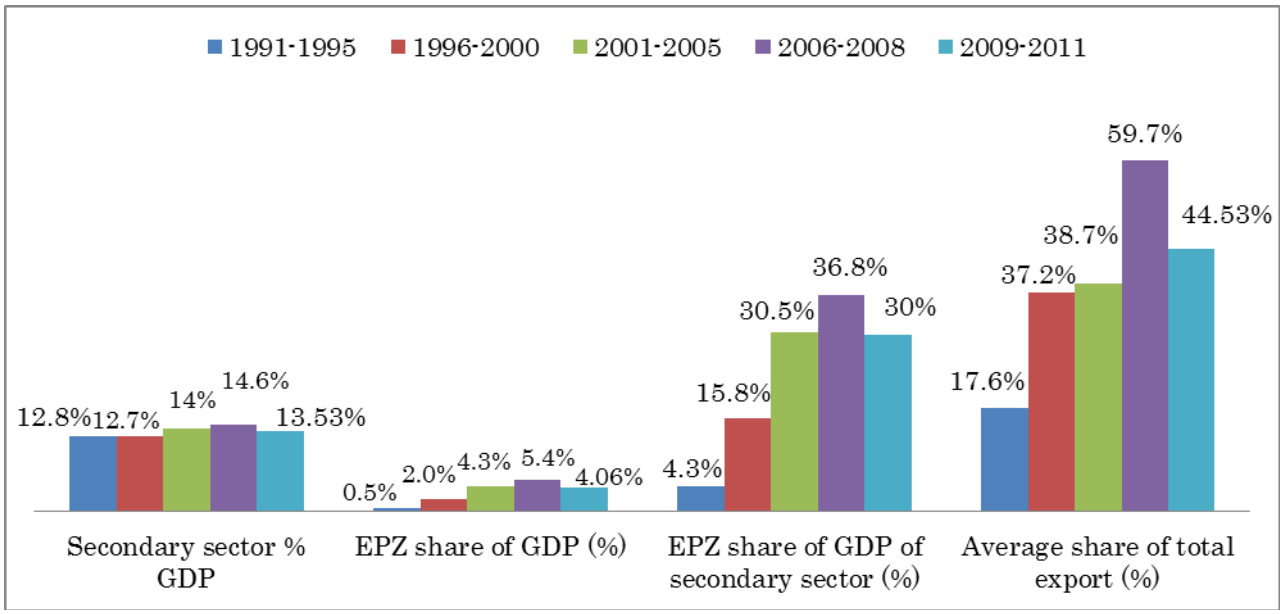
Source: Firm surveys 2008 and 2009.

Figure 1: Sectoral Distribution of EPZ firms



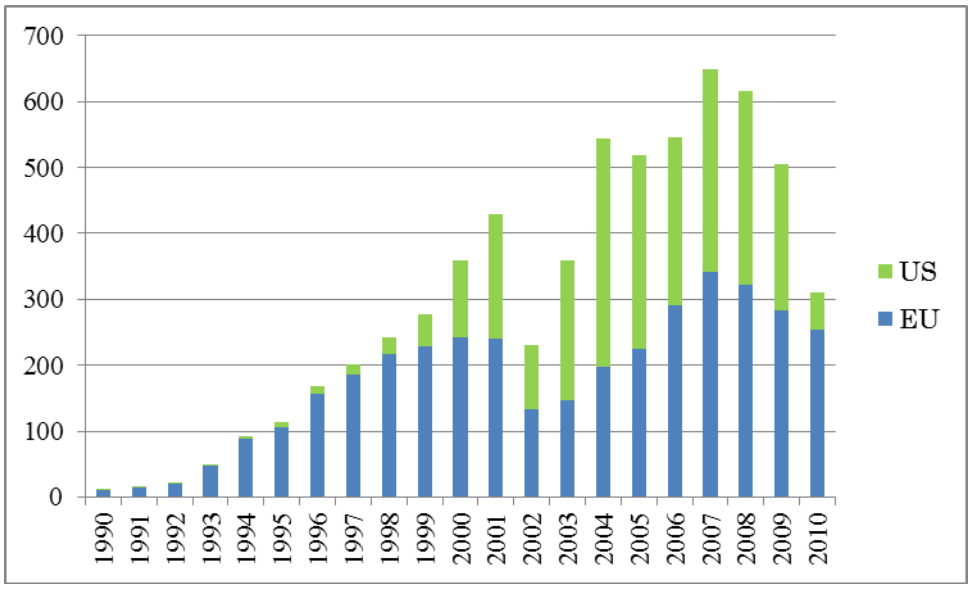
Source: (1) Ralaivelo and Rabe (2009, p.10); (2) Ministry of Economy and Industry (2009, p.16)

Figure 2. EPZ Performance



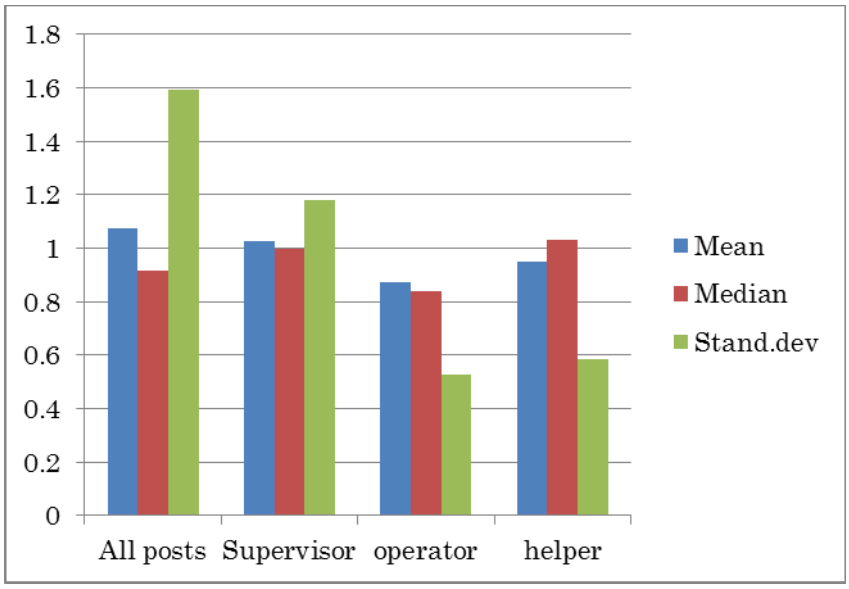
Source: Calculated from the data obtained from Ministry of Economy and Industry (Ministère de l'Economie des Finances et du Budget 2005, Ministère de l'Economie, du Commerce et de l'Industrie 2008, Ministère de l'Economie et de l'Industrie 2011), and from macroeconomic database (1969-2002) from the Ministry of Finance and Budget

Figure 3. Garment Exports from Madagascar (million US$)



Source: UN Comtrade (US and EU Report)

Figure 4. Real wage change in FY 2009 (relative to FY 2008=1)



Source: Firm surveys 2008 and 2009.