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Abstract

Prior research suggests that firm productivity and export activity are mutually reinforcing. Highly productive firms are more likely to enter the export market (i.e., self-selection), and upon doing so, achieve greater productivity levels over time (i.e., learning-by-exporting). We consider how a critical yet unexamined factor impacts this relationship: the economic development of a firm's home market. Drawing on institution-based theories, we hypothesize that self-selection effects will be strongest among firms in *more* developed economies. Drawing on knowledge-based theories, we hypothesize that learning-by-exporting effects will be strongest among firms in *less* developed economies. Taken together, we posit that firm productivity and export activity indeed reinforce one another; however, the strength of each direction of the relationship will be amplified, at least in part, by the presence of the *opposite* home market economic conditions. Analysis of longitudinal data from the World Bank Enterprise Surveys composed of responses from 3,431 manufacturing firms across 63 countries from 2006–2017 supports the proposed hypotheses.

Keywords: Exports, Productivity, Learning-by-Exporting, Self-Selection, Home Market Effects, Economic Development, Firm Internationalization

INTRODUCTION

Prior research suggests that firm productivity and export activity are mutually reinforcing. The self-selection hypothesis posits that only the most productive firms possess the requisite resources to enter export markets, thereby posing a barrier to entry for less productive firms (Melitz, 2003). The learning-by-exporting hypothesis posits that exporting exposes firms to knowledge that may not be available in the home market, thereby providing opportunities for learning (Grossman & Helpman, 1991). These two perspectives together suggest that highly productive firms are more likely to begin exporting, and upon doing so, achieve even higher productivity levels over time (Bernard & Jensen, 1999).

However, most empirical research over the past decade has focused on the learning-by-exporting hypothesis in isolation. Early findings indicated that evidence for the self-selection hypothesis was "amazingly clear-cut" whereas evidence for the learning-by-exporting hypothesis was "mixed" (Wagner, 2007, p. 66). Subsequent research tended to take for granted the former and focus on identifying contingencies of the latter (for meta-analyses, see Martins & Yang, 2009; Yang & Mallick, 2014). Yet it is unclear whether the same factors that moderate the effects of export activity on subsequent firm productivity might also moderate the effects of productivity on the propensity to enter the export market. A critical and unanswered question thus arises: Are the firms that stand to benefit the most from exporting more or less likely to enter the export market in the first place?

This study represents an initial step toward answering this question by considering how the economic development of a firm's home market might moderate each direction of the relationship between firm productivity and export activity. We draw on institution-based theories to suggest that self-selection effects will be strongest among firms in more developed economies due to pro-market conditions. We draw on knowledge-based theories to suggest that learning-by-exporting effects will be strongest among firms in less developed economies because such firms are farthest from the "productivity frontier". Taken together, we posit that firm productivity and export activity indeed reinforce one another; however, the strength of each direction of this relationship will be amplified, at least in part, by the presence of the *opposite* home market economic conditions.

The proposed hypotheses were tested and supported using longitudinal data from the World Bank Enterprise Surveys (WBES) composed of responses from 3,431 manufacturing firms across 63 countries from 2006–2017. The results indicate that firms from less developed home markets tend to benefit most from export activity; however, high productivity levels among firms in such markets provide little in the way of access to export markets. In contrast, highly productive firms from more developed home markets are especially prone to enter export markets but, paradoxically, achieve the smallest subsequent gains from doing so. Additional analysis lends support for the proposed underlying factors: institutional and technological development. Taken together, these findings suggest a more nuanced relationship between firm productivity and export activity.

This study makes at least four important contributions to international business scholarship. First, it sheds new light on the self-selection and learning-by-exporting perspectives (Wagner, 2007) by illuminating the moderating role of home market economic development (see Martins & Yang, 2009; Yang & Mallick, 2014). Second, in doing so, it builds on seminal research that emphasizes the importance of country-level differences in determining firm-level competitiveness (see Porter, 1990; Rugman & Verbeke, 1993); at the same time, it responds to more recent calls to develop theory that considers the role of home market factors in firm internationalization (Meyer & Peng, 2016; Meyer, 2018). Third, it includes data from a larger number of countries across a broader spectrum of economic development compared to prior studies, thereby responding to calls to consider the full range of economic development (Teagarden et al., 2018). Fourth, it represents a novel use of WBES data by transforming it for longitudinal analysis (Jensen et al., 2010). The findings also inform managers and policymakers alike.

THEORY AND HYPOTHESES

Two Complementary Perspectives

Two perspectives account for the relationship between firm productivity and export activity: self-selection and learning-by-exporting. We discuss each and then outline how the economic development of a firm's home market sheds new light on both.

The self-selection perspective views the relationship through the lens of how greater firm productivity enables entry into export markets. Geographical diversification requires firms to meet a certain productivity threshold to compete in foreign markets (Melitz, 2003). Firms must incur significant costs related to market research, product development, promotion, permits and licenses, and so forth, in order to begin exporting (Roberts & Tybout, 1997); these costs must be offset by higher productivity levels (Cassiman & Golovko, 2011). Even the mere prospect of entering foreign markets motivates firms to invest in productivity enhancements (Fabling & Sanderson, 2013). These costs act as a barrier to entry into export markets for less productive firms. In sum, the self-selection hypothesis posits that highly productive firms will be more prone to enter export markets.

The learning-by-exporting perspective views the relationship through the lens of how export activity enhances firm productivity. Central to this argument is that exporting requires firms to interact with foreign clients, suppliers, competitors, scientific agents, and so on (Salomon & Shaver, 2005), which provides access to new technologies (Love & Ganotakis, 2013). Consequently, firms gain valuable knowledge and learn over time, thereby enhancing productivity levels in the home market (Clerides et al., 1998). As Aw et al. (2000, p. 65) put it, exporting firms "acquire knowledge of new production methods, inputs, and product designs from their international contacts, and this learning results in higher productivity for exporters relative to their more insulated domestic counterparts." In sum, the learning-by-exporting hypothesis posits that export activity leads to higher levels of firm productivity.

These perspectives together suggest that firm productivity and export activity are mutually reinforcing. Although most studies have adopted a singular perspective (c.f., Fabling & Sanderson, 2013), it is clear scholars generally agree that these perspectives are indeed complementary (Wagner, 2007). It is less clear, however, whether those firms that stand to benefit the most from exporting are more or less likely to enter the export market in the first place.

Our core thesis is that the economic development of a firm's home market moderates both the self-selection and learning-by-exporting effects. Economic development refers to "the observed pattern, across countries and across time, in levels and rates of growth of per capita income" (Lucas,

1988, p. 3) and plays a central role in understanding international business theories (Teagarden et al., 2018) and international competitiveness (Porter, 1990). A country's economic development goes hand in hand with institutional and technological development. As such, our focus here is on the role of home market economic development but our theoretical arguments draw on these related dimensions.

The Self-Selection Hypothesis and Home Market Economic Development

We first draw on institution-based theories to propose that self-selection effects will be stronger among firms in *more* developed home markets. Central to our argument is the link between economic and institutional development (Child & Tse, 2001). Firms operating in more developed home markets enjoy pro-market conditions with strong appropriability regimes and limited corruption (Acemoglu et al., 2005). Two arguments suggest that the effect of firm productivity on export propensity will be stronger under such pro-market conditions.

First, pro-market conditions produce incentives for entering export markets and reduce institutional barriers to doing so. The implementation of pro-market reforms has been shown to dramatically increase the effects of exporting on firm profitability; however, firms in less developed markets have fewer economic incentives to engage in exporting activities (Dau, 2013). Moreover, firms in less developed markets often face institutional challenges which limit access to foreign markets (Meyer et al., 2009). Firms in such home markets frequently must rely on political ties to enter foreign markets (Gomes et al., 2018). Taken together, even highly productive firms in less developed home markets may voluntarily (due to limited economic incentives) or involuntarily (due to high institutional barriers) opt not to enter export markets. Consequently, firm productivity will be a weaker predictor of export propensity in less developed home markets.

Second, pro-market conditions alter the distribution of productivity levels across firms in the domestic market (Bartelsman et al., 2013). The distribution tends to be more concentrated for firms in more developed markets because firms with low productivity are simply more likely to fail. In contrast, greater variation exists among firms in less developed markets because such firms may be able to survive despite low productivity owing to political ties. Similarly, high productivity levels may not necessarily guarantee access to foreign markets for firms in less developed markets whereas it

more likely will for firms in more developed markets. As a result of these different distributions, comparable marginal improvements in productivity levels are statistically more likely to be associated with changes in export propensity for firms in more rather than less developed home markets.

Taken together, we posit that highly productive firms will be more likely to enter export markets; however, this self-selection effect will be stronger among firms in more developed home markets. We, therefore, offer the following hypothesis.

Hypothesis 1: *The effect of firm productivity on export propensity will be greater among firms in more developed home markets compared to firms in less developed home markets.*

The Learning-by-Exporting Hypothesis and Home Market Economic Development

We next draw on the knowledge-based view of the firm to propose that learning-by-exporting effects will be stronger among firms in *less* developed home markets. Central to this argument is the link between economic and technological development (North, 1994). Firms in more developed markets enjoy greater access to technological advances in the domestic market whereas firms in less developed markets only have access to these technologies via foreign markets (Dimitratos et al., 2009). Two related arguments suggest that the effect of exporting activity on subsequent productivity levels will be stronger under such conditions of limited technological development.

First, productivity levels at the point of entry into export markets will vary according to home market economic development. The technological advances that accompany economic development generate higher productivity levels for firms in the domestic market even in the absence of exporting such that firms in less developed markets face a knowledge gap prior to exporting (Dimitratos et al., 2009). Such firms are thus "more likely to encounter new processes that yield high returns at low cost" upon entry into export markets (Blalock & Gertler, 2009, p. 198) and to seek new knowledge via exporting activities (Salomon & Jin, 2008). Firms from less developed markets consequently stand to enjoy greater productivity gains upon entry into export markets. A firm's entry productivity level and thus opportunities for learning from exporting will be determined, at least in part, by the economic development of its home market.

Second, the extent of potential gains in productivity levels will vary according to home market economic development. A "productivity frontier" exists for all firms beyond which further gains are not possible (Salomon & Jin, 2010). Proximity to this frontier is associated with smaller marginal returns upon exposure to new knowledge (Blalock & Gertler, 2009). Firms in more developed markets tend to enjoy higher productivity levels prior to entry into the export market and are thus closer to the frontier upon entry. These firms stand to learn less from exporting because "the technological knowledge they encounter in the destination market is either already known to them or it is inferior to that which they already possess" (Salomon & Jin, 2010, p. 1092).[i] These principles of finite knowledge and diminishing returns suggest that the extent of potential gains in productivity upon entry into export markets will be greater for firms in less developed home markets.

In sum, we posit that productivity levels of exporting firms will increase over time; however, this learning-by-exporting effect will be stronger among firms in less developed home markets. Although limited and inconclusive empirical evidence from meta-analyses (Martins & Yang, 2009; Yang & Mallick, 2014) and archival data from firms in a single or few underdeveloped countries (Siba & Gebreeyesus, 2017; van Biesebroeck, 2005) have pointed to this assertion, prior research has yet to directly examine variations in the learning-by-exporting effect across the spectrum of home market economic development.[ii] We, therefore, offer the following hypothesis.

> **Hypothesis 2:** *Exporting firms from less developed home markets will exhibit greater productivity gains with increased export experience compared to exporting firms from more developed home markets.*

Summary

In sum, we have posited that the self-selection and learning-by-exporting effects are applicable in all contexts; however, the former is expected to be stronger among firms in more developed home markets whereas the latter is expected to be stronger among firms in less developed home markets. On the one hand, these arguments are consistent with seminal research that emphasizes the importance of country-level differences in determining firm-level competitiveness (see Porter, 1990; Rugman & Verbeke, 1993); simply put, firms in more developed home markets enjoy a

competitive advantage by virtue of superior conditions and are thus better positioned to enter the export market. On the other hand, these arguments diverge from such perspectives by suggesting that internationalization via exporting may be an avenue through which firms might enhance competitiveness (see Meyer & Peng, 2016; Meyer, 2018); that is, firms in less developed home markets may enjoy greater learning opportunities due to subpar conditions and are thus more likely to learn by participating in the export market.

METHODS

Data

The World Bank Enterprise Surveys (WBES) include firm-level data from a representative sample of private sector manufacturing firms from countries across a range of economic development. Data is collected via structured face-to-face interviews with managers on a semi-regular basis roughly every 4 to 5 years with a portion of firms resurveyed. This data was used to construct a panel database of 17,272 observations from 9,796 manufacturing firms from 2006-2017.[iii] Dropping firms observed in a single survey wave (2,950 firms), identified as exporters in the first wave (2,351 firms), and with missing variables (1,064 firms) resulted in a final database of 6,862 observations from 3,431 firms across 63 countries. No significant differences between firms with missing versus full information were detected. Table 1 presents summary statistics for key variables as outlined below.

[Table 1 here]

Variables

Export Propensity. The dependent variable in the self-selection analysis was export propensity, which was equal to one if the firm became an exporter in the second survey wave and zero otherwise; 494 firms (14.4%) became exporters by the second wave.

Total Factor Productivity (TFP). TFP was an independent variable in the self-selection analysis and the dependent variable in the learning-by-exporting analysis; it was computed using sales as a proxy for output, cost of labor for labor input, total costs as intermediate inputs, and net book value of machinery, vehicles, buildings, and land as capital (Levinsohn & Petrin, 2003). Missing

values for outputs and inputs were imputed using a single imputation with expectation maximization bootstrap technique, which is designed for repeated cross-section surveys (Honaker & Gary, 2010).

Export Experience. The independent variable in the learning-by-exporting analysis was export experience, which was computed as the difference (in years) between the second wave and the year in which the firm began exporting, if at all (see above regarding export propensity).[iv] Firms that became exporters by the second wave had an average of 3.629 years of experience.

Home Market Economic Development. The moderating variable in both sets of analysis was home market economic development. Each firm and its respective home market were categorized into four groups according to World Bank classifications based on gross national income per capita (GNI): low-income countries (LIC: $\leq$ \$995; 12 countries; 836 firms), lower-middle-income countries (LMIC: \$996–\$3895; 23 countries; 1,344 firms), upper-middle-income countries (UMIC: \$3896–\$12054; 19 countries; 916 firms), and high-income countries (HIC: $\geq$ \$12055; 9 countries; 335 firms).[v]

Control Variables. Estimations also included (1) *firm size* as the number of workers (divided by 1,000), (2) an indicator for *foreign ownership*, (3) an indicator for *access to credit*, (4) an indicator for membership in a *business group*, and (5) *elapsed time* between the first (t) and second (t+1) survey waves (in years). Fixed effects included (6) *year*, (7) *country*, and (8) *industry* groups (Marsili, 2001).

Statistical Approach

The estimations correct for two potential sources of bias. First, propensity score matching accounts for firm-level heterogeneities due to distinct characteristics of different income groups. Second, a Heckman selection model accounts for sample selection bias. Each is discussed below.

Propensity Score Matching (PSM). PSM was used to construct samples of firms in LICs, LMICs, and UMICs comparable to the sample of firms in HICs. Propensity scores were obtained by estimating three logit regressions (HICs/LICs, HICs/ LMICs, HICs/UMICs) in which the dependent variable was whether the firm is based in a HIC. The explanatory variables used for matching have been highlighted in prior studies as stimulants of economic development: firm size, industry, and foreign ownership. The PSM procedure employed the 1:1 nearest-neighbor method without replacement (Deheija & Wahba, 2002); the caliper was set to equal 0.01.

Two matched subsamples were constructed. For the "1:1 PSM" subsample, each firm in a HIC was matched to a firm in each of the other income groups; this procedure resulted in a total of 1,340 matched firms (335 each from LIC, LMIC, HMIC, HIC), which included 175 of the 494 exporting firms (35%) in the full sample. For the "2:1 PSM" subsample, each unmatched firm from the non-HIC income groups was included in a second round of matching; this procedure resulted in a total of 2,251 matched firms (614 from LIC, 660 from LMIC, 642 from HMIC, 335 from HIC), which included 292 of the 494 exporting firms (59%) in the full sample. Overall, this procedure yielded a lower reduction bias but larger subsample relative to the first subsample. Kolmogorov-Smirnov tests show that differences in propensity scores observed before matching are no longer significant after each matching procedure.[vi] Hypothesis tests used all three (sub)samples: full, 1:1 PSM, and 2:1 PSM.

Heckman Selection Model. Previous research offers two strategies for estimating jointly self-selection and learning-by-exporting: propensity score matching with differences-in-differences (PSM-DID) and a Heckman selection model (Chang & Chung, 2017). PSM-DID cannot be employed here because the sample does not capture observations across at least three time periods (T_1: all firms are non-exporters; T_2: some firms become exporters and matching is constructed; T_3: differences in learning are tested across matched firms). A Heckman two-stage selection model, however, can be employed (Heckman, 1979).

The first stage equation uses a probit function to estimate the probability of becoming an exporter:

$$E_{j,t+1} = \gamma + \sum_{i=1}^{4} \mu_i IG_i \times TFP_{j,t} + \Omega_{j,t} + \vartheta_s + \vartheta_c + \vartheta_t + \varepsilon_{j,t} \quad (1)$$

where $E_{j,t+1}$ is the export propensity of firm j at t+1 and $TFP_{j,t}$ is the total factor productivity of firm j at t. *IG* is a dummy variable indicating the country income group of the focal firm. Subscript i denotes the income group (LIC ($i=1$), LMIC ($i=2$), UMIC ($i=3$), HIC ($i=4$)). $\Omega_{j,t}$ is a vector of the control variables; ϑ_s, ϑ_c, and ϑ_t indicate industry, country, and year dummies, respectively; $\varepsilon_{j,t}$ is the error term. The self-selection perspective posits that μ_i will be positive for all income groups; Hypothesis 1 posits that the effect will be stronger in HICs than in LICs (i.e., $\mu_4 > \mu_1$).

The second stage equation uses a log-log OLS function to estimate the effects of exporting experience on subsequent firm productivity:

$$LnTFP_{j,t+1} = ln\alpha + \sum_{i=1}^{4} IG_i \text{x}(\beta_i LnY_{j,t+1}) + \gamma_1 \text{W}_{t+1} + \gamma_2 \text{IMR}_{t+1} + \vartheta_s + \vartheta_c + \vartheta_{t+1} + \varepsilon_{j,t+1} \quad (2)$$

where $TFP = \alpha Y^{\beta}$. Y refers to years of exporting experience and β reflects the learning coefficient, which assumes diminishing returns to exporting experience over time. This equation also includes country, year, and industry dummies, firm size in the second wave (W_{t+1}), and the Inverse Mills Ratio (IMR) from the first stage estimation. The learning-by-exporting perspective posits that β_i will be positive for all income groups; Hypothesis 2 posits that productivity gains due to exporting will be greater for firms in LICs than in HICs (i.e., $\beta_1 > \beta_4$).

The Heckman selection model must satisfy two conditions. First, the IMR must be significant in the second stage, suggesting the presence of a selection bias. Second, the IMR cannot be correlated with the independent variable in the second stage, suggesting the absence of multicollinearity. To satisfy these conditions, one or more explanatory factors must differ between the equations. Accordingly, none of the control variables in the first stage ($\Omega_{j,t}$) are included in the second stage, and the independent variable in the second stage (Y) is not included in the first stage.

RESULTS

Main Analysis

Table 2 reports tests of the baseline hypotheses. Results for all three subsamples are shown. For brevity and given the similarity of coefficients across estimations, results from the 1:1 PSM subsample are discussed.

[Table 2 here]

Columns 1, 3, and 5 present the first stage estimates. The results show a positive and significant relationship between firm productivity and export propensity, thus supporting the baseline self-selection hypothesis. The marginal effects in the 1:1 PSM subsample indicate that a 1% increase in productivity increases the likelihood of exporting by approximately 0.014 percentage points ($p < 0.05$). Ex-post exercises validate the fitness of the model, which correctly classifies 68.21% of the

observations with a balance between sensitivity (65.71%) and specificity (68.58%). The pseudo-R^2 equals 0.136 and the C-statistic (LROC) equals 0.751. Other models show similar fit indices.

Columns 2, 4, and 6 present the second stage estimates. The results indicate no significant relationship between exporting experience and subsequent productivity, thus not supporting the baseline learning-by-exporting hypothesis. Importantly, the IMR coefficient is negative and significant across all specifications, thus confirming evidence of selection bias. The negative effect suggests that unobserved characteristics that increase export propensity also have a negative effect on subsequent productivity. Additionally, the low correlation between IMR and exporting experience (i.e., corr (IMR, x)) indicates no evidence of multicollinearity. Both conditions for the Heckman selection model are thus satisfied.

Table 3 reports tests of the hypothesized moderating effects of home market economic development as presented in Equations (1) and (2). Once again, results for all three subsamples are shown and those from the 1:1 PSM subsample are discussed.

[Table 3 here]

Columns 1, 3, and 5 present the first stage estimates (i.e., Hypothesis 1). The effect of firm productivity on exporting propensity is positive and significant for UMIC and HIC (all models, $p < 0.01$); the two coefficients are significantly different from one another (all models, $p < 0.05$). The significance of the effect varies across subsamples for LIC and LMIC but is weaker than those for UMIC and HIC (all models, $p < 0.05$). Hypothesis 1 is thus supported; the self-selection effect is strongest among firms in *more* developed home markets.

Columns 2, 4, and 6 present the second stage estimates (i.e., Hypothesis 2). The effect of exporting experience on firm productivity is positive and significant for LIC only (all models, $p < 0.05$). Interestingly, the size and significance of the effect increases when the matching procedure is more restrictive. As log-log estimations were used, these parameters can be interpreted as elasticities; the 1:1 PSM subsample results suggest that a 1% increase in exporting experience increases firm productivity by 0.106%. Surprisingly, the coefficient for HIC is negative and significant in all models, suggesting a possible "de-learning-by-exporting effect". The sigmoid model of internationalization

offers a plausible explanation (Contractor et al., 2003); firms from more developed home markets may initially encounter difficulties in identifying new knowledge in foreign markets and thus experience a temporary decrease in firm productivity. Additional data from a longer study period may offer further insights. Regardless, Hypothesis 2 is supported; the learning-by-exporting effect is strongest among firms in *less* developed home markets.

Additional Analysis

The core thesis tested above is that home market economic development moderates both the self-selection and learning-by-exporting effects. However, the theoretical arguments acknowledge that economic development is correlated with other forms of development, namely, institutional and technological development. We, therefore, conducted additional analyses to estimate the moderation effect of institutional development on the relationship between firm productivity and export propensity as well as the moderation effect of technological development on the relationship between export experience and firm productivity.

Institutional development was operationalized using the Economic Freedom Index (EFI).[vii] This measure captures the extent to which a country's government promotes private investment, a stable legal system, efficient markets, and free trade (DiRienzo et al., 2007). This variable is equal to the country's overall score (0-100) for the year in which the focal firm was observed for the first wave (*t*). The merging of the WBES and EFI databases resulted in some missing data, yielding a sample of 2,756 firms (436 exporters in *t*+1) from 51 countries, or a reduction of 19.7% of total observations. EFI is highly correlated with income groups (average scores: HIC = 76.4; UMIC = 58.9; LMIC = 53.6; LIC = 47.7), suggesting that economic and institutional development indeed go hand in hand.

Technological development was operationalized using the percentage of Internet users (IU).[viii] Widespread Internet access is not only a necessary condition for economic development (Choi & Yi, 2009), it is also a source of knowledge that stimulates trade (Lapatinas, 2019) and enhances firm performance (Luo & Bu, 2016; Vendrell-Herrero et al., 2017). This variable is equal to the country's overall value for the year in which the focal firm was observed for the second wave (*t+1*). IU is also

highly correlated with income groups (average values: HIC = 41.9%; UMIC = 31.5%; LMIC = 16.8%; LIC = 6.7%), suggesting that economic and technological development also go hand in hand.

Table 4 reports the estimates of the moderating effects of institutional and technological development using variants of Equations (1) and (2), respectively. Model fitness is qualitatively the same as in Tables 2 and 3. As expected, EFI positively moderates the relationship between firm productivity and export propensity, whereas IU negatively moderates the relationship between export experience and firm productivity. Taken together, the additional analysis mirrors the main analysis: The self-selection effect is stronger among firms in home markets with higher levels of institutional development whereas the learning-by-exporting effect is stronger among firms in home markets with lower levels of technological development.

[Table 4 here]

DISCUSSION

Prior research suggests that firm productivity and export activity are mutually reinforcing; highly productive firms are more likely to enter the export market and, upon doing so, achieve higher productivity levels over time. The findings reported here indicate that this relationship is more nuanced than prior research suggests. This study thus offers four important theoretical contributions.

First, it sheds new light on the self-selection and learning-by-exporting perspectives. Most studies over the past decade have focused on identifying contingencies of the latter while taking for granted the former. These efforts have been largely driven by inconclusive findings regarding the learning-by-exporting hypothesis (Wagner, 2007). Previous tests of the impact of home market economic development on the learning-by-exporting effect are limited in terms of methodology and mixed in terms of findings (Martins and Yang, 2009; Yang and Mallick, 2014). Furthermore, these studies have not considered whether the same factors that moderate the effects of exporting activity on subsequent firm productivity might also moderate the effects of productivity on the propensity to enter the export market. The findings reported here generally support both perspectives but also show that the strength of each direction of the relationship between firm productivity and exporting activity is amplified, at least in part, by the presence of the *opposite* home market economic conditions. As

such, these findings illuminate the role of home market economic development in understanding *both* the self-selection and learning-by-exporting effects.

Second, it adds to a longstanding body of research on the role of home market factors in firm competitiveness and internationalization (e.g., Meyer & Peng, 2016; Meyer, 2018; Porter, 1990). Whereas much of this prior work has focused on internationalization via foreign direct investment, the findings reported here reveal that a firm's home market plays a critical role in exporting as well. A highly developed home market may indeed provide a competitive advantage; however, internationalization via exporting may be one viable path to overcoming the disadvantage of a less developed home market. This study also complements previous research on learning-by-exporting, in particular, which has shown that firm- (Salomon & Jin, 2010), industry- (Salomon & Jin, 2008) and region-level (Xie & Li, 2018) factors shape the effects of export activity on firm productivity; the findings reported here highlight the role of the economic development a firm's home market.

Third, it considers a broader spectrum of economic development as it relates to learning-by-exporting. Most extant work has focused on more developed economies with limited emphasis on less developed counterparts (see Martins & Yang, 2009; Yang & Mallick, 2014). In contrast, this study includes firms from a much larger number of countries across a fuller range of economic development, including heterogeneities among developing economies (see Hoskisson et al., 2013). In line with previous research, these findings indicate that the most significant effects occur at the extremes of this spectrum (Bhaumik, et al., 2018). More generally, this study thus begins to respond to recent calls (e.g., Teagarden et al., 2018) to develop theory that is applicable to the full range of economic development.

Fourth, this study represents a novel use of the WBES data that promises to inform future research endeavors. Perhaps one reason why the role of home market economic development has not previously been directly examined in the context of the relationship between firm productivity and export activity is that doing so requires comparable samples of firms from multiple countries over time. To overcome these challenges, we built a large, multi-country, longitudinal dataset. Previous

studies using similar data have been limited to cross-sectional approaches (e.g., Jensen, et al. 2010). As such, this dataset may be useful in future inquiry.

Despite these merits, the dataset also introduced some methodological limitations. First, it does not include detailed and comparable firm-level data on importing experience or demand-side factors of internationalization. Second, it does not include data about gaps in exporting activity if firms entered the export market, withdrew, and later re-entered; scholars have recently called for more research to better understand such intermittent activities (see Kafouros et al., 2021). Third, it consists of two observations for each firm; this longitudinal nature enabled the joint estimation of self-selection and learning-by-exporting but was insufficient to implement other endogeneity tests. Fourth, it contains limited data from highly developed economies. Of course, these limitations are counterbalanced by the inclusion of data from firms operating in a large number of countries across a broad spectrum of economic development.

This study also points to a range of opportunities for future research.[ix] A closer examination of home market heterogeneities may offer additional insights. We focused on economic development as a natural starting point given its central role in international business theories. Additional analysis corroborated the theoretical arguments by showing that institutional and technological development also moderated the self-selection and learning-by-exporting effects, respectively. Yet other underlying factors might also moderate these effects, such as external demand and price competition (Yang & Mallick, 2014), corruption and clientelism (Kurer, 1993), or the availability of political ties (Hutchcroft, 1997), to name a few. Whereas data about economic development is widely available, data about some underlying factors is less available for less developed countries.[x] To the extent such data is available, however, an examination of these heterogeneities stands to inform the policies governments might put in place or the actions firms might undertake to facilitate exporting and accelerate learning from it. Moreover, future research should carefully consider whether and how the findings reported here might differ for foreign subsidiaries that subsequently enter export markets; for such firms, the notion of a "home market" may be more nuanced than what is captured in the present study (see Rugman & Verbeke, 1993).

Scholars should also consider other types of firm activities. Salomon and Jin (2010) distinguished between productivity- (i.e., TFP) and innovation-related (e.g., patents) activities with respect to learning-by-exporting. We focused on the former given its generalizability and relevance for firms across the spectrum of economic development, including less developed markets where patent production is relatively rare. However, home market economic development might also inform the relationship between innovation and export activity. More generally, scholars should carefully consider the extent to which the productivity frontier is fixed; in the age of automation and artificial intelligence, firms may find new ways to push the limits of efficiency.

In addition, scholars should consider the role of export destinations. Prior studies have suggested that productivity gains are greater for firms exporting to advanced economies (Bastos et al., 2018) even as firms in such economies stand to learn from firms in leading emerging economies (Govindarajan & Ramamurti, 2011). The findings reported here offer little evidence of learning among firms in more developed economies; however, these prior studies together suggest that the difference in economic development between a firm's home market and its export destination(s) may shape learning-by-exporting.

Finally, future research would do well to consider whether exporting might be one strategy through which firms from less developed markets might partially catch up with global leaders' competitiveness levels. The findings reported here suggest that firms from less developed markets stand to gain the most from entering the export market. As such, exporting may be one viable pathway to overcoming the disadvantages seemingly inherent in such home markets (see Porter, 1990; Rugman & Verbeke, 1993). Of course, existing research highlights the importance of considering the full range of foreign investment operations as well as policy environments in asking such questions (Meyer, 2018). Other opportunities for future inquiry abound.

A few important practical implications also emerge. First, the findings show that highly productive firms from more developed home markets are especially prone to entering export markets. Policymakers should thus strengthen institutions to ensure that the most productive firms rather than those with the strongest political ties are able to access foreign markets. Second, the findings show

that firms from less developed home markets benefit most from exporting activity. Policymakers should thus strengthen technological infrastructures to enhance learning opportunities in the domestic market and also help firms prepare for exporting activities. Moreover, the results indicate that highly productive firms from more developed home markets are especially prone to enter export markets but, paradoxically, achieve the smallest subsequent gains from doing so. Managers should thus carefully consider whether the full range of outcomes likely to arise from exporting indeed outweighs the costs of entering export markets.

In conclusion, this study highlights the importance of considering the self-selection and learning-by-exporting perspectives together. The findings echo previous studies by showing that firm productivity and exporting activity reinforce one another. However, a critical nuance is added: The strength of each direction in the relationship is amplified by the presence of the *opposite* home market economic conditions. Moving forward, research in this domain should consider whether the same factors that inform one perspective might also inform the other.

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Table 1. Means and Standard Deviations by Export Propensity

		Non-Exporter (*t+1*)	Exporter (*t+1*)	Kruskal Wallis (χ^2)
	# Observations	2,937	494	
	% Observations	85.6%	14.4%	
Wave 1 (*t*)	# of Workers/1000	0.051	0.093	110.086
		(0.09)	(0.13)	*0.000*
	TFP	6.435	6.921	55.306
		(1.33)	(1.50)	*0.000*
	Foreign ownership	0.060	0.115	3.806
		(0.24)	(0.32)	*0.051*
	Access to credit	0.366	0.453	9.693
		(0.48)	(0.50)	*0.002*
	Business group	0.159	0.210	3.322
		(0.37)	(0.41)	*0.068*
Wave 2 (*t+1*)	# of Workers/1000	0.056	0.183	166.293
		(0.12)	(0.49)	*0.000*
	TFP	6.442	7.043	70.918
		(1.54)	(1.67)	*0.000*
	Elapsed time	4.497	4.654	7.557
		(1.34)	(1.24)	*0.006*
	Export experience	--	3.629	--
		--	(0.22)	--
Income Group	LIC	0.248	0.216	1.268
		(0.43)	(0.41)	*0.260*
	LMIC	0.395	0.372	0.642
		(0.49)	(0.48)	*0.423*
	UMIC	0.259	0.312	3.468
		(0.44)	(0.46)	*0.062*
	HIC	0.097	0.099	0.000
		(0.30)	(0.30)	*0.948*
Industry	Science	0.135	0.184	3.050
		(0.34)	(0.39)	*0.081*
	Extraction	0.221	0.204	0.346
		(0.41)	(0.40)	*0.556*
	Processes	0.526	0.502	0.752
		(0.50)	(0.50)	*0.386*
	Engineering	0.117	0.109	0.085
		(0.32)	(0.31)	*0.771*

Standard deviations are in parentheses. P-values for Kruskal Wallis tests are in italics.
Monetary variables were converted to USD using GDP deflators from the World Bank.

Table 2. Heckman Selection Model: Direct Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample		**1:1 PSM**		**2:1 PSM**	
	PROBIT	OLS	PROBIT	OLS	PROBIT	OLS
	Export *t*+1	Ln(TFP) *t*+1	Export *t*+1	Ln(TFP) *t*+1	Export *t*+1	Ln(TFP) *t*+1
TFP (*t*)	0.054		0.073		0.030	
	(0.018)		(0.029)		(0.014)	
	0.003		*0.010*		*0.031*	
Foreign ownership	0.292		0.102		0.195	
	(0.053)		(0.099)		(0.107)	
	0.000		*0.303*		*0.070*	
Access to credit	0.116		0.104		0.133	
	(0.031)		(0.106)		(0.061)	
	0.000		*0.326*		*0.028*	
Elapsed time	-0.288		-3.116		-0.599	
	(0.080)		(0.116)		(0.224)	
	0.000		*0.000*		*0.008*	
Business group	0.166		0.072		0.125	
	(0.075)		(0.075)		(0.088)	
	0.027		*0.337*		*0.155*	
# of Workers/1000 (t)	1.375		1.665		1.826	
	(0.236)		(0.900)		(0.560)	
	0.000		*0.064*		*0.001*	
Ln Experience (*t*+1)		0.002		0.006		-0.019
		(0.013)		(0.021)		(0.020)
		0.891		*0.784*		*0.359*
IMR		-0.330		-0.280		-0.326
		(0.053)		(0.120)		(0.108)
		0.000		*0.035*		*0.009*
# of Workers/1000 (*t*+1)		0.067		0.033		0.048
		(0.019)		(0.010)		(0.010)
		0.003		*0.004*		*0.000*
Constant	-1.486	2.556	-16.263	2.006	-0.596	2.530
	(0.129)	(0.134)	(0.501)	(0.106)	(0.385)	(0.131)
	0.000	*0.000*	*0.000*	*0.000*	*0.122*	*0.000*
Observations	3,431	494	1,340	175	2,251	292
Pseudo-R^2 // R^2	0.101	0.343	0.136	0.554	0.111	0.375
Log Likelihood	-1271.44		-448.74		-772.05	
LROC // |Corr (IMR, x)|	0.723	0.083	0.751	0.004	0.732	0.029
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Correctly predicted						
Cut-off	0.144		0.131		0.130	
Sensitivity (exporters)	68.42%		65.71%		70.55%	
Specificity (non-exporters)	63.50%		68.58%		63.81%	
Overall	64.21%		68.21%		64.68%	

Robust standard errors in parentheses. P-values in *italics.*

Table 3. Heckman Selection Model: Hypothesized Moderation Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample		**1:1 PSM**		**2:1 PSM**	
	PROBIT	OLS	PROBIT	OLS	PROBIT	OLS
	Export *t*+1	Ln(TFP) *t*+1	Export *t*+1	Ln(TFP) *t*+1	Export *t*+1	Ln(TFP) *t*+1
LIC*TFP (*t*)	0.042		0.007		0.000	
	(0.007)		(0.013)		(0.009)	
	0.000		*0.568*		*0.992*	
LMIC*TFP (*t*)	0.018		0.065		0.010	
	(0.011)		(0.013)		(0.016)	
	0.109		*0.000*		*0.525*	
UMIC*TFP (*t*)	0.106		0.097		0.045	
	(0.007)		(0.008)		(0.011)	
	0.000		*0.000*		*0.000*	
HIC*TFP (*t*)	0.170		0.173		0.160	
	(0.013)		(0.035)		(0.022)	
	0.000		*0.000*		*0.000*	
Foreign ownership	0.285		0.084		0.185	
	(0.059)		(0.104)		(0.109)	
	0.000		*0.423*		*0.089*	
Access to credit	0.117		0.113		0.139	
	(0.029)		(0.104)		(0.056)	
	0.000		*0.278*		*0.014*	
Elapsed time	-0.289		-3.118		-0.599	
	(0.075)		(0.115)		(0.224)	
	0.000		*0.000*		*0.008*	
Business group	0.165		0.076		0.123	
	(0.072)		(0.074)		(0.091)	
	0.021		*0.306*		*0.177*	
# of Workers/1000 (*t*)	1.386		1.600		1.776	
	(0.228)		(0.882)		(0.530)	
	0.000		*0.070*		*0.001*	
LIC*Ln Experience (*t*+1)		0.032		0.106		0.0460
		(0.014)		(0.020)		(0.005)
		0.041		*0.000*		*0.000*
LMIC*Ln Experience (*t*+1)		0.004		0.013		-0.010
		(0.024)		(0.010)		(0.032)
		0.883		*0.218*		*0.762*
UMIC*Ln Experience (*t*+1)		-0.005		-0.020		-0.057
		(0.013)		(0.028)		(0.027)
		0.731		*0.485*		*0.052*
HIC* Ln Experience (*t*+1)		-0.040		-0.032		-0.035
		(0.016)		(0.010)		(0.011)
		0.021		*0.006*		*0.004*
IMR		-0.314		-0.307		-0.327
		(0.044)		(0.087)		(0.089)
		0.000		*0.003*		*0.002*
# of Workers/1000 (*t*+1)		0.067		0.036		0.048
		(0.019)		(0.008)		(0.009)
		0.003		*0.001*		*0.000*
Constant	-1.409	2.538	-15.811	1.991	-0.412	2.658
	(0.087)	(0.103)	(0.492)	(0.064)	(0.339)	(0.210)
	0.000	*0.000*	*0.000*	*0.000*	*0.224*	*0.000*
Observations	3,431	494	1,340	175	2,251	292
Pseudo-R^2 // R^2	0.102	0.346	0.134	0.558	0.112	0.395
Log Likelihood	-1269.35		-447.76		-770.84	
LROC // |Corr (IMR, x)|	0.724	0.077	0.752	0.002	0.734	0.025
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Correctly predicted						
Cut-off	0.144		0.131		0.130	
Sensitivity (exporters)	70.45%		65.71%		70.21%	
Specificity (non-exporters)	63.33%		68.15%		63.45%	
Overall	64.35%		67.84%		64.33%	

Robust standard errors in parentheses. P-values in *italics*.

Table 4. Heckman Selection Model: Additional Analysis

	(1)	(2)
	Full sample	
	PROBIT	OLS
	Export *t*+1	Ln(TFP) *t*+1
TFP (*t*)	-0.170	
	(0.118)	
	0.150	
Economic Freedom Index, EFI (*t*)	0.146	
	(0.014)	
	0.000	
TFP(*t*) * EFI (*t*)	0.004	
	(0.002)	
	0.033	
Foreign ownership	0.314	
	(0.087)	
	0.000	
Access to credit	0.128	
	(0.059)	
	0.029	
Elapsed time	0.188	
	(0.018)	
	0.000	
Business group	0.214	
	(0.099)	
	0.030	
# of Workers/1000 (*t*)	1.224	
	(0.274)	
	0.000	
Ln Experience (*t*+1)		0.035
		(0.020)
		0.085
% Internet Users, IU (*t*+1)		1.364
		(0.296)
		0.000
Ln Experience (*t*+1)* IU (*t*+1)		-0.176
		(0.086)
		0.046
IMR		-0.350
		(0.052)
		0.000
# of Workers/1000 (*t*+1)		0.069
		(0.033)
		0.041
Constant	-4.527	2.320
	(0.699)	(0.064)
	0.000	*0.000*
Observations	2,756	436
Pseudo-R^2 // R^2	0.088	0.364
Log Likelihood	-1098.10	
LROC // |Corr (IMR, x)|	0.704	0.072
Year FE	YES	YES
Industry FE	YES	YES
Country FE	YES	YES
Correctly predicted		
Cut-off	0.158	
Sensitivity (exporters)	64.2%	
Specificity (non-exporters)	62.7%	
Overall	62.9%	

Robust standard errors in parentheses. P-values in *italics*.

Endnotes

[i] It is possible that firms in more developed home markets possess greater absorptive capacity and are thus better positioned to learn from exporting activities. That is, such firms might be better able to recognize the value of new knowledge in foreign markets due to the technological advances available in the domestic market, which provides a baseline to build upon. However, this possibility rests on the assumption that unlimited learning opportunities are available and that a fixed frontier does not exist. Prior studies suggest that this assumption may be true for innovation-related activities but not in the context of productivity-related activities as studied here. This distinction is revisited in the discussion.

[ii] Prior research has not directly examined the moderating effect of home market economic development across a broad spectrum of countries. Martins and Yang (2009) and Yang and Mallik (2014) used a clever approach in their meta-analytic studies to estimate this effect. However, both suffer from methodological shortcomings due to data limitations. Martins and Yang (2009) used a dummy variable to differentiate between developing and developed countries and reported that the learning coefficient in the former is superior to that of the latter. In contrast, Yang and Mallick (2014) used GDP growth as a continuous measure and reported nonsignificant results after controlling for other underlying factors. Taken together, the results from these meta-analyses are inconclusive and point to the need for direct tests using firm-level data. Critically, neither meta-analysis studied the self-selection hypothesis. The joint estimation of the self-selection and learning-by-exporting effects represents a key contribution of the present study.

[iii] See the Enterprise Survey Methodology for more details (http://www.enterprisesurveys.org/methodology). The World Bank updated the collection methodology for firm-level data in 2006; earlier data is thus not usable.

[iv] This measure is comparable to Cieślik et al.'s (2015) measure of Time After Internationalization.

[v] See the World Bank Help Desk for more details about the composition of the income groups (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups).

[vi] The results of the propensity score matching procedure are available from the authors upon request.

[vii] Source: The Heritage Foundation (www.heritage.org).

[viii] Source: World Bank Indicators (www.data.worldbank.org).

[ix] We are grateful to the anonymous reviewers for their insightful suggestions regarding these future research directions. Regarding innovation-related activities, WBES data contains a high proportion of missing data for patent-related variables, which is likely indicative of the rarity of patents generated by firms in less developed economies. Regarding export destinations, WBES data do not provide full firm-level information on country-specific export destinations. In an attempt to address this data limitation, we gathered country-level data on the total value of exports by destination for each home market from the International Monetary Fund (IMF). Results including these control variables were qualitatively unchanged.

[x] For example, price competitiveness has been examined to a limited extent using the Real Effective Exchange Rate (REER) Index (see Yang & Mallick, 2014). However, this data is not available for many less developed countries (e.g., only 1 of the 12 LICs included in the present sample).