

# Payments' Impact on Indian Agricultural Imports

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## Abstract:

*This study explores the correlation between overarching payment statistical metrics in India and the import patterns of approximately 40 key agricultural commodities governed by the Agricultural and Processed Food Products Export Development Authority (APEDA). Employing distinct regression analyses for import transactions exclusively, spanning the period from 2013-14 to 2021-22, our results reveal that only a subset of these commodities exhibits discernible effects from payment metrics. As digital payment methods gain prominence, the identification of<sup>1</sup> agricultural products unaffected by payment trends holds substantial implications for the financial sector. The recognition that certain agricultural products maintain independence from payment trends underscores the necessity for comprehensive interventions and further inquiry. Emphasizing the significance of thoroughly exploring these dynamics, this study offers insights to guide strategic decision-making and policy formulation aligned with the evolving financial landscape.*

**Keywords:** Agriculture, Gross Value Added, Imports, Indian Economy, Payment Indicators.

## 1. INTRODUCTION

Agriculture serves as the cornerstone of the Indian economy, generating employment opportunities and constituting a significant portion of the nation's GDP. India emerges as a primary cultivator of various crops, encompassing staples like grains, fruits, vegetables, and spices. Despite notable advancements, the Indian agricultural domain contends with hurdles such as fragmented land holdings, dependency on rainfall, post-harvest losses, and inadequate investment. Efforts from the government aim to tackle these obstacles, spanning initiatives such as enhancing irrigation infrastructure, promoting crop diversification, bolstering cold storage facilities, and extending financial aid to farmers. Looking ahead, the agricultural sector prioritizes domains like horticulture, organic farming, and food processing. The horticultural segment experiences rapid expansion, buoyed by heightened demand for fruits, vegetables, and spices, while organic farming gains momentum with governmental support initiatives.

The anticipated growth of the food processing industry, driven by escalating demand for processed foods and beverages, underscores the increasing significance of payment systems within the agricultural sector. These systems are pivotal in enhancing efficiency, transparency, and cost reduction. For instance, the rapid integration of digital payment methods in agriculture empowers farmers to directly vend their produce to buyers, circumventing intermediaries and bolstering their negotiating leverage.

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The Indian government is actively promoting the adoption of digital payment mechanisms in agriculture, exemplified by initiatives like the e-NAM platform facilitating online direct sales of farmers' produce to buyers.

Given the recent surge in digital payment transactions, this empirical study aims to delineate the relationship between payment statistics and agricultural imports. This endeavor seeks to ascertain efficient payments as a contributing factor to the agricultural sector's growth in India. Subsequent sections will delve into this relationship, utilizing data sourced from APEDA. Initially, overarching trends in payments and agriculture will be analyzed, followed by the identification of key products influenced by payment efficiency in trade. Ultimately, conclusions will be drawn regarding the impact of payment efficiency on the agricultural trade of major import products.

In this present work, the focus is exclusively on studying imports to assess the impact of payments. This deliberate choice stems from the recognition that imports represent a critical component of a nation's trade dynamics, particularly in the context of agriculture. By analyzing import trends, we gain valuable insights into the responsiveness of the agricultural sector to payment efficiency, shedding light on how efficient payment systems influence the procurement of key agricultural products from international markets. Import data allows us to assess the extent to which payment efficiency affects the quantity and diversity of agricultural goods entering the domestic market, providing crucial information for policymakers, stakeholders, and market participants. Additionally, by concentrating solely on imports, we can better isolate the impact of payment efficiency from other factors that may influence export dynamics, offering a clearer understanding of the direct relationship between payments and agricultural trade. This focused approach enhances the relevance and applicability of our findings, enabling us to provide targeted recommendations for improving payment systems and optimizing agricultural trade practices.

## 2. REVIEW OF LITERATURE

Žičkienė, Melnikienė, Morkūnas, and Volkov (2022) conducted an extensive examination into the impact of direct payments (DPs) on agricultural resilience within the European Union. Their investigation revealed a favorable influence of DPs on economic resilience; however, it also uncovered adverse effects on farm efficiency and related factors. Acknowledging the nuanced nature of these findings, the researchers advocated for policy adjustments to enhance overall economic resilience [1].

Coibion, Gorodnichenko, and Weber (2020) highlighted a significant observation during the pandemic, noting that U.S. households utilized only 40% of their stimulus payments due to limited spending avenues. While expressing optimism for future effectiveness as the pandemic abates, they proposed a broader range of policies aimed at stimulating aggregate demand [2].

Carstens (2019) drew attention to the challenges posed by central bank digital currencies (CBDCs), underscoring their potential to fundamentally reshape the monetary landscape. Notably, concerns were raised regarding the lack of clear societal demand for CBDCs and the profound implications for operational and financial system stability [3].

Zandi, Singh, and Irving (2013) provided insights into the economic significance of electronic payments, particularly card transactions, in fostering economic growth. Their research revealed a positive correlation between the penetration and usage of card payments and overall economic expansion, prompting recommendations for policies that encourage the adoption of electronic payment methods [4].

Noviana and Darma (2020) examined digital marketing strategies in Indonesia, with a particular focus on content marketing and social media promotion amid the COVID-19

pandemic. Noteworthy` was their emphasis on mobile banking emerging as the preferred payment method in the "New Normal Era" [5].

Hasan, De Renzis, and Schmiedel (2012) underscored the crucial role of electronic retail payments in fostering economic growth, specifically highlighting the positive influence of card payments. Their advocacy for policies supporting electronic retail payment instruments underscored their significance in driving economic advancement [6].

Moreno-Brid (1998) presented an insightful analytical model elucidating constraints on Mexico's economic growth, primarily attributed to the nation's inability to generate sufficient foreign exchange. Within this framework, strategies and challenges were discussed to spur economic growth and alleviate the balance-of-payments constraint [7].

Nakaso (2017) provided a historical perspective on the evolution of central bank payment and settlement systems, emphasizing their adaptability amidst economic and technological shifts. This evolution encompassed the transition from paper-based systems to efficient digital counterparts and the widespread adoption of real-time gross settlement (RTGS) systems [8].

Polasik, Huterska, Iftikhar, and Mikula (2020) explored the PayTech sector in Europe, evaluating the ramifications of the Payment Services Directive 2 (PSD2). Their findings unveiled significant growth propelled by market potential, regulatory backing, and evolving consumer payment habits [9].

The ECB Occasional Paper Series (2019) comprehensively analyzed the implications of crypto-assets for financial stability, monetary policy, and payment and market infrastructures. Importantly, they underscored that, at the time of their assessment, the risks posed by crypto-assets to the EU financial system were deemed limited and manageable. Nevertheless, continuous monitoring and preparedness for adverse scenarios were deemed imperative [10].

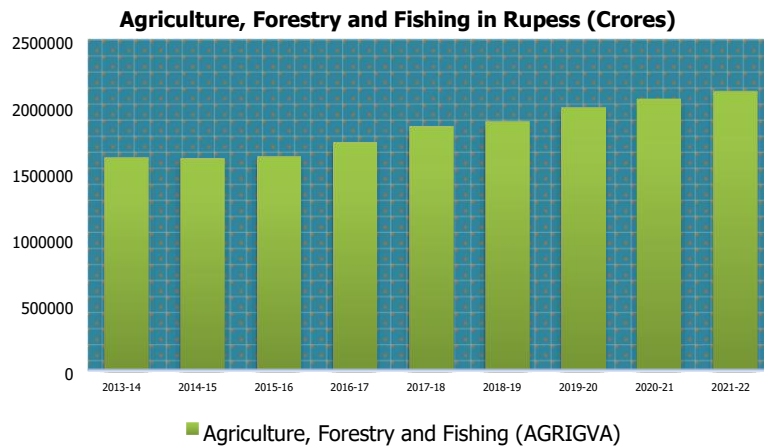
Hock-Han Tee and Hway-Boon Ong (2016) directed attention to the adoption of cashless payment methods, highlighting the role of technology, including RFID and NFC, in propelling the development of cashless payments. They emphasized the enduring impact of embracing cashless payment methods on economic growth [11].

Charles M. Kahn and William Roberds (2009) observed the intricate economics of payments, stressing payment as a fundamental economic choice. They advocated for a comprehensive understanding of payment economics among policymakers and economists, asserting its significance in making informed decisions regarding payment systems and their profound impact on economic activities [12].

### **3. CONTEXTUALIZING PAYMENTS IN AGRICULTURAL TRADE**

Figure 1 illustrates the gross value added trends in India's agriculture and allied sectors from 2013-14 to 2021-22. This data reveals a significant shift towards digital payment methods in agricultural transactions. The transition reflects broader technological adoption in the sector, potentially improving efficiency and transparency.

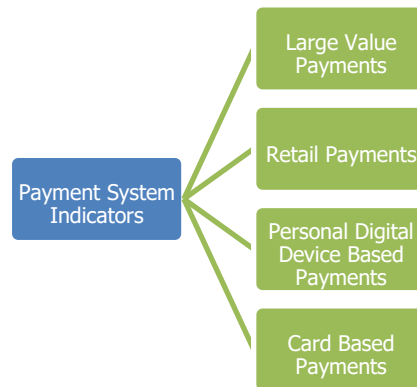
This trend aligns with India's push for digitalization across various economic sectors, including agriculture. The move towards digital payments likely impacts farmers, traders, and the overall agricultural supply chain, transforming traditional transaction methods in rural economies.



Source: Reserve Bank of India

**Fig. 1.** Gross value Added trends of Agriculture and allied (Constant Prices)

The smooth operation of payment systems is essential for the prosperity of cross-border agricultural trade, which plays a crucial role in advancing global economic growth and ensuring food security. Within the intricate network of international trade connections, the efficiency of payment systems becomes paramount in guaranteeing the prompt and secure transportation of agricultural goods to their designated locations. This research investigates the relationship between payment effectiveness and its significant influence on cross-border agricultural trade, examining the obstacles and potential advantages linked with payment systems. It particularly concentrates on the primary export and import commodities highlighted in APEPDA INDIA.



Source: By author

**Fig. 2.** Payment System Indicators Classification

Cross-border agricultural trade, with its intricate exchange of agricultural products spanning geographical, cultural, and institutional boundaries, inherently embodies complexity. Efficient payment systems lie at the heart of this intricate process, essential for facilitating smooth transaction flows. The significance of timely and secure payments extends beyond the economic growth of nations to the sustenance of farmers' livelihoods and the advancement of global food security objectives.

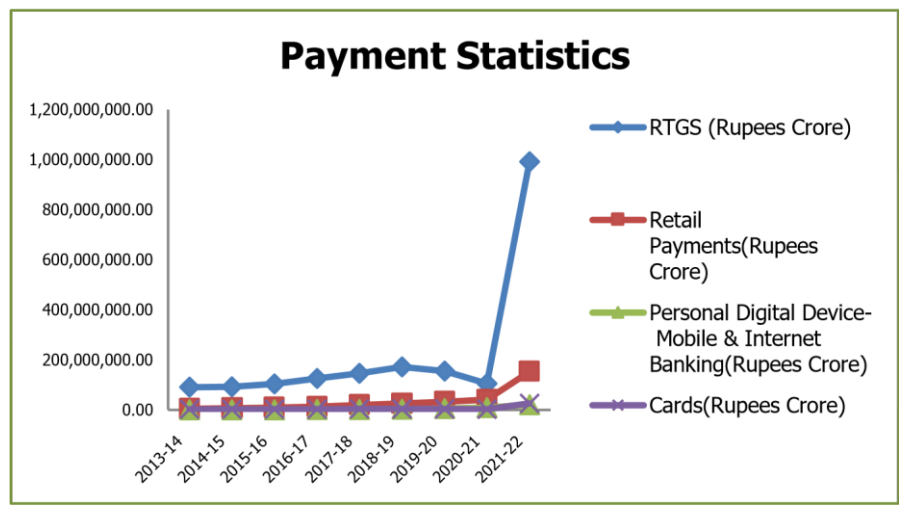
A central challenge in cross-border agricultural trade is the diversity of payment systems among different nations. Varied regulatory frameworks, currency fluctuations, and

disparities in banking practices can introduce delays and uncertainties, impacting stakeholders throughout the supply chain. Hence, establishing a harmonized and efficient payment system is crucial to mitigate challenges and promote seamless cross-border trade.

The first hurdle in achieving payment efficiency pertains to currency fluctuations and exchange rate risks. Transactions in multiple currencies, inherent in agricultural trade, expose parties to exchange rate volatility, potentially resulting in financial losses. Farmers and exporters, faced with uncertainty in earnings, struggle to plan and invest for the future agricultural cycle, disrupting the entire supply chain.

Regulatory obstacles present another significant challenge. Each country imposes its own financial transaction regulations, navigating which can be cumbersome. Compliance with diverse regulatory frameworks adds complexity, prolonging transaction times and increasing costs. These hurdles impede the agility of agricultural trade participants, hindering market growth and efficiency.

Technology and financial infrastructure play critical roles in tackling the challenges associated with payment efficiency in cross-border agricultural trade. The introduction of digital payment systems, blockchain technology, and innovative financial instruments offers opportunities to streamline transactions and bolster the security of cross-border payments. Digital payment solutions provide a faster and more transparent alternative to traditional banking channels, thereby reducing the time and cost involved in cross-border transactions. Blockchain technology, characterized by its decentralized and tamperresistant ledger, holds promise in revolutionizing cross-border payments by offering transparency and traceability. Smart contracts, enabled by blockchain technology, have the potential to automate payment processes based on predefined conditions, thus reducing reliance on intermediaries and minimizing the risk of errors or fraud. However, the implementation of these technological solutions necessitates collaboration among governments, financial institutions, and technology providers to establish standardized protocols and interoperable systems. Additionally, financial infrastructure plays a pivotal role in determining the efficiency of cross-border payment systems. The presence of robust banking networks, advanced payment gateways, and interoperable financial systems facilitates the seamless flow of transactions. Therefore, investing in the modernization of financial infrastructure, both domestically and internationally, is imperative to create an environment conducive to efficient cross-border agricultural payments. Figure 3 illustrates the trend of payment statistics as categorized earlier.



Source: Reserve Bank of India

**Fig. 3.** Payment Statistics of India

Although there are obstacles, there are promising instances of efforts to enhance payment efficiency in cross-border agricultural trade. Global entities like the World Trade Organization (WTO) and the International Chamber of Commerce (ICC) are actively engaged in standardizing trade finance practices and advocating for reforms to boost payment efficiency. Collaborative initiatives among countries to align regulatory frameworks and encourage interoperability in payment systems play a significant role in fostering an environment conducive to efficient cross-border transactions.

#### 4. MAJOR IMPORT PRODUCTS STATISTICS

India's agricultural and processed food sector serves as a cornerstone of the country's economy, making significant contributions to both domestic consumption and international trade. The Agricultural and Processed Food Products Export Development Authority (APEDA) plays a pivotal role in promoting and regulating the export of a wide range of agricultural and processed food products. It is crucial to identify major products for comprehending economic dynamics and trade efficiency, particularly concerning payment.

APEDA oversees the export of various products, with albumin derived from eggs and milk being notable. This protein-rich substance has valuable applications in the food and pharmaceutical industries, showcasing India's expertise in dairy and poultry product processing globally. Alcoholic beverages also constitute a significant export category, reflecting the thriving industry and diverse brewing practices in India. Table 1 presents the Major Products Trade Statistics (Exports and Imports), providing a thorough overview of the essential goods brought into the country.

**Table 1.** Total Year Wise Exports & Imports

Year	Total Exports	Total Imports
	Rs. Crore	Rs. Crore
2013-14	1,36,921.21	23,977.42
2014-15	1,31,343.00	31,534.99
2015-16	1,07,482.86	41,763.43
2016-17	1,13,857.98	62,919.12
2017-18	1,25,858.09	47,625.37
2018-19	1,35,112.60	40,522.59
2019-20	1,19,400.67	41,856.97
2020-21	1,53,049.86	40,900.77
2021-22	1,84,769.24	54,191.26

Source: APEPDA INDIA

Animal casings play a vital role in the food processing sector, highlighting India's position in the global meat processing supply chain. Buffalo meat, renowned for its quality, is a major component of India's meat exports, emphasizing the importance of efficient trade practices in sustaining and expanding this sector.

Cardanol, extracted from cashew nut shell liquid, serves as a notable industrial raw material, showcasing India's proficiency in cashew processing and by-product utilization. Casein, a milk protein, indicates India's significant presence in the global dairy industry, while cashew kernels and cashew nut shell liquid underscore the country's dominance in the global cashew market. Cereal preparations, encompassing breakfast cereals and ready-to-eat meals, make substantial contributions to India's export revenue, catering to diverse international consumer preferences.

Cocoa products derived from cocoa beans highlight India's involvement in global value chains related to the chocolate and confectionery sector. Preserved cucumber and gherkins demonstrate India's expertise in food preservation and processing techniques. Dairy products, floriculture, fresh grapes, and fresh mangoes showcase India's ability to supply high-quality agricultural and horticultural products to international markets.

The export of fresh onions demonstrates India's reliability as a supplier in the global market, while the export of fruit and vegetable seeds is crucial for sustaining agricultural productivity worldwide. Groundnuts, guar gum, and jaggery exemplify India's contributions to the global oilseed, natural gum, and confectionery markets, respectively. Maize exports position India as a dependable supplier globally, while mango pulp showcases the country's capability in offering high-quality processed fruit products. Milled products, millet, and miscellaneous preparations underscore India's diverse food processing capabilities.

Natural honey exports highlight the country's rich biodiversity and sustainable apiculture practices. Non-basmati rice and other cereals further solidify India's position as a leading rice exporter, showcasing its agricultural abundance. Other fresh fruits, vegetables, and meat products underscore India's agricultural diversity and its role in the global meat market. Niche products like betel leaves and nuts showcase India's unique export offerings. Poultry products, processed fruits, juices, nuts, processed meat, and processed vegetables significantly contribute to India's export revenue, meeting global demand for these processed food items. Pulses, sheep/goat meat, walnuts, and wheat exemplify India's role in supplying protein sources, nuts, and staple cereals to international markets.

**Table 2.** Major Products Import Statistics

Product(MT)/ Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Albumin(Eggs & Milk )	1031.49	1562.1	2207.73	4332.74	4977.4	10848.3	10831.8	9056.36	18074.5
Alcoholic Beverages	101308	160664	283096	433798	563713	587958	576784	643688	559597
Animal Casings	0.22	0	0	0	0	0	0	14	1.54
Buffalo Meat	0	0	0	0	0	0.95	0	0	0
Cardanol	0	0	0	34.71	499.36	5.1	3.6	2.1	3.1
Casein	186.09	1134.46	823.66	434.19	305.53	559.29	2209.73	1856.76	2039.12
Cashew Kernels	0	0	0	774503	654019	839636	941416	834399	939198
Cashewnut Shell Liquid	0	0	0	1653.06	1593	6606.39	8661.92	2198.93	6523.32
Cereal Preparations	52374.2	63249.6	61392.6	67030.6	71097.5	90248.5	96278	113372	124806
Cocoa Products	51617.9	65309.5	56424.6	63613.1	71257.5	87593.2	85276.2	89060.1	111187
Cucumber and Gherkins(Prepd. & Presvd)	5.42	157.96	22.46	59.78	434.33	338.61	192.08	150.36	14.73
Dairy Products	9916.42	11901.6	16986.7	16305.7	22683.1	12513.0	17827.8	16183.2	11873.5
Floriculture	4308.8	4813.7	4768.81	5550.08	6241.1	6374.47	7313.92	3959.21	6235.88
Fresh Grapes	3955.17	2639.91	5217.36	4428.36	5626.96	7006.13	7583.78	6463.22	7980.74
Fresh Mangoes	7.52	0	0.95	5.04	12.14	30.54	138.6	17.97	56.03
Fresh Onions	17843.8	386.93	87323.6	86.83	6592.59	7080.71	141189	66264	28512.6
Fruits & Vegetables Seeds	8198.19	14115.2	14328.0	14073.8	16051.4	19609	17776.8	24925.8	19744.9
Groundnuts	114	21	106.43	325.05	1719.4	1086.89	1952.05	1036.15	748.25
Guargum	375.33	147.82	634.63	182.05	431.71	715.16	2150.09	366.07	176.36
Jaggery & Confectionery	40086	53608.3	72927.5	64086.7	82663.9	78982.5	80380.5	81626.5	85931.7
Maize	13866.5	6021.2	181763	83216.7	30696.5	86024.7	458510	24819.2	23725.9
Mango Pulp	33	30	19.22	0	0	160.2	500.13	47.6	68.8
Milled Products	3977.44	3466.12	4393.66	3555.95	3275.7	4184.83	4325.18	2532.74	3373.14
Millet	321.12	611.1	234	655.1	913.99	1032.34	733.08	428.45	517.48
Miscellaneous Preparations	180681.6	196700.8	186123.6	229557.04	131055.23	229465.7	275743.79	216530.05	336515.45
Natural Honey	319.42	792.62	423.01	161.7	404.92	570.83	387.69	494.28	661.28
Non Basmati Rice	1442.42	1903.43	1020.13	1141.36	2123.98	6870.91	5638.47	4763.09	10582.29
Other Cereals	8102.55	18340.09	24147.72	227497.4	233520.45	157265.6	213906.04	109670.31	87828.57
Other Fresh Fruits	562664	631227.	629816.4	834811.68	753595.63	885216.8	716428.98	868379.49	1206053.6

Other Fresh Vegetables	7106.7	15778.02	10181.7	8442.66	9014.51	7659.07	11139.46	14019.58	15929.57
Other Meat	312.76	418.54	499.89	593.46	783.73	876.44	948.26	499.56	909.14
Others (Betel Leaves & Nuts)	80881.4	110813.2	67849.14	30260.5	19185.59	20681.8	16885.81	25042.16	27349.33
Poultry Products	463.96	814.18	869.27	721.37	572.11	900.35	797.55	296.77	417.83
Processed Fruits, Juices & Nuts	42303.89	51906.88	53784.24	56147.63	73470.72	81424.7	79145.38	72648.93	89906.45
Processed Meat	388.5	248.35	72.1	132.47	94.74	119.38	120.55	135.86	174.08
Processed Vegetables	20896.28	12237.28	16844.84	14615.13	17152.55	20308.19	36329.49	20550.88	26234.34
Pulses	3655163	4634739	5878397	6661329.1	5676278.2	2595914.1	2975366.81	2505038.19	2771574.34
Sheep/Goat Meat	59.26	83.57	57.35	122.92	216.29	119.38	160.25	12.3	53.58
Walnuts	141.32	1321.85	5490.73	12989.53	19573.76	13640.47	21305.23	35021.54	30087.75
Wheat	11271.39	27973.19	516166.56	5749431.07	1649724.88	2746.56	1884.51	2.66	54.06

Source: APEPDA INDIA

Table 2 presents the Major Products Import Statistics, providing a thorough overview of the essential goods brought into the country. This table offers valuable insights into the types and quantities of products that contribute to India's import scenario. Encompassing a wide range of items, from raw materials to finished goods, the data encapsulates the diverse nature of products shaping the nation's import landscape.

## 5. IMPACT OF PAYMENTS ON SELECT AGRI-IMPORTS

The quantitative research methodology adopted to examine the impact of payment data on the export and import trends of major agricultural products utilizes data sourced from APEDA (Agricultural and Processed Food Products Export Development Authority). This approach employs numerical data and statistical techniques to focus on measurable quantities. Drawing inspiration from the framework proposed by Hock-Han Tee and HwayBoon Ong (2016), payments are categorized into four main groups: Large Value Payments (LVP), Retail Payments (RP), Mobile-based payments (CPDD), and Card-based payments (ATP).

Within this quantitative framework, the independent variables consist of these four categories of payments—LVP, RP, CPDD, and ATP. These variables serve as indicators of various transaction modes within the agricultural and processed food products export sector, aiding in understanding the diverse channels through which payments influence trade dynamics. Table 3 presents a comprehensive summary of descriptive statistics for the independent variables, depicting payment statistics within the study. These variables encompass RealTime Gross Settlement (RTGS)/Large Value Payments (LVP), Retail Payments, Personal Digital Device-Mobile & Internet Banking, and Cards, with each measured in Rupees Crore.

**Table 3.** Descriptive Statistics of Independent variables (Payment Statistics)

	RTGS/LVP (Rupees Crore)	Retail Payments(RP) (Rupees Crore)	Personal Digital Device- Mobile & Internet Banking(CPDD) (Rupees Crore)	Cards(ATP) (Rupees Crore)
Mean	220255921.5	33843257.91	4723427.507	5823661.089
Standard Error	96834969.8	15363901.84	2303076.777	2560881.364
Median	125365207.6	19201797.73	1473854.49	3021400.196
Standard Deviation	290504909.4	46091705.52	6909230.33	7682644.091
Skewness	2.944233287	2.609691105	2.06923446	2.941925304
Sum	1982303294	304589321.2	42510847.56	52412949.8
Count	9	9	9	9

Source: Compiled by Author

In this study, the dependent variable centers on the import trends of individual major products, specifically emphasizing the quantity of products traded. This selection underscores the focus on the tangible volume of goods being imported, offering a



quantitative gauge of the economic ramifications of payment efficiency on distinct commodities. The regression equation for this investigation is articulated as follows:

$$\text{MPROD}_{wt} = B_0 + B_1 \text{LVP}_{wt} + B_2 \text{RP}_{wt} + B_3 \text{CPDD}_{wt} + B_4 \text{ATP}_{wt} \quad (1)$$

MPROD represents the quantity of individual major products imported, with B indicating the regression coefficients, and w representing the selected product for analysis ranging from 1 to 40. The variable "t" denotes time, starting from 2013 as 1 and progressing accordingly.

The dataset spans from 2013-14 to 2021-22, aligning with APEDA's indications to ensure a representative sample that mirrors the diversity of India's agricultural and food exports.

The research design adopts a quantitative approach, emphasizing the systematic utilization of statistical methods to analyze numerical data. Techniques such as correlation coefficients and regression analysis are employed to evaluate the relationships between payment data and the import and export trends of major products. Correlation analysis provides insights into the strength and direction of these relationships, indicating the extent to which variations in payment methods coincide with changes in the quantity of major products traded. Regression analysis aids in modeling the quantitative impact of payment data on major product import and export trends, identifying specific payment methods that significantly influence trade quantities.

Table 5 follows a similar structure, presenting correlation coefficients, this time focusing on major product imports. Noteworthy correlations include a strong positive correlation between imports of albumin (Eggs & Milk) and all payment methods, suggesting that enhanced payment efficiency correlates with increased imports of this product. Conversely, Guar gum exhibits a negative correlation with payment methods, implying that decreased payment efficiency is associated with higher imports of Guar gum.

**Table. 5.** Correlation Coefficient between Imports (Major Products) and payment statistics

Product	RTGS (Rupees Crore)	Retail Payments(Rupees Crore)	Personal Digital Device- Mobile & Internet Banking (Rupees Crore)	Cards (Rupees Crore)
Albumin ( Eggs & Milk )	0.916730926	0.968856139	0.963276127	0.919768683
Alcoholic Beverages	0.56183672	0.662510441	0.690960092	0.565206172
Animal Casings	0.286268236	0.474141044	0.618840504	0.290779832
Buffalo Meat	-0.06286967	-0.06482465	-0.095796883	-0.064013649
Cardanol	0.3480518	0.420100672	0.41562087	0.349901475
Casein	0.549282425	0.685588722	0.78525899	0.561124969
Cashew Kernels	0.337437115	0.42689992	0.452366494	0.333229285
Cashewnut Shell Liquid	0.585050547	0.649408975	0.664031736	0.589365935
Cereal Preparations	0.734999938	0.864502684	0.927356678	0.741345016
Cocoa Products	0.824040455	0.912655732	0.939498625	0.829013463
Cucumber and Gherkins( Prepd. & Presvd)	-0.342077216	-0.304453079	-0.30124	-0.339891592
Dairy Products	-0.413651818	-0.453559192	-0.474895855	-0.403265044
Floriculture	0.748753778	0.823237794	0.846270601	0.753447671
Fresh Grapes	0.362253092	0.427639886	0.440289807	0.367422089
Fresh Mangoes	0.710194175	0.768574298	0.78883704	0.716544754
Fresh Onions	-0.020170477	0.101726847	0.216222387	-0.007001899
Fruits & Vegetables Seeds	0.513123176	0.681373042	0.774911242	0.522005347
Groundnuts	0.327122522	0.437623104	0.475732409	0.331284195
Guar gum	-0.226111233	-0.178604165	-0.098337996	-0.218568437
Jaggery & Confectionery	0.729609567	0.862949628	0.925300639	0.734837473

Maize	-0.10877174	-0.054713085	0.001381455	-0.099692732
Mango Pulp	0.158802879	0.230530519	0.286621373	0.167560881
Milled Products	-0.211342265	-0.38003765	-0.479328961	-0.212413385
Millet	0.263299318	0.37356507	0.413878273	0.265918344
Miscellaneous Preparations	0.788197549	0.844741729	0.855456422	0.7919177
Natural Honey	0.448333831	0.489386056	0.458648718	0.454382191
Non Basmati Rice	0.420572468	0.514252036	0.572958332	0.428851066
Other Cereals	0.20528915	0.302476728	0.345579198	0.202457886
Other Fresh Fruits	0.806597179	0.887284669	0.900402818	0.807174401
Other Fresh Vegetables	0.213536434	0.357179136	0.473135385	0.226207634
Other Meat	0.603186963	0.619991543	0.577339147	0.606991754
Others (Betel Leaves & Nuts)	-0.067131114	-0.176033509	-0.239479941	-0.06196603
Poultry Products	0.445904576	0.439421288	0.403213086	0.451097357
Processed Fruits, Juices & Nuts	0.542283251	0.653913198	0.686918986	0.548505864
Processed Meat	0.009784786	-0.033882689	-0.035289314	0.007059612
Processed Vegetables	0.529925053	0.627692287	0.689126209	0.535430336
Pulses	-0.020137253	-0.127248725	-0.206104446	-0.025691756
Sheep/Goat Meat	-0.183266901	-0.250692232	-0.325901456	-0.184920001
Walnuts	0.33864316	0.534048764	0.662838237	0.344017572
Wheat	-0.167475397	-0.225716746	-0.263076409	-0.181669891

Source: Compiled by author using Data Analysis tool in Microsoft Excel

The regression analysis presented in Table 6 showcases the relationship between major product imports and payment statistics, with various degrees of correlation observed. Notably, Albumin (Eggs & Milk) exhibits a strong positive correlation (Multiple R = 0.96, Adjusted R Square = 0.92), indicating a significant influence of payment statistics on its import trends. Similarly, Cardanol (Multiple R = 0.83, Adjusted R Square = 0.67), Casein (Multiple R = 0.92, Adjusted R Square = 0.84), and Cereal Preparations (Multiple R = 0.96, Adjusted R Square = 0.93) also demonstrate strong positive correlations, highlighting substantial impacts of payment statistics on their import trends. Conversely, Buffalo Meat (Multiple R = 0.3, Adjusted R Square = -0.41) and Cashew nut Shell Liquid (Multiple R = 0.49, Adjusted R Square = -0.01) indicate weaker correlations, suggesting minimal influences of payment statistics on their import trends.

**Table 6.** Regression analysis between Major products Imports with Payment Statistics (Independent Variable)

Dependent Variables	IMPORTS		
	Multiple R	Adjusted R Square	P Value
Albumin (Eggs & Milk )	0.96	0.92	0.0552
Alcoholic Beverages	0.75	0.51	0.00058
Animal Casings	0.8	0.6	0.40795
Basmati Rice	-	-	-
Buffalo Meat	0.3	-0.41	0.46607
Cardanol	0.83	0.67	0.03553
Casein	0.92	0.84	0.0077
Cashew Kernels	0.73	0.47	0.02568
Cashewnut Shell Liquid	0.49	-0.01	0.36328
Cereal Preparations	0.96	0.93	0.00012
Cocoa Products	0.92	0.84	6E-05
Cucumber and Gherkins( Prepd. & Presvd)	0.62	0.24	0.0161
Dairy Products	0.62	0.24	8E-05
Floriculture	0.73	0.47	0.00147
Fresh Grapes	0.39	-0.22	0.00085
Fresh Mangoes	0.67	0.33	0.71678
Fresh Onions	0.58	0.15	0.15712
Fruits & Vegetables Seeds	0.96	0.92	6.1E-06
Groundnuts	0.71	0.41	0.05263
Guargum	0.49	-0.02	0.03047
Jaggery & Confectionery	0.99	0.98	5.2E-07
Maize	0.23	-0.54	0.16233
Mango Pulp	0.25	-0.5	0.42109
Milled Products	0.86	0.72	3.9E-05
Millet	0.68	0.36	0.00604
Miscellaneous Preparations	0.74	0.48	0.00064
Natural Honey	0.79	0.57	0.00092
Non Basmati Rice	0.44	-0.12	0.18949
Other Cereals	0.54	0.07	0.02736

Other Fresh Fruits	0.93	0.86	5.5E-05
Other Fresh Vegetables	0.65	0.29	0.01478
Other Meat	0.62	0.24	0.00236
Others (Betel Leaves & Nuts)	0.58	0.17	0.0065
Poultry Products	0.29	-0.41	0.00129
Processed Fruits, Juices & Nuts	0.86	0.71	0.00036
Processed Meat	0.35	-0.3	0.00743
Processed Vegetables	0.53	0.07	0.00231
Pulses	0.23	-0.55	0.01
Sheep/Goat Meat	0.37	-0.26	0.01385
Walnuts	0.92	0.84	0.00336
Wheat	0.49	-0.02	0.23969

Source: Compiled by author using Data Analysis tool in Microsoft Excel

## 6. CONCLUSION

The nexus of payment statistics and their correlation with the import dynamics of key agricultural products monitored by APEDA in India from 2013-14 to 2021-22 reveals intricate relationships that warrant thorough analysis. The diverse patterns observed in the correlations and regression outcomes underscore the intricate interplay between payment efficiency and the quantities of specific agricultural products involved in international trade.

The correlations in imports enhance our comprehension, indicating that enhanced payment efficiency positively affects products like Albumin (Eggs & Milk), Cereal Preparations, and Cocoa Products. These findings mirror the trends observed in exports, emphasizing the broad impact of efficient payments on trade quantities. Conversely, negative correlations for products such as Cucumber and Gherkins, Dairy Products, and Guar gum suggest that certain imports may not experience a linear increase with improved payment efficiency, reinforcing the product-specific nature of these associations.

The regression results provide further insight, emphasizing the strength and direction of the observed relationships. Notably, Albumin (Eggs & Milk) emerges with a strong positive regression, highlighting the pivotal role of efficient payments in enhancing import quantities.

These revelations collectively underscore the necessity for targeted policy interventions that accommodate the varied responses of different agricultural products to evolving payment landscapes. While some products exhibit a robust positive correlation and regression with payment efficiency, others display a more nuanced relationship, indicating that a uniform approach may not suffice. Policymakers should acknowledge the productspecific nature of these correlations and tailor interventions accordingly. Identified factors from the results include Payment Efficiency Impact, Product Nature Influence, Global Market Dynamics, and Supply Chain Considerations.

Furthermore, the study emphasizes the importance of continued research to delve deeper into the factors influencing these complex relationships. Understanding why certain products respond more favorably to improved payment efficiency than others is crucial for crafting effective policies. This may involve examining supply chain intricacies, market dynamics, and the specific characteristics of each agricultural product.

The insights presented in this study offer valuable perspectives into the evolving dynamics of payment and import trade in the agricultural sector. Recognizing the complex and product-specific nature of the relationships between payment efficiency and import quantities is essential for informed decision-making. The study encourages policymakers and stakeholders to leverage these insights effectively to navigate the changing financial landscape, fostering sustainable growth and resilience in the agricultural export-import domain.

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