



IFMR GRADUATE SCHOOL OF BUSINESS

Working Paper WP21-020

VERSION NO. 1

October 2021

Extended Abstract

The Determinants of Export Intensity in the Indian Processed Food Sector: A Firm-Level Analysis

Aditya Kumar

PhD Student, IFMR Graduate School of Business, KREA University
aditya_k.rs19@krea.ac.in

Madhuri Saripalle

Associate Professor, IFMR Graduate School of Business, KREA University
madhuri.saripalle@krea.edu.in

Abstract

Many of the world's emerging economies are naturally endowed with agricultural and natural resources which have tremendous scope to exploit their competitive advantage in export markets for these commodities. India being an agrarian economy, has a good production base for the manufacture of food products sector, yet the industry's export performance is lagging. There are no recent studies that analyze the firm-level export intensity and its impact on the food processing industry, a gap this study intends to fill. This study analyses the recent trends and performance of the Indian food processing industry at an aggregate level using the data from Annual Survey of Industries (ASI) and analyses the determinants of export at the firm level using a panel data of 536 firms from 1999-2019 taken from the Prowess database of Centre for Monitoring Indian Economy (CMIE). Tobit model is used in the analysis as the dependent variable; export intensity is a censored variable. Size, profits, import, and wage intensity have been found to have a significant positive impact on export of the Indian food processing sector. In the Indian context, there is not much literature that accounts for self-selection while determining the export intensity at the firm level. This study uses the Heckman selection model to address the issue of self-selection.

KEYWORDS: Export intensity, Food processing, Fish, Meat, Tobit, Heckman Selection

KREA UNIVERSITY, 5655, CENTRAL EXPRESSWAY, SRI CITY, ANDHRA PRADESH, 517646

The Determinants of Export Intensity in the Indian Processed Food Sector: A Firm-Level Analysis

Extended Abstract

1. Introduction

Globalization has shifted the consumption pattern of people across the world. The rise in disposable income has led to increased demand for the processed food (Raina, 2015). Many of the world's emerging economies are naturally endowed with agricultural and natural resources which have tremendous scope to exploit their competitive advantage in export markets for these commodities as evident by the example of Chile (Athukorala and Sen, 1998). India being an agrarian economy, has a good production base for the manufacture of food products sector and ranks top five globally for most food products and in the top 3 for a significant number of items^{1,2} (MOFPI Report 2019-20). Despite being among the top producers for the sectors mentioned, the industry's export performance is lagging. Recent trends indicate that the export share of food to total exports of all sectors of India declined from 11% in 2015-16 to 8.8% in 2019-2020. In the world food export share, India's share has been around 2.3% only (GOI, 2020).

Against this background, this study analyses the recent trends and performance of the food processing industry in the Indian manufacturing sector at the aggregate and firm levels. Given the diversity in the food categories, the study does a firm level analysis of the determinants of export for this industry for various sub-categories to understand sectoral constraints and derive specific policy implications for the food processing industry in general.

2. Literature Review

Globally, U.S.A. is the leading exporter of processed foods, followed by Germany and U.K, while India ranks 17th with a meagre share of 2 per cent. In terms of specific food categories, India has a considerable share in global exports; it ranks 6th in Fisheries and 10th in Meat exports (EXIM, 2017). In the processed food items, products from crops dominated the international trade followed by meat and fish products in 2018 (WITS database, Reserve Bank of India, 2020). Various factors determine a firm's export performance. Some important studies and contributions to the literature are discussed in the next section.

R&D Intensity

With an increasing trend of exports of food items worldwide, the role of process upgrading, and quality has become essential. Process upgrading has been found to positively impact export competitiveness in the Thailand food industry, emphasizing the role of R&D and training of

¹ India ranks first in terms of production for ghee, milk, pulses, ginger, papaya, banana, guava, and mango. Production of rice, wheat and other fruits and vegetables commands second rank in the world.

² India is one of the top six exporters of marine products such as fish, prawns, and shrimps (<https://www.statista.com/statistics/268269/top-10-exporting-countries-of-fish-and-fishery-products/>)

the labor force (Tanrattanaphong et al., 2020). Exports in Indian food industry is significantly impacted by R&D (Kumar and Basu, 2008).

Age

Empirical literature finds mixed results for the relationship between a firm's age and export intensity. (Wagner, 2015) in the study of German firms, found that a firm's age positively impacts the firm's export. On the other hand, (Love et al., 2016), in their study of small and medium enterprises in the U. K., found that, with age, firm exports more. They have found that the firm's age has either insignificant relation with its export or negative relation.

Salaries and Wages Intensity

According to (Srinivasan and Archana, 2011), lower wages reflect a firm's low-cost advantage. Wage intensity (wages and salaries divided by Sales) reflects the efficiency of input use. To interpret in terms of comparative advantage, we can divide numerator and denominator by production. Numerator then reflects labor intensity, while denominator reflects productivity. A positive coefficient sign then implies low-cost advantage, while a negative implies efficiency (Bhavani and Tendulkar, 2001).

Import Intensity

In this study, the import intensity has been used as one of the explanatory variables in determining export intensity similar to (Sathe, 1997).

Firm Size

Mixed results have been observed in the case of impact of firm size on the export performance. (Schlegelmilch and Crook, 1988) found a significant positive relationship whereas, the study by (Bonaccorsi, 1992; Iyer, 2010) provides empirical evidence on the negative relationship between organization size and export intensity.

Energy Intensity

A positive relationship between energy intensity and export intensity is expected. As the food processing industry is an energy-intensive industry, productivity will increase from the expenditure on energy, leading to higher exports (Srinivasan and Archana, 2011).

Profit Intensity

According to (Agnihotri and Bhattacharya, 2015) and (Shoham, 1998), prior organizational performance can be a crucial factor determining the firm's current year's exports. Hence, profitability is considered an indicator of past performance, and lagged values are assumed to positively impact exports.

Foreign Ownership

Foreign collaboration impacts firm's export performance positively. Srinivasan and Archana, (2011) in their study of the Indian manufacturing sector at firm level, found that firms with higher foreign shareholding had a higher export intensity than those with low foreign

ownership. Foreign ownership has proved to positively impact the export decision of the Chilean food processing firms (Echeverria and Gopinath, 2008).

Existing literature shows that upgrading processes in value chains, terms of trade, training of small farmers, investment in R&D, firm's size, age, profit, foreign ownership, and other factors have a significant role in determining exports. There are no recent studies that analyze the firm-level export intensity and its impact on food processing industry, a gap which this study intends to fill.

3. Data and Methodology

The data for the analysis has been taken from the Prowess database of Centre for Monitoring Indian Economy (CMIE). The analysis is for 536 Indian food processing firms over the period of 1999-2019. The firms with data on sales for ten years and more have been used in the regression analysis.

The conceptual framework developed by (Cavusgil and Zou, 1994) using the principle of structure, conduct and performance and following the past studies, the export intensity is measured as a share of exports sales in total sales. For the dependent variable, export intensity, the data is available only for exporting firms and contains zero for those with no exports. The significant number of zeroes in the dependent variable makes the dependent variable a censored variable, and the application of the Tobit model is suitable (Sterlacchini, 2001), (Srinivasan and Archana, 2011), (Ganotakis and Love, 2012), and (Agnihotri and Bhattacharya, 2015). The OLS estimation will lead to a downward bias of the estimates (Greene, 2000). The Tobit model will take the form:

$$\begin{aligned}
 Y_{it}^* &= \beta X_{it} + u_{it} \\
 Y_{it} &= Y_{it}^* && \text{if } Y_{it}^* > 0 \\
 &= 0 && \text{if } Y_{it}^* = 0
 \end{aligned}$$

So, here the Y_{it}^* acts as a latent variable which takes the value only when there is export or else it is equal to zero (McDonald and Moffitt, 1980), and Y_{it} is the observed dependent variable.

The dependent variable will take the firm's export value as the share of the firm's sales when the latent variable is non-zero, otherwise zero.

Since the decision to export is in the hands of the firms, there can be self-selection bias. The Heckman selection model has been used to address the issue of self-selection (Krammer et al., 2018). Export probability of a firm is estimated in the first step using Probit estimation. If the firm exports, the dependent variable takes the value equal to 1 or else 0. In the second step, a linear regression model estimates the export intensity using the same specification and variables as the Tobit model.

4. Key Results

Results from Tobit model shows that foreign ownership, previous year's profit intensity, import of raw material, and firm size positively impact export intensity while age has a positive and nonlinear relationship. Salary intensity has a negative impact on export intensity. Sub-sector dummies were also added to the regression model; the results remained unchanged for the major explanatory variables. The study also uses Heckman's two-step model to address the self-selection issue (Krammer et al., 2018). After accounting for the selection issue, there is a significant change in the result, which indicates that unobservable factors affect the firm's export intensity.

5. Conclusion

Firms' export intensity in the Indian food sector is explained by variables like age, size, lagged profit, energy expenses, and salaries intensity. Similar results have been obtained from the studies conducted in Indian as well as global contexts. Size, profits, import and wage intensity have been found to have significant positive impact on exports. The positive impact of imports indicates that a lot of re-exports are taking place. It also indicates India's dependence on certain raw materials like animal feed and processed food items.

In the Indian context, there is not much literature that accounts for self-selection while determining the export performance at the firm level. This study has tried to bridge the gap by identifying the problem of self-selection. Further studies can be done to identify the unobservable factors captured in Heckman's 2 step model. Such studies will help understand more factors that hinder the firms' exports and thereby contribute to the growth in exports.

References

1. Agnihotri, A., & Bhattacharya, S. (2015). Determinants of export intensity in emerging markets: An upper echelon perspective. *Journal of World Business*, Vol. 50, Issue 4, 687-695.
2. Athukorala, P.C., & Sen, K. (1998). Processed food exports from developing countries: patterns and determinants. *Food Policy*, Vol. 23, No. 1, 41-54.
3. Bhavani, T A, and Suresh D Tendulkar (2001). Determinants of Firm-level Export Performance: A Case Study of Indian Textile Garments and Apparel Industry. *Journal of International Trade and Economic Development*, Vol. 10, No. 1, 65-92.
4. Bonaccorsi, A. (1992). On the Relationship between Firm Size and Export Intensity. *Journal of International Business Studies*, 4th Qtr., Vol. 23, No. 4, 605-635.
5. Cavusgil, S. T., & Zou, S. (1994). Marketing Strategy-Performance Relationship: An Investigation of the Empirical Link in Export Market Ventures. *American Marketing Association*, Vol. 58, No. 1, 1-21.
6. Echeverria, R., & Gopinath, M. (2008). Export Behaviour in the Chilean Agribusiness and Food Processing Industry. *Chilean Journal of Agricultural Research*, Vol. 68, No. 4, 368-379.

7. Ganotakis, P., & Love, J. H. (2012). Export propensity, export intensity and firm performance: The role of the entrepreneurial founding team. *Journal of International Business Studies*, Vol. 43, No. 8, 693-718.
8. Girma, S., Gong, Y., Gorg, H., & Yu, Z. (2009). Can Production Subsidies Explain China's Export Performance? Evidence from Firm level Data. *The Scandinavian Journal of Economics*, Vol. 111, No. 4, 863-891.
9. GOI. (2020). *Annual Report 2019-20*. New Delhi: Ministry of Food Processing Industries.
10. Greene, W. H. (2000). *Econometric Analysis*. Upper Saddle River, N.J: Prentice Hall.
11. Iyer, K. (2010). The Determinants of Firm-Level Export Intensity in New Zealand Agriculture and Forestry. *Economic Analysis and Policy*, Vol. 40, No. 1.
12. Krammer, S. M., Strange, R., & Lashitew, A. (2018). The export performance of emerging economy firms: The influence of firm capabilities and institutional environments. *International Business Review*, Vol. 27, 218-230.
13. Kumar, M., & Basu, P. (2008). Perspectives of productivity growth in Indian food industry: a data envelopment analysis. *International Journal of Productivity and Performance Management*, Vol. 57, No. 7, 503-522.
14. Love, J. H., Roper, S., & Zhou, Y. (2016). Experience, age and exporting performance in UK SMEs. *International Business Review*, 806-819.
15. Narayan, S., & Bhattacharya, P. (2019). Relative export competitiveness of agricultural commodities and its determinants: Some evidence from India. *World Development*, Vol. 117 (C), 29-47.
16. Raina, R. S. (2015). Food for Thought Policy Options for India's Food Processing Industry. *Indian S&T and Innovation Policy, Bulletin No. 11*. India.
17. Sathe, D. (1997). Import Intensity of India's Exports: Some Fresh Evidence. *Economic and Political Weekly*, Vol. 32, No. 8, 22-28.
18. Schlegelmilch, B. B., & Crook, J. N. (1988). Firm-Level Determinants of Export Intensity. *Managerial and Decision Economics*, Vol 9, No. 4, 291-300.
19. Shoham, A. (1998). Export Performance: A Conceptualization and Empirical Assessment. *Journal of International Marketing*, Vol. 6, No. 3, 59-81.
20. Srinivasan, T. N., & Archana, V. (2011). Determinants of Export Decision of Firms. *Economic and Political Weekly*, Vol. 46, No. 7, 49-58.
21. Sterlacchini, A. (2001). The Determinants of Export Performance: A Firm-Level Study of Italian Manufacturing. *Review of World Economics*, Vol. 137, No. 3, 450-472.
22. Tanrattanaphong, B., Hu, B., & Gan, C. (2020). The impacts of value chain upgrading on the export of processed food. *Food Policy*, Vol. 93.
23. Wagner, J. (2015). A Note on Firm Age and the Margins of Exports: First Evidence from Germany. *The International Trade Journal*, Vol. 29, No. 5, 93-102.