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Research

Is processed food a luxury good in India? A macroeconomic Engel curve analysis, 2007–2022

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ABSTRACT
Rising incomes and urbanization have substantially transformed food consumption patterns in developing economies. Patterns of food demand at the household and economy-wide levels are commonly studied in terms of changes in the structure of food demand and expenditure patterns on food items over time. This study investigates whether processed food can be considered a luxury good in India by estimating a macroeconomic Engel curve using annual data for the period 2007–2022. It uses time-series data on household final consumption expenditure incurred on purchase of processed foods and gross domestic product measured in terms of aggregate gross value added at basic prices. The data is sourced from the input-output tables of the Indian economy published by the Asian Development Bank on annual frequency. Using a log-log regression model, this study investigates whether an Engel curve exists between household final consumption expenditure on processed foods and gross value added. The results show that household final consumption expenditure on processed foods in India has grown faster than aggregate gross value added during the said period, indicating an income elasticity of demand greater than unity. This suggests that processed foods behaved as a luxury good in India during the study period. The study highlights important implications for processed food policy framing, including strategies for processed food manufacturing, input sourcing, agribusiness development, environmental sustainability, managing health risks associated with consumption of processed foods, taxation, and export promotion and management in India's evolving food economy.

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INTRODUCTION

Rapidly growing population and evolving food systems in developing countries have been a major subject of study in the field of food economics. In this context, projecting future demand for food products constitutes one of the core challenges facing planners and policymakers in

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these countries. Understanding the patterns of consumption expenditure on a specific good, such as food, has been central to economic analysis since Ernst Engel's study on Belgian working-class households in 1857. The study revealed that as household income (M) rose, the share of income spent on food $(P.X)$ declined, illustrating that food was a necessary good for them. This relationship is known as the Engel expenditure curve or Engel law in economic analysis. While the relationship between household income (M) and quantity demanded for a good (X) shows a simple Engel curve (Hirshleifer & Glazer, 1993). They describe a negative stochastic association between bivariate distributions of income and food expenditure share/food demand across a comprehensive population of households defined by a certain geographical region or nationality. However, the relationship between the level of income, distribution of income and food demand is at the heart of this curve (Cirera & Masset, 2010; Chakraborty & Hildenbrand, 2011). In further discussion, all three terms, Engel expenditure curve, Engel curve and Engel law will be used interchangeably, but in the sense of household income-expenditure relationship only.

The Engel curves remain non-homothetic in general, meaning that budget share and income elasticity of demand for goods change when income changes, i.e., consumption patterns change when income changes. In such a case, the Engel curve is non-linear. Thus, the shape of the Engel curve indicates the dynamic nature of goods (necessity vs. luxury vs. saturation points) with changing income. At the macroeconomic level, the patterns of household expenditure on consumption goods as a whole have been a matter of concern for economists for decades. Keynes (1936) introduced consumption as one of the four components of aggregate demand in the economy. Although the idea of Engel curve in macroeconomics analysis is less common, it is equally applicable at the macroeconomic level, where it relates the consumption expenditure by the household sector to the purchase of, for example, food and the aggregate income in the economy. The Engel curve has a wide range of applications in economic analysis. In addition to its relevance in understanding patterns of consumption, it has been widely used as a tool for assessing policies related to agriculture, taxation, trade, industrial organization, housing, and household's overall standard of living (Vreyer et al., 2020).

Against this backdrop, this study investigates whether India observes an Engel curve in the case of processed foods at macroeconomic level. This work seems relevant and interesting because the Indian economy has experienced a rising middle-class population, growth in income, urbanization, changing food patterns and other structural changes in almost all of its sectors and sub-sectors, specifically during the economic reforms undertaken since 1991. This study is expected to provide insights into the changing patterns and structure of processed food demand in India.

There is a growing consensus in the existing scientific literature on the subject under consideration that the processed food industry has emerged as a leading industry of the Indian economy. It has gained prominence in terms of its share in manufacturing output, employment and exports in the Indian economy in recent years. Agri-food production and consumption are increasingly globalized, reflecting the globalization of food systems (Goyal et al., 2025). According to the Global Consumption Database (World Bank, 2025), approximately 4.5 billion people in low and middle-income economies collectively spend more than $2.3 trillion on food and beverages alone, which constitutes 46% of their total spending in a year. Gaiha et al. (2010), and Green et al. (2013) reported that food demand patterns in emerging economies exhibit a non-linear Engel curve, where processed food appeared as a luxury good at lower levels of income but converged into necessity with higher levels of income. Due to rapidly growing modern global food retail culture, demand for packaged as well as processed foods has become more common in both developed and developing countries (Popkin, 2017). These trends are consistent with the high income elasticity of demand for processed foods and the structural transformation of the Indian food basket, both of which are reflected in the ongoing shift in India's dietary patterns towards greater consumption of processed food products.

The transformation of India's food consumption pattern is evident in the recently published report by the Ministry of Statistics and Programme Implementation (2024). According to the survey, the share of food in the total monthly per capita expenditure declined continuously from 59.4% in 1999–2000, 53.1% in 2004–2005, and 52.9% in 2011–2012 to only 46.4% in 2022–2023. This trend supports Engel's law, and shows that the structure of the food basket has shifted towards processed and high-value added food items. Kumar et al. (2007) found that the food consumption basket in India is diversifying and shifting towards high value commodities, including fruits, vegetables, milk products, and processed foods, often at the expense of cereals and coarse grains. Although these diverse food preferences indicate improvements in economic well-being, a decline in cereal consumption indicates poor nutrition. Mottaleb & Mishra (2023) found that the average monthly expenditure on processed foods increased by about 77% between 1990–1991 and 2011–2012, and the households with regular salary income sources were more likely to purchase processed foods as compared to other households engaged in informal and agricultural employment. This growth is attributed to stable income and rapid urbanization. Deaton & Dreze (2009) identified a puzzle in regard to calorie intake in India. They observed that despite growing incomes in India, there has been a sustained decline in per capita calorie intake (downward shift in the calorie Engel curve). Gaiha et al. (2010) developed an alternative explanation of changes in the consumption of calories, protein and fats over the period 1993–2004. While it does not reject Deaton & Dreze (2009), its explanation is complementary to the demand-based explanations. Purushotham et al. (2023) highlighted the association between processed food consumption and health

outcomes, and consumers' buying behaviour. Paul & Paul (2023) reaffirmed that in search of nutritious and healthy diets, Indian consumption patterns are diversifying towards high-value agricultural products. The pattern follows the global dietary shift from basic staples to more diversified diets (Kearney, 2010). These changes are linked to evolving choices for work and leisure, which, in turn, are governed by many economic and non-economic factors.

Law et al. (2019) found considerable variations in processed foods and beverages consumption among, and within states over time. While purchases of processed foods and beverages for home consumption remain relatively low compared with staple foods, the demand for processed foods is rising steadily. The fastest growth is observed in categories such as sweet and salty snacks and edible oils, reflecting changing dietary preferences and lifestyle shifts. Moreover, both the levels and trends of processed food purchases vary over time, indicating diverse market dynamics within India's evolving food consumption landscape. According to Li (2021), Indian households with higher spending consume more diverse goods. Between 1983 and 2009, the dietary diversity of Indian households increased substantially, mainly because of improved access to different varieties, especially in the urban sector. Basu & Das (2015), examining household consumption patterns from 1993–1994 to 2011–2012, highlighted India's service-led growth. Non-rich households, especially those in the bottom 75% by monthly per capita expenditure, have increasingly allocated a larger share of expenditure on demand for services such as education, healthcare, transport, entertainment, and personal care. In this context, this study observed the homogenization of expenditures on services by rich and poor households. Total spending has been the strongest determinant of household spending in both rural and urban India. As income increases, the share of spending on food decreases, which is an explicit validation of Engel's law (Paul & Paul, 2023). Nayyar (2012), using Tobit and censored quantile regressions (CQRs) with household survey data for 1993–1994 and 2004–2005, derived Engel's curve for six services, including education, health, entertainment, personal, communication, and transport in India, and found a mirror image of Engel's curve for food. The CQR allows the estimation of Engel curves at different points (quantiles) of the expenditure distribution (e.g., the 25^{th}, 50^{th}, and 75^{th} percentiles).

While income remained the primary determinant of household expenditure behaviour, some studies identify factors beyond income that affect household expenditure patterns (Lewbel & Pendakur, 2008). Engel (1857) highlighted household size as one of the factors that influences food spending patterns. Other factors, such as age, gender, location, race and ethnicity, also play a role in shaping spending patterns (Hausman et al.,1995; Banks et al.,1997).

Most empirical studies on Engel's curve in India have used large-scale household survey datasets, viz. Household Consumer Expenditure Survey (HCES), the Indian Human

Development Survey (IHDS), and other targeted micro datasets. These datasets enable a detailed examination of the patterns of household demands for both food (total food, cereals, and calories) and non-food (services, clothing, and durables) categories at the subpopulation level (urban/rural, state, and demographic, social groups). The studies employing micro-level datasets of cross-sectional designs are not capable of identifying patterns of demand for processed foods in a timeframe having a close frequency of data, e.g. annual data. Unlike previous studies that primarily examine food consumption in India using household-level survey data, this study provides macroeconomic evidence on processed food demand by estimating an Engel curve using annual input-output data from 2007 to 2022. This study investigates whether processed food behaves as a necessity or luxury good at the aggregate economy-wide level, rather than at the household or demographic subgroup level. This approach allows the study to capture continuous income-consumption dynamics during a period marked by rapid income growth, urbanization, food-system transformation, and major macroeconomic shocks.

In light of growing significance of processed food items in the Indian food basket, understanding the structure of demand for processed foods at the macroeconomic level becomes relevant for management of food production and consumption in the years to come. To fill up this gap, this study attempts to investigate how increasing income affects the demand for processed foods in India, and whether the Indian household sector considers processed foods as luxury or necessity goods. Specifi-cally, it delves into the relationship between the Indian household sector's aggregate expenditure on processed food items and aggregate income-level during 2007–2022. Also, it estimates the income elasticity of demand for processed foods so as to identify the nature of the processed foods from a macroeconomic lens.

To follow the said objectives, this study employs a log-log model with annual macroeconomic data on the household sector's aggregate consumption expenditure on processed food items and income during 2007–2022. This data is sourced from the Asian Development Bank's annual input-output tables. The core contribution of this work is to extend Engel's law from an individual house-hold level to macroeconomic level analysis. Thereby, it offers evidence on the dynamics of relationship between the Indian household sector's income and demand for processed food products. This work is particularly relevant be-cause the study period 2007–2022 coincides with rapid economic growth, changing patterns of urbanization, transforming food systems, and major eco-nomic shocks such as demonetization, GST reforms and the COVID-19 pandemic. The findings are expected to inform food policy, processed food manufacturing, input sourcing, agribusiness development, nutrition-related regulation, and trade policy in India's evolving food economy.

METHOD

Model Specification

This study examines whether India's household sector observed Engel's law/function in the context of demand for processed foods, using macroeconomic-level annual data from 2007–2022. In its general mathematical form, Engel function is represented as $E = f(Y)$, where E is the household consumption expenditure incurred on a good while Y is the income of the household(s) under assessment. However, this relationship may take different functional forms depending on the characteristics of data on household consumption expenditure, income in terms of volume or growth and goods selected for analysis. The potential forms of Engel function are linear, log-linear, linear-log, semi-log linear, quadratic, log-quadratic and working-leser (share) models. A non-linear Engel function for food seems to be the correct choice because the changing structure and levels of income affect patterns of food demand (Banks et al., 1997). Given the limited annual observations, the study adopts a parsimonious log-log specification to capture the long-run income-consumption relationship. The parsimonious specification also helps avoid over-parameterization problems commonly associated with short annual time-series datasets.

Following the statistical characteristics of the data selected, the study takes the log–log functional form of this relationship and regresses the aggregate final consumption expenditure incurred on processed foods by the household sector (AFCEH) on aggregate gross value added (AGVA) in the Indian economy during the period 2007–2022. Here, AGVA at basic prices has been used as the measure of GDP (income) because it shows the aggregate income generated from the primary factors of production. It can be used as a proxy for income because GVA at basic prices equals to GDP at market prices less taxes on products plus subsidies on products. These adjustments of taxes and subsidies on products make GVA at basic prices a closer measure of factor income. The data on GVA at basic prices has been explicitly availed from the Input-Output Tables for the Indian economy from 2007-2022, Asian Development Bank. However, the use of GVA as the measure of income is within the national income accounting framework followed by the Indian economy. The study estimates the following regression model:

$$\text{Ln(AFCEH)} = \alpha + \beta\text{Ln(AGVA)} + \varepsilon$$

Where:

Ln(AFCEH) = Log of aggregate final consumption expenditure on processed foods by the household sector

Ln(AGVA) = Log of aggregate gross value added in the economy

α = Intercept

β = Income elasticity of household demand for processed foods

ε = Residual term accounting for explanatory factors other than AGVA

Data: Source and Variables

Data on both key variables AFCEH and AGVA have been extracted from the input–output tables of the Indian economy (2007–2022) published annually by the Asian Development Bank, which aligns with the National Statistics Accounts of the Indian economy. It is readily available in price-deflated values, so no adjustments against price fluctuations were needed. Given the temporal structure of the data used in this study, time-series issues such as trend, non-stationarity, and autocorrelation may be present. However, the normality of the distributions of both variables was tested via the Shapiro–Wilkinson test. Since the raw data were not statistically distributed normally, the log-transformed values were used. This database facilitates the user to access comparable annual input–output data frameworks for different economies and regional country groups in Asia for the years 2000 and 2007–2022.

Now, a basic question arises as to why Asian Development Bank data are proposed here. Notably, no official survey data on Indian consumer expenditure were published for the periods between 2011–2012 and 2022–2023. After a decade of data blackout, fresh consumer expenditure survey data were released for 2022–2023 in 2024. Ghatak and Kumar (2025) designated it as the "*missing decade".* In this light, the present study attempts to fill this gap by using this annually published dataset for the period 2007–2022. The use of data on consumer expenditure on annual frequency is expected to capture cyclical shocks in the economy such as Demonetization, Goods and Services Tax (GST) reforms, COVID–19. which can help the economic planners to evaluate the implications of such macroeconomic shocks on household consumption patterns.

Here, the processed food demand is typically an aggregate of demand for all kinds of manufactured food and beverages, such as processed products of meat, fish, milk, grain milling, edible oils, animal foods, beverages, rather than discrete purchases. The demand for processed foods by the household sector is given explicitly as one of the components of the final demand in the input–output tables used here. The exhaustive list of processed food products can be obtained from the National Industrial Classification–2008 (CSO, 2008), which classifies manufactured food and beverages at the 2–digit level, 03–digit level, 04–digit level, and 05–digit (unit) level into 2–divisions, 8–groups, 18–classes, and 104–subclasses, respectively. Moreover, studies at the macroeconomic level avoid the problem that arises in unit-level consumption expenditure data when many households report zero expenditures

attributed to non-consumptions and/or infrequent purchases (Wooldridge, 2002). To overcome such issues, the use of Tobit and censored quantile regressions becomes necessary. However, in a macroeconomic study of consumption expenditure, issues of this kind do not typically arise.

RESULTS AND DISCUSSION

Income and Processed Food Demand

In Figure 1, we visualize that both AFCEH and AGVA grew non-linearly and disproportionately over the period 2007–2022. This pattern of growth in the AFCEH and AGVA reveals that the preferences of the Indian household sector for processed food items as a whole have been non-homothetic in nature. The demand for processed foods measured in terms of expenditure incurred to purchase them increased faster than did the AGVA, which indicates that growth in processed food consumption was more than the growth in the AGVA in the Indian economy. But, the absolute share of expenditure on processed food in AGVA declined continuously. All these facts reveal the existence of Engel's law in the processed food demand at the macroeconomic level.

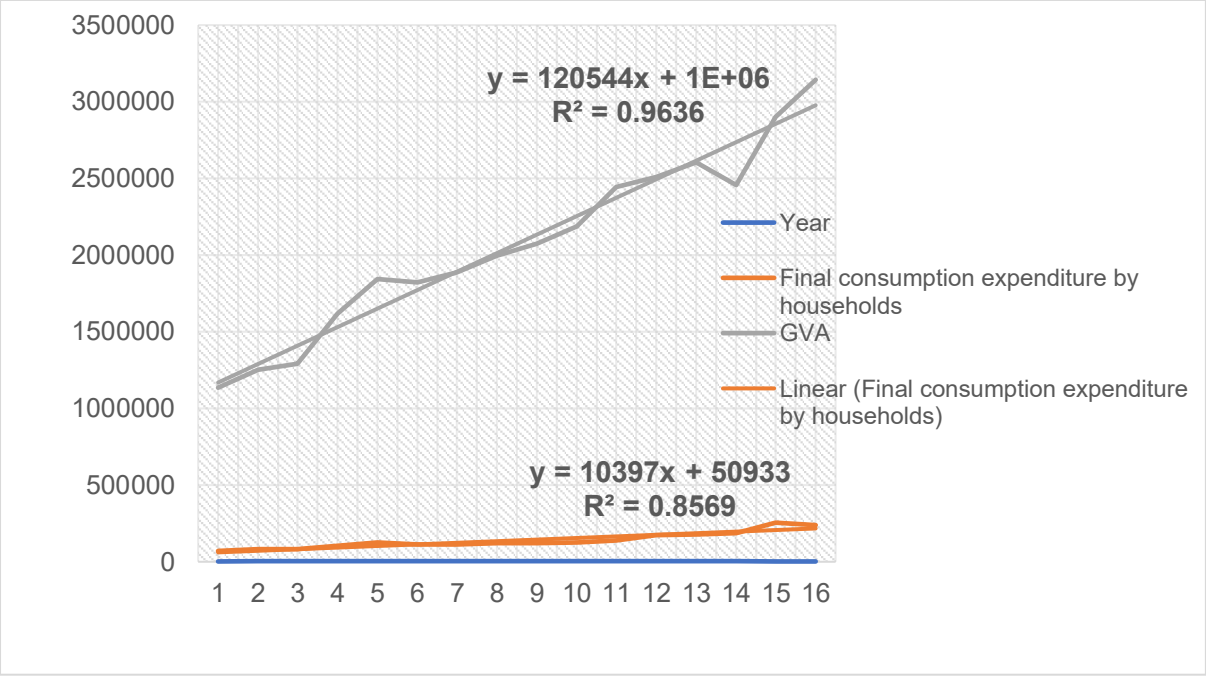

Figure 1: AFCEH and AGVA (2007–2022)

Source: Data Processed, 2025

Furthermore, the positive slope of AFCEH and AGVA curves followed by a continuously widening vertical gap between them endorses the existence of Engel's law in processed foods in the Indian economy, but relative significance of processed foods in the Indian economy as

a whole declined over time as economic progress happened. Moreover, this widening gap evidenced economic structural transformation of consumption and production, diversification beyond food systems, increasing commercialization and value addition within food systems, and shift towards services or higher-value non-food sectors of the Indian economy. In summary, it may be signaling shifting dietary behaviour, expansion in processed food industries, and evolving macroeconomic structures related to income growth and urbanization.

The natural log values of AFCEH and AGVA were normally distributed and therefore suitable for parametric estimation of their functional relationship. Accordingly, a log-log specification was employed to estimate the Engel curve relationship between processed food expenditure and aggregate income in India during 2007–2022. The results presented in Table 1 show that there has been a positive and statistically significant relationship between the Indian household sector's expenditure incurred on purchase of processed food items and aggregate income. The regression coefficient of AGVA is positive and highly significant, indicating the evidence of an Engel curve-type pattern of demand for processed foods at the macroeconomic level.

From the results, it is observed that aggregate income has been a significant factor determining the demand for processed food in India during 2007-2022. It needs to be noted that a part of variation in processed food expenditure may also include non-economic factors like changing patterns of urbanization, employment, access to market, life-styles, demographics, and regional factors. (Law et al., 2019; Mottaleb & Mishra, 2023; Pandey et al., 2020). Thereby, the growth in processed food demand in India has not only been affected by income growth, but also by broader socio-economic factors and changing patterns of consumption. Overall, both the graphical trend presented in Figure 1 and the regression estimates in Table 1 consistently support the presence of a macroeconomic Engel curve relationship between processed food expenditure and income in India. The widening gap between processed food expenditure and aggregate income further reflects the increasing economic significance of processed foods within India's evolving food system and consumption structure.

Processed Foods as Luxury Goods

Now, we move to put forward the second objective of the study, i.e., to identify the nature of processed food in India. Since we have used natural log values of AFCEH and AGVA in the regression model, an estimated regression coefficient of $\beta = 1.060884$ can be interpreted as the income elasticity of demand for processed foods in India. This clearly indicates that AFCEH of processed foods rose slightly more proportionally than did the AGVA of the Indian economy from 2007–2022. A 1% increase in AGVA caused a 1.060884% increase in the

demand for processed foods in India during this period. This shows that demand for processed foods has been slightly elastic in terms of income in India (greater than 1).

Table 1. Regression Results [Model: $ln(\text{AFCEH}) = \alpha + \beta ln(AGAV) + \varepsilon$]

Source	**SS**	**Df**	**MS**	**Number of obs.** = 16	
Model	1.510918	1	1.510918	F(1, 14) = 37.18	
Residual	0.56617	14	0.04087	Prob > F = 0.0000	
Total	**2.109022**	**15**	**0.140601**	R-squared = 0.7165	
				Adj R-squared = 0.7069	
				Root MSE = 0.20215	
Log(AFCEH)	**Coef.**	**Std. Err.**	**T**	$\boldsymbol{p\|t\|}$	**[95% Coef. Interval]**
Log(AGVA)	1.060884	0.173975	6.10	0.000	0.68774 1.434024
Constant	-5.026278	2.523869	-1.99	0.066	-10.43944 0.386881
Estimated Engel's function			$\boldsymbol{ln(AFCEH) = -5.03 + 1.061\ ln(AGVA)}$		

Source: Data Processed, 2025

Hicks (1939) used measures of income or expenditure elasticity to identify the nature of a good as luxury, necessity or inferior. When income elasticity is estimated as greater than 1, less than 1 and less than 0, a good is seen as luxury, necessity and inferior, respectively. Accordingly, the Indian household sector treated processed foods as luxury goods from 2007–2022. It needs to be noted that the aggregate expenditure on processed foods may also grow due to some factors other than rising income level, such as changing composition of household sector in terms of rural-urban share of population, size, sources of income, changing time-value, relative prices, greater availability due to emerging production and communication technology. Furthermore, Lewbel & Pendakur (2008) stated that elasticities can themselves vary with different levels of income. Elasticity of demand remains a critical input for assessing policy implications, food consumption patterns, food security status and food market outcomes (Jeon et al., 2025). However, following Hicks (1939), we may conclude that processed foods have been considered luxury goods in India, but there may be some non-income factors also that affected demand for processed foods in India. Nayyar's (2012) Engel's curve for six services was the mirror image of Engel curve for food in India, but our study revealed that Engel curve for processed foods in India was only aligned with Nayyar's Engel curve for services, whereas it was the opposite for general food in India.

The estimated value of income elasticity of demand for processed foods in India (greater than unity) shows that processed foods behaved as luxury goods in India. It indicates that growth in income levels did not merely increase food consumption quantitatively, but also transformed

the qualitative structure of food demand. In other words, economic growth in India has increasingly shifted household food preferences away from traditional staple-based consumption towards value-added, convenience-oriented, and commercially processed food products. This pattern reflects a broader nutrition transition commonly observed in rapidly urbanizing and industrializing economies.

The classification of processed food as a luxury good at the macroeconomic level may be linked to the emergence of a growing middle-income population, urban lifestyles, increased female labour-force participation, expansion of organized retail markets, and changing time allocation within households. As household incomes rise, consumers increasingly demand convenience, diversity, branding, and ready-to-consume food products rather than merely satisfying caloric requirements. Consequently, processed foods become associated not only with nutrition, but also with lifestyle transformation, modern consumption behaviour, and aspirational consumption patterns.

The findings are consistent with studies highlighting structural dietary transitions in emerging economies. Kearney (2010) and Popkin (2017) argued that rising incomes and urbanization substantially alter food systems by increasing the demand for processed and convenience foods. Similarly, Green et al. (2013) and Cirera and Masset (2010) observed that processed food demand tends to exhibit high income elasticity during the early and middle stages of economic development. In the Indian context, Law et al. (2019) documented increasing purchases of processed foods across Indian states, while Mottaleb & Mishra (2023) showed that households with stable salaried incomes were more likely to consume processed foods.

However, the present study extends the existing literature in an important way. While previous studies primarily relied on household-level cross-sectional surveys, this study demonstrates that the luxury-good characteristic of processed foods is also observable at the aggregate macroeconomic level. This indicates that the transition toward processed food consumption is not merely confined to particular demographic groups, but increasingly represents a broader structural transformation within India's food economy.

From a macroeconomic perspective, the widening gap between aggregate income growth and processed food expenditure growth may also reflect the commercialization and industrialization of food systems in India. The rapid expansion of food processing industries, supermarket penetration, digital food delivery platforms, and global food supply chains has increased the accessibility and desirability of processed foods. Consequently, processed food consumption becomes embedded within broader processes of economic modernization and market integration.

Nevertheless, the identification of processed foods as luxury goods also raises important policy concerns. Although rising processed food consumption may indicate improvements in purchasing power and dietary diversification, excessive dependence on ultra-processed foods may simultaneously increase health risks associated with obesity, diabetes, and non-communicable diseases. Therefore, economic growth and food industrialization should be accompanied by nutrition-sensitive food policies and regulatory frameworks aimed at balancing food accessibility, industrial development, and public health objectives.

A few limitations of the study need mention. As incomes vary considerably across individual households and income elasticities vary across goods, studies of an aggregated nature overlook these issues (Banks et al., 1997). In other words, this aggregate-level study masks heterogeneity across processed food subgroups and income subgroups. The relationship between food and income remains bidirectional (Godbharle et al., 2022), but this study took it as a unidirectional relationship. Our dataset covered only 16 years, while a longer time-series could have strengthened the analysis. However, this data-supported presence of Engel-type relationship between processed food demand and income level in India, even if not exclusively, provides relevant inputs to the policymakers. By having this information, policymakers can prescribe policies to the lawmakers to align and/or restructure overall food manufacturing, planning for future input supplies, development of agribusiness sector, and balancing the processed food exports and even imports.

Moreover, the presence of Engel-law in the processed foods emphasizes the need to formulate processed food policies aligning with different classifications of processed foods such as the National Industrial Classification (NIC) of manufactured food products (useful for assessing the production performance of manufacturing firms and industries); degree of processing and purpose-based NOVA Classification (Monteiro et al., 2019) for health policy purposes; degree of transformation of the ingredients in terms of nature, quantity, function, and/or additives based Sigma Index (Fardet, 2018) for health policy purposes, modified NOVA in combination with HFSS criteria (Popkin et al., 2024) for health policy purposes; Harmonized System (HS) classification of products exported and imported for trade management. HS classification of processed foods may be useful for determining customs duties and taxes, collecting trade statistics, and applying trade policies (quotas, anti-dumping, restrictions), and even Goods and Services (GST) taxes.

CONCLUSION

This study examined the macroeconomic Engel curve relationship between processed food expenditure and aggregate income in India during 2007–2022 to determine whether processed foods behaved as necessity or luxury goods. The findings indicate a positive and

statistically significant association between aggregate income and processed food expenditure. The estimated income elasticity greater than unity suggests that processed foods behaved as luxury goods in India during the study period.

These results provide macroeconomic evidence that India's rising income levels have been accompanied by a structural transformation in food consumption patterns. The expansion of processed food demand reflects not only income growth but also broader changes associated with urbanization, commercialization of food systems, lifestyle transformation, and the increasing role of food manufacturing in the economy. In this respect, the study contributes to the Engel curve literature by extending the analysis of processed food demand beyond household-level survey evidence to an aggregate macroeconomic setting.

The findings have important implications for food and agribusiness policy. Since processed food demand appears to be income elastic, policy frameworks should anticipate continued growth in this sector and align food manufacturing strategies with input sourcing, value-chain development, productivity improvement, and environmental sustainability. At the same time, the expansion of processed food consumption requires nutrition-sensitive regulation, particularly in relation to ultra-processed food products. Policy instruments related to food classification, taxation, trade management, and product standards should therefore be designed in an integrated manner, taking into account domestic demand, health risks, industrial development, HS classifications, and GST structures.

The study relies on aggregate annual data and therefore does not capture heterogeneity across households, income groups, regions, or different categories of processed foods. In addition, the relatively short time-series period limits the scope for more advanced dynamic modelling. Future research may extend this analysis by using longer time-series data, disaggregated processed food categories, regional datasets, or household-level microdata to examine whether the luxury-good characteristic varies across income classes, locations, and product groups. Such extensions would provide a more nuanced understanding of processed food demand within India's ongoing dietary and economic transformation.

CONFLICT OF INTEREST STATEMENT

The author declares no known conflicts of interest.

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AI USE DECLARATION

The use of Artificial Intelligence (AI) tools was limited to language editing, grammar enhancement, or manuscript preparation assistance, and that all intellectual contributions, research design, data collection, analysis, interpretation of results, and final content remain the sole responsibility of the author. The manuscript complies with the applicable ethical and regulatory requirements concerning use of AI as per Indian academic standards.

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