



Firm heterogeneity, foreign market entry mode and ownership choice

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ABSTRACT

We study the relationship between firm productivity, foreign market entry mode and affiliate ownership choice using Kolmogorov–Smirnov stochastic dominance tests on Japanese firm-level productivity and horizontal FDI data into 20 OECD countries during the period 1985–2001. We devote particular attention to different types of joint ventures to find that affiliate ownership increases with the parent firm's TFP.

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1. Introduction

Recent advances in the new trade theory have brought to the center of analysis the relationship between different modes of foreign market entry and intra-industry heterogeneity. The literature's main prediction is that firms follow different internationalization strategies according to their productivity levels, with more efficient firms more capable of competing in foreign markets (Melitz, 2003; Helpman et al., 2004; Helpman, 2006; Bernard et al., 2007). A 'MNE/exporters/domestics' three-tiered TFP hierarchy emerges from the previous studies, where the most productive firms enter foreign markets by FDI (become MNEs), less productive firms export, and the least productive firms remain 'domestic', as they cannot afford to enter foreign markets.

The current firm heterogeneity literature, however, fails to address the relationship between firm productivity, foreign market entry mode, and affiliate ownership choice, namely the choice between whole ownership and joint venture formation. Globally, joint ventures are a significant portion of new FDI,² and especially

so for Japanese firms. Yoshino's (1976) study of 50 major Japanese corporations found joint ventures comprised 82 percent of their foreign subsidiaries, while our data suggests joint ventures still account for over 40 percent of total Japanese FDI into 20 OECD countries during the period 1985–2001.³

Moreover, in contrast to Japanese direct investment in South-East Asia, FDI into the OECD countries is mainly horizontal (i.e., it is done with the aim of serving local markets). For example, Yoshida (2004) finds approximately 90 percent of Japanese affiliate production in North America is sold locally in the US and Canada, while less than 1 percent of Japanese production in Europe is exported out of Europe. This is in contrast to "the overwhelming majority of Japanese manufacturing affiliates in East Asia perform assembly and finishing operations", suggesting these affiliates serve in either a vertical FDI or export-platform capacity.

In this context of horizontal FDI, a study relating firm productivity and affiliate ownership choice is necessary. We show the standard three-part FDI/export/domestic TFP hierarchy should be extended to a four-part TFP hierarchy: WOS/JV/export/domestic. This relationship can be derived from a modified Helpman et al. (2004) framework that brings the foreign affiliate's ownership structure into the organizational choice of individual firms. The Helpman et al. (2004) model can be extended to

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² Harrigan (1988) suggests joint ventures are assuming greater importance due to shorter product lives, more pronounced costs advantages, and a greater number of formerly 'domestic' firms becoming international competitors. See Caves (2007) for a more complete discussion of the joint venture literature.

³ Greater cultural distance is a common explanation for the large percentage of Japanese MNEs choosing JVs as compared to 'Western' MNEs (Kogut and Singh, 1988).

consider a wider set of internationalization strategies compared to the ones explicitly accounted for in their model.⁴ These strategies are characterized by the intermediate level of fixed costs compared to the strategies considered in Helpman et al. (2004). Hence, forming a joint venture with another firm or firms allows also less productive firms to enter international markets which would not otherwise be possible if the set of foreign market entry modes would be limited only to the wholly owned subsidiaries as in the case of Helpman et al. (2004) framework.⁵

Evidence on the TFP hierarchy for Japanese firms is still rather scarce. Head and Ries (2003), based on several direct and indirect measures (sales, value added, ‘Approximate’ TFP), found that Japanese domestic firms, exporters and MNEs exhibited the predicted productivity ranking only when sales data were used, with much weaker support when direct productivity measures were employed. More recently, Murakami’s (2005) results contrast with Head and Ries (2003) and show exporter TFP to be higher than the TFP of firms that only serve foreign markets via FDI, although firms that do both have higher TFP than those that do just one of those activities. Kimura and Kiyota (2006) reproduce the standard three-level TFP hierarchy for Japanese firms with a slight twist, finding that firms that do both export and FDI are more productive than firms that just do one method of foreign market entry.⁶

The firm-level heterogeneity studies that examine the TFP-foreign market entry decision typically do not consider the ownership structure of the foreign affiliate. To the best of our knowledge, the only study that deals with the ownership issue is Raff et al. (2007) who demonstrated affiliate ownership shares increases with TFP. However, this study focuses only on firms investing abroad, ignoring the full range of productivity comparisons (i.e., domestic, exporters, MNEs). In addition, their empirical approach is based on regression analysis while our approach uses standard Kolmogorov–Smirnov (KS) stochastic dominance tests.

We also differ with respect to the previous work on firm heterogeneity by focusing on horizontal FDI by limiting our focus to host-counties within the OECD. This contrasts with several studies using Japanese data (e.g., Murakami, 2005; Kimura and Kiyota, 2006; Tomiura, 2007) that do not consider the FDI location when categorizing firm type.⁷ We also calculate a firm’s productivity directly via the Levinsohn and Petrin (2003) productivity measure that relies on intermediate inputs such as materials to control for simultaneity issues. This contrasts with the use of ‘approximate’ productivity measures (e.g., Head and Ries, 2003; Tomiura, 2007), as well as with Murakami (2005) and

Kimura and Kiyota (2006) who calculate a firm’s TFP relative to a representative firm within the same industry.

2. Empirical methodology: stochastic dominance tests

We use the non-parametric first-order stochastic dominance approach to empirically test the TFP hierarchy—foreign market entry mode relationship.⁸ Stochastic dominance tests allow us to robustly compare productivity differences across firm-groups at all moments of their productivity distributions, rather than at a single moment (typically the mean).

Stochastic dominance requires the use of both one-sided and two-sided Kolmogorov–Smirnov (KS) tests. Suppose we have the cumulative productivity distribution functions of two firm-types (F , S). The null-hypothesis of the two-sided KS test (comparison distributions are identical) is:

$$H_0 : F(z) - S(z) = 0 \forall z \in R \quad \text{against} \quad H_1 \\ : F(z) - S(z) \neq 0 \text{ for some } z \in R \quad (1)$$

In the one-sided test, we examine:

$$H_0 : F(z) - S(z) \leq 0 \forall z \in R \quad \text{against} \quad H_1 \\ : F(z) - S(z) > 0 \text{ for some } z \in R \quad (2)$$

The KS test statistics for the two-sided and one-sided tests are, respectively:

$$KS_2 = \sqrt{\frac{nm}{N}} \max_{1 \leq i \leq N} \{F_n(z_i) - S_m(z_i)\} \quad (3)$$

$$KS_1 = \sqrt{\frac{nm}{N}} \max_{1 \leq i \leq N} |F_n(z_i) - S_m(z_i)| \quad (4)$$

where n and m represent the sample sizes of the F and S distributions, with $n + m = N$. For F to stochastically dominate S , we must both reject the two-sided KS test’s null-hypothesis and fail to reject the one-sided KS test’s null hypothesis. In our results tables, we report the D -statistics, or the maximum difference between the F and S distributions.⁹

3. Data descriptive statistics

We determine the foreign market entry status of the Japanese firms in our sample from two Toyo Keizai sources: the *Japan Company Handbook* (JCH) and the *Kaigai Shinshutsu Kigyo Soran* (KSKS). The JCH provides data on all companies listed on Japan’s stock exchanges, including their export sales percentages, while the KSKS provides a listing of the overseas investment activities of Japanese corporations.¹⁰ Following the standard classification used in the literature to assure comparability with previous studies we classify as “domestic” those Japanese JCH-listed firms with no export sales, as well as no KSKS-listed wholesale/retail or manufacturing affiliates. Firms with positive export sales data

⁴ The strategies that are frequently mentioned in the international business literature include the creation of production affiliates abroad in cooperation with other firms, not necessarily the indigenous firms but also with home-country or third-country firms. Examples include Matsushita Electric Industrial Company’s 50–50 percent joint venture with the Dutch firm Philips to build a battery producing factory in Poland, Mitsubishi’s minority joint venture with two Dutch firms (Farm Frites, Avico) to produce potato chips in Poland, and Toyota Motor Corporation’s 50–50 percent joint venture with Peugeot–Citroen to produce automobiles in the Czech Republic.

⁵ In other words, compared to the original Helpman et al. (2004) model that allows for FDI in the form of a wholly owned subsidiary only in the extended framework the possibility of joint venture formation expands the range of productivities for which horizontal FDI should be observed compared to exporting.

⁶ More recently, Tomiura (2007) finds outsourcing firms are less productive than those that do FDI.

⁷ Our horizontal FDI focus is consistent with the Helpman et al. (2004) study, which extends the proximity–concentration tradeoff to include heterogeneous firms. As such, they focus on horizontal FDI, stating the decision to establish foreign manufacturing operations is primarily based on market access. See also Head and Ries (2003) who note that including vertical FDI (based on low factor costs, among other influences) may yield a result where MNEs are not the most productive—rather, high-productivity firms do horizontal FDI and low-productivity firms do vertical FDI.

⁸ For use with non-Japanese firms, see Delgado et al. (2001), Girma et al. (2004, 2005), Merino (2004), Arnold and Hussinger (2005), and Wagner (2006) who find significant heterogeneity in the TFP-foreign market entry relationship. See also Greenaway and Kneller (2007) for a full literature survey on firm-level heterogeneity and the exporting/FDI decision. Girma et al. (2004) use measures of per employee sales, value added, and profit to proxy for TFP.

⁹ The D -statistic is measured by $F(z) - S(z)$, so we expect non-negative coefficients when S stochastically dominates F , and negative coefficients when F stochastically dominates S . See Conover (1999).

¹⁰ Goerzen and Beamish (2005), p.15 find that “scholars have established that Toyo Keizai’s surveys account for nearly all cases of Japanese FDI for parent firms that responded to the survey (...) it yields an accurate picture of those firms’ foreign investments”.

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