Internationalization and Innovation in Emerging Markets

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Abstract

With high growth on domestic markets, many firms in emerging economies face a tradeoff between using their competitive advantages in foreign markets or innovating in domestic markets. By analyzing export and innovation data for a large dataset of Chinese firms, we uncover a specific productivity sorting pattern of firms over exporting and innovation. As expected, high productivity firms both export and innovate and low productivity firms do not export or innovate. Interestingly, low-medium productivity firms export more than they innovate, whereas high-medium productivity firms innovate more than they export. Clearly, these findings have important implications for the new trade literature that stresses the primacy of high productivity for entry into export markets.

Keywords: internationalization; innovation; emerging markets; strategic choice; new trade theory; profits/ productivity linkage

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Over the past few decades, firms from China and to a lesser extent Russia, Brazil, and India (the BRICs) have internationalized and become major players in the world economy. For China, its entry into the World Trade Organization (WTO) in 2001 has brought a spectacular increase in exports both to developed and developing countries. India has become an important player in trade in services, especially in the information and technology (IT) sector. Russia is confronting international diversification challenges to move it away from oil and gas and into technology-led exports and foreign direct investment (FDI). For firms from emerging markets, entry into the global economy includes an important role for international alliances and acquisitions, mostly with the goal of strategic asset seeking to improve competitiveness. Originally the term emerging markets refers to the increased importance of consumers in these countries for multinational firms. With the dramatic increase in purchasing power of consumers, domestic markets have become more important for home-grown firms as well. However, domestic markets have become fiercely competitive because of the presence of productive native firms together with foreign multinationals and thus require substantial innovation for sustainable long-term competitive advantages. For firms in China, India, and Russia, this creates a strategic challenge. Should the focus be on maintaining and gaining market share in the domestic market and should the firms invest in innovation, or should the firm leverage capabilities abroad with considerable investments in distribution and learning?

In this article we analyze the choice between internationalization and innovation for 13,874 Chinese firms included in the National Bureau of Statistics Annual Database. Based on our conceptual model founded in the new trade theory [*Melitz,* 2003] and developed in the next section, we hypothesize that this trade-off will be especially relevant for firms with medium productivity. In the conceptual model, managers struggle of allocating limited (financial) resources over competing strategies. The most common trade-off is between product innovation (R&D, product development) and organizational scope expansion like starting to export. Our conceptual model provides a theoretical lens for such innovation management that is contingent of firm conditions. The regression results indeed show a complex relationship of the factors that define the investment trade-off between exporting and innovation. In line with theory, we show that the most productive firms sort into exporting and innovation and the least productive firms do not export or innovate. The middle segment of productivity where firms are financially constrained and must choose between export and innovative activity is the most interesting. We show that high-medium productivity firms choose innovation on the domestic market over internationalization. By contrast, low-medium productivity firms choose exporting over innovation.

The statistical findings have potentially important theoretical, managerial, as well as policy implications. From a theoretical perspective, to the best of our knowledge, this is the first paper that connects firm heterogeneity to *simultaneous* moves toward exporting and innovation under resource constraints. Other papers focus either on exporting or innovation, some analyze the sequential process of exporting and innovation. By looking only at internationalization and innovation separately, current theory shows why the more productive firms are exporters [*Bernard, Jensen,* 1999, 2004] and are engaged in quality improvement [*Fan et al.,* 2015]. In addition, there is a substantial literature that stresses that internationalization may result in innovation [*De Loecker,* 2007] and that there is complementarity between exporting and innovation [*Ferguson,* 2009].

The empirical findings also have potentially important policy implications for emerging markets and transition economies. Most policy makers are well-aware of the Solow implications that in the long run, economic growth and prosperity are determined by innovation [*Solow,* 1956]. However, innovation has many faces including new products and services, using new technologies, new organizational forms, and entering new markets. In the presence of imperfect information, policy makers have to nudge firms towards the correct strategy by providing incentives and business facilitation. This paper provides policy guidance about where to focus for which type of firms. We argue that very low and very high productivity firms do not need innovation policy as their choices are predetermined. However, on large domestic markets like China, Russia, and Brazil, contrary to popular perception, the high-medium segment maybe best pushed toward R&D and product innovation and not into export. By contrast, low-medium productivity firms should be nudged towards exporting and not innovation. In practice, many policies are designed to achieve the opposite at high cost to the taxpayer.

Demand and Innovation in Emerging Markets

One of the most important features, probably the most important feature, of the last 30 years is the political and economic liberalization of China, Russia, and India, which together account for slightly less than half of the global population. Economic liberalization has led to social transformation and impressive economic growth and development. The internationalization of business has been an important driver for growth. In the case of China, global demand in the supply chain of labor-intensive goods has led to the massive relocation of workers from the agricultural sector into manufacturing. Russia has made use of its technological advantages to support its exporting manufacturing industry, whereas India with its strong IT skills tapped into the globalization of the services industry. As is well documented elsewhere, in these markets this process led to an inflow of foreign investments and substantial increases in productivity.

Over time, economic dynamics in emerging markets closely follow the predictions of the classical Solow growth model [*Solow,* 1956]. This approach stresses two engines of economic growth: increases in inputs of labor and capital and increases in productivity. In the short run, high growth rates mainly come from the increases in inputs (labor from agriculture to manufacturing and foreign direct investment), whereas technology catch-up and spill-over effects shape productivity increases. The speed of technology catch-up is shaped by public investments in education, which improves the absorption capacity of firms. The Solow model predicts that in the long run, the economy returns to steady state growth driven by productivity increases only, for the aforementioned normal increases in inputs die out. However, as stressed by the new growth models, reviewed by Syverson [*Syverson,* 2011], productivity growth is endogenously determined by three dominant factors. First, with respect to institutional elements, in order to keep growing, emerging markets have to improve their business climate in terms of legal restrictions, property rights, and ease of doing business. Second, with respect to business culture, improvements in management practices play an important role in shaping productivity [*Bloom, van Reenen,* 2007]. Third, with respect to spatial economic development, industrialization has led to large scale urbanization. For productivity to keep increasing, this move to the city has to be accompanied by a rise in ambitious entrepreneurship in the service industry and at creative start-ups [*Glaeser et al.,* 2016].

Table 1 provides some general statistics on demand and productivity in China, Russia, and India. The top part of the table focuses on changing demand factors in these emerging economies. The main stylized fact demonstrated here is the relative decline in the importance over time of export demand, as measured by the fall in export growth rates. By contrast, rising domestic demand has become a more important driver of growth. For example, in the recent period for China, consumption growth has overtaken the role of export growth. Another example is the increased overall importance of domestic investments (net of FDI) as a driver of demand in Russia and China. The lower part of Table 1 shows aggregate scores on innovation coming from the Global Competitiveness Index [WEF, 2017]. As an overall conclusion, emerging markets have substantially increased their internal engines of innovation in the recent period, as can be observed in several overall innovation scores. Overall, China, India, and Russia have improved R&D spending, patent applications, and public funding for innovation. In addition, substantial improvements have been made on the soft elements of innovation like technology transfer, retaining talent, and entrepreneurship.

To dig one level deeper, in Table 2 we use our dataset to show the overall statistics for the exports and innovation of Chinese firms over time. The data, to be discussed in more detail below, are from the annual surveys of manufacturing enterprises from 1998 to 2009 conducted by the National Bureau of Statistics (NBS) of China and include all state-owned firms and non-state-owned firms with annual sales of more than RMB 5 million. In Columns (2) to (5), we show (i) the share of firms with no exports or new products sales in the total number of firms, (ii) the share of firms exporting traditional products, (iii) the share of firms with new product sales but no exports, and (iv) the share of firms with exports and innovation, respectively. Looking at the time pattern of these statistics, we have some interesting observations. In Column (3), the share of firms exporting traditional products first increases over time, probably due to China's entry into the WTO in 2001. However, in recent years this share has begun to decrease. In Column (4), it can be observed that there has been a mild increasing trend in the share of firms focusing on innovation in domestic markets over years. Again, this table provides evidence of the increased importance of the Domestic Demand – Innovation locus for economic development.

Theoretical Background and Conceptual Model

The cornerstones of the new trade models are monopolistic competition and firm heterogeneity with respect to productivity. Together these assumptions imply that in each industry there is a cut-off productivity level for the firm with zero profits and the rest of the firms make a profit. Expanding the firm with an export unit and selling in foreign markets are costly because this strategy has fixed costs and the marginal costs are higher for exporters than for producers on the domestic market. Melitz's [*Melitz,* 2003] seminal paper shows that trade liberalization in the form of lower marginal trade costs induces a selection effect among domestic producers. Trade liberalization causes an expansion of the export sector and increases labor demand. When labor relocates, this also increases the wage costs in equilibrium for domestic firms, raising the cut-off productivity level.

The position that exporting firms are more productive than non-exporting firms has deep roots in the international business literature, which stresses that internationally oriented firms have (technological) ownership advantages that they leverage on foreign markets [*Dunning,* 1988]. However, firms from emerging markets often lack these advantages and build them through international alliances [*Mathews,* 2009; *Mathews, Zander,* 2007]. In addition, there are older studies investigating the interaction between internationalization and product improvement through quality ladders [*Grossman, Helpman,* 1991]. This has given rise to a substantial empirical literature on the spillback effect of internationalization on innovation in emerging markets [*Damijan, Kostevc,* 2006; *Damijan et al.,* 2010; *De Loecker,* 2007, 2011]. In this literature, innovation is often modelled as R&D expenditures to increase productivity by reducing the marginal costs of production. When analyzing the effects of productivity on the sorting pattern into exporting and innovation, account should be taken of other factors that influence these decisions. Clearly,

Table 1. **Exports, Domestic Consumption, and Innovation for Major Emerging Markets**

Indicators	China		India		Russia	
	2001–2011	2012–2017	2001–2011	2012–2017	2001–2011	2012–2017
International Orientation						
Exports of goods – growth	24.2	3.2	22.7	0.2	22.3	-4.7
High-tech exports (%)	27.0	25.9	6.7	7.6	11.0	10.9
Trade to GDP ratio	29.5	22.7	20.8	24.9	26.9	23.7
Domestic market						
Gross fixed capital formation (%)	38.9	44.5	30.5	30.1	18.7	20.1
Gross fixed capital formation (change)	20.9	5.6	18.5	3.5	30.6	16.2
Household consumption expenditure (%)	40.3	37.9	61.4	58.2	49.3	49.6
Household consumption expenditure ($bn)	946.9	3863.2	487.9	1243.1	394.3	881.8
Household consumption expenditure (change)	15.0	8.8	12.3	7.6	27.1	-2.3
Innovation						
Patent applications per capita	14.3	64.2	0.9	1.7	20.4	22.5
Total R&D personnel in business per capita	0.9	2.1	0.1	0.1	3.6	2.9
Researchers in R&D per capita	1.0	1.1	0.2	0.2	3.2	3.1
Business expenditure on R&D (%)	1.0	1.5	0.2	0.3	0.7	0.6
Attracting and retaining talent*	6.5	6.9	7.6	6.9	5.2	5.4
Brain drain*	3.4	3.8	5.7	5.4	2.6	3.0
Entrepreneurship*	5.5	6.4	6.0	5.6	5.7	5.1
Funding for technological development*	4.2	5.6	5.2	5.5	3.2	4.4
Innovative capacity*	4.7	5.3	5.3	5.0	4.1	3.8
Knowledge transfer*	3.8	4.6	4.4	4.1	3.2	3.4

Note: Items marked by * are on 1-10 scale where 10 means a higher score and better performance.

Source: [WEF, 2017].

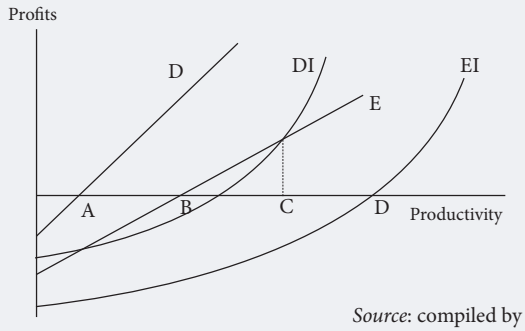
industry context matters as well as firms' characteristics such as size and location. The stage model of international learning argues that it takes time for firms to internationalize, so that firm age potentially is an important factor to control for [*Johanson, Vahlne,* 1977]. Access to capital is another crucial factor to finance exports and innovation [*Feenstra et al.,* 2014; *Manova et al.,* 2015].

We use the above theoretical insights to construct a conceptual model that guides the empirical analysis. The basic intuitions of the approach are highlighted in Figure 1. On the axes we have firm productivity (x-axis) and firm profits (y-axis). The intuition behind the new trade theory is that firms within a single industry differ in productivity, which under monopolistic competition results in higher profits for the higher productivity firms. Firms serve a domestic market and potentially a foreign market by exporting. Firms with constant returns to scale can evenly split production into serving the domestic and the foreign markets. As exporting has some fixed costs (so the profit curves start below zero) and higher marginal costs than serving the domestic market (so exporting profit curves are flatter), only firms with higher productivity than the cut-off point A make a profit in the export market. Firms that serve only the domestic market are depicted by the profit curve D and exporting firms have the profit curve E.

For innovation, we follow the Aghion-Chaney setup in which innovation raises the marginal costs of production. More simply put, producing higher quality products does not come free [*Aghion et al.,* 2001; *Chaney, Ossa,* 2013]. Firms that only sell domestically but are innovative are captured by the profit curve DI. The convex shape of the curve comes from the following. Higher quality products can be sold at a premium price because of lower substitutability. Innovation comes at a cost that is equal for all firms, however, it comes from a trade-off that is different for high and low productivity firms. Higher productivity firms have larger market shares (lower marginal costs) which at the margin means that quality increases have a larger impact on profitability for high productivity firms than they have for low productivity firms. Hence, the profit functions for innovators are convex. We draw two profit curves: DI is for innovators that produce for the domestic market, whereas EI are for exporters that innovate.

In the new trade models, firms first evaluate their productivity and after that decide on their business choices. In our model, there are four options: domestic traditional production only, domestic innovator, export traditional production, and export innovator. Using Figure 1, the choices for the outer segments

Figure 1. **The Conceptual Model of Companies and the Level of Productivity**



Source: compiled by the authors.

of the productivity distribution are pretty straightforward: low productivity firms choose traditional domestic production methods to maximize profits, whereas high productivity firms choose to produce innovative exports. In-between the choices depend upon the cost structures of exporting and innovation. In our setup, low-medium productivity firms choose exporting over innovation. The reason is that although the fixed costs of innovation for firms are lower than those of exports, for low productivity firms, the effect of innovation is that it raises marginal costs without substantially increasing market shares and prices, so the DI curve for low-medium productivity firms is rather flat. Hence, as the benefits of innovation on the domestic market are low for low-medium productivity firms, traditional production together with paying the fixed costs of exporting produces higher payoffs for these firms than innovation. By contrast, for high-medium productivity firms, taking on the higher marginal costs associated with innovation on the domestic market has a higher payoff than traditional low quality production on export markets. However, doing both innovation and the exporting would produce lower profits than restricting it to domestic innovation. Only firms with very high productivity can bare the combined costs of exporting and innovation.

Figure 1 shows the structure of the distribution of companies according to productivity. In line with the new trade theory concepts, the story is best told by assuming that all firm owners observe a productivity draw for their firms and then decide on strategy. Firms that observe a productivity below A will not start production as they expect to be loss making, thus saving on sunk costs. Low productivity firms in the segment AB will become domestic producers that do not engage in exporting and innovation, as these firms given their market shares will not be able to earn back the higher fixed and variable costs of these strategies. In the BC segment, firms make profits on the exporting and innovation strategy, however, combining these would mean very high fixed costs. These firms choose exporting traditional goods

Table 2. **Exports and Innovation in China in the Period of Study**

Year	(1) Number of firms	Share in total number of firms (%)			
		(2) Focus on the Domestic Market	(3) Focus on Exports	(4) Domestic Innovator	(5) Export Innovator
1998	165135	75.02	18.28	3.52	3.18
1999	162033	74.78	18.35	3.81	3.07
2000	162883	73.45	19.67	3.72	3.17
2001	171256	72.54	20.51	3.64	3.32
2002	181557	71.50	21.93	3.54	3.03
2003	196220	70.83	23.05	3.23	2.89
2004	276475	68.11	24.95	3.72	3.22
2005	271834	68.41	22.00	3.77	5.82
2006	301958	69.59	20.53	4.14	5.74
2007	336765	72.11	19.44	4.39	4.05
2008	412285	74.34	18.12	4.08	3.46
2009	434673	76.42	15.64	4.41	3.52

Source: Calculated based on the annual surveys of manufacturing enterprises from 1998 to 2009 conducted by the National Bureau of Statistics (NBS) of China.

Table 3. **Firm Divide by Groups: 1998–2009**

Group	Name	Description
G1	Domestic traditional producer	Company has not exported nor sold any new products
G2	Export traditional producer	Company has exported but not engaged in innovation and created new products
G3	Domestic innovator	Company has engaged in innovation and created new products but not exported
G4	Export innovator	Company has exported and engaged in innovation

Source: compiled by the authors.

over innovation as their market shares are too low for domestic innovation to be more profitable than exporting. In the CD segment, firms have higher market shares and benefit more from innovation on the domestic market than they do by entering foreign markets. Firms with productivity levels higher than D sell innovative products on both the domestic and foreign markets.

Empirical Analysis

Our data are taken from the annual surveys of manufacturing enterprises from 1998 to 2009 conducted by the National Bureau of Statistics (NBS) of China. We clean the data by dropping observations with missing values on key variables and firms with employment of less than eight people.[1] To allow a consistent comparison of firms with different strategies over the sample period, we restrict our data sample to firms

Table 4. **Firm Distribution across Groups and Industries**

Industry	G1	G2	G3	G4	Total
Processing and Food from Agricultural Products	465	108	124	99	796
Foods	184	62	66	49	361
Beverages	181	53	90	40	364
Tobacco	20	8	6	6	40
Textile	287	275	197	121	880
Textile Wearing Apparel, Footwear and Caps	75	130	129	43	377
Leather, Fur, Feather and Related Products	30	64	67	35	196
Processing of Timber, Wood, Bamboo and Others	59	28	31	32	150
Furniture	36	19	19	28	102
Paper and Paper Products	373	74	80	54	581
Printing, Reproduction of Recording Media	267	46	43	36	392
Articles for Culture, Education and Sport Activities	7	22	49	13	91
Processing of Petroleum, Coking, Processing of Nuclear Fuel	93	22	13	10	138
Raw Chemical Materials and Chemical Products	639	244	284	185	1352
Medicines	33	11	25	5	74
Chemical Fibers	39	17	20	11	87
Rubber	82	43	48	37	210
Plastics	255	139	143	86	623
Non-metallic Mineral Products	1284	157	249	179	1869
Smelting and Pressing of Ferrous Metals	181	65	46	39	331
Smelting and Pressing of Non-ferrous Metals	30	11	11	10	62
Metal Products	378	211	255	110	954
General Purpose Machinery	527	235	312	188	1262
Special Purpose Machinery	273	153	153	135	714
Transport Equipment	120	71	77	51	319
Communication Equipment, Computers and Other Electronic Equipment	401	199	295	162	1057
Machinery for Cultural Activity and Office Work	66	95	131	51	343
Artwork and Other Manufacturing	43	25	53	28	149
Total	6428	2587	3016	1843	13874

Note: Here and in the following tables the sample is restricted to firms that are active for all the 12 years between 1998-2009. For the definitions of firm groups (G1 to G4) see Table 3.

Source: compiled by the authors.

[1] In China, firms with fewer than eight employees are regarded as being under a different legal regime.

Table 5. **Data Summary for Different Groups**

Variables	Non-innovator		Innovator	
	G1: Non-exporter	G2: Exporter	G3: Non-exporter	G4: Exporter
TFP_1	5.434 (0.783)	5.561 (0.881)	5.639 (0.874)	5.647 (0.860)
Age_1	13.664 (9.987)	10.265 (9.368)	11.681 (9.573)	10.474 (9.289)
$Employment_1$	258.312 (194.273)	250.110 (201.569)	288.472 (205.708)	255.316 (203.276)
$Leverage_1$	0.609 (0.247)	0.606 (0.234)	0.613 (0.222)	0.589 (0.233)

Note: Standard deviations are reported in parentheses.

Source: compiled by the authors.

that are observed in each of the 12 years. We end up with 13,874 firms in 28 industries and 31 provinces. The data are cut at 5th and 95th percentiles so as to drop outliers.

To check whether the pattern depicted in Figure 1 is consistent with the data, we classify firms into four groups (see Table 3). The ranking order of the four groups is therefore consistent with the sorting pattern predicted in the conceptual model. Table 4 reports the breakdown of firms across groups and industries.

The main dependent variable is an ordinal variable with four levels from 1 to 4 corresponding to the four groups of firms' exporter and innovator status (*Group*). For robustness, we also use several dummy dependent variables to make comparisons between separate groups. These dummy variables take on the value 1 if a firm is in a higher group and 0 if it is in a lower group. For example, $Group_{\_12}$ takes on the value 1 if a firm is in Group 2 and 0 if in Group 1. The main explanatory variable is the initial productivity level of firms (TFP_1). To alleviate potential simultaneity bias and selection bias, we use the Olley and Parkes [*Olley, Parkes,* 1996] method to estimate the production function and construct the total factor productivity. We estimate the production function separately for each 2-digit industry so as to capture variations in production across industries. We also control for initial firm age (Age_1), employment ($Employment_1$), and leverage ratio ($Leverage_1$).

Table 5 reports on the descriptive statistics for the main variables based on firms' exporter and innovator classification. We find that the mean of the initial firm productivity level increases with the ordering of the groups, which provides some evidence for the pattern predicted in our conceptual model. It is worth noting that compared with firms exporting traditional products (G2), firms focusing on innovation on domestic markets (G3) have higher levels of initial productivity. The mean difference tests results in Table 6 show that the mean differences in the initial level of productivity across groups are statistically significant.

We then employ rigorous econometric regression analysis to control for some confounding factors in order to better identify the effect of the initial productivity on firms' export and innovation decisions. The econometric model is set up as follows:

$$Group_i = \alpha + \beta TFP_{1i} + X'\gamma + u_j + u_p + u_o + e \qquad (1)$$

where the subscript i, j, p, o denote firm, industry, province, and firm ownership type, respectively. *Group* refers to dependent variables on firm classification including the ordinal variable *Group* and several dummy variables for separate comparisons; TFP_1 denotes the main explanatory variable of the initial productivity; X is a vector of the control variables. In the model we incorporate industry (u_j), province (u_p), and ownership type (u_o) fixed effects. It is noted that we use a cross-sectional data set as a firm enters into a group only once in the sample period. We employ the ordered probit estimation method for modelling the ordinal dependent variable and the probit regressions for the dummy dependent variables. Compared with the OLS method, the ordered probit and probit models can better deal with heteroscedasticity and nonnormality.[2]

Table 6. **Mean-Difference Test on Initial TFP between Groups**

TFP_1	G2–G1	G3–G1	G4–G1	G3–G2	G4–G2	G4–G3
Mean difference	0.127***	0.205***	0.213***	0.078***	0.086***	0.008***
t-value	6.439	11.131	8.738	3.387	2.534	2.245

Note: Here and in the following table ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Source: compiled by the authors.

[2] We also use the OLS method to estimate the econometric model. The OLS results are consistent with the results of the ordered probit and probit regressions.

Table 7. **Effects of Initial TFP on Firm Export/Innovation Decisions**

Variables	(1) Group G1=1, G2=2, G3=3, G4=4	(2) $Group_{\_12}$ G2=1, G1=0	(3) $Group_{\_13}$ G3=1, G1=0	(4) $Group_{\_14}$ G4=1, G1=0	(5) $Group_{\_23}$ G3=1, G2=0	(6) $Group_{\_24}$ G4=1, G2=0	(7) $Group_{\_34}$ G4=1, G3=0
TFP_1	0.115*** (0.014)	0.023*** (0.006)	0.037*** (0.006)	0.040*** (0.006)	0.017** (0.008)	0.033*** (0.009)	0.021** (0.009)
AGE_1	-0.006*** (0.001)	-0.003*** (0.001)	0.000 (0.001)	-0.003*** (0.001)	0.004*** (0.001)	-0.001 (0.001)	-0.005*** (0.001)
$Employment_1$	0.196*** (0.013)	0.064*** (0.006)	0.091*** (0.005)	0.060*** (0.005)	0.052*** (0.008)	0.026*** (0.008)	-0.017** (0.008)
$Leverage_1$	-0.024 (0.044)	-0.026 (0.019)	-0.006 (0.019)	-0.001 (0.017)	0.049* (0.029)	-0.002 (0.030)	-0.045 (0.029)
Province dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ownership dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	13 873	9016	9445	8272	5601	4428	4857

Note: Robust standard errors are reported in parentheses. Columns (2-7) contain values of the marginal effects and the dependent dummy variables which take on the value 1 if firms are in a higher group and 0 if they are in a lower group.

Source: compiled by the authors.

Table 7 reports the main estimation results. The dependent variable in Column (1) is the ordinal variable *Group* with value 1 if the firm is a domestic traditional producer (G1), 2 if it is an export traditional producer (G2), 3 if it is domestic innovator (G3), and 4 if it is export innovator (G4), respectively. We then use the dummy dependent variables for separate group comparisons in the rest columns. For example, in Column (2) we compare the effect of the initial productivity level on the choice between traditional domestic production ($Group_{\_12}$ takes on the value 0) and exports with traditional production ($Group_{\_12}$ takes on the value 1). The same way of constructing the dummy dependent variables applies to Columns (3) to (7) with different comparisons between groups. The ordered probit results in Column (1) shows that the initial productivity level of firms, as expected, has a significantly positive impact on the probability of firms located in a higher exporter and innovator classifications, which supports the pattern illustrated in our conceptual model, and which is confirmed by the probit results in the rest columns. Again, we find that firms with relatively low productivity choose to export traditional products (G2), while those with relatively high productivity choose domestic innovation over exporting (G3). As for control variables, the results show that young and large firms are more likely to end up in the higher groups.

Conclusion and Policy Implications

Transforming economic growth from input-based to innovation-driven is the most important objective for policy makers in emerging markets. Russia is probably the most outspoken in stating that digitalization and scientific capabilities are the key to its future success. Guided by a conceptual model, the analysis conducted for this article shows that on emerging markets, the connections between firm productivity and internationalization and innovation are quite multi-faceted. When firms face constraints in financing and resources, they may have to choose between exporting and innovating on the domestic market. We provide evidence for China that the increased importance of the domestic market raises the incentives for productive firms to choose innovation over internationalization.

The analysis has potentially important policy implications. When policy incentives are there to nudge firms towards their first best choice, our analysis argues that policies should take a great amount of care in differentiating incentives for firms with differing levels of productivity. As a thought experiment, often it is assumed that a close connection exists between productivity and firm size. In that case, and in contrast to popular policy opinion, internationalization should be promoted among smaller firms. The reason is that these firms can leverage their low costs capabilities internationally. By contrast, larger firms may better concentrate on gaining market share on the rapidly growing domestic market. Hence, policies that support access to technology and access to financing for innovation may better be aimed at larger and more productive companies.

In addition, our analysis has important strategic managerial implications. The most important one may be for the high productivity firms that face a trade-off between internationalization and innovation. Often, these firms connect with foreign firms in order to learn and leverage their capabilities for operational efficiency and excellence. The long run strategy is access to strategic assets that would complement existing capabilities. However, in the minds of senior management, such linking strategies often have the strategic goal of opening foreign markets. Our analysis highlights the fact that linking internationally may serve the goal of gaining access to capabilities that are to be leveraged on the domestic market more than internationally.

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