Received: 23 October 2024 Revised: 1 May 2025 Published online in Wiley Online Library:

(wileyonlinelibrary.com) DOI 10.1002/jsfa.70020

# Impact of agricultural export duration on new market entry: evidence from China

Hongman Liu,[a] Junbo Wang[a] and Ping Wei[b*]

## Abstract

**BACKGROUND: Export duration is crucial for accumulating experience and facilitating learning. Using HS 6-digit data on Chinese agricultural exports, this paper integrates export duration and new market entry into a unified framework to examine the impact and underlying mechanisms of agricultural export duration on entry into new markets.**

**RESULTS: The results suggested that export duration has an inverted U-shaped impact on new market entry. This effect varies depending on the region in which the export learning effect is acquired, the level of processing of agricultural products, and the degree of vulnerability to non-tariff barriers. The results of a mechanism test also reveal that export duration mainly affects the probability of agricultural products entering new markets through two channels: the reduction in information search costs and the growth of total factor productivity. There was evidence of a spillover effect of export duration on new market entry both at the market and product levels, which resulted in path dependence in new market entry decisions.**

**CONCLUSIONS: These findings provide valuable insights for policymakers in developing countries, supporting the design of effective trade policies, the promotion of agricultural exports, and the diversification of export markets.**


**Keywords:** new market entry; export duration; spillover effects; export diversification

## INTRODUCTION

Increasing trade protectionism, geopolitical instability, and the global spread of COVID-19 have introduced uncertainty to agricultural exports. Nations with concentrated export markets are particularly susceptible to abrupt shocks and unforeseen risks, rendering them more vulnerable to disruptions in export relationships and fluctuations in export volumes. Such frequent fluctuations not only heighten the uncertainty and risk associated with exports, thereby impeding farmers' income, but also pose a threat to food security in certain countries by impacting the international supply of agricultural products.[1] Consequently, encouraging new market entry and diversifying agricultural exports to mitigate disruption risks has remained a persistent concern for policymakers.

Nevertheless, agricultural products encounter numerous challenges when attempting to penetrate new markets, including stringent quality requirements, health and safety standards imposed by importing countries, high transportation and preservation costs, and exporters' limited awareness and experience in international markets.[2,3] These challenges are particularly prevalent in developing and emerging countries. Using China as an example, it is evident that, although China is the largest developing country and one with a rich agricultural history, its agricultural sector is still relatively underdeveloped. As a result, its ability to compete internationally with agricultural products is restricted, which makes it difficult for China to enter export markets. As Fig. 1 shows, since China's accession to the World Trade Organization (WTO) in 2001, there has been a rapid increase in the import of agricultural products. However, the growth in exports has been notably sluggish, resulting in an expanding trade deficit in agricultural products. From a regional perspective, developed economies in Asia and North America constitute the primary markets for China's agricultural exports. Data from the National Bureau of Statistics of China indicate that, in 2021, 46.2% of its exports went to the top five markets. Although this concentration is less pronounced than in certain developed economies such as the United States – where USDA data indicates that 61% of agricultural exports flow to just five countries – China's export concentration remains higher than that of several major agricultural exporters. For instance, according to FAO statistics, Brazil directs 34% of its agricultural exports to its top five destination markets. In the event of geopolitical conflicts, natural disasters, or public health emergencies, the volatility of agricultural exports may be significantly exacerbated. Consequently, enhancing the export capabilities of agricultural products, particularly the ability to penetrate new markets, is of paramount importance in diversifying export risks and ensuring the stability of agricultural trade markets.

As a key channel for experience accumulation and export learning, export duration may be important for new market entry. Under conditions of information asymmetry, exporting is not a

* Correspondence to: *P Wei, School of Business, Jiangsu Ocean University, Lianyungang, P.R. China, E-mail: pingwei_2020@163.com (Wei)

a College of Economics and Management, China Agricultural University, Beijing, P.R. China

b School of Business, Jiangsu Ocean University, Lianyungang, P.R. China

 

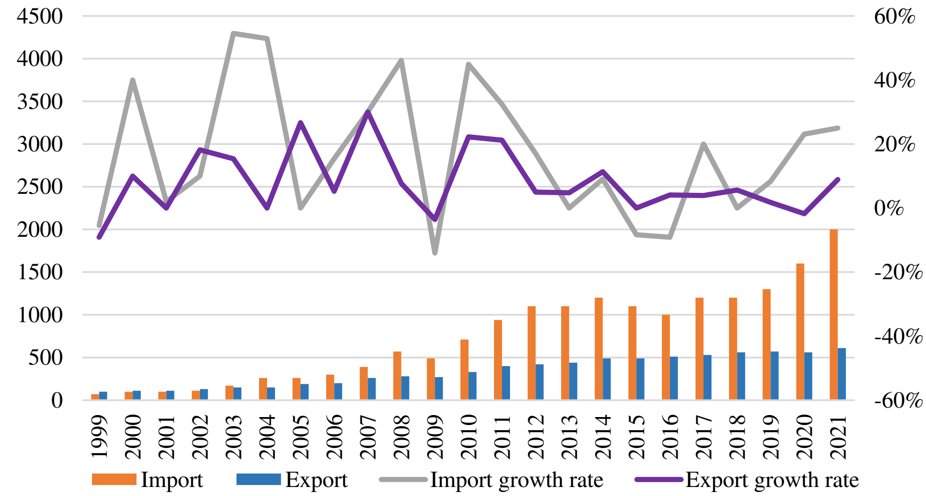


**Figure 1.** Imports and exports of agricultural products in China. *Source*: Compiled by the authors using data from FAOSTAT.

separate decision-making process, but a continuous adjustment and learning process.[4,5] Products face productivity and cost thresholds when entering new markets. Exporters with export experience have acquired proficiency in establishing market channels and locating potential customers. Compared with exporters without export experience, they thus have more advantages and a stronger ability to enter new markets.[6] The accumulation of experience, knowledge, and technology – from learning to mastery and application – requires time; therefore, export duration has attracted attention. The duration of a trade relationship for a specific product between two countries is defined as the continuous period from the initiation to the interruption of trade in that product.[7] Long-lasting, stable export relationships are likely to have a greater impact on exporters entering new markets. This study thus investigated new market entry from the perspective of export duration and aimed to answer the following questions: Can export duration facilitate new market entry? What are the specific transmission mechanisms? How can these linkages be used to facilitate new market entry? These questions have important implications for the diversification of export markets and strengthening of export resilience.

The first body of literature related to this article focuses primarily on the dynamics of enterprise market entry and the factors that influence it, which have been explored from both macro and micro perspectives. At the macro level, traditional gravity variables, such as economic scale, population size, and geographical distance, have been found to impact market entry significantly. Research indicates that larger economic scales and population sizes in the importing country correlate with higher market demand and an increased likelihood of enterprise entry.[8] Conversely, some studies have suggested that higher per capita GDP in the importing country often correlates with stricter product quality requirements on entering enterprises.[9,10] Geographical distance poses a primary barrier to exports, with evidence showing that greater distances complicate export activities.[11,12] Geographical or cultural similarities can also reduce transaction costs, facilitating market entry.[13–15] Trade liberalization, too, has been shown to facilitate market entry significantly.[15] The influence of exchange rate fluctuations on market entry varies depending on the specific country and context.[9,16] The impact of policy uncertainty has been observed to increase over time, with export revenue subsidies proving more effective in stimulating exports compared to cost subsidies.[17] Xu *et al.*[18] have proposed various strategies for exporters to cope with foreign demand shocks.

At the micro level, scholars have examined factors such as productivity, export fixed costs, and product quality. According to the theory of heterogeneous firms,[19] firms with higher productivity are more likely to penetrate export markets.[20] Export fixed costs help to explain why more efficient firms are capable of entering new markets,[21] and these costs are influenced by market heterogeneity.[10,22] Export experience plays a crucial role in reducing sunk costs associated with market entry and in mitigating uncertainty.[17,23–25] According to Cadot *et al.*,[27] an increase in the number of firms exporting identical products to the same market correlates with a higher success rate in market entry. Eaton *et al.*[28] introduced a dynamic export model that accounts for the costs related to customer acquisition and the network effects of identifying buyers. Haidar[29] suggested that companies can gather information about new export markets by observing the export activities of their peers, even in the absence of formal networks. Using Chilean customs export data from 2007 to 2016, Mendoza[5] found that firms tend to rely more heavily on their own export experience than on that of other companies. Enhancing product quality is identified as a critical factor for successful exporting.[30–33] 33 Research indicates that, due to information and reputation frictions,[15,34,35] the survival of new exporters depends on factors such as productivity growth, R&D investment, adjustment costs, financial constraints, demand learning capabilities, and the institutional quality of the target market.[17,18,28,36,37] Flach and Unger[38] found that endogenous quality adjustments can offset the negative effects of export fixed costs.

Another body of literature has investigated export duration and its impact. The duration of a trade relationship for a specific product between two countries is defined as the continuous period from the initiation to the interruption of trade in that product.[7] Numerous studies have demonstrated that the duration of exports tends to be relatively short.[39,40] Regarding the factors influencing export duration, the existing literature has examined factors at both the country and product levels extensively. Country-level factors include economic scale, geographical distance, shared language, cultural similarities, free trade agreements (FTAs), and institutional quality.[26,41] Product-level factors encompass market share, degree of differentiation, and unit product value.[42,43] Some scholars have also investigated the potential impact of export duration as an explanatory variable, discussing its effects on export markups, innovation, the domestic value-added rate of exports, and export product quality. Timoshenko[36] used horizontal data from Colombia to demonstrate that export duration is influenced by sunk costs and learning mechanisms. Intermittent exporters exhibit distinct learning patterns compared to continuous exporters, and firms with prolonged export durations have greater opportunities for comprehensive learning.[44] According to Martín and Rodríguez,[45] export duration affects profit margins positively. Ayllón and Radicic,[46] employing Spanish data, investigated the complementary relationship between export duration and product innovation, concluding that this complementarity is manifested primarily through the same period effect. He *et al.*[47] found that, as firms extend their export duration after entering new markets, the quality of export products improves alongside consumer recognition. Nevertheless, some scholars warn that in developing economies, excessively prolonged export duration may result in 'low-end lock-in' a self-reinforcing trap where firms stagnate in low-value-added production[48] as firms may become overly reliant on existing exports and exhibit inertia in quality innovation.

An examination of the existing literature indicates a substantial body of research concerning new market entry and export duration. Nonetheless, several gaps persist. First, while the factors influencing new market entry have been studied extensively, limited attention has been given to export duration. Some scholars have examined the impact of short-term export experience on export decisions, particularly in relation to the reduction in sunk costs. However, short-term export experience – characterized by brief export durations and rapid exit from the market – provides only minimal insight into the exporter's overall experience[5] and fails to account for the role of learning mechanisms. Second, although the literature has addressed the impact of export duration on productivity, domestic value-added rates, and the competitiveness of export products, no consensus has been reached. Export duration offers substantial potential for spillover effects as a means of experience accumulation or learning, yet the nature and extent of these spillovers remain underexplored and warrant further investigation.

This paper offers several innovations compared to the existing literature. First, from the perspective of the research object, with the continuous upgrading of product quality and safety standards, the international community has imposed increasingly stringent inspection and quarantine requirements on agricultural products. Given the perishable nature of agricultural products and their susceptibility to cultural differences and consumption habits, export experience plays a critical role in ensuring the smooth export of such goods. This study, focusing on agricultural products, examines the long-term variable of export duration and its impact on new market entry. This approach fills a gap in the literature and provides fresh insights for international market expansion and for the export diversification of agricultural products. Second, although much of the existing literature emphasizes the impact of export duration on sunk costs, it largely overlooks the learning effect. In contrast, this paper develops a theoretical framework that integrates both sunk costs and learning effects, thereby offering a deeper understanding of the mechanisms through which export duration influences new market entry. Third, recognizing that knowledge and experience generate spillover effects, this study further investigates the spillover impact of export duration. It elucidates the theoretical 'black box' of new market path selection by examining both market and product dimensions, thus broadening the scope of existing research. Finally, this study extends the analysis to include the heterogeneity of factors such as the income level of the importing country, the degree of agricultural product processing, and the extent of non-tariff barriers imposed by the importing country. These extensions provide valuable insights for the refinement of export policies.

# MECHANISM AND HYPOTHESES

## The impact of export duration on new market entry

Export duration refers to the continuous period between the time a product enters a market and when it exits. For agricultural products with prior export experience and an established market presence, a preliminary entry advantage exists in terms of productivity enhancement and international market expansion.[49] Exporters are also able to accumulate valuable information through export learning, such as insights into potential customer segments, marketing channels for agricultural products, customs procedures, logistics, and other critical aspects. This accumulated knowledge enables exporters to understand foreign market demand better, assess market risks, and reduce the uncertainty associated with entering new markets.[5] Consequently, extended export duration in foreign markets increases the likelihood of successfully entering new markets. However, this effect may diminish over time and even become negative, driven by the diminishing marginal returns associated with export learning. Moreover, long-term, continuous exports signal stable profitability for a product in the target market. If exporters perceive that the returns from expanding into new markets are lower than the benefits of maintaining long-term trade relationships with existing partners, they may lose the incentive to expand further into new markets. The demand learning framework proposed by Berman *et al.*[34] suggests that changes in export dynamics arise from ongoing learning about demand in target markets. As export learning reaches its conclusion, export behavior stabilizes, thereby losing the momentum for further expansion. Accordingly, the following hypothesis is proposed:

Hypothesis 1: *The export duration of agricultural products has an inverted U-shaped effect on new market entry*.

## The mechanism of export duration affecting new market entry

The study explored the specific transmission mechanisms by which export duration affects new market entry (Fig. 2).

### *The first mechanism is the cumulative effect of experience*

The duration of export activities influences new market entry by impacting the costs associated with information search. Exporters incur significant expenses when gathering information about new markets.[50] Trade networks are instrumental in facilitating the acquisition of this information.[29] Initially, network connections may be weak; however, as the duration of export activities and network density increase, the exchange of information within the network intensifies. Positive information spillovers reduce search costs significantly[51] and enhance the likelihood of entering new markets. Given that information rapidly depreciates over time,[5] exporters encounter difficulties in filtering valuable

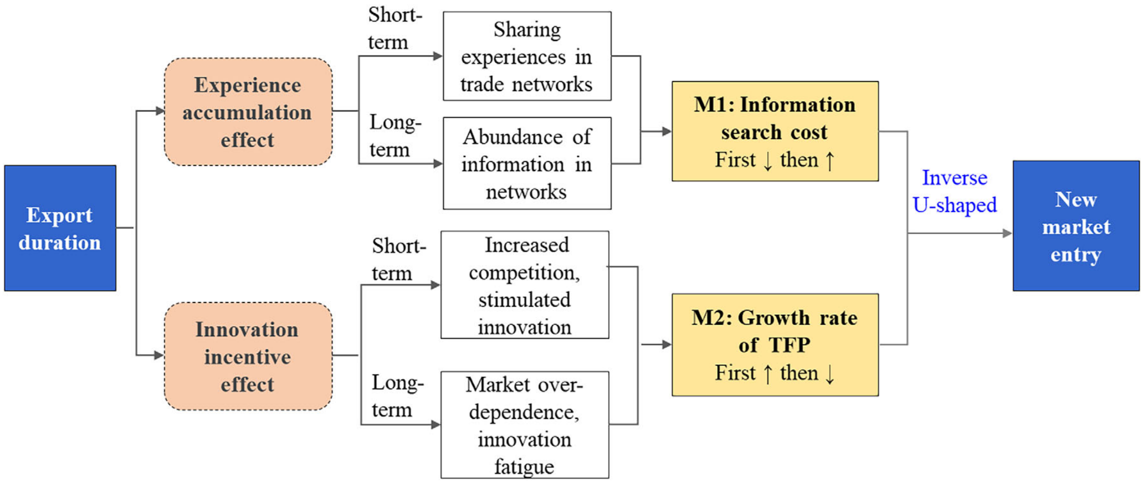


**Figure 2.** Theoretical framework for the transmission mechanisms.

information due to increasingly dense trade networks and resource redundancy. This situation heightens their susceptibility to misinformation, escalates information search costs, and impedes new market entry. Therefore, the following hypothesis is proposed:

Hypothesis 2: *Export duration influences new market entry through information search costs. As export duration extends, information search costs decrease initially but subsequently increase in the long term.*

*The second mechanism is the innovation incentive effect*

Export duration influences new market entry by impacting total factor productivity. According to firm heterogeneity theory, firms must achieve a certain productivity threshold to penetrate new markets.[42] The learning-by-doing theory posits that exporters can enhance their productivity by adopting advanced agricultural technologies from international sources.[52] Technological learning through exports is a long-term process that involves imitation, absorption, mastery, and eventual application. Consequently, the longer the duration of agricultural product exports, the greater the agricultural technology spillover, leading to a more pronounced productivity growth effect.[53] However, sustained long-term export success may depend on China's inherent endowment advantages or relatively lower export prices in comparison with the global market. An over-reliance on established relationships can result in exporter inertia, diminishing the motivation for continuous learning and technological innovation. This, in turn, may adversely affect productivity growth and expose exporters to the risk of becoming ‘locked in’ at the lower end of the market. Accordingly, the following hypothesis is proposed:

Hypothesis 3: *Export duration affects new market entry through the growth of total factor productivity. As export duration extends, the growth rate of total factor productivity initially increases but decreases in the long term.*

### Spillover effects of export duration

The duration of export activities not only impacts the ability of agricultural products to penetrate new markets but also influences strongly the strategic decision-making process regarding the selection of these markets.[54] The experience, knowledge, and technology accumulated through export activities generate externality effects,[55] which spread to other markets and products through information networks. These externality effects result in market and product spillover effects associated with export duration in the context of entering new markets. Geographically proximate markets with similar levels of economic development or cultural backgrounds often exhibit analogous consumption structures, habits, and preferences for agricultural products. An extended export duration in existing markets therefore increases the probability of agricultural products successfully entering these analogous markets, illustrating the market spillover effect. Similar items often necessitate analogous information in areas such as market research and standards. The sunk costs and resource investments required for market entry also tend to be relatively similar. Consequently, a longer export duration of an existing product in a specific market allows for the accumulation of export experience that is closely related to new products, thereby enhancing the likelihood of them entering the same market. Accordingly, the following hypothesis is proposed:

Hypothesis 4: *Export duration has spillover effects at both market and product levels, promoting the expansion of agricultural products into similar new markets and driving the entry of closely related new products into the same market.*

## MATERIAL AND METHODS

### Baseline estimation strategy

To explore the impact of the export duration of agricultural products on new market entry, the following benchmark regression equation was constructed:

$$Pr(S_{nkt}=1)=\alpha+\beta_1 Dura_{kt}+\beta_2 Dura_{kt}^2+\gamma X_{nkt}+\mu_n+\delta_k+v_t+\varepsilon_{nkt} \quad (1)$$

where $Pr\,(S_{nkt}=1)$ denotes the probability of new market entry, $n$ denotes potential export markets, $k$ denotes HS 6-digit agricultural products, and $t$ denotes years. The main independent variable $Dura_{kt}$ denotes average export duration, $X_{nkt}$ denotes the control variables, $\beta$ and $\gamma$ denote the coefficients, $\alpha$ denotes the constant item, and $\varepsilon_{nkt}$ denotes the error item. To control for a range of potentially omitted variables, importer fixed effect $\mu_n$, product fixed effect $\delta_k$, and year fixed effect $v_t$ are included in Eqn (1).

## Variables

*Dependent variable: new market entry*

The dependent variable is the probability of new market entry for agricultural products. New market entry is defined as the entry of agricultural products, exported in the base period, into previously unserved markets. The sample is based on export data between 1995 and 2021. Following the study of Rakhman[55] 1995–1998 was selected as the base period to identify benchmark products and potential export relationships. Benchmark products selected include those that a country exported to in the base period, and potential export relationships are defined as observations with no prior exports of product $k$ to destination market $n$ in any given year going back to 1995. Let $S_{nkt}$ be a binary dummy variable indicating whether a country enters a new export market $n$ with product $k$ in year $t$. Specifically:

$$S_{nkt}=\begin{cases}1, \text{if } x_{nkt}>0\\ 0, \text{if } x_{nkt}=0\end{cases} \tag{2}$$

where $S_{nkt}$ denotes a dummy variable equal to 1 if a country enters a new market $n$ with product $k$ in year $t$ and equal to 0 otherwise. $x_{nkt}$ denotes the export value of product $k$ to importer $n$ in year $t$. $S_{nkt}=1$ is identified as a new market entry if $x_{nkt}=0$ from the year 1995 to year $t-1$ and $x_{nkt}>0$ in year $t$ for the first time. $S_{nkt}=0$ is identified as a potential export relationship if $x_{nkt}=0$ in any given year going back to 1995. The proportion of new market entry in the potential export relationship of Chinese agricultural products can be calculated with these definitions, and Fig. 3 shows the results.

Figure 3 demonstrates the new market entry trends for China's agricultural products. From 1999 to 2021, new market entries in potential export relationships averaged just 2.93%. Since joining the WTO in 2001, new agricultural market entries grew rapidly, with their share rising from 3.20% to 4.26% by 2007. However, this share declined, reaching just 1.32% in 2021, lower than in 1999. This downward trend in new market entries may explain the weak growth in agricultural export relationships.

*Main independent variable: export duration*

The main independent variable is the average export duration of agricultural products. In order to comprehensively examine the role played by past export durations in current new market entries, it is necessary to create a measure capturing a country's overall export experience in a given product. Referring to Rakhman[55] $Dura_{kt}$ – the length of an export period of product $k$ in year $t$ – is defined as the aggregate export relationship duration with a weight based on the relative value of the relationship. Equation 3 presents the formula for calculating this:

$$Dura_{kt}=\sum_{j=1}^{J}\frac{x_{jkt}}{x_{kt}}Dura_{jkt} \tag{3}$$

where $Dura_{kt}$ represents the average export duration of product $k$ in year $t$; $j\in J$ is a possible export destination market for product $k$ in year $t$; $x_{jkt}$ denotes the export volume of product $k$ from the exporting country to market $j$ in year $t$; $x_{kt}$ is the total export volume of product $k$ from the exporting country to the world in year $t$; and $Dura_{jkt}$ represents the export duration of product $k$ from the exporting country to market $j$ in year $t$. For a specific product $k$, the importance of its export relationship with different markets may vary. Unlike the binary variable representing short-term export experience, this study utilizes export duration as a continuous variable, which more accurately captures the long-term accumulation of rules, knowledge, technology, and other pertinent factors. Acknowledging that firms are likely to gain more substantial experience from trade relationships with larger export volumes, this study also incorporates the market export share as a weighting factor in the construction of the indicator. This approach accounts for the differential learning effects that may emerge from exporting to various markets. The statistical properties of the average export duration of agricultural products are detailed in Table 1.

Table 11 shows that the average export duration across all 1436081 potential export relationships in the sample was 4.851647 years. For relationships that successfully achieved new market entry, the average duration was 5.61787 years – 0.791621 years longer than for those that did not. This suggests

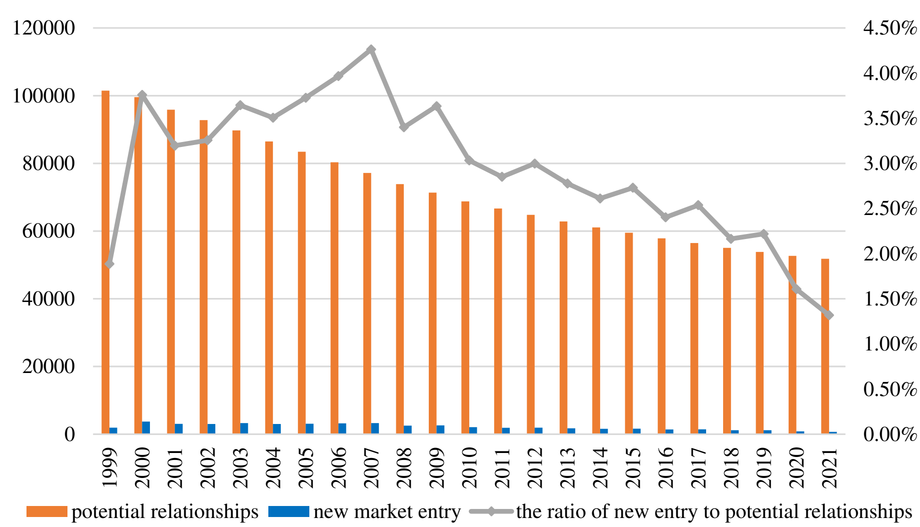


**Figure 3.** New market entry in potential export relationships of Chinese agricultural products *Source*: Compiled by the authors using data from CEPII - BACI.

**Table 1.** Stylized facts of the average export duration of agricultural products

| | Observations | Mean | SD | Min. | Max. |
|---|---|---|---|---|---|
| Fail to realize new market entry | 1 390 007 | 4.826249 | 3.993557 | 3.531387 | 0.000 |
| Successfully realize new market entry | 46 074 | 5.61787 | 3.878293 | 4.572058 | 1.000 |
| All potential relationships | 1 436 081 | 4.851647 | 3.992348 | 3.576396 | 0.000 |

a positive association between export duration and new market entry, as longer export relationships appear more likely to lead to entry into new markets. However, this conclusion is based solely on descriptive statistics; the impact and mechanism of export duration on new market entry require further analysis.

*Control variables*

Following the existing literature,[4] the following variables were selected: (1) economic scale (*lnPGDP*), measured by the per capita GDP of the destination market; (2) bilateral income gap (*lnPGDP_dif*), measured by the absolute value of the difference in per capita GDP; (3) Free Trade Agreement (*FTA*), a binary variable where the value is 1 if an FTA is in place between China and the importing country in a given year, and 0 otherwise; (4) openness of the destination market (*ln Open*), measured by the target market's total import value in a given year; (5) bilateral exchange rate change (*lnER*), measured by the rate of change in the bilateral exchange rate between China and the target market, using the indirect quotation method. To reduce potential bias from heteroscedasticity, logarithmic transformations were applied to all variables. Table 2 presents the descriptive statistics of all variables.

### Data

This study used China's agricultural export data from 1995 to 2021, as provided by the CEPII-BACI trade database, to further examine the influence of the duration of agricultural exports on entry into new markets. The analysis encompasses agricultural products as defined by the WTO Agreement on Agriculture, employing the HS1992 classification, which includes a total of 772 HS 6-digit products (HS1-HS24, 290 543, 290 544, 3301, 3501–3505, 380 910, 382 360, 4101–4103, 4301, 5001–5003, 5201–5203, 5301, 5302). Data on per capita GDP were sourced from the World Bank's World Development Indicators (WDI) database, using constant 2015 prices. Information on free trade agreements (FTAs) was derived from the CEPII database, and data on trade openness was obtained from the World Bank. Bilateral exchange rate data were sourced from the United Nations Conference on Trade and Development (UNCTAD).

Two data processing issues require clarification. (1) For multiple trade spells, a given destination–product combination may experience several starts and interruptions. According to Besedeš and Prusa,[7] this does not affect the distribution of survival times. Consistent with most existing studies, multiple trade spells within the same trade relationship were treated as independent.

(2) Regarding left-censoring, duration-related research often struggles with the challenge of left-censoring. For left-censored trade spells, the inability to ascertain the precise start time of the export relationship compromises measurement accuracy. For this reason, this paper excludes left-censored data from the analysis.

## RESULTS

### Benchmark regression

Table 3 presents the baseline regression results for the logit model, with the variables *Dura* and $Dura^2$ serving as the central focus of this study. As the regression coefficients of the logit model lack direct interpretability, this paper reports the marginal effects for each variable. In column (1), only the effects of the primary explanatory variables are examined, whereas column (2) adds control variables for contrast. The results demonstrate that the marginal effect estimate of the first-order term (*Dura*) is positive, whereas the second-order term ($Dura^2$) has a significantly negative marginal effect, implying that export duration exerted an inverted U-shaped effect on new market entry. Based on the estimates in column (2), extending the duration of agricultural product exports by 1 percentage point was linked to an average rise of 0.032 percentage points in the likelihood of these products accessing new markets. This highlights the diminishing marginal returns that were associated with export duration. In the initial phase of market entry, export enterprises primarily focused on adapting to the local market, with their market acumen progressively enhancing as export duration increases. Consequently, they could gradually leverage the experience gained from continuous export activities to penetrate new markets. However, if the duration of continuous export became excessively prolonged, the positive effects began to wane, potentially leading to

**Table 2.** Descriptive statistics

| Variables | Observations | Mean | SD | P50 | Min. | Max. |
|---|---|---|---|---|---|---|
| *Newentry* | 1 436 081 | 0.032 | 0.176 | 0.000 | 1.000 | 1 436 081 |
| *Dura* | 1 436 081 | 4.852 | 3.992 | 0.000 | 25.969 | 1 436 081 |
| *lnPGDP* | 1 436 081 | 8.093 | 1.355 | 5.565 | 11.396 | 1 436 081 |
| *lnPGDP_dif* | 1 436 081 | 8.162 | 1.263 | 0.944 | 11.262 | 1 436 081 |
| *FTA* | 1 436 081 | 0.029 | 0.168 | 0.000 | 1.000 | 1 436 081 |
| *lnOpen* | 1 436 081 | 7.557 | 2.940 | −6.908 | 15.239 | 1 436 081 |
| *lnEr* | 1 436 081 | −1.270 | 2.736 | −7.207 | 2.420 | 1 436 081 |

  

**Table 3.** Baseline regression results

| | Dependent variable: new market entry | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Dura* | 0.070*** | 0.032*** | 0.069*** | 0.030*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Dura*$^2$ | −0.004*** | −0.002*** | −0.004*** | −0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| *lnPGDP* | | 0.005*** | | 0.005*** |
| | | (0.000) | | (0.000) |
| *lnPGDP_dif* | | 0.002*** | | 0.001*** |
| | | (0.000) | | (0.000) |
| *lnOpen* | | 0.004*** | | 0.004*** |
| | | (0.001) | | (0.001) |
| *FTA* | | 0.006*** | | 0.006*** |
| | | (0.000) | | (0.000) |
| *lnER* | | −0.001*** | | −0.001*** |
| | | (0.000) | | (0.000) |
| Importer FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Product FE | Yes | Yes | Yes | Yes |
| Observations | 1 436 081 | 1 436 081 | 1 349 522 | 1 349 522 |

*Note*: Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

adverse outcomes. This phenomenon is attributable to the diminishing marginal returns encountered in the process of export learning. The expertise that businesses acquired in the export market enhanced their profits and enabled them to evaluate costs and uncertainties swiftly in new markets. However, if exports continued for too long, their benefits diminished and may even have had negative effects due to diminishing returns in export learning. Firms gain experience and profit from exports but they may lose motivation to explore new markets if maintaining existing partnerships is more beneficial. Long-term export stability might depend on China's advantages or lower prices but rising production costs and declining comparative advantages pose risks. Over-reliance on current relationships can weaken a company's ability to handle market fluctuations. To mitigate potential endogeneity concerns, columns (3) and (4) substitute the independent variables from columns (1) and (2) with the first-order lagged export duration. The findings indicate that the inverted U-shaped effect of export duration persists, albeit with a reduced estimated marginal effect. These findings provide evidence for Hypothesis 1.

The regression results for each control variable are statistically significant, with the signs aligning with expectations. The economic scale of the target market (*lnPGDP*) exerts a significant positive influence on the entry into new markets, suggesting that higher economic levels in the target market were associated with stronger import demand for agricultural products. Similarly, the *per capita* income gap between importing and exporting countries (*lnPGDP*$_{dif}$) also positively affected new market entry, which is consistent with the theory of comparative advantage. When the income gap was large, the complementarity of economic structures and demand increased the likelihood of agricultural products entering new markets. The openness of the target market (*lnOpen*) significantly facilitated the entry of agricultural products into new markets, indicating that greater openness was associated with reduced trade barriers. The presence of FTAs typically lowers tariffs and trade barriers, positively influencing the entry of agricultural products into new markets. Conversely, fluctuations in bilateral exchange rates (*lnEr*) significantly hinder new market entry, as exchange rate volatility can introduce uncertainty and risk.

Following Lind and Mehlum,[57] a U-test was conducted to examine the non-linear relationship. The results indicate an extreme point for export duration at 9.5680 years, within the observed range of (0, 25.9685). A t-value of 6.29 and a confidence interval for the post-turning-point slope containing only negative values confirm an inverted U-shaped relationship between export duration and new market entry, as the null hypothesis was rejected at the 1% significance level.

The turning point of the inverted U-shaped curve, indicated by the red dotted line in Fig. 4, was identified at an export duration of 9.5680 years. Descriptive statistics showed a median export duration for agricultural products of 3.5764 years and a mean of 4.8516 years. A total of 87.74% of export relationships fell below this turning point, suggesting that extended export durations were associated with improved new market entry.

## Robustness checks

Robustness tests were conducted by changing the estimation method, adjusting the sample period, performing sub-sample regression, adding high-dimensional fixed effects, and winsorizing the main independent variable. Table 4 shows the results.

First, the sample period was adjusted. Considering that the 2008 international financial crisis had a significant impact on the entry of new agricultural products into the market, samples from 2008 and before were removed and the model was regressed. Column (1) shows the results. The results remain robust.

Second, a subsample was selected. To further test the robustness of the main conclusions in sub-samples, the samples of OECD countries and 'Belt and Road' countries, respectively, were used for regression. Columns (2) and (3) show the results. They are consistent with the baseline regression.

Third, high-dimensional fixed effects were added. On the basis of the baseline model, the country-year fixed effect was further controlled to reduce the estimation bias that might be caused by omitting the time-varying variables of the importing country.

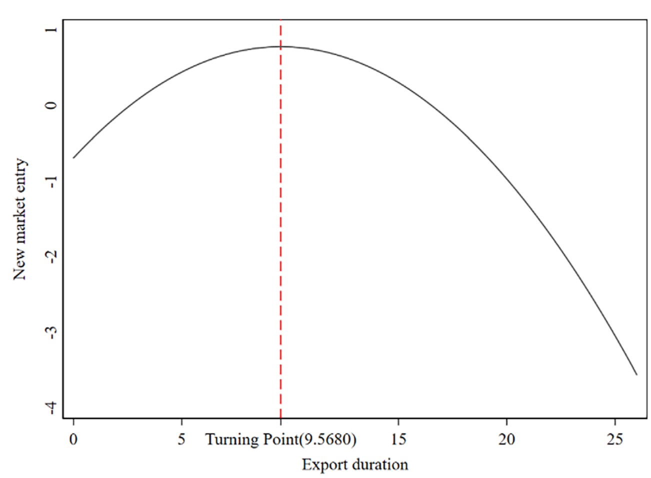


**Figure 4.** The inverted U-shaped effect of export duration on new market entry.

  

**Table 4.** Robustness test results

| | Adjusting the sample period (1) | OECD countries (2) | 'Belt and Road' countries (3) | High-dimensional fixed effects added (4) | Winsorized (5) |
|---|---|---|---|---|---|
| *Dura* | 0.038*** | 0.049*** | 0.029*** | 0.040*** | 0.035*** |
| | (0.002) | (0.006) | (0.002) | (0.001) | (0.001) |
| $Dura^2$ | −0.002*** | −0.003*** | −0.002*** | −0.002*** | −0.003*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Importer FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Product FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 687 429 | 149 936 | 485 185 | 1 478 069 | 623 130 |
| Adjusted $R^2$ | 0.038*** | 0.049*** | 0.029*** | 0.040*** | 0.035*** |

*Note*: Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Column (4) shows the results, implying that the results were robust.

Fourth, to eliminate the possible interference of outliers, the main independent variable was truncated bilaterally at 1% levels, and column (5) shows the results. The empirical results are still robust.

### Endogeneity discussion

The regression included importer, year, and product fixed effects to mitigate endogeneity arising from omitted variables. However, potential reverse causality remains a concern. Longer export duration could facilitate entry into new markets through experience accumulation, learning effects, and increased market competition but expansion into new markets could also influence export duration by enhancing diversification and reducing market risk. Additional sources of endogeneity, such as omitted variables and measurement errors, may also have been present. To address these issues and obtain unbiased estimates, instrumental variables were employed. Following Chen and Shen,[49] the one-period lag of export duration was used as an instrument, and the model was re-estimated accordingly.

Based on the analysis in the prior session, the model was estimated using two-stage least squares estimations (2SLS), and the instrumental variable (IV) estimates are presented in Table 5. The first-stage regression shows that the coefficients of the instrumental variable are significant at the 1% level, and the value of the F statistic is significantly greater than the empirical test value (10). The second-stage regression suggests that the value of the Kleibergen–Paap Wald F statistic is significantly greater than the critical value of the 10% level of the Stock–Yogo weak identification test (16.38). The above results imply that the selection of the instrumental variable is reasonable. The second-stage regression suggests that the coefficient of *Dura* is significantly positive and the coefficient of $Dura^2$ is significantly negative, proving that

**Table 5.** Endogeneity test results

| | | IV regression | | |
|---|---|---|---|---|
| | | First stage | | Second stage |
| | Baseline results | *Dura* | $Dura^2$ | *New market entry* |
| IV1:*Dura_Lag* | | 0.807*** | −0.211*** | |
| | | (0.001) | (0.027) | |
| IV2:$Dura\_Lag^2$ | | 0.007*** | 1.017*** | |
| | | (0.000) | (0.002) | |
| *Dura* | 0.032*** | | | 0.029*** |
| | (0.001) | | | (0.001) |
| $Dura^2$ | −0.002*** | | | −0.002*** |
| | (0.000) | | | (0.000) |
| Control variables | Yes | Yes | Yes | Yes |
| Importer FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Product FE | Yes | Yes | Yes | Yes |
| *F* statistic | | 809 085.3 | 809 085.3 | |
| Kleibergen–Paap rk Wald F | | | | 1911.9 |
| Observations | 1 436 081 | 1 349 522 | 1 349 522 | 1 349 522 |

*Note*: Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

  

the baseline results remain unchanged when instrumental variables are included.

## Heterogeneity analysis

Based on our analysis, the extension of the export duration of agricultural products had an inverted U-shaped effect on new market entry. However, did this impact vary by region or product? A heterogeneity analysis was conducted to investigate this. Table 6 reports the results of this analysis.

*The level of economic development of the destination market*

This study divided the destination markets into developed markets and developing markets following the United Nations Conference on Trade and Development (UNCTAD). Columns (1) and (2) of Table 6 show the results of grouped regression. The findings indicate that the export duration exerted a significant inverted U-shaped influence on both developed and developing countries. A comparison of the magnitude of the marginal effects reveals that extending the duration of exports to developed countries had a relatively greater impact on the entry of products into new markets. This disparity underscores the differences in experiential learning or export knowledge acquisition resulting from sustained exports to developed versus developing markets. This reflects regional differences in export learning related to experience and technology. Despite the decline in external demand from developed economies following the 2008 financial crisis, these countries continued to lead in product quality, agricultural technology, international standards, and management practices. They remained key sources of knowledge, technology, and experience spillovers for developing countries through export learning. Accordingly, fostering stable relationships with developed markets remains essential to the high-quality development of agricultural trade in developing countries.

*The degree of processing of agricultural products*

Following the classification of Regmi *et al.*[57] agricultural products were divided into primary and processed agricultural products. Columns (3) and (4) of Table 6 show the results. They indicate that the impact of export duration on the entry of processed agricultural products into new markets was more pronounced. This phenomenon can be attributed to the inherent characteristics of primary agricultural products, such as grains and fruits, which are typically more reliant on natural resources, exhibit minimal brand differentiation, and are sensitive to price fluctuations. Consequently, the influence of export duration is primarily realized through the mechanism of reducing fixed export costs. In contrast, processed agricultural products, including items such as canned food and juice, tend to possess higher added value and are more significantly influenced by brand and product quality. Thus, export duration influences new market entry through dual mechanisms: cost reduction and experiential learning. Specifically, the production processes for processed agricultural products necessitate greater technological and capital investments, enabling enterprises to accumulate technical knowledge and production experience over extended export durations. This accumulation enhances product quality and adaptability, better aligning with the diverse demands of various markets. Processed agricultural products are likely to encounter a greater number of non-tariff barriers, including stringent quality standards and certification requirements. Firms with extensive export experience are generally more adept at navigating these requirements and can comply with the regulatory standards of the target market more effectively, thus reducing the barriers to entry into new markets. The supply chain management of processed agricultural products is also inherently more complex, encompassing various stages such as raw material procurement, processing, packaging, and logistics. An extended export duration may enable firms to optimize their supply chains, establish a stable network of suppliers and distributors, and enhance overall efficiency, thereby increasing their competitiveness when entering new markets.

*Vulnerability to non-tariff barriers of agricultural products*

According to the Global Trade Alert database, grain and vegetable oil are the sectors most affected by non-tariff barriers in China. Grain and vegetable oil could be considered as products vulnerable to non-tariff measures (NTMs) and the rest as other agricultural products. Columns (5) and (6) of Table 6 show the results of grouped regression. The export duration has a particularly significant impact on agricultural products that are susceptible to non-tariff barriers. This is attributable to the fact that longer export duration enabled enterprises to develop expertise in

**Table 6.** Heterogeneity analysis results

| | (1) Developing markets | (2) Developed markets | (3) Primary products | (4) Processed products | (5) Vulnerable to non-tariff measures | (6) Other products |
|---|---|---|---|---|---|---|
| *Dura* | 0.035*** | 0.037*** | 0.031*** | 0.036*** | 0.036*** | 0.025*** |
| | (0.001) | (0.004) | (0.001) | (0.003) | (0.003) | (0.001) |
| $Dura^2$ | −0.002*** | −0.002*** | −0.002*** | −0.003*** | −0.003*** | −0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Importer FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Product FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1 268 216 | 167 865 | 1 025 623 | 410 458 | 556 878 | 879 203 |
| Adjusted $R^2$ | 0.035*** | 0.037*** | 0.031*** | 0.036*** | 0.036*** | 0.025*** |

*Note*: Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

navigating non-tariff barriers, such as efficiently passing customs inspections and preparing compliance documentation. Such experiences are vital for penetrating new markets, particularly those with high entry barriers. In recent years, non-tariff barriers, including technical standards, sanitary and phytosanitary measures, and certification requirements, have emerged as critical impediments to the export of agricultural products. These barriers are often intricate and subject to change, necessitating time and resources for enterprises to adapt. Prolonged export duration can facilitate enterprises in effectively managing non-tariff barriers. Enterprises with extensive export experience are likely to be more acquainted with the regulatory frameworks of target markets and to have accumulated substantial compliance expertise, thereby gaining a competitive edge when entering new markets. Furthermore, sustained export activities enable enterprises to develop robust compliance frameworks, secure essential certifications, and lower the fixed costs associated with entering new markets. The establishment of a stable supply chain and a comprehensive quality management system, facilitated by ongoing exports, enhances the ability to satisfy the non-tariff requirements of diverse markets. Long-term partnerships can also foster trust and diminish the importing country's concerns regarding product quality, thereby mitigating the risk of product rejection.

## DISCUSSION

### Mechanisms test

As can be seen from the above, the duration of agricultural product exports had an inverted U-shaped effect on new market entry, with information search costs and productivity growth being potential underlying mechanisms. To validate the existence of these mechanisms, this study tested the impact mechanisms by regressing the core explanatory variables against the mechanism variables.

(1) Information search cost (*Infocost*). Following Jin and Shi (2022)[58] market price variance was used to measure the information search cost faced by new exporters. A higher variance indicated greater uncertainty and higher search costs. Allen (2014)[51] argued that information frictions in trade commonly lead to discrete price fluctuations, with more intense fluctuations implying higher information costs. Thus, market price variance was considered a valid proxy for the magnitude of information search costs.

(2) Growth rate of total factor productivity (*TFPGrowth*). The DEA-Malmquist index, commonly used in the literature, was employed to measure total factor productivity in the agricultural sector. Following Zheng et al. (2021)[59] output was measured by agricultural yield per unit area, and inputs included labor consumption and material and service costs per unit area – covering expenses for seed, fertilizer, pesticide, agricultural film, machinery, fuel, and related items. Given technological spillovers and catch-up effects, the technological level of agricultural production was expected to improve or at least remain stable. To construct the best practice production frontier, the sequential data envelopment analysis (DEA) method was used instead of the conventional contemporaneous DEA to avoid the risk of technological regression. The DEA-Malmquist approach, as proposed by Färe *et al.*[60] was adopted to calculate the intertemporal total factor productivity (TFP) change index using base-period technology as the reference. This index, known as the Malmquist Index (MI), was defined as $MI = Effch \times Techch$, where *Effch* captured the change in technical efficiency (the 'catch-up effect') and *Techch* represented technological progress under constant returns to scale (the 'growth effect'). The TFP growth rate was then calculated as $TFPGrowth = MI - 1$. A positive value indicated productivity growth, and a negative value signified a decline.

Table 7 shows the mechanism test results. Column (1) shows that with the extension of export duration, information search costs for agricultural products entering new markets first decrease and then increase, resulting in an inverted U-shaped effect on new market entry, thus confirming Hypothesis 2 of this study. Column (2) indicates that with the extension of export duration, the growth rate of agricultural productivity first increased and then decreased, leading to an inverted U-shaped effect on new market entry, thereby supporting Hypothesis 3 of this study.

**Table 7.** Mechanism test results

| | (1) Information search cost | (2) The growth rate of TFP |
|---|---|---|
| *Dura* | −0.043*** | 0.029*** |
| | (0.015) | (0.001) |
| *Dura*$^2$ | 0.004*** | −0.002*** |
| | (0.001) | (0.000) |
| Control variables | Yes | Yes |
| Importer FE | Yes | Yes |
| Year FE | Yes | Yes |
| Product FE | Yes | Yes |
| Observations | 1 368 790 | 531 419 |
| $R^2$ | 0.223 | 0.401 |

*Note*: Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

### The spillover effect of export duration

As discussed, export duration influenced both the ability to enter new markets and the choice of markets, reflecting market and product spillover effects. The market spillover effect indicates that export experience in neighboring markets had a greater impact on agricultural product entry. To test this, we adapted the method described by Rakhman,[55] constructing weights based on the distance between market *j* and the target market *n* to recalculate export duration as follows:

$$D_{nkt} = \sum_{j=1}^{J} \frac{WeightD_{jnkt}}{\sum_{j=1}^{J} WeightD_{jnkt}} Dura_{jkt} \tag{4}$$

where $D_{nkt}$ represents the export duration considering market proximity. *n* denotes the potential export market, *k* refers to the product, *t* indicates time, and *j* represents a specific existing export market for product *k* in year *t* for the country, and *J* is the set of these markets. $Dura_{jkt}$ represents the export duration of the country in year *t* to market *j* for product *k*. The variable $WeightD_{jnkt}$ indicates the market proximity between market *j* and the potential market *n*, measured by the inverse of the bilateral geographic distance, the inverse of the difference in *per capita* GDP, and the inverse of cultural distance (calculated using method of Kogut and Singh).[61] These measures capture the

  

**Table 8.** The spillover effect of export duration

| | Market proximity | | | Product proximity | |
|---|---|---|---|---|---|
| | Geographic distance (2) | Economic distance (3) | Cultural distance (4) | HS 6 distance (5) | HS 4 distance (6) |
| *Dura* | 0.007*** | 0.006*** | 0.006*** | 0.152*** | 0.034*** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) |
| *Dura*$^2$ | −0.001*** | −0.001*** | −0.001*** | −0.070*** | −0.006*** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) |
| Control variables | Yes | Yes | Yes | Yes | Yes |
| Importer FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Product FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 1 436 081 | 1 436 081 | 1 436 081 | 1 436 081 | 1 436 081 |

*Note*: Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

geographic, economic, and cultural proximity between market $j$ and the target market $n$.

Similarly, the product spillover effect suggests that a longer export duration for similar products had a greater impact on the entry of agricultural products into new markets. To examine the effect of export experience for similar products, weights were constructed based on the distance between product $p$ and the target product $k$, and export duration was recalculated as follows:

$$D_{jkt} = \sum_{p=1}^{P} \frac{WeightD_{jkpt}}{\sum_{p=1}^{P} WeightP_{jkpt}} Dura_{jkt} \tag{5}$$

where, $D_{jkt}$ represents the export duration considering product proximity, $k$ denotes a potential export product, $p$ refers to a specific product exported by the country in year $t$ to market $j$, and $P$ is the set of these products. $WeightD_{jkpt}$ represents the product proximity between potential export product $k$ and product $p$, measured by the inverse of the difference in HS 6 and HS 4 product codes.

Table 8 shows the market and product spillover effects of export duration. Columns (1) through (3) elucidate the influence of average export duration on the entry into new markets, integrating variables such as the inverse of geographical distance, economic distance, and cultural and institutional distance. The findings demonstrate that export duration, when adjusted for market proximity, manifests a significant inverted U-shaped effect on new market entry. This pattern implies that export duration enhanced the entry of agricultural products into new markets that shared similarities with existing markets in terms of geographical proximity, economic development, or cultural attributes, thereby affirming the presence of a market spillover effect. An analysis of the marginal effects indicates that the market spillover effect associated with geographical proximity is more significant than those influenced by economic development levels or cultural similarities. This disparity can be ascribed to the inherent characteristics of agricultural products. Due to their perishable nature, considerations such as transportation duration and preservation needs are paramount. Reduced geographical distance generally results in decreased transportation costs and aids in the establishment of a reliable supply chain. When firms expand into adjacent markets, they can capitalize on pre-existing logistics networks, mitigating potential risks. Information pertaining to neighboring markets – such as consumer demand and regulatory frameworks – is also more readily available, thereby diminishing uncertainty.

Columns (4) and (5) present the effects of export duration, weighted by the inverse of the difference between the HS 6 and HS 4 quantile codes. The analysis reveals that when considering product proximity, export duration exhibits an inverted U-shaped effect on new market entry. This indicates that the sustained presence of an enterprise in a market facilitated the entry of new, closely related products into the same market. Consequently, this finding demonstrates that enterprises can incrementally expand their product lines based on existing offerings, thereby confirming the presence of a product spillover effect. In comparison, the product spillover effect associated with export duration is significantly more pronounced than the market spillover effect. This indicates that introducing related new products within the same market is more feasible than entering a new market. This phenomenon can be attributed to the higher level of familiarity within the same market, where enterprises already possess an understanding of consumer demand, regulatory frameworks, policies, and distribution channels. These elements can be leveraged for new product introductions, thereby reducing entry barriers. Conversely, entering new markets necessitates the re-acquisition of this knowledge, which incurs higher costs. Consequently, enterprises are advised to prioritize product diversification by leveraging existing customer relationships to promote new products, while simultaneously deepening their presence in local markets before venturing into new ones. In conclusion, Hypothesis 4 is supported.

## CONCLUSIONS AND POLICY IMPLICATIONS

In the context of information asymmetry, entering a new market is a continuous process of adjustment and learning rather than an independent decision. As export learning and experience take time, this study examined how the duration of agricultural product exports affects new market entry.

The findings indicated that export duration had a notable inverted U-shaped effect on entering new markets. In terms of regions, the duration of exports to developed countries significantly improved new market entry of agricultural products. In terms of products, this effect was particularly strong for processed agricultural products and those susceptible to non-tariff barriers. The study also investigated the transmission mechanisms, and it revealed that export duration primarily impacted agricultural products entering new markets through the reduction in information search costs and the growth of total factor productivity. Finally, the study found evidence of the spillover effect of export duration on new market entry both at the market and product levels. This facilitated agricultural product expansion to geographically close markets or those with similar economic or cultural characteristics. It also helped to introduce new, related products to the same markets.

This paper offers a new perspective on the challenge of entering new markets for agricultural products amidst information asymmetry. It shows that lengthening existing export relationships can help to reduce information uncertainty, boost the total factor productivity, and enhance export quality. As the average export duration for agricultural products is below the optimal point, extending it can improve market entry capabilities significantly. Developing countries should focus on maintaining current agricultural export markets while expanding into new ones, ensuring stable development. They must also be cautious about information redundancy and technological stagnation due to stable export relationships and enhance independent agricultural innovation.

## ACKNOWLEDGEMENTS

This work was supported by the Humanities and Social Science Fund of Ministry of Education of China (23YJA790049), and the 2023 Higher Education Scientific Research Planning Project of China Association of Higher Education (23BR0205).

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## REFERENCES

1 Wang Z and Liu HM, Can export market diversification mitigate agricultural export volatility? A trade network perspective. *Emerg Mark Financ Trade* **59**:2234–2251 (2023).
2 Murina M and Nicita A, Trading with conditions: the effect of sanitary and phytosanitary measures on the agricultural exports from low-income countries. *World Econ* **40**:168–181 (2017).
3 Hejazi M, Grant JH and Peterson E, Trade impact of maximum residue limits in fresh fruits and vegetables. *Food Policy* **106**:102203 (2022).
4 Wang L and Zhao Y, Does experience facilitate entry into new export destinations? *Chin World Econ* **21**:36–59 (2013).
5 Mendoza B, Experience and market signals in export entry decisions. *World Econ* **45**:176–199 (2021).
6 Berthou A and Vicard V, Firms' export dynamics: Experience versus size. *World Econ* **38**:1130–1158 (2015).
7 Besedeš T and Prusa TJ, Ins, outs, and the duration of trade. *Can J Econ* **39**:266–295 (2006).
8 Lawless M and Whelan K, Where do firms export, how much and why? *World Econ* **37**:1027–1050 (2014).
9 Álvarez R, Faruq H and López RA, Is previous export experience important for new exports? *J Dev Stud* **49**:426–441 (2010).
10 Tomás C, Export costs and geographic diversification: Does experience matter? *Banco Central de la República Argentina (BCRA)*, Working Paper No. 2011/52 (2010).
11 Lawless M, Marginal distance: Does export experience reduce firm trade costs? *Open Econ Rev* **24**:819–841 (2013).
12 Kang K, The choice of export destinations and its determinants: Evidence from Korean exports. *Korean Econ Rev* **25**:139–160 (2013).
13 Evenett SJ and Venables AJ, Export growth in developing countries: market entry and bilateral trade *Working Paper*, London School of Economics (2003).
14 Defever F, Heid B and Larch M, Spatial exporters. *J Int Econ* **95**:145–156 (2015).
15 Carballo J, Handley K and Limao N, Economic and policy uncertainty: Export dynamics and the value of agreements. *NBER Working Paper* No. **24368**:1–88 (2018).
16 Fabling R, Grimes A and Sanderson L, Whatever next? Export market choices of New Zealand firms. *Pap Reg Sci* **91**:137–160 (2012).
17 Das S, Roberts MJ and Tybout JR, Market entry costs, producer heterogeneity, and export dynamics. *Econometrica* **75**:837–873 (2007).
18 Xu M, Zhong T, Xie Q and Liu H, Foreign demand, competition strategy, and export markups: Evidence from Chinese multi-product exporters. *Chin World Econ* **30**:187–209 (2022).
19 Melitz MJ, The impact of trade on industry reallocations and aggregate industry productivity. *Econometrica* **71**:1695–1725 (2003).
20 Helpman E, Melitz M and Rubinstein Y, Estimating trade flows: Trading partners and trading volumes. *Q J Econ* **123**:441–487 (2008).
21 Chaney T, Distorted gravity: The intensive and extensive margins of international trade. *Am Econ Rev* **98**:1707–1721 (2008).
22 Özler Ş, Taymaz E and Yilmaz K, History matters for the export decision: Plant-level evidence from Turkish manufacturing industry. *World Dev* **37**:479–488 (2009).
23 Brenton P, Saborowski C and Uexkull EV, What explains the low survival rate of developing country export flows? *World Bank Econ Rev* **24**: 474–499 (2010).
24 Wagner R and Zahler A, New exports from emerging markets: Do followers benefit from pioneers? *J Dev Econ* **114**:203–223 (2015).
25 Carre're C and Strauss-Kahn V, Export survival and the dynamics of experience. *Rev World Econ* **153**:271–300 (2017).
26 Aeberhardt R, Buono I and Fadinger H, Learning, incomplete contracts and export dynamics: Theory and evidence from French firms. *Eur Econ Rev* **68**:219–249 (2014).
27 Cadot O, Iacovone L, Pierola MD and Rauch F, Success and failure of African exporters. *J Dev Econ* **101**:284–296 (2013).
28 Eaton J, Eslava M, Jenkins D, Krizan CJ and Tybout J, A search and learning model of export dynamics. *No. 1535. In: 2015 Meeting Papers from Society for Economic Dynamics* (2014).
29 Haidar J, Internalization of externalities in international trade. *Empir Econ* **63**:1–29 (2021).
30 Antoniades A, Heterogeneous firms, quality, and trade. *J Int Econ* **95**: 263–273 (2015).
31 Bas M and Strauss-Kahn V, Input-trade liberalization, export prices and quality upgrading. *J Int Econ* **95**:250–262 (2015).
32 Fieler AC, Marcela E and Daniel YX, Trade, quality upgrading, and input linkages: Theory and evidence from Colombia. *Am Econ Rev* **108**: 109–146 (2018).
33 Ciani A, Income inequality and the quality of imports. *Rev World Econ* **157**:375–416 (2021).
34 Berman N, Rebeyrol V and Vicard V, Demand learning and firm dynamics: Evidence from exporters. *Rev Econ Stat* **101**:91–106 (2019).
35 Rodrigue J and Tan Y, Price, product quality, and exporter dynamics: Evidence from China. *Int Econ Rev* **60**:1911–1955 (2019).
36 Timoshenko OA, Learning versus sunk costs explanations of export persistence. *Eur Econ Rev* **79**:113–128 (2015).
37 Araujo L, Mion G and Ornelas E, Institutions and export dynamics. *J Int Econ* **98**:2–20 (2016).
38 Flach L and Unger F, Quality and gravity in international trade. *J Int Econ* **137**:103578 (2022).
39 Bekes G and Murakozy B, Temporary trade and heterogeneous firms. *J Int Econ* **87**:232–246 (2012).
40 Kasahara H and Tang H, Excessive entry and exit in export markets. *J Jpn Int Econ* **53**:1–15 (2019).
41 Arguello R, Garcia-Suaza A and Valderrama D, Exporters' agglomeration and the survival of export flows: Empirical evidence from Colombia. *Rev World Econ* **156**:703–729 (2020).
42 Hess W and Persson M, Exploring the duration of EU imports. *Rev World Econ* **147**:665–692 (2011).
43 Lejour A, The duration of Dutch export relations: Decomposing firm, country and product characteristics. *Dent Econ* **163**:155–176 (2015).
44 Love JH and Máñez JA, Persistence in exporting: Cumulative and punctuated learning effects. *Int Bus Rev* **28**:74–89 (2019).
45 Martín LM and Rodríguez DR, Export activity, persistence and mark-ups. *Appl Econ* **42**:475–488 (2008).

  

46 Ayllón S and Radicic D, Product innovation, process innovation and export propensity: Persistence, complementarities and feedback effects in Spanish firms. *Appl Econ* **51**:3650–3664 (2019).
47 He D, Wang Y and You K, Market entry and the dynamics of export product quality. *Econ Anal Policy* **78**:692–706 (2023).
48 Chen X and Shen CY, Research on the impact of export duration on export product quality. *International Trade Issues* **01**:47–57 (2015).
49 Pane DD and Patunru AA, Does export experience improve firms' productivity? Evidence from Indonesia. *J Dev Stud* **57**:2156–2176 (2021).
50 Allen T, Information Frictions in Trade. *Econometrica* **82**:2041–2083 (2014).
51 Fernandes AM, Ferro E and Wilson JS, Product standards and firms' export decisions. *World Bank Econ Rev* **33**:353–374 (2019).
52 Benkovskis K, Masso J, Tkacevs O, Vahter P and Yashiro N, Export and productivity in global value chains: Comparative evidence from Latvia and Estonia. *Rev World Econ* **156**:557–577 (2020).
53 Greenaway D and Kneller R, Exporting, productivity and agglomeration: A difference in difference analysis of matched firms. *Eur Econ Rev* **52**:919–939 (2004).
54 Bisztray M, Koren M and Szeidl A, Learning to import from your peers. *J Int Econ* **115**:242–258 (2018).
55 Rakhman A, *Three Essays on Export Relationships Duration*. The George Washington University, Washington (2011).
56 Lind JT and Mehlum H, With or without U? The appropriate test for a U-shaped relationship. *Oxf Bull Econ Stat* **72**:109–118 (2010).
57 Regmi A, Gehlhar MJ, Wainio J, Voath T and Kathuria N, Market access for high-value foods *Electronic Report from the Economic Research Service, USDA/ERS Report No. 840* (2005).
58 Jin XY and Shi BZ, Internet Search, Information Cost and Quality of Export Products. *Chin Indus Econ* **8**:99–117 (2022).
59 Zheng ZH, Cheng S and Henneberry SR, Total factor productivity change in China's grain production sector: 1980–2018. *Aust J Agric Resour Econ* **7**:100–120 (2021).
60 Färe R, Grosskopf S, Norris M and Zhang Z, Productivity growth, technical progress, and efficiency change in industrialized countries. *Am Econ Rev* **84**:66–83 (1994).
61 Kogut B and Singh H, The effect of national culture on the choice of entry mode. *J Int Bus Stud* **19**:411–432 (1988).