Determinants of Firms Growth in Developing Countries:
An Extension of the Resource-based Theory of Firm Growth

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Keun Lee* and Tilahun Temesgen**

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*Professor of economics at the Seoul National University and consultant at the World Bank: E-mail: Kenneth@snu.ac.kr; klee2@worldbank.org.
**Economist at the World Bank, Development Research Group (DECRG):
E-mail: ttemesgen@worldbank.org.

Abstract

Using firm-level survey data sets from a number of developing countries, this paper examines what make firms grow successfully in developing countries. We use the investment climate survey conducted by World Bank in eight developing countries from different geographical locations covering a total of about 6,600 manufacturing firms.

As a basic theoretical framework, we rely on the resource-based theory of the firm originally proposed by Penrose (1959) and its later developments, such as the dynamic resource-based theory of the firm. In Penrose theory, a firm is a bundle of resources (or capabilities) and firm growth depends on what kinds and how much of the diverse resources a firm has and how effectively it can utilize them for growth. The findings of the paper are as follows.

First, in relatively low growth (capability) firms, growth is mainly contributed by what can be termed as relatively basic resources such as physical capital and human capital, whereas in high growth (capability) firms, growth is, in a relative sense, more driven by higher level resources such as managerial capital and R&D capital. Second, not specific human capital but general human capital of workers is found to have significant contribution to firm growth, whereas for managers, specific knowledge rather than general knowledge is found to be more important. Third, difference between slow vs. high growth firms has more to with the different effectiveness of relevant resources less with the difference in the absolute amount of the resources. Fourth, export orientation and conglomeration are the most important strategies for firm growth, compared to networking with other local, SOE or foreign firms.

1. Introduction

When we see economic development as private sector development and thereby generating incomes for the population, a crucial issue is what determines the growth of firms in developing countries?" This paper takes up this important question and attempts to provide an answer using firm-level survey data sets from eight developing countries at different level of economic growth.

Empirical studies that focused on firm growth go back to Javanovic (1982) and Evans (1987ab) for the US firms and Hart and Oulton (1996) for UK firms. These papers deal with the classical question of the relationship between the size, age and growth of the firms. For developing countries, Shanmugam and Bhaduri (2002) and Das (1995) follow this tradition with focus on the size and age, using the data of Indian firms. Sleuwaegen and Goedhuys (2002) relate firm growth in Cote d'Ivoire to other factors, such as access to market, resources, infrastructure and financial services, in addition to size and ages. While Tybout's article in Journal of Economic Literature (2000) is an important survey on firms in developing countries, it focuses on the impact of regulatory and protection regimes on technical efficiency and turnover in large vs. small firms. This paper aims to contribute to the literature by adopting a new theoretical framework, addressing more diverse determinants beyond age and size, and using multi-country data.

A starting point of this paper is the recognition that one of the most fundamental differences between firms in the advanced and developing economies is that for the latter the resources are not easily available either within the firm itself or from other neighboring firms whereas diverse resources are available within the firm or from other firms in the former countries. This difference leads to totally different behaviors and strategies by the management of firms in the two economies. The main task of the firms in advanced economies is to optimize the uses of diverse resources for the objective of profit maximization. In contrast, the main task of the firms in developing economies is not only how to utilize the existing resources but also, more importantly, how to acquire the critically lacking resources and improve their availability over the course of the firm's life. Profit is sought not just to distribute back to the shareholders but more importantly to be used for further expansion of the firm's resources, such as human capital of workers and managers, R&D team, brand power and so on. While these are of course borne by all firms including those from advanced economies, they will be heavier in the cases of firms from developing countries facing more imperfections in markets and other constraints in business environment or investment climate.

Given our theoretical starting point state above, we find very suitable for our purpose the insight from the resource-based theory of the firm as originally proposed by Penrose (1959). In Penrose theory, the firm is a bundle of resources (or capabilities) and firm growth depends on what kinds and how much of the diverse resources a firm has, and how effectively it can utilize them for its growth. One of the recent developments of this theory is to make it dynamic. Helfat and Peteraf (2003) articulate general patterns and paths in the evolution of organizational capabilities over time, and incorporates the founding, development, and maturity of capabilities in a manner that helps to explain the sources of heterogeneity in organizational capabilities. However, the contributors in this trend do not seem to have much interest in firms in developing countries.

Going beyond simply applying the Penrose' theory to the context of developing countries, this paper further extends the original insight of the resource-based theory in several dimensions. First, the paper focuses on the situation in developing countries and introduces not only managerial resources that is the original focus by Penrose but also other diverse resources such as workers human capital, R&D capital and physical capitals. Second, we emphasize the dynamics in the relationship between the resources and firm growth such that core resources of the firm change through time or with the country's stage of economic development. Specifically, our hypothesis is that the growth of firms in developing countries is determined by firm-level resources, and that there are differences in the relative importance among

each component of these resources, depending on the level of capabilities of the firm or general economic development of the country where the firm is located.

Third, while the resource-based theory of the firm tend to be oriented toward "internal" resources of the firm, this paper address the possibility of utilizing "external" resources for growth by networking or integrating with other firms, such as foreign firms, buyer firms from export markets, state-owned firms, or other bigger local firms. Finally, beyond just testing the importance of workers' human capital and managerial capital, our analysis goes further to test the relative importance of generic vs. firm-specific capital, and will see if there is any difference with the findings from the advanced countries, such as that by Laursen at al. (1999). This is very important in that even though in the growth literature Kim and Kim (2000) pointed out the need to distinguish between general and specific human capital, there has been few empirical research verifying this, mainly due to lack of reliable data. We are able to test this hypothesis in this paper using the Investment Climate survey data sets collected by the World Bank in collaboration with various agencies in each country.

Using regression analyses of firm growth in various specifications, this paper find the followings. First, firm growth is mainly contributed by what can be termed as relatively basic resources such as physical capital and human capital, whereas in high growth (capability) firms, growth is, in a relative sense, more driven by higher level resources such as managerial capital and R&D capital. Second, not specific human capital but general human capital of workers is found to have significant contribution to firm growth, whereas for managers, specific knowledge rather than general knowledge is found to be more important. Third, difference between slow vs. high growth firms has more to with the different effectiveness of relevant resources less with the difference in the absolute amount of the resources. Fourth, export orientation and conglomeration are the most important strategies for firm growth, compared to networking with other local, SOE or foreign firms.

The remaining part of the paper is organized as follows: Section two discusses the theoretical framework and derives the testable hypotheses. Section 3 explains the data and basic characteristics of the sample firms by country and industrial sectors. Section 4 conducts the empirical analyses using various regression specifications, and discusses the results. Section 5 summarizes the results and discusses the policy implications.

2. Theoretical Framework and Hypothesis

The theoretical basis of our work goes back to the earlier work by Penrose (1959) and its more recent revised version (Penrose, 1995) where she proposed the resource-based view of firm growth. Her theory has influenced greatly the later works in the study of the firm, developing them into several variations such as the capability based theory of the firm, knowledge based theory of the firm, and evolutionary theory of the firm (Hoopes, Madsen, and Walker, 2003). Recently, a book titled 'The Legacy of Edith Penrose' (Pitelis 2002), has been published in commemoration of the 40th year anniversary of the Penrose book.

In her original book, Penrose (1959) saw the function of the firm as "acquiring and organizing human and other resources in order to profitably supply goods and services to markets", and defined the firm as, " a collection of resources bound together in an administrative framework, the boundary of which are determined by the area of 'administrative coordination' and 'authoritative communication'". Here comes the labeling of the resource-based theory of the firm. One of the key ideas of this theory is that since the firm is a bundle of resources (or capabilities) the firm growth depends on what kinds and how much of these diverse resources it commands and can utilize for its growth.

One of the recent developments of the theory is to make it dynamic. Helfat and Peteraf (2003) introduced the concept of the capability life cycle, which articulates general patterns and paths in the evolution of organizational capabilities over time, and incorporates the founding, development, and

maturity of capabilities in a manner that helps to explain the sources of heterogeneity in organizational capabilities. Another trend is to utilize the original intuition to analyze firms, business groups in particular, in developing or emerging economies (Kock and Guillen 2001; Guillen 2000; Amsden and Hikono 1994). Kock and Guillen (2001) consider the diversification of business groups from developing economies as a way to utilize their own unique capability or resources, which is termed as "project execution capability" by Amsden and Hikono (1994). This capability refers to the skills required to establish or expand operating and other corporate facilities, including undertaking pre-investment feasibility studies, project management, project engineering, procurement, construction and start-up of operations.

Acquisition of such capability by firms in developing countries has to do with the unique origins of the firms themselves. While having started with simple labor-intensive sectors, these late-comer firms in developing countries faced severe entry and growth barriers based on first-mover advantages in many of the new, capital-intensive industries (Chandler, 1990, ch.2). In the absence of proprietary technology to exploit in related industries and in the presence of potentially high profit rates in 'pre-modernized' start-up industries, their pattern of diversification tended to be opportunistic and technologically unrelated (Amsden and Hikino, 1994). Through diversification, they were able to learn and accumulate something, which can be called project execution capability. However, such exposition of the business groups from developing countries have not analyzed the specific dynamics of the more general growth path of firms over the course of economic development, especially with regard to the firms other than business groups.

Our work is to combine the dynamic resource-based view of the firm growth with the interest on firms from developing countries. Our assumption is that one of the most fundamental differences between firms in the advanced and developing economies is that for the former diverse resources are available within the firm or from other firms, whereas for the latter these critical resources are not easily available either within the firm itself or from other neighboring firms. Thus, the main task of the firms in developing economies is not only how to utilize the existing resources but also, more importantly, how to acquire the critically lacking resources and improve their availability over the course of the firm's life. Profit is sought not just to distribute back to the shareholders but more importantly to be used for further expansion of the firm's resources. To put it another way, accounting profitability might be lower owing to the additional "growth costs" borne by the firms from developing countries. Growth costs would include the costs spent to increase capabilities of workers, managers, R&D team, brand power and so on. While these are of course borne by all firms including those from advanced economies, they will be heavier because firms from developing countries are faced with more imperfections in markets and other constraints in business environment or investment climate, as pointed out by Tybout (2000) and World Bank (2005).

Thus, our focus on the study of firms from developing countries is primarily on that measured by the growth rates of sales, not profitability, as well as on what kinds of resources are more or less important in a relative sense in the growth process. There are diverse resources that should affect firm performance and growth, which include social capital (network and connections), physical capital, human capital (embodied in workers employed by the firm), managerial capital, R&D capital (capability to conduct R&D independently), and brand capital. Given data availability, this study looks at the following four endowments available at the firm: human capital, physical capital, managerial capital, and R&D capital.

Actually we are not alone in paying attention to these as important factors for firm performance, although we may be the first with regard to the empirical analysis of developing countries. At theoretical dimension, the relative importance of human capital and learning-by-doing has also long been pointed out as one of the determinant factors for economic growth in developing economies since Lucas (1988). Along ths tradition, Kim and Kim (2000) pointed out the need to distinguish between general and specific human capital in economic growth. Among empirical studies, Jensen and McGuckin (1997) find using US data that the vast majority of variations in firm performance is not associated with traditional observables, such as location, industry, size, age or financial capital, but with unobservable and

relatively permanent attributes of the firm, such as managerial capital and skills composition of its workforce. Griffith, Redding and Reenen (2004) find R&D and human capital to be statistically important for firm performance or productivity.

However, along our reasoning so far, there is a good reason to suspect that not all of these resources are found to be significant or existing at al as determinants of firm growth. Specifically, we will specifically explore the following hypotheses.

Hypothesis. Depending upon the level of firm-level growth capability or economic development of the country, the key resource variables are different across firms within a country or across countries. Specifically we hypothesize that for the firms in general, or specifically those with low-growth capability, in developing countries, their growth is mainly contributed by relatively basic resources such as physical capital and human capital, whereas for firms in the advanced countries or the high-growth capability firms in developing countries, their growth is, in a relative sense, more driven by higher level resources such as managerial capital and R&D capital

This hypothesis will be first verified by running regressions and comparing the results with those from other existing studies on the advanced countries. Another way of its verification is to sort out firms from developing countries into two groups, high and low growth groups, and then to see if there is any difference in contribution of different firm-level resources to growth. The same regression will also be able to find what differentiates high growth from low growth firms, namely whether it is due to the differences in the absolute amount of key resources or to the differences in effectiveness in utilizing the resources. The paper will also examine the possibly different role of firm-specific vs. generic capital (or resources) as determinants of firm growth.

So far, we remain loyal to the original insight of the resource-based theory of the firm growth. However, one important criticism against this theory is that many modern firms tend to rely on outsourcing rather than trying to do everything themselves. In other words, firms, do not have to, or sometimes should not, keep all the necessary resources for growth ready inside the firms, as they can rely on resources from other firms or markets to the extent it is possible owing to the development of market and other supporting institutions. International networking is particularly important for firms in developing countries, as many of the critical resources are not available within the national territories. Amsden (1989) and Lee and Lim (2001) pointed out that one of the keys for growth of the Korean firms is getting connected to reliable international and domestic firms and a pool of knowledge. In contrast, integration of several firms (or plants) within the framework of the business groups or conglomerates is an effort to cope with scarcity of resources by sharing of resources within a given territory.

Here, we will consider diverse international or intra-national networking or integration strategies, such as networking with foreign buyer firms in exporting arrangement (export-orientation), being a foreign owned firms (FDI), being integrated as a part of conglomerates, doing subcontracting with other big firms, or being connection with the government by selling to state-owned enterprises.

As forms of intra-national networking, integration within the framework of the business groups has received more attention in the literature. Advantage of being a member firms of the conglomerates or business groups has been discussed in the context of market failure (Leff 1978; Goto 1982) or "institutional voids" (Khanna and Palepu 1997; 2000). The basic argument is that since many of the institutions that support business activities are absent in many parts of the world, the business groups emerge to fill the institutional voids. For example, in capital markets, without access to information, investors refrain from putting money into unfamiliar ventures. In such context, established and diversified groups have superior access to capital markets. In labor markets, given the lack of well-trained business people and educational facilities in developing countries, the groups can create value by developing promising mangers within the group, and can spread the fixed costs of professional

development over the businesses in the group. [1]

Specifically from the view of the resource-based view, obvious advantage of conglomerates is sharing and coordinated use of scarce resources, whose benefits has been confirmed in the case of the Korean chaebols (Chang and Hong 2000). The fact that so many emerging economies have seen and saw the development of various forms of business groups is evidence in support of the advantage of being business groups. Even in the context of the developed economies, many research argue that firms become conglomerates to benefit from more efficient capital allocations (Matsuska and Nanda 2002) or to take advantage of across-industry difference of their comparative advantages or productivities (Maksimovic and Phillips 2002).

On the other hand, the literature on SMEs suggests that networks per se are good especially because through accessing and utilizing external resources in the network, the SMEs can overcome some of the assumed disadvantages of a limited size (Havnes and Senneseth 2001). However, it is often observed that big firms, taking advantage of superior bargaining positions (monopsony), tend to pay only the no-margin prices to the goods supplied by the small contracting firms although they maintain long term relations and thus are beneficial to long term stability.   Actually, Havnes and Senneseth (2001) find no evidence of the short-term benefits of networking, such as growth in employment or growth in total sales, despite the fact that a substantial number of SMEs are actively networking and that the level of networking has been maintained over a five-year period.   Thus, we can reason that networking with big firms might not necessarily lead to rapid firm growth.

In a similar but slightly different context, the limitations of FDI strategy has also been pointed out. Whereas FDI may benefit local firms and economy by bring in new knowledge through imitation and learning (Findlay 1978, Blomstrom 1986), more competition in local markets and facilitating human capital mobility (Fosfuri et al. 2001), and/or promoting vertical linkages (Rodrigueze-Clare 1996), positive effect of FDI is not well confirmed by empirical analysis (Gorg and Greenaway 2004). Aitken and Harrison (1999) were not able to establish any positive linkage of technology spillover from MNCs to local firms in Venezuela in the 1980s. In the case of FDI firms owned by foreigners, transfer of knowledge might be limited or learning is not that automatic. Borensztein, Gregorio, and Lee (1998) also find from cross-country regressions that FDI contribute to economic growth only when a sufficient absorptive capacity is available in the host country. Moran, etc (2005) also find that there should be met certain conditions for FDI to have positive impact on development.

While the literature is somewhat divided with regard to the impact of FDI arrangement, it is quite unanimous with regard to the benefits of exporting. Exporting can help resource-scarcity of the firms to the extent that it is not simply an act of making goods and selling them abroad but also a way to learn from foreign buyers in the forms of blueprint, designs, quality control, and technical advice, as argued by Dahlman, Westphal, and L. Kim (1985) and Rhee, etc (1984). However, as pointed out by Tybout (2000), the issue of reverse causality remains, such that more successful firms tend to emerge as exporters, not vice versa. Thus, while we hypothesize that export-orientation is positively related to firm growth in developing countries, we will try to tackle this two-way causality in regressions.

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[1].   Similar argument has been made with regard to other markets as well. For instance in product markets, given the lack of information about products and transaction-related claims-processing institutions, companies in emerging markets face much higher costs in building credible brands than their counterparts in advanced economies. Thus, a conglomerate with some reputation can use its group name to enter new business and can also spread the costs of maintaining the brand names. Also, given that the governments in emerging economies intervene much more extensively in business operations, diversified groups can create value by acting as intermediaries when their affiliate companies need to deal with the regulatory bureaucracy. The larger the group is, the easier it is to carry the costs of maintaining government relations. Also, when labor market is rigid, running an internal labor market within a group can provide additional room for flexibility.

In Taiwan where the presence of FDI firms were much heavier than in Korea, in the final and recent stage of catch-up, the nationally owned firms have eventually emerged as leaders of the industry (Amsden and Chu 2003), which suggests the importance of ownership of firms in technological catch-up. Amsden and Chu (2003, p. 3) argue that technological catch-up requires using assets related to project execution, product engineering, and a form of R&D that straddles between applied research and exploratory development, and if such assets are to be accumulated at all, the responsible party tends to be a nationally owned organization. Or, as argued by Amsden and Chu (2003) for the case of Taiwan firms and by Mu and Lee (2003) for the case of China which benefited greatly from FDI, local employees did learn a lot by working in FDI firms but they tended to take advantage of this learned knowledge by establishing their own firms after leaving the FDI firms.

3. The Data and Basic Characteristics of the Sample Firms

1) The World Bank Investment climate Surveys

The World Bank has been conducting investment climate surveys around the world since 2001, and to date it has collected data that covers over 26,000 firms in 53 countries (World Bank 2005). The standard questionnaire administered in these surveys has a number of sections covering regulations, governance, access to finance, and infrastructure, as well as firm productivity, investment, and employment decisions. The surveys cover a diverse range of sizes and activities, with stratified samples of several hundred firms from multiple locations in each country. Data is gathered through face-to-face interviews conducted with senior managers or owners and accountants.

The current study uses the data base covering the following 8 countries (Numbers next to the country's name in parentheses indicate the year when the survey was conducted, and numbers to the right of each country name (second column) indicate the sample size):

Country (year)	Number of firms
Bangladesh (2002):	1,001 firms
Brazil (2003):	1,642 firms
China (2002),	1020 firms
Peru (2002),	553 firms
Indonesia (2003),	713 firms
India (2002),	1,824 firms
Ethiopia (2002),	427 firms
Tanzania (2002):	276 firms

For each country, we selected the surveys of manufacturing firms only (i.e. excluding services, tourism and construction firms whenever they are included in the data sets). The number of firms in the final sample of the multi-country manufacturing establishments is 6,666. Table 1 shows the number of manufacturing firms in the sample from each country by sector, and the corresponding sales growth rates for each cell by country and sectors. Brazil has the largest representation in the sample with 1,541 firms and Peru has the smallest sample with 124 firms.

The average growth rate of sales for the whole sample is 8.74 percent per annum. Among the country level observation of firms, the lowest growth rates are achieved by firms from Peru (-3.3%), followed by Indonesia (1.2%), Bangladesh (5.7%) and Ethiopia (6.3%). The highest among the sample in terms of sales growth is that of China (13.3%), followed by Brazil (12.7%) and Tanzania (11.7%). India is in the middle with 8.5% growth rate of sales which is closest to the sample average.

[table 1: no. and sales growth by country and sectors]

Table 2 lists, and provides the basic statistics for the variables used in our analyses. The variables are divided into three groups, namely resources, strategies, and control variables.

[table 2: basic statistics]

2) Four types of firm-level resources are included in the first group. These are: physical, human, managerial, and R&D capital.

a) Physical capital is measured by the net book value in dollars of machinery and equipment, which is also the accumulated stock of net fixed investment. Tables 2 and 3 show that the average net book value of physical capital is 2749 US dollars with highest average values shown in China (9522 dollars) and the lowest is in Ethiopia (399 dollars).

b) Human capital is measured in terms of both generic and specific human capital. Generic human capital is measured by the educational attainments of workers, especially by the ratio of workers with secondary education at the firm level. We also measure generic capital by the proportion of workers with tertiary or below-primary education. Tables 2 and 3 show that the average percentage of workers with secondary education is 62 percent with the highest average values shown in Peru (79 percent) and the lowest in Tanzania (37 percent). Specific human capital is measured by a dummy indicating whether workers in a firm have received on-job-training or not. In table 2, it is shown that 49% of the workers in the sample have received such training, with high ratio observed in Brazil and China, and lowest ratio shown in Ethiipia (22%).

c) Managerial capital is measured by various indicators which can be considered as representing either generic or specific managerial capital. Generic capital is represented by a dummy (mc_tertiary) indicating whether he/she has the tertiary education or not. On average 68% of the managers are shown to have tertiary education. Indicators of specific capital include managers' years of experience in the fields (mc_year2), years in foreign firms (mc_foreign), and a dummy variable representing whether the manager has received specific training related to the business, apart from formal schooling (mgr_training). Tables 2 and 3 show that the average percentage of managers with special training is 59 percent with the highest average values shown in India (88 percent) and the lowest in Ethiopia (24 percent).

d) R&D capital is meant to try to indicate whether a firm has the capacity to develop the products with its own plans by conducting in-house R&D (a dummy). Table 2 and 3 show that the average percentage of the firms with some R&D capacity is 13 percent with the highest average values shown in India (22 percent) and the lowest in Peru (5 percent).

[Table 3: key resource variables; by country]

3) Key Strategies

As variables of networking strategy for growth, we consider the followings: export-orientation strategy; FDI attraction strategy, embodied technology absorption strategy, conglomerate strategy, subcontracting strategy, and connection with the government strategy.

a) Export Orientation. It is an important strategy for a firm to be export-oriented, as exporting allows the firm to get an opportunity to learn from foreign buyers and let them be subjected to more tough quality controls (Dahlman, etc 1985). Table 4 shows that in our sample firms, the proportion of export-related sales to total sales is 18 percent on average with the highest ratio observed in the case of Bangladesh (38 %) and the lowest in Ethiopia (4%).

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b) FDI attraction.   The second option would be to invite foreigners directly into the firm as a major stakeholder so that they have incentives to provide help in managerial, production and marketing know-how. Table 4 shows the percentage of the firms that are foreign-owned (defined as those with foreign equity ownership of 20% or higher). It is shown that in our sample firms, the proportion of foreign owned firms so defined are 10 percent on average with the highest ratio observed in the case of China (36 %) and the lowest in India (1.5%).

c) Embodied Technology.   The third option would be to introduce advanced or foreign technology / knowledge in the form of machinery and equipment that embody them.   Tables 2 and 4 show that on average 6 percent of the sample answered that the main form of technology absorption is the use of technology embodied-in physical capital with the highest ratio in Indonesia (30%) and lowest in Peru (2.5%).

d) Affiliation with Conglomerates.   Another strategy would be to seek affiliation with big diversified conglomerates. Conglomerates are known be in advantageous positions vis-à-vis stand-alone companies in such environment featured by more market imperfections typical of developing economies (Khana and Palepu 1997). They can utilize internal capital markets when external capital markets are not working properly, and also share key resources which is often lacking in one affiliates and get the initial boost of sales from within-group internal transactions (Chang and Hong 2000). In our sample, about 20 percent of the sample firms are found to be affiliated with business groups or multi-plant conglomerates. [2] Tables, 2 and 4, show an interesting fact that there is a very uniform distribution of this ratio, with all the countries having about 20% of their firms in conglomerates, except Ethiopia with only 7%.

e) Connected with the Government. Firms can also seek more stable growth opportunity by being connected with the government. In our study, we measure this strategy by the percentage of sales to the government or to the state-owned enterprises. Average of this value for the whole sample is 4.83 percent ranging from 0% to 100%.

d) Networking with other big firms.   If a firm is small in size, it usually depends on other big domestic or foreign firms in diverse aspects of businesses. In our study, we measure this strategy by the percentage of sales to multinationals, other big firms, or parent companies and affiliates. In table 2, it is shown that the share of this connected sale to total sales is about 16%, with the highest ratio being in China.

[Table 4: strategy variables: by country]

4. Determinants of Firm Growth in developing countries
1) The Model:

In classical works on firm growth in the advanced economies (Evans 1987ab), the model takes a very simple following form:

$$(\ln S_{t'} - \ln S_t) / d \quad = \quad F (A_t, S_t) \quad + u_t \qquad (1)$$

where S_t stands for size at time t, A_t for age at time t, $d = t' - t$ (time difference) and u_t is normally

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[2] Our definition of conglomerates here is to include only those firms (about a half of the sample) who reported the percentage of their sales sold to the parent companies or other subsidiaries or those who (another half) answered positively to the questions of whether you are a plant affiliated to a multi-plant firm.

distributed with mean zero and possibly a non-zero constant variance and is independent of size and age. Without other firm characteristic variables, the key two variables of size and age, are supposed to represent everything happening is inside the firms. Size may represent the size of firm capacities and resources, and age may represent learning process in which firm uncover their true inefficiencies, accumulate capabilities, and conduct innovations (Jovanovic 1982; Nelson and Winter 1982). Such reasoning makes sense at least when we consider long term performance and growth of firms.

However, when our interests are about short term performance of firms, it is better to have more detailed information about firm characteristics. Taking advantage of richness of our data set covering diverse aspects of firm behavior and characteristics, we can now be more specific with regard to determinants of firm growth. However, the data is just about cross-section of firms from several countries without information about long term performance and behavior. Thus, for our purposes, equation (1) is modified as follows.

$$(S_{t+1} - S_t) / S_t \quad = \quad \text{F} (R_t, G_t, C_t) \quad + u_t \tag{2}$$

where R_t stands for firm-level resources, G_t for growth strategies, and C_t for other control variables. In regressions, to take into account of the possible non-standard behavior of error terms (u_t), we report all White's heteroskedasticity consistent t-statistics, following Evans (1987ab). As discussed earlier, regarding the firm-level resource variables, we investigate the impact of the following four major resources on the firm growth: physical capital, human capital, managerial capital, and R&D capital.

As strategy variables, we considered the following: export-orientation strategy; FDI strategy, embodied technology absorption strategy, conglomerate strategy, subcontracting strategy, and connection with the government strategy.

As control variables, we considered age and initial size of the firm and dummies for sectors and countries.

2) Four Firm-level Resources (Capitals):

We first run regressions of sales growth rates on four firm-level resource variables and other controls. The four firm level resources are primarily supposed to represent physical capital, human capital, managerial capital, and R&D capital. Other controls include ownership (whether the firm is owned by private persons and/or families), size (number of workers), age (since the date of the establishment), and a dummy for conglomerate firms (whether the firm/units are affiliated with business groups or whether the establishment is a multi-plant firm), in addition to country and industry dummies.

Table 5 shows the results with the basic specifications focusing on the four firm-level resource variables. To guarantee robustness of the results, we have also tried instrumental variable regressions for a suspected endogenous variable. While there is no a priori reason to suspect the endogeneity of other variables, one can reason out that the fast growth firms have more capacity to build their physical capital, which might thus be endogenous. Thus, we selected the amount of energy usage in each firm as an instrumental variable for physical capital. Since the variable of physical capital here is a normalized measure taking the ratio of physical capital at each firm to the average dollar amount of physical capital at the industry level in each country, the energy use variable is also normalized the same way as a proportion of firm level energy use to the average in each sector and country. The choice of this instrument turns out to be very good as it is highly correlated with the normalized measure of physical capital but is not significantly correlated with growth of sales (see appendix table on correlation). Comparing the two regressions, that is, OLS and IV, we notice that the adjusted R^2 has been reduced slightly, while the significance of four capital variables remained roughly the same. No changes were observed with regard to the control variables. The effect of sectoral controls has not changed either, with the beverage sector growing faster and electronics sectors recording negative and significant growth

rates. This pattern holds for most regression results without any important difference between the OLS and IV results. Thus, from now on, discussion of the results will be referring to those of the IV regressions. Below are the main findings:

First, the results confirm the significant importance of two basic measures of capital, namely, physical capital and human capital, in addition to a marginal positive significance of managerial capital and R&D capital. This is in contrast with the typical cases of more advanced economies where the importance of R&D or managerial capital is also critical. Even with the Korean firm data, Chang and Hong (2000) find that R&D is an important factor for firm performance.

Among the control variables considered, significant are the variables of age (-), and size (-). This result is exactly the same with the findings by Evans (1987ab) based on a sample of American manufacturing firms between 1976 and 1982. He argues that that his findings are robust to alternative assumptions concerning the effects of sample censoring and the functional form of growth relationship. The inverse growth-age relationship we found is consistent with Javanovic (1982) while the inverse growth-size relationship is indeed inconsistent with a number of theories that assume or imply Gibrat's law (Gibrat 1931). Ownership variables representing whether a firm is owned by an individual or a family are marginally significant or in some cases become insignificant as we add more variables.

[table 5: basic regression with IV and OLS]

We also tried other measures of human capital and managerial capital as shown in tables 6 and 7. Only the variable representing the share of workers with secondary education is positive and significant, while the share of workers with college education or primary or below education also turn out to be negative. When put together with the secondary worker variable, the share of tertiary (primary)-educated worker variables turn into out to be insignificant, which implies that in the context of low or middle income developing country, the contribution of tertiary level educated workers is not that significant. This result is also in sharp contrast to the findings from the advanced countries (for example as applied in Denmark) that the proportion of workers with tertiary education is significantly and positively related to firm growth as measured by job growth (Laursen, etc. 1999). But, it is consistent with findings from studies on other developing economies, such as Guatemala, that secondary education, compared to primary or tertiary education, is most important for growth (Loening 2005).

Another interesting finding here is that between the two measures of human capital, that is, generic knowledge vs. specific knowledge. The variable of specific human capital (hc_training), represented by a dummy variable indicating whether or not workers had received training from the firm, turns out to be not significant. The level of significance initially was only 40%, but it became 93% when general human capital variable represented by the share of workers with secondary education) is added in the regression. To the extent that the training dummy is a good measure of specific knowledge-based human capital at a firm level, this implies that in developing countries in general firms utilize more of general knowledge of workers than firm- or industry specific knowledge, which is consistent with the nature of the production in these countries that is assembly-type, simple production process using technology embodied in machinery.

[table 6 : human capital measures]

Table 7 presents the results with various measures of managerial capital. These measures can be divided into two groups, one representing more generic knowledge (managers with university or higher degrees = mc_tertiary) and sector and business specific knowledge (years of experience in the same sector = mc_exper2, years of experience in a foreign company = mc_foreign, whether the manager had special training in relevant knowledge = mgr_training, and a combination of experience in the field plus in foreign companies = mc_year = mc_exper2 + 2*mc_foreign). While none of the managerial capital

measures are significant at 10 % or better level of significance, we can notice some difference among them. The worst performance in terms of the level of significance is the generic knowledge variable representing the highest education attained by the managers (99% insignificant), whereas performance of sector specific managerial capital variables show all similar levels of significance, around 20 to 40 percent, with the dummy representing whether the manager has a special training performing best in terms of the level of significance (19.5%). This pattern of relative order among the two groups of managerial capital variables remains consistent in both OLS and IV regressions. These results are consistent with the hypothesis that as components of managerial capital, sector-specific or business-specific knowledge are more important than generic knowledge. This is in sharp contrast to the case of human capital for workers where generic knowledge variable is significant (represented by share of workers with secondary education).

[table 7: measures of managerial capital and firm growth]

3) Five Networking Strategies: Exporting, FDI, Conglomeration, Subcontracting, and Connection with the Government

The preceding sections show that the four basic firm-level resources are all important, and thus confirm the insights of the resource-based theory of the firm. Then, an obvious follow-up to the analysis of the determinants of firm growth is to add other independent variables and to build up on these four resources. We started by adding variables that are under the firm's choices. These variables, as mentioned earlier, are strategic choices among export-orientation strategy; FDI strategy, conglomerate strategy, subcontracting strategy, and connection with the government strategy. When we test the importance of each of these strategy variables, one by one and also simultaneously, we find that the two most significant variables turn out to be export-orientation strategy, as measured by the share of export in total sales revenues and the variable representing affiliation with conglomerates.

Not significant at all is FDI variable, a dummy which takes one if foreign share is higher or equal to 20%, showing that foreign owned firms do not necessarily grow faster, other things being equal. The above results stay robust both in the OLS specification as well as the instrumental variable regressions.
The finding that there is 'no significance' of the coefficients for the variable representing the ratio of sales to other big firms or to the government or to government-owned enterprises is consistent with the findings by Havnes and Senneseth (2001), that of no evidence of short-term benefits of networking, such as growth in employment or growth in total sales resulting from networking activities.

In contrast to the insignificance of the sales to other big firm variables, high and very robust significance of the conglomerate variables confirms the well-known superiority of conglomerates or business groups in the economic environment featured by market failure (Leff 1978; Goto 1982) or "institutional voids" (Khanna and Palepu 1997; 2000). Variyam and Kraybill (1992) also find that firm growth is lower in single-establishment firms than in multiple-establishment firms in the US.

Then, comparing the insignificance of networking with other big firms and significance of the affiliation with conglomerates, what can explain this difference? First of all, theoretically, the former is networking, which is more close to market relations in the sense that their networking is not based on equity sharing, while the latter is rather integration, which is more close to internal transactions based on equity sharing. This difference should translate to the difference in the level and kinds of the support from the transacting firms. In the case of networking with big firms, it is often observed that big firms, taking advantage of superior bargaining positions (monopsony), tend to pay only the no-margin prices to the goods supplied by the small contracting firms although they maintain long term relations and thus are beneficial to long term stability. In its worse forms, it is simply survival but not independent prosperity. However, in the case of group affiliation, the situation is different because they are under the common ownership and control and thus common destiny. It is now established that one source of the advantages of conglomerate affiliates are sharing of knowledge, brand, and R&D (Branstetter 2000; Chang and

Hong 2000).

Then, how can we explain the performance difference between the FDI and conglomerates given the same fact of the common ownership?. The answer is the nationality matter as argued by Amsden and Chu (2003) and Lee and Lim (2001). In the case of FDI firms owned by foreigners, transfer of knowledge tends to be limited or learning is not automatic. In Taiwan where the presence of FDI firms were much heavier than in Korea, in final and recent stage of catch-up, the nationally owned firms eventually emerged as the leader of the industry (Amsden and Chu 2003), which suggests the important of ownership of firms in technological catch-up.

[table 8:   firm growth model with networking variables, OLS and IV]

While the regressions find that export-orientation and conglomeration are only two significant as determinants of firm growth, there is a remaining issue of reverse causality, such that only high performing or already fast growing firms tend to become exporters or form groups.   To handle this problem require information about the time when the firm become exporters or conglomerates. Luckily, for the exporter, the survey has a variable of the number of years being exporters. With this variable, we have created a dummy variable of new exporters who are defined as those firms with 1 to 3 years of export experience. Table 9 presents a robustness test of export-orientation strategy with the export-orientation variable now replaced by this new variable of new exporter. This new dummy is shown to be significantly positive, which implies that becoming exporter makes the firm grow faster, not the opposite.[3] .

[table 9:   Impact of becoming exporters]

However, the potential reverse causality with conglomeration is harder to handle due to the lack of data. Experiences of Korea and China indicates that there are three paths toward being a conglomerates or business groups, and they include: M&A (being acquired by a business groups), a spin-off (created by a business group), and a new joint venture between two firms. The latter two cases are free from endogeneity suspicion because spin-offs and joint ventures are newly created by the business groups. Regarding M&A case, there is no a priori reason to believe that only high growth firms are acquired by a business group as business groups often acquire low-performing performing firms as in the case of China and Korea. Graham, Lemmon and Wolf (1999) also show that conglomerate firms purchase firms that have a lower value than the acquisitions' single-segment counterparts. A final possibility is that a firm in this sample is a parent firm of a business groups and has been growing fast to create more son firms. Thus, if we have information about whether the firm is a parent company or son companies of a business groups, we can distinguish the impact of being a conglomerates. Unfortunately, we do not have either this information or the information about the exact date that the firms became conglomerates. However, unless the parent companies are the majority of those classified as the group firm in our sample, our results support the hypothesis, and that seems to be case.[4] What we tried as a partial way was to divide the firms into young and old firms with the average year (17 years) of the sample firms as the dividing line, and to see if the group variables remain significant in old firm sample. The reasoning is that fast growing firms are more like to have become conglomerates within 17 years or less after its birth, and if they remain growing faster even long time after being a conglomerate, that growth generating power has to do with being a conglomerate. The variable was still significant, although the results are not provided here.

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[3] Hallward-Driemeier, Iarossi and Sokoloff (2002) also try a similar method to confirm the impacts of exporting on productivity growth.

[4] In our survey and sampling design, only those who answered either they are a part of multi-plant company or their sales to conglomerates is bigger than zero percent of total sales are classified as group firms. In the second type of question, there is a separate question asking their sales to other firms, meaning that conglomerates in the sale question means conglomerates the answering firm belong to. As designed as such, we have no a priori reason to suspect that those classified as group firms are actually parent firms of groups or conglomerates, rather they are more likely to be sons or affiliates of the parent companies.

4) Sources of difference between the High and Slow Growth Firm

The dynamic resource-based view of firm growth implies that depending upon the level of their capabilities, the firms enjoy greater benefits from the possibly more diverse resources, among physical, human, managerial and R&D capitals. In this regard, we want to reveal the sources of the difference between the high and low growth firms. In order to do such a comparison, we divided the whole sample into two groups as high growth capacity and slow growth capacity firms. Given the lack of a good proxy for firm capability, we take the above-average growth record as the indicator of the being high capability firm. Thus, a firm is classified as slow growth capacity if its sales growth rates are below the average of the sector in each country.

Table 10 shows comparison of the sample means of all selected variables between the two groups and the results of a t-test checking the difference of the two sample means for each variable. It is very clear that there are only a few variables showing significant difference between the two sample means. Among the variables contributing to the superiority of the high growth firm groups, only three variables are shown to have passed the t-test at the 10 percent level. They are export-orientation, conglomeration, and firm age. In contrast, the share of workers with secondary level education is contributing to reducing the gap between the high and slow growth firms as it has a significantly higher sample means in slow growth firms. These results strongly indicate that the difference between the slow and high growth firms does not lie at the amount of the core resources but at the effectiveness (productiveness) of the core resource variables.

[table 11:   t-test results of difference between high vs. slow growth firms]

In regression terms, the differences should show up in the different coefficients of the core resource variables. To test this, we create a dummy which takes one for low growth capability firms and zero for others. Then, we have added interaction terms of this growth capacity variable with the four resource variables namely, physical, human, managerial and R&D capitals. Then, according to this regression specification, the coefficients of the four resource variables represent the effectiveness of these four resources in the high growth capacity firms, whereas the sums of the coefficients of the four variables and those of the interaction terms indicate the effectiveness of the four resource variables in the case of low growth capacity firms.

The comparative results are shown in model (7) of table 12. At first glance, the results show critical differences among the high vs. low capacity firms as the interaction term with dummies and four resource variables are all significantly negative, meaning that contribution of these resources are much smaller in the case of low growth firms. First of all, for the low capacity firms, the coefficients of the managerial and R&D capital variables are even negative and not significant, indicating that these firms are not equipped with such luxurious capacities. The first finding from this table is that effectiveness of the four resources is all higher in the high capacity firms, implying that the difference between the slow and fast growth firms lies in the effectiveness (productiveness) of the four key resources. This comparison also signifies the relatively high importance of managerial and R&D capital in the high capacity firms, which proves the hypothesis of the dynamic resource-based view of the firm growth.

Other results in table 12 show the impact of interaction terms among resource variables, for instance, to see if there is any positive interaction between human and managerial capital. As shown, none of the interaction terms are significant, which seems to reflect a more simple, rather than complex, nature of the production process in developing countries.

[table 12:   regressions with slow growth and high growth dummy variables]

5. Summary and Policy implications

The analysis so far verifies the grand conceptual hypotheses that growth of firms in developing countries is determined by firm-level resources and strategic variables. More specific finding can be summarized as follows.

It is shown that there are at least four firm-level resources critical to firm growth: physical, human, managerial and R&D capital. We have verified that in the lower growth capability firms, their growth is mainly contributed by relatively basic resources such as physical capital and human capital, whereas in the higher growth capability firms or those similar to firms in advanced countries, their growth is, in a relative sense, more driven by higher level resources such as managerial capital and R&D capital. In sharp contrast to the findings from advanced countries which suggests that the proportion of workers with tertiary education is significant and positively related to the firm growth measured by job growth (Laursen, etc. 1999) and that R&D capital is important in these countries (Griffith et al 2004; Chang and Hong 2000), our results from an analysis of firms in developing countries shows that managerial capital and R&D capital may contribute positively to firm growth but not much and the results are not very significant. It is also found that the difference between the slow and high growth firms does not come from the amount of the core resources but from the effectiveness of the core resource variables, and that there exist few positive feedback among the key resource variables in the context of developing countries.

Another interesting finding is that there are different impacts between the two measures of human capital, generic knowledge vs. specific knowledge. We find that it is not specific knowledge, but rather general knowledge of workers that is important for firm growth in developing countries, whereas for managerial quality, it is specific knowledge rather than general knowledge which is found to be significant and more important for firm growth in these countries. This is consistent with the nature of the production process in these countries which is mainly assembly-type, and a simple production process using a technology embodied in machinery.

With regard to alternative strategies, export orientation and conglomeration are found to be the most important strategies for firm growth, compared to other networking or integration strategies, including FDI strategy, subcontracting, and connection with the government strategy,

All the above findings lead one to the following characterization of the fast growing firms in developing countries. They are privately-owned conglomerates pursuing export-oriented strategy, mainly relying on workers with secondary education. This is not surprising given that successful catching-up economies of Korea and Taiwan used to be led by such firms during their high growth period. The finding also implies that workers should get access to education to at least (or even better) secondary level education beyond primary education, and that exporting is both a good learning and growth strategy than FDI.

The following are also the major policy and strategic implications of the findings.

First, firms from countries with different stages of economic development should focus on different resources for firm growth. At earlier stage, they had better focus on building physical and human capital focusing on primary and secondary levels of education, however as their economy grows and they want to upgrade their production process, a gradual emphasis shift is also needed to upgrade managerial and R&D capabilities/resources.

Second, it is more critical to enhance effectiveness (productivity and mutual positive feedback) of key resources than the absolute amount of the key resources. To the extent that external investment climate has impact on single and collective productivity of the resources, it is worthwhile for the governments to try to improve investment climates of the countries.

Third, firms should also try to be export-oriented as exporting serves them as a window of opportunity to learn from buyers and world-wide competition and discipline, rather than to be connected with other big foreign, domestic, state-owned firms. Given the significant correlation between export-orientation and FDI, we can also say that FDI strategy works better when it is oriented toward production for exports rather than local markets. Also, it is advisable to focus more on export-promotion than simply attracting more FDI or to encourage FDI firms to pursue more exports as in the case of China during the 1980s and 1990s.

This observation on the role of the FDI does not mean that the late-comer countries should not invite foreign firms. Many Korean chaebols, including Samsung' electronic affiliates, used to have or even currently have a FDI or OEM relations with foreign multi national corporations (MNCs). Also, it should be noted that having once arrived at the higher stage of technological development, the catching-up firms might want to form international alliances or even joint ventures to cope with the increasingly fierce global competition and to keep ahead. Several Korean firms have now reached this stage, and the old standing-alone strategy might not be effective anymore (Lee and Lim 2001). However, the alliance or networking strategy is possible and can work only after the late-comer firms have become able to command certain level of technological capability, which affects their bargaining positions. [5] Borensztein, Gregorio, and Lee (1998) also find from cross-country regressions that FDI contribute to economic growth only when a sufficient absorptive capacity is available in the host country. In other words, the existing technological capability and base of local firms matters since they determine the concrete terms of the technology-related contract between the local and foreign firms.

[5]. It is no wonder that Samsung Electronics now can create a company together with Sony which in the past Samsung cannot dare to approach.

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Table 1. Sales Growth and the Number of Firms by Country and industry   (% and number of firms)

Industry	Bangladesh	Brazil	China	Ethiopia	India	Indonesia	Peru	Tanzania	Total
Textiles	4.6%	10.8%	19.4%	21.7%	3.3%	1.9%	-6.7%	2.9%	5.2%
	252	97	49	12	228	175	17	13	843
Leather	5.1%	18.4%	13.4%	8.6%	10.1%		9.5%	74.7%	13.1%
	98	159	58	22	65		8	4	414
Garments	6.0%	10.9%	9.1%	-8.1%	13.8%	-2.1%	10.6%	-10.9%	8.1%
	305	421	109	36	260	146	26	6	1,309
Agro-industry				98.6%		22.5%		15.7%	21.7%
				4		18		54	76
Food	0.1%	17.0%		-7.6%	8.9%	12.6%	6.7%		6.9%
	147	114		81	192	106	4		644
Beverages				63.1%		85.7%			76.5%
				11		16			27
Metals & machinery		11.3%	5.6%		13.0%	10.0%	4.9%	30.3%	10.9%
		303	157		162	2	17	22	663
Electronics	3.2%	0.0%	20.5%		8.3%	-21.2%			11.2%
	91	70	365		281	33			840
Chemicals & pharmaceutics	24.0%	22.3%			6.0%	-21.7%	-7.2%	31.2%	7.5%
	80	81			378	74	17	18	648
Wood and furniture		12.9%		10.8%		-8.1%	-22.3%	-6.0%	7.9%
		296		187		51	18	45	597
Non-metallic & plastics							-13.8%	-21.3%	-15.5%
							17	5	22
Paper						22.0%		10.6%	17.8%
						28		16	44
Other manufacturing goods.	-5.0%			-8.0%					-7.2%
	11			30					41
Auto & & components			7.5%		8.0%	-50.6%			5.6%
			208		254	18			480
Other Transport equipment						36.8%			36.8%
						18			18
Total	5.8%	12.7%	13.3%	6.3%	8.5%	1.2%	-3.3%	11.7%	8.7%
	984	1,541	946	383	1,820	685	124	183	6,666

Table 2. Descriptive Statistics of variables

Variable		Obs	Mean	Std. Dev.	Min	Max
1) Resources (capitals)						
normcapital	physical capital (ratio to sector average)	6452	1.00	5.29	0.00	167.70
mgr_training	manager with training	7205	0.57	0.50	0.00	1.00
hc_wksecond	workers with secondary education.	4865	62.83	30.97	0.00	100.00
tech_local	In-house R&D capability	7444	0.12	0.33	0.00	1.00
hc_wkbelowp	wokers w/ primary or below	4876	19.75	27.42	0.00	100.00
hc_wkterti~y	workers with tertiary education	4876	17.65	23.69	0.00	100.00
mc_tertiary	mgr with tertiary education.	7205	0.67	0.47	0.00	1.00
mc_exper2	managers' of sector experience	5899	8.79	9.50	0.00	80.00
mc_foreign	manager with foreign firm experience	7444	0.09	0.29	0.00	1.00
mc_year	mc_exper2 + 2*mc_foreign	7444	4.72	8.67	0.00	82.00
hc_training	workers with training	4845	0.49	0.49	0.00	1.00
2) Networking Strategies						
new_exporter	new exporter with 1-3 year experience	7444	0.05	0.21	0.00	1.00
group_firm	dummy for conglomerates	6173	0.24	0.42	0.00	1.00
sale2firms	other big firm sales ratio	7444	17.59	32.44	0.00	100.00
sale2gov	government sale ratio	7444	4.85	16.83	0.00	100.00
sv_export	export sale ratio	7444	18.17	34.78	0.00	120.00
tech_FDI	dummy for foreign owned	7444	0.10	0.30	0.00	1.00
3) Controls						
norm_enrgn	energy consumption (ratio to sector average)	7429	1.00	6.70	0.00	183.80
contr_person	owned by individual/families	7444	0.35	0.48	0.00	1.00
age_opTZA	size of employment	7320	17.55	15.44	1.00	156.00
emplsiz1	firm age	6040	279.85	1238.69	0.00	75466.00

Source: authors' calculations

Table 3 ,	Key Resource Variables by Country							
Variable	Bangladesh	Brazil	China	Ethiopia	India	Indonesia	Peru	Tanzania
nbv_equipUSD	725.06	871.79	9522.87	399.06	2093.31	4079.32	1373.54	460.58
hc_wksecond		73.31			55.25	53.24	79.40	37.33
hc_wkterti~y		8.28			19.03	35.88	19.26	13.61
hc_wkbelowp		18.41			25.72	12.20	1.34	49.21
hc_training	0.27	0.67	0.70	0.22		0.24	0.55	0.45
mgr_training	0.71	0.30	0.67	0.24	0.88	0.49	0.44	0.32
mc_exper2		6.84	11.50	7.22	8.95	9.28	8.96	15.92
mc_tertiary	0.71	0.51	0.82	0.24	0.88	0.64	0.59	0.50
tech_local	0.10	0.16		0.07	0.22	0.10	0.05	0.09

Note: nbv-equipUSD is a new book value of physical capital in dollars.
For explanation about the variables, see the table 2.

Table 4,	Networking and Control Variables by Country							
	Bangladesh	Brazil	China	Ethiopia	India	Indonesia	Peru	Tanzania
group_firm	0.23	0.23	0.17	0.07	0.18	0.23	0.20	0.21
sv_export	38.20	7.76	25.46	4.18	11.15	29.11	22.06	12.32
sale2gov	0.00	3.57	23.88	0.00	0.00	1.76	4.89	7.33
sale2firms	0.00	32.42	43.78	0.00	0.00	20.31	26.93	14.11
tech_FDI	0.03	0.05	0.36	0.05	0.02	0.16	0.08	0.20
contr_person	0.00	0.91	0.00	0.09	0.17	0.75	0.18	0.58
emplsiz1	284.61	123.88	578.58	114.49	70.03	701.67	53.18	76.36
age_opTZA	14.22	19.16	17.29	17.70	17.78	18.80	16.70	17.71

	IV Regressions				OLS Regressions			
Table 5: Firm-Level Resources and Firm Growth								
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
normcapital	0.009	0.009	0.009	0.009	0.004	0.004	0.004	0.004
	(1.738)*	(1.730)*	(1.692)*	(1.690)*	(1.900)*	(1.899)*	(1.678)*	(1.726)*
mgr_training	0.022	0.023	0.032	0.034	0.022	0.023	0.031	0.034
	(0.902)	(0.922)	(1.111)	(1.190)	(0.900)	(0.918)	(1.094)	(1.169)
hc_wksecond	0.001	0.001	0.002	0.002	0.001	0.001	0.002	0.002
	(2.471)**	(2.486)**	(2.883)***	(2.935)***	(2.461)**	(2.472)**	(2.875)***	(2.924)***
tech_local	0.048	0.049	0.046	0.049	0.050	0.051	0.048	0.051
	(1.377)	(1.401)	(1.304)	(1.379)	(1.405)	(1.427)	(1.333)	(1.405)
contr_person		0.028		0.094		0.026		0.090
		(0.770)		(1.880)*		(0.715)		(1.833)*
group_firm			0.095	0.106			0.102	0.113
			(2.732)***	(3.034)***			(2.925)***	(3.192)***
age_opTZA	-0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.003	-0.003
	(4.322)***	(4.325)***	(4.530)***	(4.488)***	(4.390)***	(4.389)***	(4.626)***	(4.580)***
emplsiz1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(1.834)*	(1.836)*	(1.836)*	(1.824)*	(1.849)*	(1.847)*	(1.849)*	(1.830)*
Leather	0.026	0.025	-0.001	-0.008	0.028	0.027	0.003	-0.004
	(0.681)	(0.637)	(0.016)	(0.138)	(0.732)	(0.692)	(0.053)	(0.068)
Garments	-0.055	-0.056	-0.083	-0.089	-0.053	-0.054	-0.080	-0.086
	(1.327)	(1.354)	(1.427)	(1.511)	(1.305)	(1.332)	(1.405)	(1.490)
Food	0.077	0.077	0.064	0.063	0.078	0.078	0.065	0.065
	(1.867)*	(1.859)*	(1.111)	(1.107)	(1.893)*	(1.886)*	(1.144)	(1.140)
Beverages	0.694	0.698	0.691	0.707	0.694	0.698	0.693	0.708
	(1.289)	(1.297)	(1.280)	(1.312)	(1.280)	(1.286)	(1.271)	(1.301)
Metmach	-0.010	-0.009	-0.032	-0.028	-0.010	-0.010	-0.030	-0.027
	(0.278)	(0.253)	(0.624)	(0.551)	(0.289)	(0.266)	(0.609)	(0.538)
Electronics	-0.095	-0.093	-0.195	-0.176	-0.093	-0.091	-0.188	-0.170
	(2.155)**	(2.112)**	(2.377)**	(2.191)**	(2.143)**	(2.100)**	(2.364)**	(2.174)**
Chempha	-0.011	-0.010	-0.037	-0.025	-0.011	-0.010	-0.037	-0.026
	(0.246)	(0.222)	(0.514)	(0.349)	(0.252)	(0.230)	(0.519)	(0.361)
Woodfur	-0.013	-0.015	-0.045	-0.051	-0.012	-0.014	-0.042	-0.048
	(0.342)	(0.400)	(0.926)	(1.040)	(0.317)	(0.371)	(0.893)	(1.008)
Nonmet	0.068	0.071	0.045	0.053	0.070	0.073	0.048	0.055
	(0.989)	(1.039)	(0.597)	(0.725)	(1.031)	(1.076)	(0.640)	(0.762)
Paper	0.107	0.106	0.088	0.088	0.111	0.110	0.093	0.093
	(0.616)	(0.613)	(0.507)	(0.507)	(0.636)	(0.632)	(0.535)	(0.536)
brazil	-0.069	-0.079	-0.079	-0.112	-0.069	-0.078	-0.079	-0.111
	(1.093)	(1.214)	(1.167)	(1.604)	(1.093)	(1.197)	(1.177)	(1.587)
india	-0.123	-0.113	-0.167	-0.156	-0.123	-0.114	-0.164	-0.153
	(2.000)**	(1.818)*	(2.161)**	(2.025)**	(2.007)**	(1.845)*	(2.114)**	(1.986)**
indonesia	-0.149	-0.157	-0.157	-0.182	-0.152	-0.159	-0.160	-0.184
	(1.999)**	(2.077)**	(2.052)**	(2.347)**	(2.065)**	(2.128)**	(2.123)**	(2.394)**
peru	-0.242	-0.231	-0.265	-0.227	-0.241	-0.231	-0.263	-0.226
	(3.390)***	(3.243)***	(3.511)***	(2.994)***	(3.363)***	(3.235)***	(3.461)***	(2.981)***
Constant	0.157	0.141	0.139	0.081	0.158	0.143	0.138	0.082
	(2.503)**	(2.154)**	(2.078)**	(1.145)	(2.511)**	(2.184)**	(2.069)**	(1.166)
Observations	3,108	3,108	2,259	2,259	3,108	3,108	2,259	2,259
R-squared	0.026	0.026	0.034	0.037	0.028	0.028	0.038	0.040

Note: White's heteroskedasticity-consistent t-statistics are in parentheses.
  *, **, and *** means 10, 5, and 1%   level of significance, respectively

	(1)	(2)	(3)	(4)	(5)	(6)
	grsal	grsal	grsal	grsal	grsal	grsal
normcapital	0.0092	0.0091	0.0089	0.0091	0.0148	0.0151
	(1.738)*	(1.736)*	(1.727)*	(1.736)*	(1.779)*	(1.504)
mgr_training	0.0204	0.0221	0.0141	0.0221	0.0209	0.0373
	(0.803)	(0.870)	(0.548)	(0.870)	(1.026)	(1.271)
hc_wktertiary	-0.0008	0				
	(1.265)	(0.066)				
hc_wksecond		0.0012		0.0011		0.0019
		(2.352)**		(1.651)*		(3.099)***
hc_wkbelowp			-0.001	0		
			(2.270)**	(0.066)		
hc_training					0.0192	0.0094
					(0.886)	(0.370)
tech_local	0.0255	0.0281	0.0212	0.0281	0.0056	0.0485
	(1.024)	(1.167)	(0.850)	(1.167)	(0.194)	(1.341)
contr_person	0.0293	0.0276	0.0328	0.0276	0.106	0.0882
	(0.802)	(0.761)	(0.899)	(0.761)	(2.082)**	(1.596)
age_opTZA	-0.0025	-0.0025	-0.0025	-0.0025	-0.0035	-0.0029
	(4.333)***	(4.346)***	(4.312)***	(4.346)***	(6.429)***	(4.184)***
emplsiz1	0.00	0.00	0.00	0.00	0.00	0.00
	(1.835)*	(1.839)*	(1.808)*	(1.839)*	(0.793)	(1.824)*
10 sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
bangladesh					-0.0367	
					(0.575)	
brazil	-0.0382	-0.0773	-0.0691	-0.0773	-0.0498	-0.1077
	(0.611)	(1.206)	(1.098)	(1.206)	(0.858)	(1.505)
china					0.0453	
					(0.683)	
ethiopia					-0.0542	
					(0.784)	
india	-0.0875	-0.1217	-0.1133	-0.1217		
	(1.421)	(1.997)**	(1.848)*	(1.997)**		
indonesia	-0.1227	-0.1574	-0.1801	-0.1574	-0.1565	-0.1766
	(1.613)	(2.020)**	(2.327)**	(2.020)**	(2.204)**	(2.311)**
peru	-0.1748	-0.2322	-0.2248	-0.2322	-0.1415	-0.2375
	(2.530)**	(3.259)***	(3.185)***	(3.259)***	(2.126)**	(3.054)***
Constant	0.1987	0.1427	0.2372	0.1472	0.1163	0.0904
	(3.319)***	(2.203)**	(3.651)***	(1.655)*	(1.929)*	(1.228)
Observations	3115	3108	3115	3108	4233	2160
R-squared	0.023	0.025	0.025	0.025	0.023	0.028

Table 6 General and Specific Human Capital and Firm Growth (IV regressions)

Notes : White's heteroskedasticity consistent t-values are in parentheses : * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Managerial Capital and Firm Growth

	(1)	(2)	(3)	(4)	(5)
	grsal	grsal	grsal	grsal	grsal
normcapital	0.009	0.0151	0.0091	0.0089	0.0088
	(1.728)*	(1.504)	(1.733)*	(1.725)*	(1.718)*
mc_tertiary	-0.0014				
	(0.06)				
mgr_training		0.0373			
		(1.271)			
hc_training		0.0094			
		(0.37)			
mc_exper2			0.0004		
			(0.235)		
mc_foreign				0.0041	
				(0.064)	
mc_year					0.0012
					(0.684)
hc_wksecond	0.0011	0.0019	0.0012	0.0011	0.0011
	(2.411)**	(3.099)***	(2.437)**	(2.461)**	(2.459)**
tech_local	0.0284	0.0485	0.0306	0.0295	0.0294
	(1.169)	(1.341)	(1.268)	(1.231)	(1.223)
contr_person	0.0266	0.0882	0.0242	0.021	0.0233
	(0.741)	(1.596)	(0.652)	(0.609)	(0.641)
age_opTZA	-0.0025	-0.0029	-0.0024	-0.0025	-0.0024
	(4.280)***	(4.184)***	(3.981)***	(4.404)***	(4.016)***
emplsiz1	0.00	0.00	0.00	0.00	0.00
	(1.849)*	(1.824)*	(1.846)*	(1.846)*	(1.852)*
10 sector dummies	Yes	Yes	Yes	Yes	Yes
brazil	-0.0765	-0.1077	-0.0627	-0.0597	-0.0541
	(1.182)	(1.505)	(0.814)	(0.864)	(0.819)
india	-0.1091		-0.1011	-0.1009	-0.0849
	(1.779)*		(1.391)	(1.476)	(1.290)
indonesia	-0.1533	-0.1766	-0.1417	-0.1383	-0.1359
	(2.031)**	(2.311)**	(1.649)*	(1.735)*	(1.772)*
peru	-0.2286	-0.2375	-0.2154	-0.217	-0.2125
	(3.199)***	(3.054)***	(2.655)***	(2.899)***	(2.951)***
Constant	0.1546	0.0904	0.1361	0.1415	0.1243
	(2.297)**	(1.228)	(1.769)*	(2.058)**	(1.854)*
Observations	3108	2160	3058	3118	3118
R-squared	0.025	0.028	0.025	0.025	0.025

Notes : White's heteroskedasticity consistent t-values are in parentheses : * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8A: Five Networking Strategies for Firm Growth (IV Regressions)						
	(1)	(2)	(3)	(4)	(5)	(6)
	grsal	grsal	grsal	grsal	grsal	grsal
normcapital	0.0091	0.0091	0.0082	0.009	0.0084	0.0077
	(1.737)*	(1.739)*	(1.669)*	(1.723)*	(1.634)	(1.589)
mgr_training	0.0227	0.0222	0.0157	0.0214	0.0202	0.0148
	(0.9)	(0.887)	(0.618)	(0.852)	(0.796)	(0.575)
hc_wksecond	0.0011	0.0011	0.0012	0.0011	0.0012	0.0012
	(2.466)**	(2.466)**	(2.536)**	(2.471)**	(2.484)**	(2.524)**
tech_local	0.0283	0.0279	0.0287	0.0279	0.0274	0.0289
	(1.173)	(1.149)	(1.187)	(1.142)	(1.127)	(1.18)
sale2firms	-0.0002					
	(0.35)					
sale2gov		0.0004				
		(0.619)				
sv_export			0.0015			0.0013
			(2.247)**			(1.731)*
tech_FDI				0.0262		-0.0223
				(0.352)		(0.290)
group_firm					0.086	0.0804
					(3.002)***	(2.741)***
contr_person	0.026	0.0277	0.0405	0.0344	0.0393	0.0444
	(0.718)	(0.76)	(1.084)	(1.013)	(1.065)	(1.267)
age_opTZA	-0.0025	-0.0025	-0.0025	-0.0025	-0.0028	-0.0028
	(4.336)***	(4.358)***	(4.348)***	(4.342)***	(4.851)***	(4.872)***
emplsiz1	0.00	0.00	0.00	0.00	0.00	0.00
	(1.841)*	(1.838)*	(1.849)*	(1.832)*	(1.816)*	(1.807)*
brazil	-0.0726	-0.0757	-0.0704	-0.0751	-0.0865	-0.0821
	(1.106)	(1.163)	(1.093)	(1.147)	(1.322)	(1.250)
india	-0.1244	-0.1186	-0.1053	-0.1121	-0.1109	-0.1064
	(2.031)**	(1.928)*	(1.734)*	(1.736)*	(1.813)*	(1.652)*
indonesia	-0.1543	-0.1546	-0.1798	-0.1561	-0.161	-0.1836
	(2.051)**	(2.052)**	(2.451)**	(2.070)**	(2.107)**	(2.468)**
peru	-0.2284	-0.2316	-0.2313	-0.2234	-0.2289	-0.2333
	(3.203)***	(3.247)***	(3.262)***	(3.073)***	(3.212)***	(3.213)***
Constant	0.1467	0.1419	0.1198	0.1344	0.1256	0.1149
	(2.290)**	(2.151)**	(1.806)*	(1.990)**	(1.899)*	(1.690)*
Observations	3108	3108	3108	3108	3067	3067
R-squared	0.025	0.025	0.03	0.026	0.029	0.033

Notes: White's heteroskedasticity consistent t-values are in parentheses. * means significant at 10%; **, significant at 5%; and *** significant at 1%.   Industry dummies are included.

Table 8B : Five Networking Strategies and Firm Growth (OLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
	grsal	grsal	grsal	grsal	grsal	grsal
normcapital	0.0043	0.0043	0.0037	0.0041	0.0035	0.0031
	(1.886)*	(1.908)*	(1.753)*	(1.851)*	(1.677)*	(1.537)
mgr_training	0.0224	0.0221	0.0152	0.0209	0.0199	0.014
	(0.890)	(0.882)	(0.601)	(0.835)	(0.785)	(0.544)
hc_wksecond	0.0011	0.0011	0.0012	0.0011	0.0011	0.0012
	(2.451)**	(2.452)**	(2.530)**	(2.458)**	(2.469)**	(2.516)**
tech_local	0.0289	0.0285	0.0292	0.0284	0.0278	0.0293
	(1.189)	(1.167)	(1.203)	(1.157)	(1.141)	(1.193)
sale2firms	-0.0001					
	(0.225)					
sale2gov		0.0004				
		(0.580)				
sv_export			0.0015			0.0014
			(2.271)**			(1.766)*
tech_FDI				0.0357		-0.0157
				(0.477)		(0.204)
group_firm					0.0931	0.0863
					(3.212)***	(2.936)***
contr_person	0.0241	0.0252	0.0388	0.0344	0.0376	0.0451
	(0.674)	(0.704)	(1.055)	(1.018)	(1.034)	(1.285)
age_opTZA	-0.0024	-0.0024	-0.0024	-0.0023	-0.0027	-0.0027
	(4.396)***	(4.424)***	(4.419)***	(4.407)***	(4.950)***	(4.972)***
emplsiz1	0.00	0.00	0.00	0.00	0.00	0.00
	(1.854)*	(1.848)*	(1.876)*	(1.840)*	(1.822)*	(1.824)*
brazil	-0.0732	-0.0748	-0.0693	-0.0735	-0.0858	-0.0807
	(1.116)	(1.146)	(1.071)	(1.118)	(1.309)	(1.225)
india	-0.1248	-0.1202	-0.1059	-0.1103	-0.1112	-0.1039
	(2.041)**	(1.964)**	(1.748)*	(1.702)*	(1.821)*	(1.605)
indonesia	-0.1571	-0.1569	-0.183	-0.1583	-0.1632	-0.1869
	(2.117)**	(2.105)**	(2.527)**	(2.121)**	(2.160)**	(2.545)**
peru	-0.229	-0.2311	-0.2308	-0.22	-0.2269	-0.2295
	(3.218)***	(3.240)***	(3.254)***	(3.004)***	(3.175)***	(3.133)***
Constant	0.148	0.1443	0.1207	0.1332	0.1262	0.1123
	(2.309)**	(2.184)**	(1.820)*	(1.973)**	(1.907)*	(1.651)*
Observations	3108	3108	3108	3108	3067	3067
R-squared	0.028	0.028	0.032	0.028	0.032	0.035

Notes : White's heteroskedasticity consistent t-values are in parentheses : * significant at 10%; ** significant at 5%; *** significant at 1%. Industry dummies included.

	OLS regressions			IV regressions		
	(1)	(2)	(3)	(1)	(2)	(3)
	grsal	grsal	grsal	grsal	grsal	grsal
normcapital	0.0043	0.0042	0.0036	0.0089	0.0089	0.0083
	(1.923)*	(1.876)*	(1.687)*	(1.724)*	(1.713)*	-1.629
mgr_training	0.0196	0.0188	0.0179	0.0197	0.0192	0.0184
	(0.796)	(0.758)	(0.713)	(0.801)	(0.775)	(0.733)
hc_wksecond	0.0011	0.0011	0.0012	0.0011	0.0011	0.0012
	(2.491)**	(2.491)**	(2.494)**	(2.505)**	(2.504)**	(2.509)**
tech_local	0.0294	0.0291	0.0289	0.0288	0.0287	0.0286
	(1.207)	(1.191)	(1.184)	(1.191)	(1.177)	(1.173)
contr_person	0.0301	0.0367	0.0407	0.0325	0.0367	0.0403
	(0.838)	(1.084)	(1.192)	(0.888)	(1.080)	(1.177)
age_opTZA	-0.0021	-0.0021	-0.0025	-0.0023	-0.0023	-0.0026
	(4.280)***	(4.272)***	(4.903)***	(4.231)***	(4.226)***	(4.816)***
emplsiz1	0.000	0.000	0.000	0.000	0.000	0.000
	(1.847)*	(1.839)*	(1.811)*	(1.838)*	(1.831)*	(1.808)*
new_exporter	0.1322	0.1307	0.1166	0.1328	0.1318	0.1184
	(2.148)**	(2.142)**	(1.860)*	(2.154)**	(2.154)**	(1.881)*
tech_FDI		0.0251	-0.0018		0.0159	-0.01
		(0.341)	(0.024)		(0.217)	(0.131)
group_firm			0.088			0.0815
			(2.958)***			(2.760)***
brazil	-0.0799	-0.0781	-0.0883	-0.0808	-0.0797	-0.0895
	(1.235)	(1.195)	(1.341)	(1.252)	(1.224)	(1.363)
india	-0.1118	-0.1032	-0.1026	-0.1103	-0.1048	-0.1048
	(1.857)*	(1.598)	(1.587)	(1.824)*	(1.630)	(1.628)
indonesia	-0.1523	-0.1523	-0.1574	-0.1501	-0.1501	-0.1551
	(2.030)**	(2.030)**	(2.071)**	(1.981)**	(1.981)**	(2.017)**
peru	-0.2179	-0.2104	-0.2164	-0.2183	-0.2136	-0.2205
	(3.052)***	(2.867)***	(2.945)***	(3.058)***	(2.932)***	(3.029)***
Constant	0.128	0.1191	0.1119	0.1258	0.1202	0.1138
	(1.951)*	(1.759)*	(1.653)*	(1.918)*	(1.774)*	(1.681)*
Observations	3108	3108	3067	3108	3108	3067
R-squared	0.031	0.031	0.034	0.029	0.029	0.032

Table 9.: Impact of Becoming Exporters on Firm Growth

Notes: White's heteroskedasticity consistent t statistics in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

The variable of new_exporter is a dummy indicating whether the firm is a new exporter with 1 to 3 years of exporting.

Table 11 High vs. Low Growth Firms: T-tests				
	Slow Firm	High Firm	High-Slow	P-values
1) Resources				
Physical Capital (ratio to avg.)	0.92	1.13	0.21	0.12
workers with sec. Edu	62.43	60.36	-2.07	0.03
workers with tertiary Edu.	16.78	18.55	1.77	0.02
workers w/ primary or below	20.94	21.31	0.37	0.66
workers with training	0.47	0.51	0.04	0.00
manager with training	0.59	0.58	-0.01	0.49
Mgr year of sector experience	8.57	8.86	0.29	0.27
mgr year of experience	5.37	5.95	0.58	0.03
mgr with tertiary edu.	0.68	0.68	-0.01	0.58
In-house R&D capability	0.14	0.12	-0.02	0.06
2) Networking Strategies				
dummy for conglomerates	0.19	0.21	0.02	**0.06**
export sale ratio	17.03	19.45	2.42	**0.00**
government sale ratio	4.71	4.96	0.25	0.55
other big firm sales ratio	16.34	17.46	1.12	0.15
dummy for foreign owned	0.08	0.12	0.04	0.00
3) Controls				
owned by individual/families	0.35	0.37	0.02	0.12
size of employment	285.02	288.61	3.59	0.91
firm age	18.83	16.76	-2.07	**0.00**
4) Investment Climates				
problems in hard infra.	0.38	0.43	0.05	0.00
problems in soft infra	0.75	0.77	0.03	0.23
secure property rights	3.77	3.75	-0.03	0.51
days to deal with bureacrats	9.46	9.15	-0.31	0.30
borrowing interest rates	18.95	19.16	0.21	0.63
days to connect power	53.61	54.45	0.85	0.70
days to connect telephones	63.93	66.40	2.47	0.46

Table 12. Interactions among Resources and Slow vs. High Growth Firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	grsal	grsal	grsal	grsal	grsal	grsal	grsal
normcapital	0.0083	0.0083	0.0105	0.031	0.008	0.0082	0.0169
	(1.684)*	(1.698)*	(1.116)	(0.753)	(1.474)	(1.667)*	(1.202)
mgr_training	-0.0224	0.016	0.0202	0.0132	0.0157	0.0169	0.1146
	(0.352)	(0.631)	(0.762)	(0.517)	(0.618)	(0.609)	(3.925)***
hc_wksecond	0.0009	0.001	0.0012	0.0014	0.0012	0.0012	0.0033
	(1.573)	(2.312)**	(2.513)**	(2.588)***	(2.527)**	(2.532)**	(7.282)***
tech_local	0.0285	0.0086	0.0293	0.032	0.0271	0.0297	0.0849
	(1.183)	(0.265)	(1.198)	(1.226)	(1.037)	(0.879)	(2.897)***
sv_export	0.0015	0.0014	0.0015	0.0015	0.0014	0.0015	0.001
	(2.249)**	(2.240)**	(2.259)**	(2.233)**	(2.217)**	(2.254)**	(1.771)*
hc_mc	0.0006						
	(0.703)						
tech_hc		0.0004					
		(1.258)					
capital_mc			-0.0051				
			(0.473)				
capital_hc				-0.0003			
				(0.630)			
tech_capital					0.0021		
					(0.257)		
tech_mc						-0.0023	
						(0.058)	
nocapa_hc							-0.0038
							(9.458)***
nocapa_capital							-0.0156
							(1.129)
nocapa_mc							-0.2121
							(5.539)***
nocapa_tech							-0.0947
							(3.148)***
contr_person	0.0411	0.0386	0.0428	0.0336	0.0413	0.0405	0.0502
	(1.096)	(1.032)	(1.117)	(0.918)	(1.104)	(1.093)	(1.376)
age_opTZA	-0.0025	-0.0025	-0.0025	-0.0026	-0.0025	-0.0025	-0.0015
	(4.380)***	(4.354)***	(4.384)***	(4.078)***	(4.413)***	(4.351)***	(2.960)***
emplsiz1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(1.841)*	(1.867)*	(1.880)*	(1.868)*	(1.888)*	(1.848)*	(1.484)
Constant	0.1368	0.1243	0.1159	0.1103	0.1192	0.1195	0.111
	(2.019)**	(1.881)*	(1.744)*	(1.598)	(1.793)*	(1.813)*	(1.740)*
Observations	3108	3108	3108	3108	3108	3108	3108
R-squared	0.031	0.031	0.029	0.02	0.031	0.031	0.178

Notes: White's heteroskedasticity consistent t-values are in parentheses.
 *, significant at 10%; **, significant at 5%; and ***, significant at 1%.
 Industry and country dummies included, except China, Ethiopia, and Bangladesh which are dropped

Appendix table 1. Correlation matrix for major variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1.000																					
2	0.0458*	1.000																				
3	0.016	0.5396*	1.000																			
4	-0.002	0.0270*	0.015	1.000																		
5	0.0463*	0.005	-0.002	0.1232*	1.000																	
6	0.004	-0.010	-0.015	0.0402*	0.020	1.000																
7	0.0633*	-0.007	-0.002	0.003	-0.012	0.0231*	1.000															
8	0.019	-0.008	0.005	0.2355*	0.0678*	0.0466*	0.0603*	1.000														
9	-0.0666*	0.0880*	0.0923*	0.013	-0.0375*	-0.0300*	0.0673*	0.0611*	1.000													
10	-0.013	0.1246*	0.0951*	0.0422*	0.004	-0.0309*	-0.010	0.0628*	0.0614*	1.000												
11	0.0308*	0.1347*	0.0822*	0.0354*	-0.0289*	-0.004	0.0314*	0.0586*	0.1227*	0.0558*	1.000											
12	-0.016	0.0340*	-0.022	-0.012	0.6805*	-0.011	0.002	-0.009	0.004	0.0744*	0.0412*	1.000										
13	-0.0475*	0.0347*	0.028	0.1763*	0.5254*	-0.013	0.011	0.0734*	0.0454*	0.0870*	0.0834*	0.2553*	1.000									
14	0.001	0.0802*	0.0391*	0.8105*	0.0979*	0.0245*	0.0577*	0.1922*	0.0649*	0.0954*	0.0978*	0.0683*	0.2095*	1.000								
15	-0.005	0.021	0.006	0.0317*	0.0383*	0.003	0.0286*	0.0939*	0.0795*	0.0460*	0.025	-0.005	0.0563*	0.0321*	1.000							
16	0.006	0.015	0.018	-0.008	0.0299*	0.0661*	0.0733*	0.0699*	-0.012	0.0578*	0.0400*	0.0450*	0.0884*	0.0967*	0.1697*	1.000						
17	0.004	0.006	0.005	0.1339*	-0.0402*	0.0553*	0.0711*	0.1544*	-0.0493*	0.0651*	-0.007	0.0682*	-0.0308*	0.0596*	0.7250*	0.4193*	1.000					
18	0.015	0.0430*	0.015	0.0785*	0.1205*	0.0596*	0.0670*	0.1024*	0.0404*	0.0514*	0.0973*	0.1384*	0.002	0.0649*	0.0609*	0.2520*	0.2826*	1.000				
19	0.023	-0.002	0.004	-0.004	0.0368*	0.0682*	0.0289*	0.0903*	0.0425*	0.0321*	0.0394*	0.0397*	-0.003	0.0458*	0.0492*	0.1468*	0.1227*	0.0273*	1.000			
20	0.0385*	0.0524*	0.022	0.1010*	-0.0823*	-0.0331*	0.0360*	-0.1400*	-0.0690*	0.1142*	0.1659*	-0.027	0.1535*	0.1258*	0.1015*	0.0710*	0.0503*	-0.004	0.0486*	1.000		
21	0.0362*	0.0901*	0.0414*	0.0487*	0.0410*	0.0657*	0.0613*	0.1723*	0.0461*	0.1261*	0.0787*	0.0827*	0.1491*	0.1643*	0.1662*	0.2849*	0.1903*	0.2391*	0.1070*	0.2068*	1.000	
22	0.019	0.008	0.005	0.0597*	-0.015	0.0941*	0.008	-0.1286*	0.007	0.0324*	0.0439*	0.0565*	0.0943*	0.0415*	-0.001	0.014	0.0740*	0.0251*	0.0276*	0.0502*	0.001	1.000

Notes: Numbers in each column or row respresent the following variables

1	grsal	12	hc_wkbelowp
2	normcapital	13	hc_wkterti~y
3	norm_enrgn	14	mc_tertiary
4	mgr_training	15	mc_exper2
5	hc_wksecond	16	mc_foreign
6	tech_local	17	mc_year
7	new_exporter	18	sale2firms
8	contr_person	19	sale2gov
9	age_opTZA	20	sv_export
10	emplsiz1	21	tech_FDI
11	group_firm	22	tech_embod