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Regional Economic Transformation amid Industrialization in Batang Regency, Central Java Province, Indonesia

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ABSTRACT: This study examines the structural transformation of the regional economy in Batang Regency, and its implications for farming household income diversification. Agriculture has historically been the backbone of the local economy; recent trends show a declining contribution of the agricultural sector to the GRDP, concurrent with the rise of manufacturing, trade, and service industries. Using secondary data from 2013–2024, the research applies descriptive sectoral analysis, Shift Share analysis, Location Quotient (LQ) to evaluate economic shifts before and after the establishment of the Industrial Park in Batang Regency. The descriptive findings reveal that manufacturing has become the dominant sector, followed by agriculture and trade. Shift Share results indicate that while agriculture benefits from overall regional economic growth, it lacks structural and competitive advantages. LQ analysis identifies key basic sectors, including agriculture, manufacturing, information and communication, and transportation.

1. INTRODUCTION

Structural transformation is a fundamental process of economic development in which economic activity and resources gradually shift from agriculture toward manufacturing and service-oriented sectors. This transformation is commonly reflected in changes in the sectoral composition of output, employment, and productivity. As economies develop, labor and other resources tend to move from traditional agricultural activities toward more productive non-agricultural activities, although the pace and direction of transformation may vary across regions. Industrialization can accelerate this process by generating new employment opportunities and expanding non-agricultural sources of value added. However, the expansion of manufacturing and services does not necessarily eliminate the importance of agriculture, particularly in rural and agriculture-based regions where agricultural and non-agricultural activities continue to coexist and interact [1] [2] [3].

In Indonesia, structural transformation has been reflected in the changing contribution of agriculture, manufacturing, and service activities to economic output and employment. Empirical evidence indicates that the relative role of agriculture has declined while manufacturing and service activities have expanded, although the pattern and speed of transformation differ across regions. [4] Previous study for example, found that the service sector increasingly outperformed agriculture in terms of value added and employment, while agricultural productivity showed a declining trend relative to manufacturing and services. Similarly, [5] identified structural transformation in Indonesia over the 1990–2019 period and showed that changes in the agricultural, industrial, and service sectors were associated with differences in population and human capital. More recent evidence also indicates that Indonesian regions remain at different stages of structural transformation, with some agriculture-based regions experiencing gradual shifts toward manufacturing and service activities.

Batang Regency in Central Java provides a relevant case for examining these dynamics because industrial development is occurring alongside a historically important agricultural economy. Agriculture has traditionally played a substantial role in supporting the regional economy, with Batang possessing diverse agro-ecological conditions and considerable potential for

agricultural and horticultural development [6]. At the same time, the role of manufacturing and other non-agricultural activities has become increasingly important in shaping the regional economic structure. Previous evidence on regional industrial development in Central Java has identified Batang among the regencies experiencing changes in industrial development and structural composition, demonstrating that the region's economic trajectory cannot be understood solely from its agricultural base. The development of the Batang Integrated Industrial Estate (KIT Batang) has further intensified this transformation, with industrial development accompanied by changes in land use and increasing pressure on agricultural areas [7]. These developments illustrate a broader process of industrialization and structural transformation, in which changes in production activities and the relative importance of economic sectors reshape regional economic structures [8]. Against this background, the coexistence of a substantial agricultural sector and an expanding manufacturing base makes Batang an appropriate case for examining whether industrialization is accompanied by broader regional economic transformation.

The transformation of the sectoral structure has implications beyond changes in the composition of GRDP. Industrialization may alter the distribution of economic activities, employment opportunities, and sectoral specialization across regions. As manufacturing and service activities expand, agricultural employment and agriculture's relative contribution to the economy may decline, while rural households may increasingly combine agricultural activities with non-agricultural employment or business activities. Evidence from Indonesia shows that structural transformation is associated with the reallocation of labor and economic activity across sectors, although the extent of this reallocation varies according to regional characteristics and the availability of non-agricultural opportunities [2] [4]. Therefore, examining regional transformation requires not only identifying sectors with increasing contributions to GRDP but also determining whether these sectors exhibit stronger growth, competitiveness, and specialization within the regional economy.

Previous studies of regional economic transformation in Indonesia have employed approaches such as Shift Share and Location Quotient (LQ) to examine sectoral growth, competitiveness, and specialization. Shift Share analysis decomposes regional sectoral growth into components associated with overall economic growth, sectoral structure, and regional competitive effects, thereby helping identify sectors that perform relatively better or worse than the reference economy [9]. Location Quotient, meanwhile, is commonly used to identify sectors with a relatively high degree of regional concentration and to distinguish potential basic sectors from non-basic sectors. Recent Indonesian studies have applied Location Quotient and Shift Share analysis to identify regional base sectors, leading sectors, and sectoral competitiveness, as demonstrated in studies of Riau Province and Ciamis Regency [10] [11]. Nevertheless, much of the existing regional literature applies these methods primarily to identify leading sectors or measure sectoral competitiveness. A more integrated interpretation is needed to explain how changes in sectoral growth, competitiveness, and specialization collectively reflect regional structural transformation in agricultural regions undergoing industrialization.

This study addresses this gap by examining the transformation of Batang Regency's regional economic structure amid the ongoing expansion of industrial activities. The study combines descriptive analysis of sectoral GRDP and employment with Shift Share analysis to identify sectoral growth dynamics and competitiveness, and Location Quotient analysis to identify sectors that constitute the regional economic base. By integrating these analytical perspectives, the study provides a more comprehensive assessment of the direction of Batang's economic transformation and the changing position of agriculture, manufacturing, trade, and service sectors within the regional economy. This approach is particularly relevant because structural transformation in Indonesia does not necessarily follow a uniform transition from agriculture to manufacturing; instead, regions may experience different combinations of agricultural, industrial, and service-sector expansion [5] [3].

The study contributes to the literature by providing empirical evidence from Batang Regency, where industrialization is developing alongside a historically important agricultural sector. Rather than treating agricultural decline and industrial expansion as separate processes, this study conceptualizes them as interconnected dimensions of regional structural transformation. The findings are expected to clarify the changing economic position of agriculture, the emerging role of manufacturing and other non-agricultural sectors, and the sectoral characteristics that underpin Batang's economic transformation. Such evidence can provide a stronger empirical basis for regional development planning, particularly in designing policies that strengthen productive sectors, facilitate rural economic adaptation, and promote more inclusive and sustainable industrialization. This regional perspective is important because recent evidence suggests that structural transformation in Indonesia remains uneven across regions and that agriculture-based regions may require stronger linkages with manufacturing and service sectors to capture the benefits of transformation.

2. MATERIALS AND METHODS

The research was conducted in Batang Regency, Central Java Province, Indonesia, using regional economic data covering the 2013–2024 period. The observation period was divided into two phases to examine changes in the regional economic structure in relation to the development of the Batang Industrial Park (KIT Batang): 2013–2019, representing the period prior to the development of the industrial park, and 2020–2024, representing the period of increasingly prominent industrial development. Batang Regency was selected because it has historically maintained a strong agricultural base while simultaneously experiencing rapid industrial development and changes in its sectoral economic structure. This setting provides an appropriate context for examining structural transformation associated with industrialization. Previous evidence from Indonesia demonstrates that industrial development can alter regional economic structures through changes in sectoral specialization, productivity, labor allocation, and the emergence of supporting sectors [12]. Similar evidence has been reported in Kendal Regency, Central Java, where the development of the Kendal Special Economic Zone was associated with an increase in the relative importance of manufacturing and broader changes in the regional economic structure [13]. These findings provide a relevant regional context for examining the economic transformation of Batang, which is located within the same broader industrial corridor of Central Java.

This study employs a quantitative approach with descriptive and comparative analysis. Quantitative analysis is used to measure changes in the contribution and specialization of economic sectors based on regional Gross Domestic Product (GRDP) data. The descriptive component identifies the characteristics and evolution of Batang's sectoral economic structure, while the comparative component examines the sectoral performance of Batang Regency relative to Central Java Province as the reference region. The analysis employs Location Quotient (LQ) to identify sectors with relatively high regional specialization and Shift-Share analysis to decompose sectoral growth into overall regional growth, industry-mix, and competitive effects. The application of LQ and Shift-Share is well established in regional structural analysis in Indonesia. For example, [14] combined LQ and Shift-Share to examine structural transformation across regencies and cities in West Java, identifying differences in agricultural, industrial, and service-based economic specialization. More recently, [15] used LQ and Shift-Share to examine structural transformation in South Kalimantan over 2010–2024, demonstrating the usefulness of these methods for identifying changes in sectoral specialization and growth performance.

This methodological approach is appropriate for examining regional structural transformation because it allows sectoral specialization and growth dynamics to be assessed simultaneously. LQ identifies the relative concentration of economic sectors in Batang compared with the reference economy, while Shift-Share distinguishes the contribution of overall regional growth, sectoral growth structure, and regional competitive performance [16]. The combined use of these methods has been applied in studies of structural transformation in different Indonesian regions, including Java and other resource- or agriculture-based economies [14] [15]. Recent evidence from South Halmahera further demonstrates how LQ and Shift-Share can be used alongside broader regional analysis to identify structural transformation associated with industrialization, including changes in manufacturing competitiveness and the emergence of supporting sectors [12]. Meanwhile, the evidence from Kendal shows that industrial-zone development can coincide with an increasing role of manufacturing in a previously agriculture-oriented regional economy [13].

Therefore, the combination of LQ and Shift-Share in this study provides a suitable framework for assessing whether Batang's economic transformation represents a simple shift away from agriculture or a broader reconfiguration involving agriculture, manufacturing, trade, transportation, information and communication, and other service sectors.

2.1 Study Material

Gross Regional Domestic Product (GRDP) data at constant prices by industry, obtained from the Central Statistics Agency (BPS) of Batang Regency and the Central Java Provincial Statistics Agency (BPS), is used to analyze the sectoral economic structure, competitiveness, and potential of basic sectors.

2.2 Analytical Methods

Step 1: Sectoral Descriptive Analysis

Used to describe the economic structure of Batang Regency based on sectoral contributions to GRDP and employment. This analysis displays the pattern of changes in sectoral contributions over time, thus demonstrating the direction of regional economic transformation.

Step 2: Shift Share Analysis

- National Share (NS) → describes the province's overall economic growth.
- Proportional Shift (PS) → shows the effect of industrial structure (whether the sector is growing faster than the provincial average).
- Differential Shift (DS) → shows the region's competitive advantage (whether the sector in Batang is growing faster than the same sector in the province).

Step 3: Location Quotient (LQ) Analysis

Used to identify basic and non-basic sectors in Batang Regency. An LQ value > 1 indicates a basic (leading) sector, an LQ = 1 indicates a sector with a balanced contribution, and an LQ < 1 indicates a non-basic sector. This analysis helps identify potential sectors that are regional economic strengths and can support community income diversification.

$$LQ_i = \frac{\frac{Y_{i,Batang\ Regency}}{Y_{total\ Batang\ Regency}}}{\frac{Y_{i,Central\ Java\ Province}}{Y_{total\ Central\ Java\ Province}}}$$

Where:

- $Y_{i,Batang}$: GRDP i sector in Batang Regency
- $Y_{total,Batang}$: GRDP total of Batang Regency
- $Y_{i,Central\ Java}$: GRDP i sector in Central Java Province
- $Y_{total,Central\ Java}$: GRDP total of Central Java Province

Interpretation criteria:

- LQ > 1 → basic sector (superior, has potential for inter-regional exports)
- LQ = 1 → neutral sector (balanced)
- LQ < 1 → non-basic sector (dependent on other regions)

3. RESULTS AND DISCUSSION

3.1 Result Summary Flow

Proces	Analysis Methods	Data Used	Objective	Results
1	Descriptive Analysis	Sectoral GRDP	Describing the rural economic structure	Top three leading industries have contribution to Batang Regency GDRP: 1) manufacturing (32,91%); 2) Agriculture, forest and fishing (19.72%); 3) Wholesale and retail trade; repair of motor vehicles and motorcycles (14,13%)
				Agriculture sectoral is not the main contributor to GRDP, it is on the 2 nd place after manufacturing industry

Proces	Analysis Methods	Data Used	Objective	Results
2	Shift Share Analysis	Sectoral GRDP Batang Regency vs Central Java Province	Measuring the contribution and sectoral competitiveness	Positive National Share (N_i) , while both the Industry Mix (IM_i) and Competitive Share (C_i) components are negative.
3	<i>Location Quotient (LQ)</i>	Sectoral GRDP	Determine the basis or non-basis sectoral	Basic sector ($LQ > 1$): Agriculture, Forestry & Fishing, Information & Communication, Water supply & waste management, Transportation & storage, Business activities, Manufacturing, Wholesale & retail trade, Electricity & gas, Education.
				Non-Basic sector ($LQ < 1$): Construction, Accommodation & food service, Public administration, Financial & insurance, Mining & quarrying, Other services, Human health and social work

3.2 Discussion

The Rural Economic Structure

The sectoral composition of Batang Regency's economy indicates a diversified economic structure in which manufacturing, agriculture, forestry and fishing, and wholesale and retail trade constitute the three largest contributors to Gross Regional Domestic Product (GRDP). Manufacturing accounted for 32.91% of total GRDP, followed by agriculture, forestry and fishing at 19.72%, and wholesale and retail trade; repair of motor vehicles and motorcycles at 14.13%. The dominance of manufacturing over agriculture indicates that Batang's regional economy has developed beyond a predominantly agrarian structure, although agriculture continues to represent an important component of regional economic activity. This configuration is consistent with the broader pattern of structural transformation observed in Indonesia, where the relative contribution of agriculture has declined while industrial and service-related activities have become increasingly important [4] [5].

The dominant contribution of manufacturing, at 32.91% of GRDP, indicates that industrial activities constitute the largest source of regional value added. This finding is particularly relevant in the context of Batang's ongoing industrial development. However, a high contribution to GRDP should not be interpreted directly as evidence of superior labor absorption or overall competitiveness, because sectoral GRDP shares measure the contribution of each sector to regional output rather than employment or productivity. Nevertheless, the prominence of manufacturing provides evidence that the economic structure of Batang has become increasingly industrial-oriented. This is consistent with the literature on structural transformation in Indonesia, which identifies the expansion of manufacturing and other non-agricultural activities as an important component of the transition away from an agriculture-dominated economic structure [5] [17].

The relatively large contribution of agriculture, forestry and fishing, at 19.72%, demonstrates that the industrialization of Batang has not eliminated the economic importance of the primary sector. Agriculture remains a substantial component of the regional economy and provides an important foundation for rural economic activity. This finding is consistent with evidence from Indonesia showing that structural transformation does not necessarily imply the disappearance of agriculture. Rather, agricultural transformation may occur simultaneously with the expansion of manufacturing and service activities, particularly through changes in productivity, labor allocation, and linkages with non-agricultural sectors [2]

The coexistence of a large manufacturing sector and a substantial agricultural sector suggests that Batang is experiencing a transitional or mixed regional economic structure rather than a complete replacement of agriculture by industry. This interpretation is important because structural transformation should not be assessed solely from the declining or increasing contribution of individual sectors. The Indonesian evidence indicates that structural change has occurred across regions, but the direction and intensity of transformation differ considerably. Using Shift Share analysis across Indonesian provinces, [Structural Change and Regional Economic Growth in Indonesia] found that structural change occurred across provinces, although the transition has increasingly involved a movement from agriculture toward services rather than following a uniform agriculture-to-industry pathway. Thus, the relatively high agricultural contribution in Batang should be interpreted as evidence of continued agricultural relevance within an increasingly industrialized regional economy rather than as an indication that industrialization has displaced agriculture.

The third-largest contribution comes from wholesale and retail trade; repair of motor vehicles and motorcycles, which accounts for 14.13% of GRDP. The substantial contribution of this sector suggests that trade and distribution activities constitute an important component of Batang's regional economy alongside production-oriented sectors. Rather than interpreting this share simply as evidence of a "well-developed local market," it is more appropriate to view trade as part of the regional economic linkage system connecting producers, consumers, and businesses. In an industrializing region, the expansion of manufacturing can generate demand for transportation, distribution, commercial services, and other supporting activities. Similarly, agriculture requires marketing and distribution channels to connect rural producers with consumers and downstream markets. The interaction between agriculture, manufacturing, and services is therefore an important dimension of regional structural transformation.

The coexistence of these three major sectors also indicates potential for stronger inter-sectoral linkages. Agriculture can provide raw materials for agro-processing and food-related manufacturing, while manufacturing can generate demand for logistics, trade, and business services. Conversely, trade and distribution networks can facilitate the movement of agricultural products and industrial inputs and outputs. Recent evidence from Indonesia's agriculture-based regions shows that agricultural sectors often have relatively weak upstream and downstream linkages despite possessing substantial potential for generating regional economic effects. Strengthening linkages between agriculture, manufacturing, and services is therefore important for deepening structural transformation and increasing the benefits of industrialization in agriculture-based regions [3].

From a regional development perspective, the current sectoral configuration presents both opportunities and challenges. The large manufacturing sector provides a foundation for further industrial upgrading, investment, technological adoption, and integration into regional value chains. However, industrial expansion should be accompanied by stronger linkages with local economic activities rather than operating as an isolated enclave. Evidence from Indonesia suggests that structural transformation contributes more strongly to regional economic growth when it is accompanied by productivity improvements within sectors (Structural Change and Regional Economic Growth in Indonesia). Therefore, policies that focus solely on increasing the scale of industrial activity may be insufficient unless they also enhance productivity, local supplier participation, skills, and inter-sectoral linkages.

At the same time, the relatively large agricultural contribution indicates that agricultural development remains relevant within Batang's transformation process. Rather than viewing agriculture as a declining sector that should simply be replaced by manufacturing, regional development policy should seek to improve agricultural productivity and strengthen its connections with processing, trade, logistics, and other non-farm activities. This perspective is consistent with evidence that agricultural transformation can involve the reallocation of labor and resources toward non-agricultural activities while agriculture itself becomes more productive and commercially integrated [2].

Overall, the sectoral composition of Batang's GRDP manufacturing first (32.91%), agriculture, forestry and fishing second (19.72%), and wholesale and retail trade third (14.13%) indicates that the regional economy is moving beyond a predominantly agrarian structure toward a more diversified economy with a strong industrial component. However, these shares alone do not establish the extent or direction of structural transformation. Rather, they provide an initial indication that Batang's industrialization is occurring alongside the continued importance of agriculture and trade. The subsequent Shift Share and Location Quotient analyses are therefore essential for determining whether the dominant sectors are also characterized by strong growth, regional competitiveness, and economic specialization. In this sense, Batang's transformation is better understood not as a simple transition from agriculture to industry, but as the emergence of an increasingly interconnected agricultural–industrial–trade regional economy.

The Sectoral Contributions and Competitiveness

The results of the Shift-Share decomposition for the agricultural sector in Batang Regency reveal a somewhat paradoxical pattern: the sector is benefiting from the broader expansion of the national economy (as evidenced by the positive National Share (N_i)), but at the same time it is constrained by both structural and competitive limitations negative Industry Mix (IM_i) suggests that agriculture in this region grows slower than would be expected given its national sectoral counterpart, and negative Competitive Share (C_i) indicates that the region is under-performing relative to other regions in the same sector.

The value of Shift share indicators are displayed as below

Table 2. Shift Share Indicators

Indicators	Value	Sign	Interpretation
N_i	16.674.453.831.474,40	+	Batang's agricultural sector experienced growth due to the expansion of the national or provincial economy as a whole.
IM_i	(446.396.887.967,14)	-	agricultural sector is growing slower than the average growth rate of the national economy.
C_i	(8.639.523.733.507,22)	-	Batang's agricultural sector grew more slowly than the same sector in the provincial or national level.
ΔE	7.588.533.210.000,00	+	The sector's growth is dependent on the overall economic environment, not on its own performance.

Source: Primary Data Processed (2025)

The Shift-Share decomposition provides further insight into the position of the agricultural sector within Batang Regency's changing economic structure. The results show a positive National Share (N_i) of IDR 16.674 trillion, a negative Industry Mix (IM_i) of IDR 446.397 billion, and a negative Competitive Share (C_i) of IDR 8.640 trillion. The resulting total change (ΔE) is positive at IDR 7.589 trillion. Taken together, these results indicate that the agricultural sector in Batang Regency experienced an absolute increase during the study period, but its growth was not supported by either a favorable sectoral growth structure or a positive regional competitive effect.

The positive N_i indicates that part of the increase in agricultural value added can be attributed to the overall expansion of the reference economy, namely Central Java Province. In the classical Shift-Share framework, the national or regional growth component represents the hypothetical increase that would have occurred if the sector had grown at the same rate as the overall reference economy [16]. Thus, the positive N_i should not be interpreted as evidence of an agricultural-specific advantage in Batang. Rather, it indicates that the general expansion of the Central Java economy provided a favorable growth environment for the agricultural sector.

In contrast, the negative IM_i , amounting to IDR 446.397 billion, indicates an unfavorable industry-mix effect. This result means that agriculture in the reference economy grew more slowly than the overall economy during the study period. Consequently, Batang's initial concentration in agriculture exposed the region to a sectoral structure that generated less growth than would have been obtained from specialization in relatively faster-growing sectors. This finding is consistent with evidence of structural

transformation in Indonesia, where agriculture has generally lost relative importance in value added and productivity compared with manufacturing and services [4] [17]. Previous study [4] for example, finds that the agricultural sector has experienced a decline in productivity relative to manufacturing and services as Indonesia's economic structure has changed.

The negative C_i of IDR 8.640 trillion provides an additional and more localized dimension to this result. The negative competitive effect indicates that agricultural value added in Batang Regency grew more slowly than the agricultural sector in the reference region, suggesting that the sector did not generate a positive regional competitive effect during the study period. Importantly, this finding should not be interpreted as evidence that agriculture lacks comparative advantage in Batang. Instead, it indicates relatively weaker growth performance compared with the corresponding agricultural sector in Central Java. Similar evidence has been reported in regional studies in Indonesia. [18], for example, found negative proportional and differential effects for agriculture in Garut Regency, indicating that although agriculture remained an important regional sector, its growth was constrained by an unfavorable sectoral structure and weaker competitive performance.

The combination of a positive N_i and negative IM_i and C_i is particularly important for understanding Batang's regional economic transformation. The positive N_i shows that agriculture benefited from the expansion of the broader economy, whereas the negative IM_i indicates that agriculture belongs to a relatively slower-growing sector. At the same time, the negative C_i suggests that Batang's agricultural sector did not grow sufficiently fast relative to the same sector in the reference region. Therefore, the agricultural sector can be characterized as an important but relatively slow-growing component of Batang's economy rather than a major driver of the ongoing structural transformation.

The positive ΔE of IDR 7.589 trillion nevertheless indicates that the agricultural sector increased in absolute terms over the study period. However, the decomposition shows that this increase was largely supported by the general expansion of the reference economy, while unfavorable industry-mix and competitive effects reduced the sector's potential contribution to regional growth. This distinction is important because an increase in agricultural value added does not necessarily imply that agriculture is becoming more dynamic or competitive relative to other sectors.

From a regional development perspective, the findings suggest that agricultural development in Batang should not be approached simply as an effort to preserve the existing agricultural structure. Instead, the challenge is to improve agricultural productivity and strengthen its linkages with the emerging manufacturing, trade, and service sectors. Such an approach is consistent with recent evidence that structural transformation in agriculture-based regions requires stronger intersectoral linkages and greater integration of agriculture with higher-value economic activities [3]. In the context of Batang, therefore, industrialization does not necessarily imply the disappearance of agriculture. Rather, it creates a need for agriculture to reposition itself through productivity enhancement, agro-processing, market integration, and stronger linkages with the expanding non-agricultural economy.

The LQ analysis for this research, displayed as below:

Table 3: LQ Average Analysis (2013-2024)

No	Sectors	LQ Average	
1	Construction	0,58	
2	Other services activities	0,84	
3	Fiancial and insurance activities	0,85	
4	Public admiistration and defence; compulsory social security	0,90	
5	Accomodation and food service activities	0,90	
6	Mining and Quarrying	0,95	
7	Human health and sosial work activities	0,99	
8	Estate activities	0,99	

9	Education	1,04	
10	Electricity and Gas	1,06	
11	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,07	
12	Manufacturing	1,09	
13	Business activities	1,20	
14	Transportation and storage	1,29	
15	Agriculture, Forestry and Fishing	1,45	
16	Information and communication	1,50	
17	Water supply, sewerage, waste management and remediation activities	1,51	

Source: Primary Data Processed (2025)

4. CONCLUSION

This study examined the regional economic transformation of Batang Regency amid increasing industrialization using Location Quotient (LQ) and Shift-Share analysis over the 2013–2024 period. The findings demonstrate that Batang's economic transformation cannot be characterized simply as a transition from agriculture to manufacturing. Instead, the region is experiencing a reconfiguration of sectoral specialization in which agriculture remains an important basic sector while manufacturing, trade, transportation, information and communication, business activities, utilities, and education have also developed as areas of regional specialization.

The LQ results show that nine of the seventeen economic sectors had average LQ values above one. Agriculture, forestry and fishing recorded a relatively high LQ of 1.45, confirming its continued specialization in Batang. At the same time, manufacturing recorded an LQ of 1.09, while transportation and storage (1.29), information and communication (1.50), and business activities (1.20) also emerged as specialized sectors. These findings indicate that industrialization has not displaced agriculture from the regional economic structure. Rather, agriculture and non-agricultural sectors are developing simultaneously, reflecting a broader process of structural diversification and economic reconfiguration.

However, the Shift-Share results reveal an important distinction between specialization and competitive performance. The agricultural sector recorded a positive National Share (Ni) of IDR 16.674 trillion, indicating that part of its growth was associated with the overall expansion of the reference economy. Nevertheless, the sector recorded negative Industry Mix (IMi) of IDR 446.397 billion and negative Competitive Share (Ci) of IDR 8.640 trillion. Thus, although agriculture increased in absolute value, its growth was relatively disadvantaged by the slower growth of the agricultural sector compared with the overall reference economy and by its weaker growth performance relative to agriculture in the reference region. The positive total change (ΔE) of IDR 7.589 trillion confirms that agricultural value added nevertheless increased during the study period.

Taken together, the LQ and Shift-Share findings reveal that agriculture in Batang represents a specialized but relatively slow-growing and less competitive sector. This distinction is important because a high LQ should not be interpreted automatically as evidence of competitiveness. Conversely, the emergence of manufacturing and service-related sectors as basic sectors indicates that Batang's industrialization is accompanied by the development of a broader economic base. The regional transformation is therefore better understood as a shift toward a more multi-sectoral economic structure rather than the simple replacement of agriculture by industry.

These findings imply that regional development policy should not pursue industrialization at the expense of agriculture. Instead, policy should focus on strengthening the linkages between agriculture and the expanding manufacturing, trade, transportation, information, and business-service sectors. Agricultural upgrading through productivity improvement, agro-processing, market integration, logistics, and value-chain development could allow agriculture to participate more effectively in the industrializing regional economy. At the same time, the emerging specialized sectors can provide new opportunities for employment, investment, and higher-value economic activities. Such an approach would enable Batang to pursue structural transformation

while maintaining the economic role of agriculture and strengthening the complementarities between agricultural and non-agricultural sectors.

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AUTHOR CONTRIBUTIONS

Liska Simamora: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft-review and editing;

Migie Handayani: Conceptualization, Methodology, review & editing.

CONFLICT OF INTEREST

The authors have no relevant financial or non-financial interests to disclose.

ETHICS STATEMENT

Ethical approval was not required for this study.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

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