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Contrasting the Perception and Response of Domestic Manufacturing Firms to FDI in Sub-Saharan Africa

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Abstract

This paper uses the data set from the fourth survey by UNIDO of manufacturing firms in Sub-Saharan Africa to identify whether foreign direct investment affects the behaviour of local firms with respect to investment, product innovation and process innovation. We look at the perception and response of 1,140 manufacturing firms in 9 sectors in 19 countries. Using Probit models the results suggest that, once controlling for firm's characteristics, there is a marked difference between perception and reality. The presence of foreign investment has not affected the behaviour of the vast majority of domestic firms in terms of their investment, production of similar products to foreign firms, production of different products to avoid competition or adopt similar production technologies.

Key words: FDI, investment, technology, Sub-Saharan African countries.

JEL classification: O14; 031; O55

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1. Introduction

There is a general consensus in the literature that foreign direct investment (FDI) can improve the economic performance of a country, although some have argued that the emphasis that the international community gives to the role of FDI is out of proportion when it is contrasted to the empirical evidence.[1] However, the United Nations and other international organisations promote the idea: "We [the United Nations General Assembly] resolve therefore to take special measures to address the challenges of poverty eradication and sustainable development in Africa, including debt cancellation, improved market access, enhanced Official Development Assistance and increased flows of Foreign Direct Investment, as well as transfer of technology" (UN Millennium Declaration, A/55/L.2, 8 September 2000). A few years earlier, on the same lines, the World Bank stated "if developing countries are to get more global knowledge, they need to attract more FDI" (World Bank, 1998/99, p.29).

Theoretically, FDI is regarded as one of the main channels to transfer technology from more advanced economies to less developed ones. The knowledge of foreign companies can spill over to domestic firms through learning by their workers and domestic suppliers and through backward and forward linkages. It is also argued that foreign investors can provide local firms with an incentive to innovate as a means to compete, which induces local firms to respond to defend their markets and retain market share (Chung, 2001). It is expected that local firms try to improve their productivity, and this is the area where most of the empirical research has focused on (e.g. Aitken and Harrison, 1999; Haddad and Harrison, 1993; Javorcik, 2004; Xu, 2000).

But one important aspect of FDI which is missing from the literature relates to the difference between the perception of the effect of FDI and the actual response of domestic firms to FDI. The purpose of this paper is to explore this difference using a survey published by UNIDO (2012) containing information on approximately 7,000 firms based in 19 Sub-Saharan African countries in 2010 of which 64 per cent were domestic and 36 per cent were partly or wholly foreign-owned. The purpose of the survey was to generate a reliable informative data platform to assist Sub-Saharan African countries develop foreign investment promotion strategies. It collected information on investor (firm) characteristics; investment performance indicators; financial data; and various responses of domestic firms to the presence of FDI. Do domestic firms undertake more investment as a result of FDI? Do they carry on producing

[1] Moss et. al. (2006) argue that "many of the purported benefits of FDI are frequently challenged directly, on both ideological and empirical grounds" (p.343).

similar products, or produce different products to avoid competition? Do they adopt similar production technologies? Does the response depend on whether the domestic firms are exporting or not? The richness of the data makes it possible to contrast the perception that managers have about the presence of foreign investment and the actual response to FDI on investment, innovation and technology upgrading.

After analysing the data using Probit analysis, it has to be said that the enthusiasm for FDI has to be tempered with caution. In the Sub-Saharan African case analysed here, the spillovers seem to be minimal. The conclusions of the much-cited paper by Görg and Greenaway (2004), "Much Ado About Nothing? Do Domestic Firms Really benefit from Foreign Direct Investment?" still apply: "'general' policies aimed at altering the fundamentals are more important than specific policies geared to particular investments."

The paper is organised as follows. The next section refers to a succinct description of the literature review, presenting the theoretical and empirical arguments about the relationship between FDI and local firms' response. The third section deals with the description of the data focusing mainly on the characteristics of the local manufacturing firms in the 19 Sub-Saharan African countries. The fourth section gives the results of our analysis using Probit analysis, and the marginal effects on each of the dependent variables we look at such as increased investment due to the presence of foreign investors; production of similar products to those produced by foreign companies; adoption of similar production technologies; etc. Here the differences between the perception and actual response of local firms to the presence of foreign firms are highlighted. The last section concludes with some policy suggestions.

2. Literature review

Economic theory gives some guidance of what to expect from FDI. It is recognised that FDI not only leads to an inflow of capital to a country, but also that foreign firms have specific advantages (e.g. production methods, marketing, management, etc.) which can benefit domestic firms through technological spillovers via imitation, labour mobility and competition. These spillovers have the potential to increase productivity, but the potential for host countries to benefit from them depends on their structural characteristics, in particular their absorptive capacity, which in turn depends on the stock of human capital, the dynamism of entrepreneurship, the quality of institutions, and the desire for progress (Abramovitz, 1986). Theoretically, Kokko (1994) identifies at least four ways in which technology might

be diffused from foreign companies to domestic firms in the host economy: (i) demonstration-imitation; (ii) competition; (iii) foreign linkage; and, (iv) training. Two arguments on technological distance and spillovers are present in the literature on FDI and technology transfer. The first argues that the wider the technology gap between foreign and domestic firms, the more the scope for spillovers (Findlay, 1978). The other argument suggests that the narrower the gap the easier it is to bridge the gap (Glass and Saggi, 1998). Görg and Greenaway (2004) and Kokko (1994) suggest that the latter argument is more plausible than the former.

Various papers have contributed to assess the externalities on productivity generated by FDI, for example, Haddad and Harrison (1993); Aitken and Harrison (1999); Djankov and Hoekman (2000); Xu (2000); Javorcik (2004); Keller and Yeaple (2009); Arnold, Javorcik and Mattoo (2011); Guadalupe *et. al*. (2012); Fernadez and Paunov (2012), among many others. However, as our interest is exploring the answers of local firms to the perception and actual response to FDI, to the best of our knowledge we only find three relevant recent papers related to our research question: García *et. al*. (2013), Ge Bao and Chen (2013) and Boly *et. al*. (2013).

García *et.al*. (2013) use data from 1799 Spanish manufacturing firms from 1990 to 2002. They analyse the relationship between industry-level and firm-level inward FDI and the innovative performance of local firms. They found that inward FDI into Spanish firms is negatively associated with the ex post innovation. Inward FDI blunts domestic innovation. "Specifically, we find that firm-level FDI inflows are negatively related to the ex post patent applications of multinational affiliates."(p.242). Also, they find a negative relationship between industry-level FDI inflows and the ex post product innovation of local firms, meaning that foreign entry crowds out domestic innovation and/or relegates domestic firms to less profitable niches. In other words, they argue that inward FDI may actually hinder the development of technological capabilities among local firms and, hence, the long-term growth prospects of local economies.

Ge Bao and Chen (2013) apply a very novel approach to separate the response of domestic firms to the presence of foreign investment and the effect of actual foreign competition by exploring the time lags between the foreign investment news and actual investments. They construct a data set of foreign investment news between 2001 and 2007. Their results suggest that domestic firms respond significantly to the 'threat' of foreign investor competition by increasing productivity, R&D, training, patent applications, product diversification and

advertising expenditure. However, the actual arrival of foreign investors is found to have weak effects or none at all on productivity.

In a recent paper, Boly *et. al*. (2014) use the same data base as in our paper to explore the channels through which foreign investors have an impact on the local firms and the characteristics which could make them net 'winners' or 'losers'. By using Probit models, their analysis suggests that the effects of FDI inflows on domestic Sub-Saharan African firms are heterogeneous across countries. They find evidence to argue that large, newly established and highly productive domestic firms are those more likely to benefit from interactions with foreign firms. The found that the effects of inward FDI on Sub-Saharan Africa firms are heterogeneous across countries, and the differences are influenced by domestic firms characteristics and contrasting macroeconomic environments within which domestic and foreign firms compete.

In the next section, we are going to describe the data set and characteristics of the firms used in our study to differentiate the perception from the actual response of FDI on Sub-Saharan African firms.

3. Data and empirical analysis

3.1 Data

In the present study we use firm-level data on 1,140 manufacturing firms in 19 Sub-Saharan African countries, collected by UNIDO in the Africa Investor Survey 2010. This is the fourth survey of investors under the UNIDO's Investment Programme and it is designed in the context of the Network of African Investment Promotion Agencies (AfriPANet).[2] In particular, our study in this analysis contributes to the second out of the six components of the Programme, "b) Analysis of the data to assess perceptions, performance and plans of different types of investors and investigate the impact of their operations on the socio-economic development objectives of host countries;" (UNIDO, 2012: p.30).

The survey was conducted from 2010 to 2011 covering almost 7000 firms, in four broad sectors: agriculture, mining, manufacturing and others (e.g. electricity, gas and water supply; and, construction). [3] The purpose of the survey was to provide reliable firm data to look at the

[2] See www.unido.org/afripanet or www.afripanet.org
[3] For a detailed description of the database see UNIDO, 2012.

impact of FDI and to formulate investment promotion strategies which could attract potential foreign and domestic investment in Africa. The vast survey contains detailed information on over 700 variables.

The description of the statistics is revealing in itself about the characteristics and composition of manufacturing firms in Sub-Saharan Africa. The empirical analysis discussed later will refer to 1,140 domestic firms distributed among 19 Sub-Saharan African countries. The distribution of firms across countries and their size is shown in Table 1. The country distribution of firms is very wide ranging from 201 in Ethiopia to 1 in Burkina Faso. In terms of size, the majority of the firms are categorized as medium size in terms of full time employees, from 22 to 75.

[Table 1]

In Table 2 the distribution of manufacturing firms according to industries and locations is presented. Most of the firms are in the sector containing coke and refined petroleum, chemicals, plastics and rubber, and non-metallic mineral products (240 firms); followed by food, beverage and tobacco (228 firms) and basic metals and fabricated metal products (166 firms). The smallest sectors are recycling (9 firms) and motor vehicles, trailers and other transport equipment (14 firms). Another characteristic to highlight is the composition of manufacturing industries regarding their level of technological sophistication, high, medium or low, according to the OECD criteria. Table 3 shows this structure: high-technology manufacturing, with 13.5% of the sample; medium technology manufacturing with 27.7%, and low technology with 58.8%. For all the countries this composition is skewed towards the low technology spectrum, but notice that there are four countries (Rwanda, Niger, Burundi and Burkina Faso) that do not have any firms in the high technological category at all.

[Table 2]

[Table 3]

3.2 Dependent and independent variables in the model

In this section we describe the dependent and independent variables used in the modelling. UNIDO's survey contains the answers for three specific sets of questions that we are interested in analysing. Regarding domestic firms' *perception* of foreign entry, they were asked to assess, on a five-point scale (1. strongly negative/ 2. slightly negative/ 3. no effect/ 4. slightly positive/ 5. strongly positive), how the presence of foreign firms has affected seven different areas related to their business (see Table 4). For example, they answered to the question "How do you rate the effect of the presence of foreign investors on this company's overall ability to compete in the market?" Notice that we build dummy variables equal to 1 if firms respond that they perceive a slightly positive and strongly positive effect and 0 otherwise.

Domestic firms were asked about their *response* to the entry of foreign firms. We consider the dichotomous answers (yes or no) given to the following four specific questions: 1) Have you undertaken investment that can be attributed to the presence of foreign investors? 2) What has been the response of this company to the presence of foreign investors? Produce similar products; 3) produce different products to avoid direct competition; and 4) adopt similar production technologies. Table 4 summarizes the description of all the variables used in the probit models and the estimation of marginal effects. Most of the variables are dichotomous. Table 5 shows the descriptive statistics related to each variable, including the mean, standard deviation, minimum and maximum values.

Table 6 show the frequency of the dependent and independent variables. Notice that all the dependent variables have a percentage of over 50 as a negative answer.

[Table 4]

[Table 5]

[Table 6]

3.3 Model and Results

In order to analyse the perception and response of Sub-Saharan manufacturing firms to the presence of foreign investors, Probit models are estimated. As shown in Table 4, seven dependent variables are related to the perception of firms and four to the response of firms. As our dependent variables, y_i, take only two values (1 and 0), their distribution is binomial with one tail, with a probability of p_i. $y = \begin{cases} 1 \text{ with probability } p \\ 0 \text{ with probability } 1\text{-}p \end{cases}$

Our interest is modelling p as a function of regressors x. The probability mass function for the observed outcome, y, is $p^y(1-p)^{1-y}$ with $E(y) = p$ and $Var(y) = p(1-p)$. A regression model is formed by parameterizing p to depend on an index function $x'\beta$ where x is a K x 1 regressor vector and β is a vector of unknown parameters. In standard binary outcome models, the conditional probability has the form:

$$p_i \equiv P_r(y_i = 1|x) = Fx_i'\beta \quad (1)$$

where F(•) is the standard normal cumulative distribution function of $x'\beta$ on $(-\infty, \infty)$ thus ensuring that the bounds $0 \leq p \leq 1$ are satisfied (see Cameron and Trivedi, 2010).

Table 7 presents the results showing which firms' characteristics explain firms' perception of the impact of FDI. Seven different variables are considered as dependent variables: 1) overall ability to compete, 2) business opportunities, 3) demand for the company's products, 4) cost of skilled labour, 5) availability of raw materials and other inputs, 6) access to finance, and 7) access to export markets. For each of these dependent variables, the same set of ten independent variables are considered. Two variables are added to control for the location of the country in which each firm is located (land-locked) and for the magnitude of the FDI received by the country (FDI as a share of GDP). If we look across the rows of the characteristics of domestic firms, the size of firms and whether products are certified seems to matter most in determining the positive perception that domestic firms have about the presence of FDI, while being a family firm affects perception negatively. The estimated parameters for certification are statistically significant in six out of the seven regressions, while firm's size and family ownership are statistically significant in five of the seven regressions. Whether firms train labour seems to matter with regard to the overall ability to compete with FDI and also access to finance.

[Table 7]

Table 8 shows the results of the response of firms to FDI, controlling for the characteristics of the firms. Four dependent variables are considered: 1) investment undertaken attributed to the presence of foreign investors, 2) produce similar products to FDI investors, 3) produce different products to avoid direct competition, and 4) adopt similar production technologies to FDI investors. As far as encouraging domestic investment is concerned, the only characteristics that seem to matter are whether firms have training, whether firms are sub-contractors and source of funding. Firm size, or whether the firm exports, do not seem to matter. With regard to the production of similar products, the firm being locally owned appears to affect negatively the probability of producing similar products whereas if the competition comes from imports or foreign owned companies, the probability of producing similar products increases. Certification encourages the production of similar products. Being land-locked reduces the probability of producing similar products. In terms of producing different products to avoid direct competition, variables such as firm size and whether products are exported, don't seem to matter. Only 'tangential' variables appear as significant, such as finance (positively), and certification and training (negatively). The latter is hard to explain. Finally, the adoption of similar production technologies is confined to firms that have formal employment training and act as sub-contractors.

[Table 8]

The results presented in Table 7 and Table 8 show weak effects in terms of the perception and response of local manufacturing firms to the presence of foreign investors. Moreover, the probability of a change in firms' behaviour is not consistent across the explanatory variables (taken as control variables). Perhaps the most consistent variables are whether firms have formal training programmes and whether their products are certified. Theses results, though with their limitations, also suggest that it cannot be automatically assumed that the presence of FDI will induce innovation and technological upgrading in Sub-Saharan African manufacturing firms. There needs to be more emphasis on designing and implementing policies to promote the interaction between local and foreign firms in the manufacturing industries if the intention is for FDI to contribute to the sustainable industrialisation of the Sub-Saharan countries.

4. Conclusions

By using data from the UNIDO investor survey (AIS) of 1,140 manufacturing firms in 19 Sub-Saharan African countries the results reported here show that the perception of firms towards the entry of foreign investors contrasts with the actual response to FDI once the foreign investment has established. The survey has specific questions which allow distinguishing between both reactions. In other words, there is a response from domestic firms prior the arrival of foreign investment, and in advance there is anticipation and preparation for the threat that FDI could imply (see again Ge Bao and Chen, 2013), but in reality not much happens.

On balance, the evidence suggests that Sub-Saharan African manufacturing firms do not modify significantly their behaviour after the entry of foreign investors. They do not increase their investment, they do not produce different products to avoid direct competition nor adopt similar production technologies as those used by foreign investors.

With the ongoing interest of foreign investment in Africa, in particular from rapidly industrializing countries such as China, Brazil and South Korea, it is interesting and important to consider the effects that their investment is generating in the manufacturing sector in Sub-Saharan African countries to see whether it is contributing towards the upgrading of the industrialization process of these countries. The nature of the survey impedes applying alternative quantitative methods of analysis of the performance of firms over time, but the snapshot picture we have portrayed for the year 2010 does not provide grounds for optimism.

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Table 1. Number of manufacturing firms according to location and size

Country	Size in terms of full-time employees			Number of firms
	Small (less than 21)	Medium (22-75)	Large (more than 75)	
Ethiopia	23	73	105	201
Nigeria	38	53	48	139
Tanzania	72	36	27	135
Uganda	83	35	16	134
Kenya	23	56	49	128
Ghana	42	38	16	96
Zambia	12	28	18	58
Cape Verde	32	14	1	47
Mozambique	13	25	2	40
Malawi	9	11	12	32
Mali	12	17	3	32
Cameroon	6	10	8	24
Madagascar	5	4	8	17
Senegal	5	6	5	16
Rwanda	3	9	2	14
Lesotho	12	1	0	13
Niger	6	2	0	8
Burundi	1	2	2	5
Burkina Faso	0	0	1	1
Total	397	420	323	1,140

Table 2. Distribution of manufacturing firms according to industries and location

Country / Industry	Food[1]	Textiles[2]	Wood[3]	Paper[4]	Coke[5]	Metals[6]	Machinery[7]	Vehicles[8]	Recycling[9]	Total
Ethiopia	40	39	13	22	46	33	4	1	3	201
Nigeria	24	18	9	12	43	24	5	4	0	139
Tanzania	33	19	21	18	24	8	6	3	3	135
Uganda	26	14	31	13	22	22	5	0	1	134
Kenya	25	12	13	16	32	14	14	2	0	128
Ghana	9	7	24	9	22	20	2	2	1	96
Zambia	18	8	2	5	14	8	3	0	0	58
Cape Verde	13	3	8	7	6	8	2	0	0	47
Mozambique	0	4	6	11	5	10	3	1	0	40
Malawi	5	2	8	4	7	4	2	0	0	32
Mali	12	2	3	7	5	3	0	0	0	32
Cameroon	5	2	0	6	2	8	0	0	1	24
Madagascar	3	3	4	2	3	2	0	0	0	17
Senegal	5	1	1	2	4	1	1	1	0	16
Rwanda	6	0	3	1	3	1	0	0	0	14
Lesotho	2	6	2	1	1	0	1	0	0	13
Niger	1	1	0	6	0	0	0	0	0	8
Burundi	1	2	0	2	0	0	0	0	0	5
Burkina Faso	0	0	0	0	1	0	0	0	0	1
Total	228	143	148	144	240	166	48	14	9	1,140

Notes: [1]Food, beverage and tobacco; [2]Textiles, garments and leather; [3]Wood, wood products and furniture; [4]Paper and publishing and printing; [5]Coke and refined petroleum, chemicals, plastics and rubber, and non-metallic mineral products; [6]Basic metals and fabricated metal products; [7]Electro-mechanical machinery and equipment; [8]Motor vehicles, trailers and other transport equipment; and [9]Recycling and other manufacturing.

Table 3. Technological classification of manufacturing firms[a]

Country	High technology	Medium technology	Low technology	Total
Ethiopia[b]	18	66	116	200
Nigeria	24	52	63	139
Tanzania[b]	18	23	93	134
Uganda[b]	14	35	84	133
Kenya	30	32	66	128
Ghana[b]	15	31	49	95
Zambia	8	17	33	58
Cape Verde	4	12	31	47
Mozambique	6	13	21	40
Malawi	5	8	19	32
Mali	4	4	24	32
Cameroon[b]	1	9	13	23
Madagascar	2	3	12	17
Senegal	3	4	9	16
Rwanda	0	4	10	14
Lesotho	2	0	11	13
Niger	0	0	8	8
Burundi	0	0	5	5
Burkina Faso	0	1	0	1
Total	154	314	667	1,135

Note: [a] Based on OECD definition. [b] One firm is not classified, hence the difference in the total number of firms.

Table 4. Description of variables

Dependent Variables		**Description of variable/Question in the survey**	**Value**
Perception variables	How do you rate the effect of the presence of foreign investors in this country on this company?		
	Overall ability to compete	Ability to compete in the market	1: Positive 0: Negative or no effect
	Business	Business opportunities	
	Demand	Demand for the company's products	
	Cost	Increase cost of skilled labour	
	Availability of materials	Greater availability of raw materials and other inputs	
	Access to finance	Better access to finance	
	Access to export markets	Greater access to export markets	
Actual response	Investment	Have you undertaken investment that can be attributed to the presence of foreign investors?	1: Yes 0: No
	Produce similar products	What has been the response of this company to the presence of foreign investors?	1: Yes 0: No
	Produce different products to avoid competition	What has been the response of this company to the presence of foreign investors?	1: Yes 0: No
	Adopt similar production technologies	What has been the response of this company to the presence of foreign investors?	1: Yes 0: No
Independent Variables			
	Age	Age of the firm	1: 0-5 year 2: 6-10 years 3: 11-20 years 4: +21 years
	Size	Size of firm in terms of full time employees	1: small <21 2: medium 22-75 3: large >76
	Family business	Company owned by family	1: if more than 0% share 0: otherwise
	Exporter	Exports	1: if company exports 0: otherwise
	Origin of competition	Main competition come from:	1: locally-owned companies 0: imports or foreign-owned companies based in this country
	Ever Foreign Owned	Has this company ever had a foreign partner or joint venture?	1: Yes 0: No
	Certified	Are any of this company's products or services certified?	1: Yes 0: No
	Training	Does this company provide internal/external training to its employees?	1: Yes 0: No

	Sub-Contract Work	Does this company undertake sub-contract work, such as manufacturing operations, or business services for other companies in this country?	1: Yes 0: No
	Financed	Sources of financing for the initial investment?	1: Personal savings, family and friends 0: Other sources
	FDI	Foreign direct investment as a share of GDP	Various values
	Landlocked country	Is the company located in a landlocked country?	1: Landlocked 0: Not landlocked

Table 5. Descriptive statistics, 1,140 observations

Dependent Variables	**Mean**	**Std. Dev.**	**Min**	**Max**
Overall ability to compete	0.3192982	0.4664094	0	1
Business	0.4026316	0.490643	0	1
Demand	0.3614035	0.480618	0	1
Cost	0.2184211	0.413356	0	1
Availability of materials	0.3131579	0.4639815	0	1
Access to finance	0.2245614	0.4174763	0	1
Access to export markets	0.2421053	0.4285457	0	1
Investment	0.0508772	0.2198434	0	1
Produce similar products	0.3201754	0.4667486	0	1
Produce different products to avoid competition	0.2570175	0.4371809	0	1
Adopt similar production technologies	0.2692982	0.4437899	0	1
Independent Variables				
Age	3.009649	0.9723544	1	4
Size	1.935088	0.7924116	1	3
Family business	0.4798246	0.499812	0	1
Exporter	0.2561404	0.4366918	0	1
Origin of competition	0.6017544	0.4897514	0	1
Ever Foreign Own	0.0833333	0.2765067	0	1
Certified	0.5473684	0.4979696	0	1
Training	0.3736842	0.4839936	0	1
Subcontract	0.15	0.3572281	0	1
Main customer foreign	0.077193	0.2670145	0	1
Self-financed	0.5903509	0.4919848	0	1
Land-locked country	0.4368421	0.4962127	0	1
FDI/GDP	4.250675	3.174963	0.02	12.41

Table 6. Frequency of dependent and independent variables for 1,140 firms

	Variables	Code	Percent frequency
Dependent variables: Perception to the presence of foreign Investors	Overall ability to compete		
	Positive	1	31.93%
	Negative	0	68.07%
	Business		
	Positive	1	40.26%
	Negative	0	59.74%
	Demand		
	Positive	1	36.14%
	Negative	0	63.86%
	Cost		
	Positive	1	21.84%
	Negative	0	78.16%
	Availability of materials		
	Positive	1	31.32%
	Negative	0	68.68%
	Access to finance		
	Positive	1	22.46%
	Negative	0	77.54%
	Access to export markets		
	Positive	1	24.21%
	Negative	0	75.79%
Dependent variables: Response to the presence of foreign Investors	Investment		
	Yes	1	5.05%
	No	0	94.91%
	Produce similar products		
	Yes	1	32.02%
	No	0	67.98%
	Produce different products to avoid direct competition		
	Yes	1	25.70%
	No	0	74.30%
	Adopt similar production technologies		
	Yes	1	26.93%
	No	0	73.07%
Independent variables	Age		
	0-5 years	1	9.82%
	6-10 years	2	17.28%
	11-20 years	3	35.00%
	21+ years	4	37.89%
	Size		
	Small	1	34.82%
	Medium	2	36.84%
	Large	3	28.33%
	Family business		
	Yes	1	47.98%
	No	0	52.02%
	Exporter		
	Yes	1	25.61%
	No	0	74.39%

	Variables	Code	Percent frequency
	Origin of Competition		
	Locally-owned manufacturers	1	60.18%
	Imports or From foreign-owned companies	0	39.82%
	Ever had a foreign partner		
	Yes	1	8.33%
	No	0	91.67%
	Certified		
	Yes	1	54.74%
	No	0	45. 26%
	Training		
	Yes	1	37.37%
	No	0	62.63%
	Sub-contract		
	Yes	1	15.00%
	No	0	85.00%
	Main Customer Foreign		
	Yes	1	7.72%
	No	0	92.28%
	Initial source of finance		
	Family and friends	1	59.04%
	Commercial banks and other institutions	0	40.96%
	Firm located in a landlocked country		
	Yes	1	43.68%
	No	0	56.32%
	FDI as percentage of GDP		
	0.02		0.44%
	0.38		11.23%
	0.68		0.09%
	0.79		17.63%
	0.98		2.81%
	1.15		2.81%
	2.26		1.23%
	2.58		1.40%
	3.34		2.11%
	4.46		11.84%
	5.05		12.19%
	5.43		5.09%
	5.68		11.75%
	7.42		4.12%
	9.13		8.42%
	9.3		3.51%
	10.34		1.14%
	11.7		0.70%
	12.41		1.49%

Table 7. Marginal effects using perception variables as dependent variables

VARIABLES	(7.1) Overall ability to compete	(7.2) Business	(7.3) Demand	(7.4) Cost	(7.5) Availability of materials	(7.6) Access to finance	(7.7) Access to export markets
Age	-0.00932	-0.0237	-0.0203	9.90e-05	-0.00361	**-0.0221***	**-0.0270****
	(0.0151)	(0.0159)	(0.0156)	(0.0132)	(0.0150)	(0.0133)	(0.0136)
Size	**0.0610*****	**0.0811*****	**0.0567*****	0.0130	**0.0660*****	0.0267	**0.0517*****
	(0.0212)	(0.0224)	(0.0219)	(0.0185)	(0.0210)	(0.0186)	(0.0190)
Family business	**-0.0985*****	**-0.0781****	**-0.0651****	**-0.0503****	**-0.0794*****	-0.0283	-0.00292
	(0.0291)	(0.0308)	(0.0302)	(0.0256)	(0.0290)	(0.0259)	(0.0267)
Exporter	-0.0326	-0.0203	-0.0489	-0.0126	-0.0386	0.0493	**0.113*****
	(0.0331)	(0.0359)	(0.0346)	(0.0297)	(0.0333)	(0.0310)	(0.0331)
Origin of competition	-0.0458	**-0.0530***	-0.0354	-0.0195	-0.0134	**-0.103*****	**-0.0591****
	(0.0289)	(0.0304)	(0.0297)	(0.0253)	(0.0286)	(0.0260)	(0.0265)
Ever Foreign Own	0.0421	0.0551	**0.131****	-0.0170	0.00785	**0.103****	-0.00282
	(0.0521)	(0.0549)	(0.0553)	(0.0430)	(0.0509)	(0.0504)	(0.0465)
Certified	**0.128*****	**0.115*****	**0.111*****	**0.0507****	0.0395	**0.0583****	**0.0517***
	(0.0290)	(0.0309)	(0.0302)	(0.0257)	(0.0293)	(0.0260)	(0.0268)
Training	**0.0558***	0.0294	0.0270	-0.0233	0.0310	**0.0643****	0.0108
	(0.0299)	(0.0315)	(0.0308)	(0.0258)	(0.0297)	(0.0268)	(0.0272)
Sub-Contract Work	**0.0961****	0.0622	**0.0768***	0.0500	**0.0966****	0.0323	0.0303
	(0.0419)	(0.0427)	(0.0421)	(0.0365)	(0.0412)	(0.0364)	(0.0382)
Financed	-0.00642	-0.0123	0.000562	0.00254	**0.0846*****	-0.0371	-0.0113
	(0.0298)	(0.0315)	(0.0308)	(0.0261)	(0.0290)	(0.0264)	(0.0269)
Landlocked country	0.0127	**0.0604***	0.0448	-0.0155	**0.0533***	0.0162	**0.0703****
	(0.0312)	(0.0329)	(0.0322)	(0.0270)	(0.0310)	(0.0276)	(0.0286)
FDI	**0.0147*****	**0.00879***	**0.0185*****	**0.0136*****	**0.0128*****	0.00362	**-0.00890****
	(0.00490)	(0.00519)	(0.00507)	(0.00425)	(0.00488)	(0.00430)	(0.00452)
Log likelihood function	-676.5814	-739.4554	-718.2778	-585.3504	-689.4772	-576.5864	-596.6338
LR Chi Square	74.89	57.96	55.07	26.08	38.30	61.21	68.70
Pseudo R2	0.0524	0.0377	0.0369	0.0218	0.0270	0.0504	0.0544
Observations	1,140	1,140	1,140	1,140	1,140	1,140	1,140

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Software used Stata12.

Table 8. Marginal effects using response variables as dependent variables

VARIABLES	(8.1) Investment	(8.2) Produce Similar Products	(8.3) Produce Different Products	(8.4) Adopt similar production technologies
Age	0.0104	0.0142	0.000870	0.0123
	(0.00640)	(0.0152)	(0.0141)	(0.0144)
Size	0.000249	-0.00607	0.0217	0.00709
	(0.00840)	(0.0213)	(0.0197)	(0.0199)
Family business	-0.0113	0.0390	0.0211	0.0121
	(0.0115)	(0.0295)	(0.0272)	(0.0278)
Exporter	0.0215	-0.0367	-0.00782	0.0400
	(0.0154)	(0.0339)	(0.0320)	(0.0330)
Origin of competition	-0.0159	**-0.0594****	-0.0117	-0.0270
	(0.0117)	(0.0291)	(0.0269)	(0.0273)
Ever Foreign Own	0.0173	-0.0123	0.0816	0.0440
	(0.0224)	(0.0505)	(0.0518)	(0.0501)
Certified	0.00216	**0.0548***	**-0.0487***	0.0422
	(0.0116)	(0.0295)	(0.0278)	(0.0280)
Training	**0.0340****	0.00924	**-0.0471***	**0.0640****
	(0.0133)	(0.0299)	(0.0273)	(0.0285)
Sub-Contract Work	**0.0655*****	**0.130*****	0.0205	**0.0761***
	(0.0232)	(0.0418)	(0.0379)	(0.0394)
Financed	**0.0190***	**0.0566***	**0.0629****	0.0320
	(0.0112)	(0.0297)	(0.0272)	(0.0278)
Landlocked country	-0.00767	**-0.0567***	0.0389	-0.0408
	(0.0119)	(0.0305)	(0.0288)	(0.0289)
FDI	0.00255	**0.0228*****	-0.00482	-0.000513
	(0.00176)	(0.00488)	(0.00463)	(0.00463)
Log likelihood function	-206.93714	-677.01427	-638.5607	-650.10435
LR Chi Square	44.61	75.54	22.28	28.03
Pseudo R2	0.0973	0.0528	0.0171	0.0211
Observations	1,140	1,140	1,140	1,140

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Software used Stata12.