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An Analysis of the Economic Development Threshold Effect of Employment Density in Shanghai's Consumer Goods Industry within the Context of New Manufacturing, Using Comparative Insights from International Metropolises

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Abstract: The service-oriented manufacturing sector is a crucial driver of future economic growth in the context of continuous technology advancements and industrial revolutions. This research develops an economic development threshold model to evaluate job density in the consumer goods sector in Shanghai and Tokyo, utilizing data from 2007 to 2016. The research investigates the impact of varying population densities on the relationship between employment in consumer goods sectors and urban economic growth. Analyzing Tokyo's circumstances aids in comprehending Shanghai's current market situations and potential future prospects. The consumer goods sector in Tokyo exhibits a threshold of 0.608, serving as a limit for economic stimulation, which results in adverse effects when beyond. Shanghai attains favorable economic growth contributions when its consumer goods sector exceeds the 0.329 threshold level. The consumer goods business in Tokyo has surpassed its vital turning point, but Shanghai's sector has yet to attain that pivotal moment. The consumer sector in Shanghai is underutilized in its economic potential relative to Tokyo. The light industry sector in Shanghai is poised for significant expansion due to rising population density, potentially reinstating its position as a premier hub.

Keywords: New manufacturing; consumer goods industry; employment density; population density; threshold model

INTRODUCTION

An international metropolis is the middle point of an urban internationalization process. It is crucial, as in a city with well-established and stable manufacturing industries, the transformation of the service sector proceeds through restructuring and refining. These two areas are closely linked, promoting each other and becoming one

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system thus the immersion of the city into the global network. Producers services are the crucial power that has recently started to steer the industrial sector of international metropolises with economic progress and structural adjustment activities. There is an observable trend in the economy indicating that a higher share of the economy is service based with high levels of human capital and knowledge-driven growth. These transformations are deeply rooted in the modern service sectors that are targeting production processes which are optimized for industrial distribution. Within the service industry, the intelligence of manufacturing has been elevated, which has further relays the role cities and their international position in the global economy, and thus distinguish urban. The transformation into an international metropolis requires a symbiotic relationship between the segments of the service and manufacturing sectors to bring about significant innovations. On the basis of this, the likes of New York, London, Paris, Tokyo, and Hong Kong have become global cities. The rank of Shanghai is moving toward the quasi-international metropolis, communities inside the city are mirroring the urban-generated process following Japan's example. Notwithstanding such development, the key challenge Shanghai faces in its urban reformation relates to the deteriorating manufacturing environment and the underdeveloped support services. These include crowded labor markets, land-use density, and doubts surrounding the effectiveness of explosive job growth in creating a sustainable economy. Moreover, the "Made in China 2025" strategy emphasizes the rebuilding of the urban industry value chain and emphasizes overcoming the obstacle raised by low-value chain positioning and unsustainable growth mode.

Japan, as a major net overseas asset owner, and as a manufacturing powerhouse that is advanced in the industry too, largely depend on the manufacturing sector as the main route for economic expansion. The real economy, mainly due to the manufacturing sector, is what drives Japan’s economic development. Japan navigated through difficulties like trade frictions of U.S. with china and the economic impact of the COVID-19 pandemic by means of digital transformation initiatives to sustain and improve the global competitiveness of digital manufacturing. Even if China is very careful about urbanization, Japan had already laid a technological foundation and brand advantages in the 80s that its manufacturing industry was complete. Therefore, China should stop being a manufacturing-based economy and turn into a world’s top manufacturer by learning from Japan’s consumer goods sector.

The scope of the survey is as follows: it is about consumer goods customer preferences and demand-related dynamics, which are integral to the sector. One of the main research tasks is to explore alternatives that appear to be the most efficient. From the viewpoint of jobs per area in Shanghai and the real economy of Japanese consumer goods manufacturers this study aims to find the matrix which will provide not only the basis for theories conceived but also the string of applications which Shanghai as the eternal metropolis should take. In what follows a literature review is presented first. It establishes the connection between employment density, population distribution, and economic development, which serves as the theoretical elements to be tested. Second, a Barro-type economic growth equation will be used to investigate the critical effects of the employment density on urban economic development in Shanghai and Tokyo in such sectors as the automobile, computer, and food processing by testing the various threshold effects and the most likely connections with the relative growth rates. The analysis, which is a comparative one, is the last part of the paper. Hence, connections between the different data will be considered, the least deviant points will be found, and conclusions on the empirical data will be made. Finally, we provide some suggestions for the consumer goods sector in Shanghai and policy ideas from the findings of this research. The entire framework for the analysis is illustrated in Figure 1.

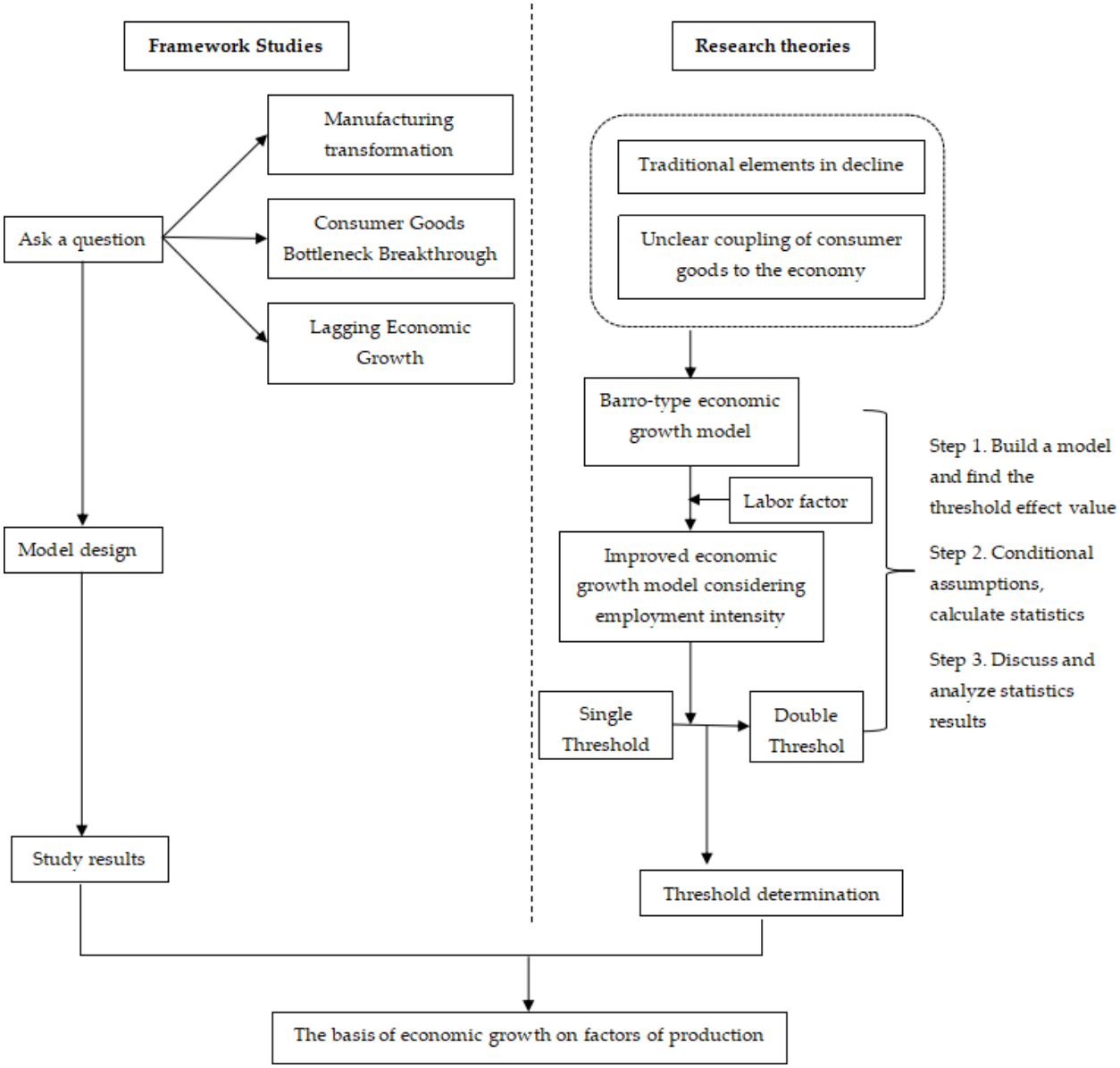

Fig. 1: Diagram of research concepts

LITERATURE REVIEW

The contemporary manufacturing age is undergoing a substantial upheaval, resulting in notable changes in regional economic growth, which has emerged as a primary area of inquiry. This evolution has positioned the consumer products sector as a pivotal element of urban industry, harmoniously aligning with consumer viewpoints. Service quality is significantly prioritised in this sector and serves as a crucial accelerator for urban economic development. The shift in its manufacturing paradigm has significantly improved urban economic structures and efficiency. The "light manufacturing" sector of consumer goods must strategically identify its strengths and markets, emphasising demand, production circumstances, and temporal efficiency. At this pivotal moment of late industrialisation, Shanghai ought to derive inspiration from successful global urban models and establish a development trajectory aligned with its unique economic attributes.

Tokyo, a mature international metropolis, has established a relatively clear industrial structure wherein its consumer goods industry has played a significant role in the development of the greater metropolitan region of Tokyo. Studies have revealed that various industrial economic models in Japan have an over-arching framework across employment density, industrial transformation, and accessibility to development opportunities, which finally promotes economic growth. The employment density is the core of this model, which acts as the driving

force behind industrial progress and thereby attracts labor and external investments while creating new development lines for future economic growth. These findings become the theoretical basis of this present study. Consequently, analyzing Japan's consumer goods sector provides valuable insights into the mechanisms underlying Shanghai's consumer goods industry and its impact on urban economic growth. Employment density is frequently utilized as a key indicator to assess industrial agglomeration levels and their economic influence. Policymakers often incorporate this metric when allocating resources and implementing industrial strategies. While most studies indicate that industrial agglomeration significantly influences regional economic growth, differences in the focuses and methodologies of studies conducted have led to varying conclusions.

In terms of manufacturing in China, there are other studies indicating an "inverted U-shaped" pattern for the agglomeration of industrial activity with low economic returns across several regions. In terms of the service sector in the Beijing-Tianjin-Hebei region, for instance, findings indicate that though employment density fosters short-run economic growth, its long-term impact diminishes during the times of economic transition. Empirical research on Shanghai demonstrated a strong positive relation between industrial concentration and economic development. It also identified international studies that showed the role of employment density in economic growth. Some have noted that greater employment density enhances worker mobility between enterprises with associated increases in productivity and income; others point out the important work on the distribution of employment in the large city and its relationship to economic growth and service industry structure. Studies also find that the employment levels in the neighboring cities contribute to an industrial concentration, which also, in turn, increases the speed of long-term economic development and urban sprawl. However, economic efficiencies of industrial agglomeration differ between regions and industries. As an international metropolis, the capital goods industry in Shanghai was the leading area for economic growth in recent years and was transformed into service-oriented manufacturing. However, with the increasing intensity of employment concentration, it remains uncertain whether the sector's agglomeration effects can sustain Shanghai's long-term economic development. Industrial clustering also fosters regional concentration, where population density serves as a critical determinant of urban economic vitality. Population concentration enhances economies of scale through resource-sharing mechanisms and labor market externalities, thereby improving industrial efficiency and stimulating regional economic growth. For example, in world cities like Tokyo and London, there is a strong connection between population density and per capita income. However, when the population is overly concentrated, production costs rise and operational efficiency falls, ultimately negatively impacting economic growth. Several empirical findings denote an inverted-U-shaped or "rise and decline" pattern of relationship between population density and economic growth, with further explanations of the underlying economic mechanisms. With further growth, the dominant model of economic development would shift from resource- and labor-intensive industries to knowledge-based industries, reflecting broader shifts in industrial logic. The ongoing synchronization of production and demand adjustment has reshaped the consumer goods industry. Meanwhile, the demographic dividend is being transformed into a human capital dividend, and the benefits of economies of scale are becoming less and less, with the introduction of crowding economics on a large scale. Therefore, it is necessary to evaluate the sherecotnire and development of the concentrate of the TCO industry on the city date, especially on the population density factor.

In summary, consumer goods have been the primary impetus for contemporary manufacturing developments. The consumer products sector in Shanghai is anticipated to be the primary catalyst driving the city's industrialisation development. The reference to employment density is common, and the author's research reveals a critical juncture in the relationship between employment density and economic growth. Nonetheless, it has not yet attained the prominence anticipated for the future of Shanghai's consumer products sector. Industrial clustering is recognised as a significant contributor to urban expansion; nevertheless, the precise influence of the consumer goods industry on economic development in Shanghai remains unclear. The evolution of a city into an international metropolis is primarily propelled by the services and manufacturing sectors, alongside consumer goods leading this shift. This research aims to understand the fluctuations in employment density within Shanghai's consumer goods sector by utilising the lagged employment figures as the threshold variable. The objective is to assess the influence of product and inflection points within the consumer goods sector in Shanghai on economic growth and to evaluate its long-term developmental potential. This research connects Tokyo's evolutionary trajectory to offer theoretical insights about the future expansion of Shanghai's consumer goods sector.

RESEARCH DESIGN

Research on the impact of economic growth threshold effect is an area that has been extensively researched. In most studies, panel threshold models have been employed to analyze the impacts of various economic factors and their consequences on growth basing on different threshold conditions. For instance, in some data analysis, the occurrence of new energy demand is defined as the economic variable if a group of definite threshold variables are satisfied. Other results are that the relationship between human capital and economic expansion is positive when the level of economic development reached a certain point. In the same fashion, the research has concluded that the economic inequality changes in a positive favorable way to growth when the ration of human capital to physical capital is above a particular level. These above revelations, therefore, endorse the view that the threshold model forms one of the widely used and efficient tools in research on economic growth.

Data from China's census show that the educational status of the mobile population in this country is continuously improved due to compulsory schooling. As urbanization has been further strengthened in China, the share of urban citizens with high human capital becomes bigger and bigger. The concentration of skilled labor is growing; it positively influences the accumulation of human capital, which in turn acts as an accelerator in industry development and raising urban economic growth. Labor usually migrates to the area where marginal productivity is higher in neoclassical economic growth models, which leads to regional economic convergence theoretically. However, there are some empirical studies opposed to this expectation. The new conceptual approaches to the theory of economic growth embed the role of human capital within the model of physical capital and they, therefore, combine endogenous growth factors with the process of economic convergence. It is on the basis of this theoretical model, in this paper, the goal of building an endogenous growth model based on the Barro model will be carried out. Additionally, with a structured formula and computation process, an empirical study will be done based on the relationship estimate of economic development and human capital.

The fundamental representation of the production function is given by:

$$Y=F(K,AL) \quad (1)$$

where Y signifies total output, K denotes physical capital, A represents technological advancement, L stands for labor input, and AL indicates effective labor

$$\text{Population growth rate} : L/L = n + m \quad (2)$$

where the rate of population mobility is denoted by m and the rate of population increase by n. The Solow-Swan model's equation for physical capital accumulation is created by adding the human capital that the mobile population carries:

•

$$K = sF(K, AL) — \delta K + \lambda M \quad (3)$$

where λM stands for the migrant population's human capital contribution to the building of physical capital. The formula for efficient physical capital accumulation per capita follows from this:

$$\hat{k}/\hat{k} = sf(\hat{k})/\hat{k} — (\delta + g + n) — m(1 — \lambda/\hat{k}) \quad (4)$$

Define the population mobility function:

$$\xi(\hat{k}) = m(1 — \lambda/\hat{k}) \quad (5)$$

Equation (5) can be substituted into Equation (4) to create the economic growth model that incorporates population mobility:

$$\hat{k}/\hat{k} = sf(\hat{k})/\hat{k} — [\delta + g + n + \xi(\hat{k})] \quad (6)$$

Barro and Sala-i-Martin invented a model of economic growth that reflects the traffic of people from one part of the country to another and develops the model with the rule of a geometric series.

This study recognizes the economic growth of the Barro-type equation and uses a new way of calculation, which is proposed by Brulhart and Sbergami, to do research on the differences caused by population density distribution in the world. The main aim of the research is to investigate the threshold impacts of job density on urban economic development that occurs in Shanghai and Tokyo's consuming goods' industries. There can be a nonlinear relationship between employment density and economic growth in these places which means the relationship of these two variables along time in different years of industries can be different. To produce a nonlinear panel threshold model that studies employment density and economic growth, the threshold variable is the population density:

Step 1. The threshold effect value is determined by establishing a nonlinear panel threshold model in conjunction with the Barro-type economic growth equation.

$$g_{it} = a_0 + a_{11} ED_{it} I(pd_{it} \le \gamma) + a_{12} ED_{it} I(pd_{it} > \gamma) + \theta x_{it} + \varepsilon_{it} \quad (7)$$

where, a_{11}, a_{12}, and threshold γ are the parameters to be estimated using the Ordinary Least Squares (OLS) method:

$$\beta(\gamma) = (X(\gamma)'X(\gamma))^{—1} X(\gamma)' g_{it}$$

(8)

Residual sum of square:

$$S_1(\gamma) = \overline{e}_{it}(\gamma)' \overline{e}_{it}(\gamma)$$

(9)

Threshold estimation:

$\gamma = \text{argmin} S_1(\gamma)$

(10)

Step 2. Establishing hypotheses and statistical validation for the panel threshold model:

Panel threshold model has $H_0 : \beta_1 = \beta_2$; original $H_1 : \beta_1 /= \beta_2$ hypothesis and alternative hypothesis.

To further test the number of thresholds, the statistical measure is computed as: F= $\frac{S0-S1(Y)}{\sigma^2}$

Step 3: Analysis of Model Results

If the p-value of the statistic is less than 0.1, then the null hypothesis H0 is rejected because there is a threshold effect in model (7). Furthermore, I(·) is the indicator function; it returns 1 if the condition is met and 0 otherwise. The estimated threshold parameter is denoted by γ. This study uses a panel threshold model with single threshold; multiple thresholds simultaneously increase the number of threshold parameters and indicator functions.

In the equation, git represents the economic development level at time t, quantified by the GDP of the consumer goods sectors. EDit represents the employment density of consumer goods sectors, while pdit denotes urban population density. xit and θ represent the control variable vector and its corresponding coefficient vector, respectively. Numit, the quantity of firms in consumer goods sectors, is used as a control variable, whereas εit represents random disturbance. Furthermore, a0 represents the drift term, whereas a1i is the coefficient of the explanatory variable.

Two essential outputs of the study are: first, dependence on traditional factors of production, such as labour, to facilitate manufacturing; and second, the application of employment intensity to overcome developmental limits and achieve sustained economic growth. The comparison of the manufacturing models of developing nations, such as China, with those of advanced nations like Japan has provided empirical evidence and a framework for China and similar countries to restructure their labour production factors within the context of Barro-type economic growth.

The delineation of the relevant variable index selection and data sources is as follows:

1. Economic Development Level ($g_{it.}$): GDP is a commonly accepted measure of the state of the area economy. A more developed economic state is indicated by a larger GDP. For consistency, this study uses nominal GDP data from Shanghai and Tokyo from 2007 to 2016, adjusted using the GDP deflator from 2006. The Tokyo Statistical Yearbook and the Shanghai Statistical Yearbook are the sources of the data.
2. The distribution of workers among administrative units is reflected in employment density ($ED_{it.}$), which is a measure of industrial agglomeration. It is computed by dividing the total number of workers in the consumer goods sector by the entire area of each city. The official statistical yearbooks of Tokyo and Shanghai are the source of this information.
3. Urban potential is indirectly indicated by population density (pd_{it}), which represents the concentration of economic activity. The population density in this study is defined as the entire regional population divided by the land area, in accordance with Ciccone and Hall's (1996) methodology. The Tokyo and Shanghai Statistical Yearbooks are two sources of data.
4. Number of Enterprises ($Num_{it.}$): The scale effect of enterprise numbers influences economic contributions within an industry. Thus, this study incorporates the number of enterprises in consumer goods industries as a control variable.
5. The consumer goods industry include both durable and non-durable products that are sold in a variety of marketplaces. The industry is divided into three categories based on the needs of consumers: basic consumption (such as necessities like food and clothing), developmental consumption (such as leisure and cultural expenses), and luxury consumption (such as expensive items). Food processing, cosmetics, clothing, packaging, interior design, tiny electronics, and medicines are important industries.

Examining the Original Numbers:

The data from Shanghai and Tokyo shows that Shanghai can still grow its population . Shanghai had 24.197 million people in 2016, while Tokyo had 13.6362 million. These numbers made up 1.75% and 10.74% of their countries' populations . Even though Shanghai has many people, its small share of China's population affects its standing as a global city. The numbers tell us that in 2016, Shanghai packed in 38,000 people per square kilometer. Tokyo, on the other hand, squeezed in 0.6 million people per square kilometer. Since 2012, Shanghai's population density has stayed around 0.4 million people per square kilometer. This is much lower than Tokyo's density, which was 1.58 times higher than Shanghai's. Job patterns differ between these two cities. In 2016, Shanghai had 13.6524 million workers, while Tokyo had 7.377 million. These numbers made up 1.76% and 11.57% of their countries' totals . Even though Shanghai had more workers overall, its job density (0.22 million people/km²) was less than Tokyo's (0.34 million people/km²). Shanghai's density was 0.65 times that of Tokyo's, which suggests there's still room to grow.

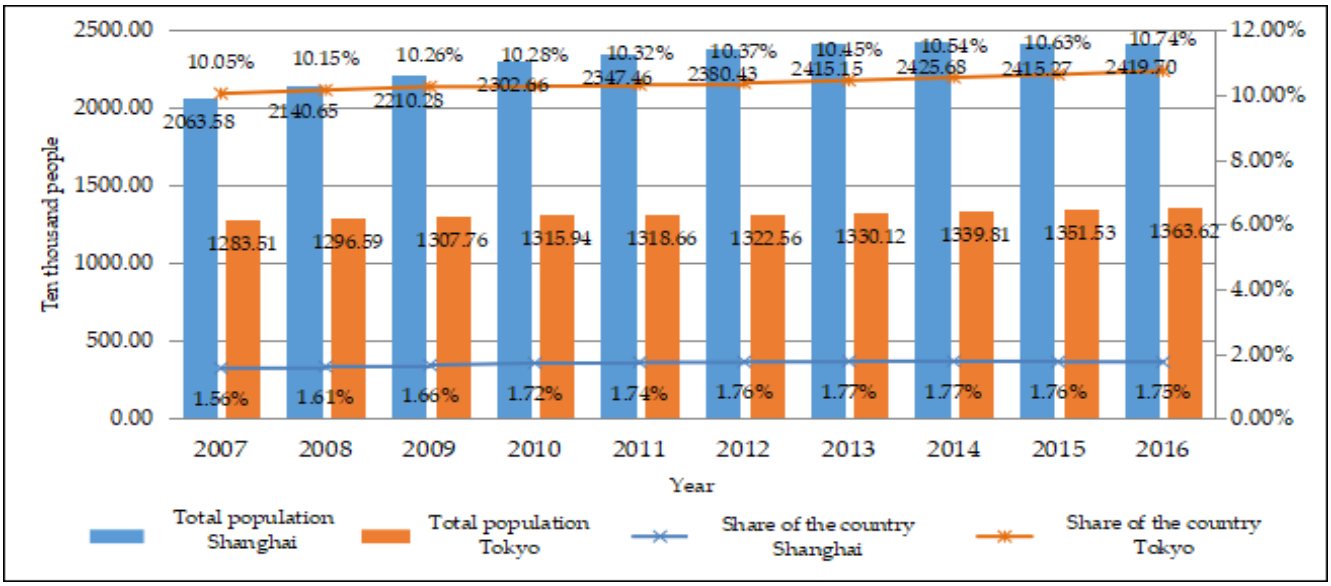

Figure 2. The population figures for Shanghai and Tokyo are derived from the Shanghai Statistical Yearbook, the National Bureau of Statistics of China, the Statistics Bureau of the Japanese Ministry of Internal Affairs and Communications, and the Tokyo Metropolitan Bureau of Statistics.

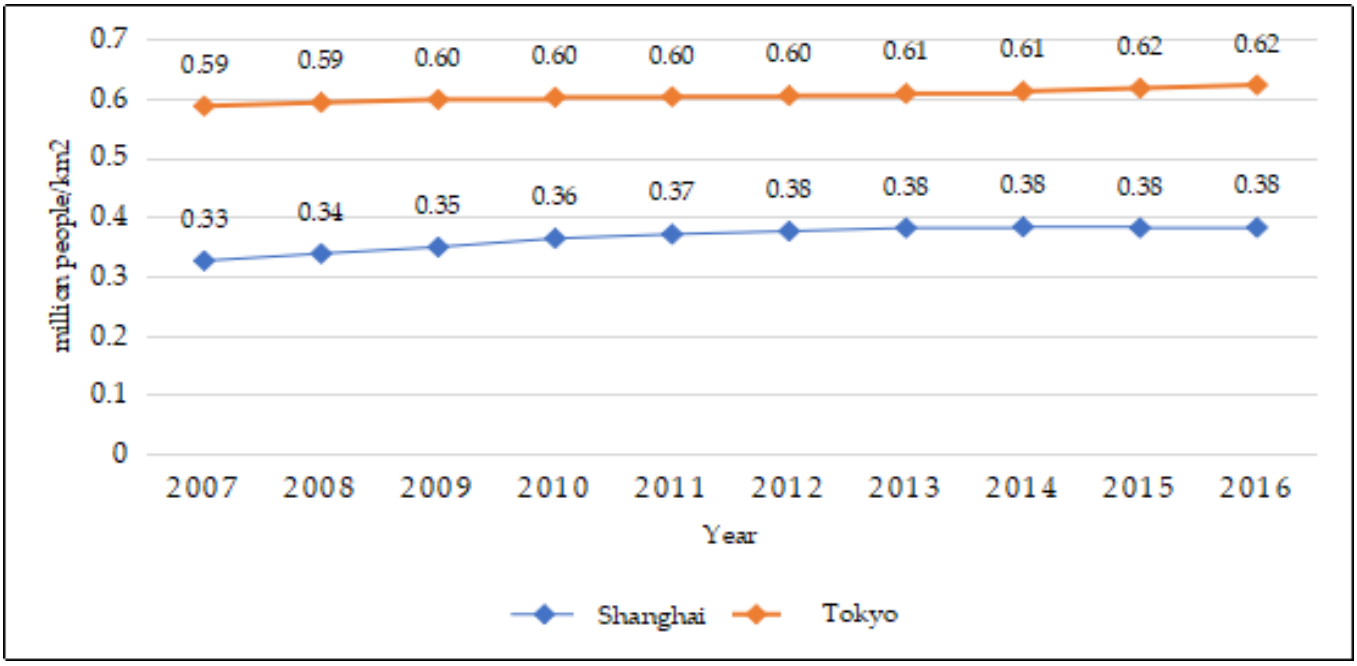

Figure 3: The population density figures for Shanghai and Tokyo are derived from the Shanghai Statistical Yearbook, the National Bureau of Statistics of China, the Statistics Bureau of the Ministry of Internal Affairs and Communications of Japan, and the Tokyo Metropolitan Bureau of Statistics.

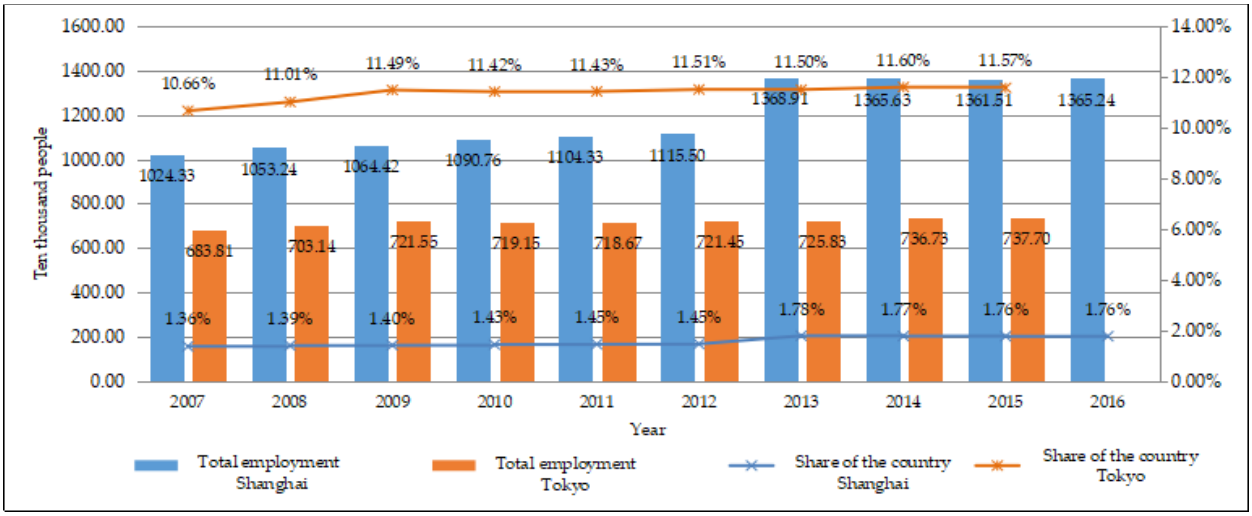

Figure 4. Shanghai Statistical Yearbook, Tokyo Metropolitan Bureau of Statistics, Statistics Bureau of the Ministry of Internal Affairs and Communications of Japan, and the National Bureau of Statistics of China are the sources of information about employment in Shanghai and Tokyo.

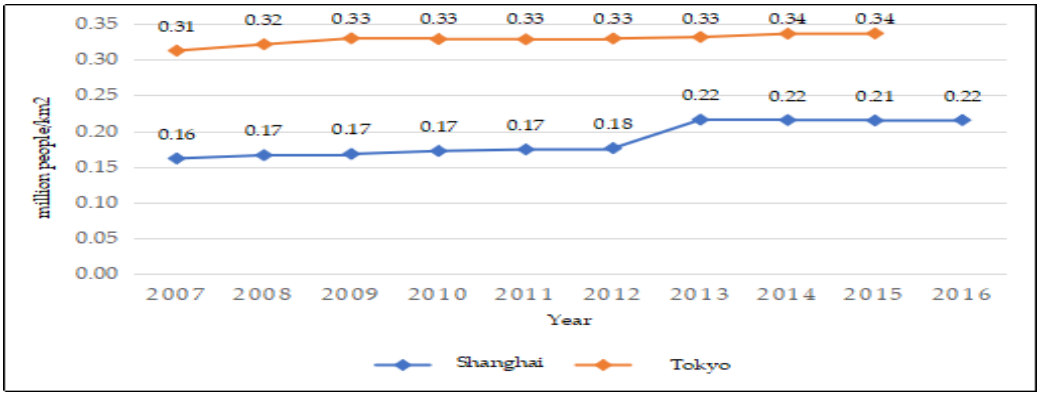

Figure 5. We collect employment density statistics for Shanghai and Tokyo from the Shanghai Statistical Yearbook, the National Bureau of Statistics of China, the Statistics Bureau of the Ministry of Internal Affairs and Communications of Japan, and the Tokyo Metropolitan Bureau of Statistics.

EMPIRICAL RESULTS AND ANALYSIS

Empirical Results:- The particular type of panel threshold model is determined by the number of thresholds. F statistics are produced in this study by utilizing the squares of the residuals of the single threshold and double threshold. To ascertain the significance of the threshold effect, a self-sampling will yield the relevant probability P-value, which serves as the foundation for identifying the panel threshold model forms. Table 1 displays the findings from tests of the threshold effect that used population density as the threshold variable.

Table 1. Self-sampling inspection of threshold effect.

	Food Processing Industry		Cosmetics and Cleaning Supplies Industry		Clothing Industry		Packaging and Printing Industry	
Shanghai	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value
Single threshold test	2.238	0.021	4.653	0.008	7.467	0.036	6.138	0.007
Double threshold test	2.238	0.015	1.331	0.328	25.079	0.006	22.739	0.004
Tokyo	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value
Single threshold test	6.504	0.042	10.403	0.022	24.976	0.002	13.251	0.010
Double threshold test	8.339	0.024	15.669	0.004	8.343	0.002	17.734	0.009
	Interior Decoration Industry		**Craft Tourism**		**Small Electronic Processing Industry**		**Pharmaceutical Manufacturing**	
Shanghai	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value
Single threshold test	9.501	0.018	19.707	0.005	3.850	0.009	8.034	0.046
Double threshold test	1.429	0.302	2.111	0.218	2.892	0.152	3.766	0.124
Tokyo	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value	F statistics	*P* value
Single threshold test	13.000	0.006	—	—	33.024	0.001	4.814	0.007
Double threshold test	3.019	0.017	—	—	8.487	0.039	10.465	0.023

When population density is treated as the threshold variable, the F statistics for the other industries attain significance at the 10% level or lower, with the exception of the double threshold models related to the Shanghai pharmaceutical manufacturing, small-scale electronic processing, interior decoration, cosmetics and cleaning supplies, and craft tourism sectors. We can advance with the panel threshold model employing a single threshold for further analysis, as the significance test for the individual threshold in the overall model has been met. Thus, as outlined in Table 2, the self-sampling technique and likelihood ratio statistics are utilised to ascertain the threshold estimation and its associated confidence interval.

Table 2. Estimated results of threshold value and confidence interval.

	Food Processing Industry		Cosmetics and Cleaning Supplies Industry		Clothing Industry		Packaging and Printing Industry	
Shanghai	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval
Single threshold/	0.334	[0.315, 0.344]	0.326	[0.315, 0.344]	0.339	[0.315, 0.344]	0.326	[0.315, 0.344]
Double threshold test	0.345	[0.344, 0.345]	0.316	[0.315, 0.344]	0.334	[0.328, 0.338]	0.335	[0.334, 0.338]
Double threshold test	0.335	[0.334, 0.338]	0.326	[0.317, 0.344]	0.340	[0.339, 0.344]	0.326	[0.325, 0.328]
Tokyo	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval
Single threshold/	0.603	[0.600, 0.607]	0.612	[0.603, 0.617]	0.612	[0.604, 0.617]	0.612	[0.604 0.617]
Double threshold test	0.606	[0.603, 0.607]	0.604	[0.587, 0.617]	0.604	[0.587, 0.617]	0.598	[0.598, 0.601]
Double threshold test	0.633	[0.631, 0.634]	0.599	[0.598, 0.602]	0.598	[0.598, 0.602]	0.612	[0.612, 0.617]
	Interior Decoration Industry		**Craft Tourism**		**Small Electronic Processing Industry**		**Pharmaceutical Manufacturing**	
Shanghai	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval
Single threshold/	0.326	[0.325, 0.339]	0.326	[0.315, 0.328]	0.326	[0.315, 0.344]	0.326	[0.315, 0.338]
Double threshold test	0.338	[0.315, 0.344]	0.334	[0.315, 0.344]	0.316	[0.315, 0.344]	0.316	[0.315, 0.344]
Double threshold test	0.326	[0.315, 0.334]	0.326	[0.315, 0.328]	0.326	[0.325, 0.328]	0.326	[0.325, 0.328]
Tokyo	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval	Estimated value	Confidence interval
Single threshold/	0.612	[0.603, 0.617]	—	—	0.604	[0.602, 0.607]	0.598	[0.587, 0.617]
Double threshold test	0.604	[0.587, 0.617]	—	—	0.612	[0.587, 0.617]	0.612	[0.604, 0.617]
Double threshold test	0.602	[0.587, 0.617]	—	—	0.598	[0.598, 0.601]	0.598	[0.598, 0.602]

As shown in Table 2, using population density as the threshold variable indicates some overlap in the confidence intervals between the single and double threshold models. When combined with the threshold effect self-sampling test results in Table 1, the single threshold panel model appears to have more explanatory power for the study. Overall, Shanghai's consumer goods sector has an average threshold of 0.329, which is significantly lower than Tokyo's 0.608. This difference highlights a significant developmental gap between Shanghai's consumer goods industry and major global cities like Tokyo over the last decade, indicating considerable potential for future growth. The regression results from the threshold model analysis (Table 3) indicate that the food processing sector has a threshold of 0.334. Below this threshold, the correlation coefficient is 5.899, which decreases to 3.992 when population density surpasses this level. In contrast, Tokyo's food processing threshold is 0.603, with a coefficient of 3.442 below this threshold. Beyond 0.603, the coefficient shifts to —3.233, marking a crucial turning point where Tokyo's economic contribution becomes negative. In comparison, Shanghai's sector maintains a positive, though diminished, impact despite increasing density, suggesting there is still significant growth potential compared to Tokyo. Further investigation is necessary to determine how enhancing R&D and branding in Shanghai's food industry could increase its economic advantages. For the cosmetics and cleaning products sector, Shanghai's threshold is 0.326, resulting in coefficients of —4.513 (below threshold) and —4.372 (above threshold). Conversely, Tokyo's threshold is 0.612, with a coefficient of 4.103 below this level and —9.813 beyond it. These findings indicate that Tokyo's industry has reached a critical economic juncture, while Shanghai's sector is still developing. Through continued supply-side reforms, Shanghai's cosmetics industry—a crucial sector for livelihoods—could leverage its global brand presence to close this gap. Unlike Japan's established industry, Shanghai has room to grow.

Table 3. Estimation results of the panel threshold model regarding the impact of employment density in the consumer goods industry on urban economic development.

	Food Processing Industry		Cosmetics and Cleaning Supplies Industry		Clothing Industry		Packaging and Printing Industry	
	Shanghai	Tokyo	Shanghai	Tokyo	Shanghai	Tokyo	Shanghai	Tokyo
ED_{it} $(pd_{it} \leq \gamma)$	5.899 ** (0.66)	3.442 *** (0.93)	—4.513 * (—0.30)	4.103 ** (0.34)	—6.488 *** (—4.28)	12.912 *** (1.16)	—29.083 ** (—1.63)	7.128 ** (0.72)
ED_{it} $(pd_{it} > \gamma)$	3.992 ** (0.47)	—3.233 ** (—0.22)	—4.372* (—0.05)	—9.813 ** (—0.75)	—3.214 *** (—1.57)	—5.234 *** (—0.44)	—21.045 ** (—1.24)	—9.489 *** (—0.92)
Num_{it}	—0.104 * (—0.67)	0.273 * (2.00)	—1.081 * (—1.28)	3.103 * (2.02)	0.011 (0.14)	0.098 * (1.26)	—0.075 * (—0.41)	0.206 ** (2.45)
-----	6.630 *** (0.34)	2.048 *** (0.76)	3.345 *** (0.49)	3.630 *** (0.44)	5.630 ** (0.19)	4.630 *** (0.29)	4.630 *** (0.27)	2.344 *** (0.56)
R^2	0.857	0.877	0.887	0.867	0.877	0.862	0.827	0.897
	Interior Decoration Industry		Craft Tourism		Small Electronic Processing Industry		Pharmaceutical Manufacturing	
	Shanghai	Tokyo	Shanghai	Tokyo	Shanghai	Tokyo	Shanghai	Tokyo
ED_{it} $(pd_{it} \leq \gamma)$	—10.876 ** (—1.55)	8.754 ** (0.31)	—18.758 ** (—3.93)	—	—15.759 * (—2.08)	—39.983 ** (—4.80)	—18.683 ** (—0.95)	—42.856 ** (—2.48)
ED_{it} $(pd_{it} > \gamma)$	—6.298 *** (—0.87)	—21.874 ** (—0.91)	—13.272 ** (—2.72)	—	—9.915 *** (—1.22)	—55.234 ** (—5.66)	—9.682 ** (—0.48)	—34.224 * (—2.28)
Num_{it}	—0.236 * (—2.39)	0.175 * (2.26)	—0.093 * (—1.18)	—	—0.387 * (—2.52)	0.064 (1.30)	—0.625 * (—2.17)	0.145 (0.32)
_cons	3.96 ** (0.23)	3.644 *** (0.64)	3.629 *** (0.49)	—	3.964 ** (0.12)	6.630 *** (0.89)	6.630 *** (0.73)	6.630 *** (0.38)
R^2	0.857	0.835	0.847	—	0.857	0.851	0.874	0.857

Note: *, **, *** mean passing the significance test at the level of 10%, 5%, and 1% respectively; the reported value in parentheses is the t-statistic.

Discussion of Results

The consumer goods industry's effect coefficient on urban economic growth signifies its degree of influence and can be categorised into three levels. The preliminary level includes the food processing sector (5.899 → 3.992). The second level encompasses the cosmetics business (−4.513 → −4.372), apparel industry (−6.488 → −3.214), packaging and printing industry (−29.083 → −21.045), and interior decoration industry (−10.876 → −6.298). The tertiary sector includes the minor electronic processing industry (−15.759 → −9.915), the pharmaceutical manufacturing sector (−18.683 → −9.682), and the tourism industry (−18.758 → −13.272). In the final five categories of Tokyo's consumer goods sector, the clothing textile industry (12.912 → −5.234), packaging and printing industry (7.128 → −9.489), and interior decoration industry (8.754 → −21.874) exhibit similar characteristics, as their contributions to economic growth shift from positive to negative beyond the threshold. However, the small electronic processing industry (−39.983 → −55.234) and the pharmaceutical manufacturing sector (−42.856 → −34.224) demonstrate contrasting patterns. The detrimental effects of the small electronic processing industry increase beyond a specific threshold, whereas the pharmaceutical manufacturing sector encounters a reduced negative impact, indicating a decline in Tokyo's small electronic processing industry alongside continued strength in pharmaceutical production.

A comparison analysis indicates that, unlike Tokyo, Shanghai's consumer goods sector has adversely impacted economic growth over the past decade. It has not yet attained a pivotal moment, particularly in sectors such as packaging, printing, and process tourism. Recently, Shanghai has leveraged its status as a pivotal metropolis in the Yangtze River Delta to integrate the cultural and tourism sectors. Shanghai seeks to elevate the value chain of smart

and connected cultural tourism to establish itself as a premier global tourism destination, while creating new growth opportunities within the sector. Moreover, taking into account the threshold and action coefficient, substantial growth potential remains in Shanghai's consumer goods sector. Amidst a tough global landscape and constrained resources, Shanghai is utilising the national "Belt and Road" program and the Shanghai Free Trade Zone to enhance its industrial framework. Enhancing the growth potential of the consumer products industry and fostering economic recovery through consumption are vital chances for improving Shanghai's industrial economy in this new manufacturing era. This potential has frequently been undervalued.

An examination of Tokyo's consumer goods sector indicates that increased job density often enhances economic growth, especially when population density is beneath a specific threshold, aligning with previous studies. Tokyo, as Japan's most economically dynamic region, has the largest population of enterprises and citizens. In 2001, the Japanese government sought to replicate Silicon Valley's success through the implementation of an industrial cluster policy. The aggregation of human and financial resources has resulted in advantageous spillover effects, promoting the expansion of businesses such as cultural output, including animation and information services. Japan has encountered obstacles including an ageing population and a constrained domestic market, leading to diminished employment growth and decreased consumer expenditure. Consequently, it is imperative to bridge the efficiency disparity between the manufacturing and service sectors, as well as to reorganise the manufacturing industry or relocate industrial operations. Prior research suggests that augmenting competition in manufacturing via deregulation is essential for enhancing industry efficiency. Furthermore, additional study indicates that capital markets often facilitate the expansion of manufacturing enterprises, especially as a result of technical advancements. The COVID-19 pandemic in 2020 significantly disrupted Japan's conventional consumer products development paradigm, prompting the government to prioritise enhancing supply chain resilience and advancing digital transformation within the sector. The globalisation of the consumer products sector has transformed the economic landscape of China and other developing nations by facilitating the growth and modernisation of many industries through technology and labour. It is also linked with numerous industries, hence enhancing growth potential. Industrial enterprises in China's major urban centres benefit from a substantial population density, presenting significant opportunities for worker expansion. The government has tremendous prospects to exploit for economic and resource development. All industries inside the nation must be vigilant regarding fluctuations in domestic and international market trends, while also drawing insights from prominent developed cities like Tokyo. These insights can facilitate the transition of industries in China's rapidly developing economy to the forefront of development. Technologies such as big data, IoT, AI, mobile internet, and cloud computing can facilitate a new era of economic growth. Innovative advancements in industrial technology are crucial for attaining economic objectives.

Shanghai is acknowledged as one of China's most globalised cities, necessitating a more thorough examination. The progress of consumer goods industry in cities such as Beijing, Shenzhen, and Hangzhou would significantly benefit from acquiring ideas and knowledge from large cities like Shanghai. Furthermore, as a developing nation, China's experience might offer strategic ideas on industrialisation to other rising nations.

RESEARCH CONCLUSION AND POLICY RECOMMENDATIONS

Research Conclusions:

By identifying industries with substantial growth potential and the biggest impact on economic expansion, this study looks at how employment density in the consumer goods sector affects economic development in Shanghai and Tokyo. The study uses comparative analysis to improve the growth of Shanghai's unique sectors by using Tokyo's superior consumer goods sector as a standard. This study investigates the ways in which Shanghai's consumer goods sector supports urban economic growth, with a particular focus on population thresholds. First, research shows that Tokyo's consumer goods sector has a threshold impact, meaning that after a certain point, its contribution to economic growth changes from positive to negative. This implies that the consumer goods sector in Tokyo has reached a turning point in its growth as an industry. Despite a fall in its economic impact, the sector's absolute worth is nevertheless significant across a number of industries. On the other hand, Shanghai's consumer goods sector has been negatively impacted

since the threshold, which is indicative of the city's poor performance over the previous ten years and its incapacity to use its industrial advantages to boost economic growth. Shanghai should, however, follow Tokyo's growth tactics in order to fully realize the potential of its consumer goods industry, as the negative coefficient decreases beyond the threshold and tends toward a positive shift.

Shanghai's growing population density makes it possible to support steady and sustained urban economic growth by utilizing consumer spending as a major engine of economic expansion.

Second, the consumer products sector in Shanghai has the potential to grow in the following areas: food processing, cosmetics, apparel, packaging and printing, interior design, small electronics, pharmaceuticals, and process tourism. There is a significant disparity in the development of the industry as compared to Tokyo. Shanghai should continue to strengthen its consumer goods sector while giving priority to the growth of the food processing, cosmetics, cleaning, and apparel industries in order to close this gap. Building a solid industrial identity will boost Shanghai's consumer products sector's economic output and increase its overall competitiveness in the international market.

Policy Recommendations:

This study assesses the influence of job density in the consumer goods sector on economic growth in Shanghai and Tokyo, identifying the industries with the greatest economic impact and potential for expansion. The research is inspired by Tokyo's sophisticated consumer goods sector and employs a comparative analysis to facilitate the enhancement of Shanghai's industrial framework. The research examines the impact of Shanghai's consumer goods sector on urban economic growth, with a specific emphasis on population thresholds.

To begin with, the data suggests that the consumer good industry in Tokyo provides economic growth, whereas in Shanghai, it still has some way to go. In Tokyo, industries related to consumer goods tend to switch from having a positive contribution to economic development until the threshold to having a negative one after the threshold is crossed, meaning that the sector is at a maturity phase. Nevertheless, the consumer goods sector’s contribution towards the economy may have diminished, but is still a powerful segment in Tokyo’s GDP. In contrast, the consumer goods industry in Shanghai has mainly had a worsening impact on the economy after the cut-off date indicating sluggish economic growth over the last 10 years and failure to utilize industrial benefits to catalyze economic activity. Nevertheless, the fact that such an economy is developing suggests that Shanghai will be able to draw from Tokyo. Meanwhile, negative balance would gradually fade away after the cut-off date. Due to the increased population concentration in Shanghai, utilizing consumer spending as the main engine of economic growth will be vital to achieve sustainable and controlled urban economic development.

The subsectors of the consumer goods industry—food processing, cosmetics, clothing, packaging and printing, indoor decoration, small electronics processing, pharmaceutical manufacturing, and process tourism—are ranked in descending order based on an assessment of their development potential in Shanghai. A significant disparity exists in the industrial growth of the two cities in comparison to Tokyo. To rectify this deficiency, Shanghai ought to prioritise the enhancement of the food processing, cosmetics, and cleaning supplies sectors, while positioning the garment industry at the core of its consumer products strategy. By meticulously nurturing these pivotal firms, Shanghai can cultivate a unique industrial identity and enhance the overall economic contribution of its consumer products sector, thereby reinforcing Shanghai's role in urban economic development.

Research Limitations and Perspectives

This study examines the consumer products sector in Shanghai, China, and Tokyo, Japan, using empirical examination of industry data from 2007 to 2016. The report compares the two cities, highlighting disparities and issues while proposing recommendations for Shanghai's future development. Nonetheless, certain limits exist. Although Shanghai has drawn lessons from Tokyo's development throughout its internationalisation period, notable disparities persist between China and Japan, particularly concerning regional industrialisation levels. The industrial sector in China advantages from a substantial domestic market; nonetheless, urbanisation has led to persistent labour surpluses and employment challenges for university graduates. Consequently, although Tokyo's consumer goods sector offers

valuable benchmarks, Shanghai should also consider the experiences of other global cities, such as New York, USA, to inform its industrial transformation and enhance economic growth. Furthermore, owing to data constraints, the statistical analysis of the study is confined to 2016. Given the escalating environmental risks, it is essential to evaluate changes from the past five years for precise comparisons and trend projections. The authors advocate for future study to expand to comparative studies of additional foreign cities, resulting in conclusions with broader applicability. Moreover, ongoing monitoring and analysis of recent industrial advancements in each city are essential for comprehending long-term industry trends and providing actionable recommendations for industrial enhancement and urban economic development.

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