

Regional economic competitiveness and structural transformation in Banjarnegara: LQ, DLQ, and Shift-Share evidence

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Abstract

Regional development policy requires distinguishing sectors that are currently specialized from sectors whose relative position is strengthening and from sectors that outperform the same activities in a benchmark economy. This study examines the sectoral structure of Banjarnegara Regency and identifies development priorities by integrating Location Quotient, Dynamic Location Quotient, and classical Shift-Share analysis. The study addresses limited district-level evidence that jointly evaluates current specialization, dynamic prospects, and local competitive performance during the post-pandemic period. A quantitative descriptive-comparative design is applied to official constant-price gross regional domestic product data for all industries in Banjarnegara and Central Java published by Statistics Indonesia. The findings show that mining, trade, public administration, and education are base sectors with strengthening relative specialization. Manufacturing is not yet a base sector but records the greatest dynamic improvement and the largest positive competitive effect, while construction is also strengthening and competitive. The results support differentiated policy by consolidating established bases, accelerating emerging manufacturing and construction, and closing productivity gaps in rapidly expanding services. The study adds value by integrating three complementary diagnostics into a single sectoral priority framework for evidence-based regional planning.

INTRODUCTION

Regional economic policy is more effective when it distinguishes the size of a sector from the sources of its growth. A large sector may dominate a local economy because of inherited specialization without necessarily growing faster than its benchmark, while a smaller sector may be strengthening rapidly and developing a local competitive advantage. This distinction has become particularly important after the pandemic, when sectors recovered at markedly different speeds and the geography of recovery reflected industrial composition, specialization, institutional capacity, and local agency (Duran & Fratesi, 2023; Hu et al., 2022; Qiao & Ji, 2024). The broader regional literature likewise shows that economic structure and technological coherence shape how territories absorb shocks and subsequently reorient their development paths (Martini, 2020; Rocchetta & Mina, 2019).

Banjarnegara Regency provides a relevant case for this type of structural diagnosis. Statistics Indonesia reports that real gross regional domestic product (GRDP) at 2010 constant prices increased from IDR 15.54 trillion in 2021 to IDR 19.01 trillion in 2025. The increase, however, was uneven across the 17 industries. Transportation

and storage more than doubled, accommodation and food services expanded strongly, and manufacturing recorded one of the largest absolute additions to real output. Agriculture remained the largest local activity, but its growth was considerably slower than the expansion of the overall provincial economy. These contrasting trajectories mean that simple rankings based on contribution or growth alone can produce misleading development priorities (Badan Pusat Statistik Kabupaten Banjarnegara, 2026; Badan Pusat Statistik Provinsi Jawa Tengah, 2026).

Three analytical perspectives are therefore combined in this study. First, Location Quotient (LQ) identifies current relative specialization by comparing an industry's share in Banjarnegara with the same industry's share in Central Java. Second, Dynamic Location Quotient (DLQ) evaluates whether that relative specialization is strengthening or weakening through time. Third, Shift-Share analysis decomposes sectoral output change into the portion associated with overall provincial growth, the industry-mix effect, and the local competitive effect. The complementarity of these tools is supported by methodological work on localization indicators and shift-share decomposition (Fracasso & Vittucci Marzetti, 2018; Montanía et al., 2021) and by Indonesian

applications that integrate LQ, DLQ, and Shift-Share to classify development priorities (Saragih et al., 2024; Tanjung et al., 2021).

The research gap is twofold. Empirically, the most recent 2021-2025 BPS series allows a district-level assessment that captures the post-pandemic reconfiguration of Banjarnegara's economy using a consistent 2010 constant-price basis. Analytically, many regional-sector studies rely on one static indicator or treat high growth as equivalent to competitiveness. This study instead separates current base status, dynamic strengthening, and competitive performance. Such separation is important because a sector can be non-base yet increasingly specialized and locally competitive, or can grow rapidly in absolute terms while still lagging behind the same sector at the provincial level. The regional resilience and diversification literature similarly emphasizes that structural composition, related capabilities, and territorial competitiveness should be evaluated jointly rather than inferred from a single growth statistic (Balland et al., 2019; Boschma, 2017; Pizzuto, 2020).

Accordingly, this study asks four questions: (1) which Banjarnegara industries are base and non-base sectors relative to Central Java; (2) which industries are strengthening or weakening dynamically; (3) which industries exhibit favorable industry-mix and local competitive effects; and (4) what development priorities emerge when the three diagnostics are integrated? The objective is to construct an evidence-based sectoral priority map for Banjarnegara. The study contributes to regional development practice by distinguishing sectors that should be consolidated, sectors that warrant acceleration because they are emerging competitively, and sectors that require productivity upgrading despite rapid output growth.

LITERATURE REVIEW

Economic-base specialization and dynamic sectoral positioning

Economic-base analysis starts from the proposition that regional development is partly driven by activities whose relative concentration exceeds the benchmark economy. Location Quotient (LQ) operationalizes this proposition by comparing a sector's local share with its share in a reference region. The indicator is attractive because it is transparent and replicable, but its interpretation requires care: high specialization is not equivalent to high productivity,

competitiveness, or future growth. Fracasso & Vittucci Marzetti (2018) show that the location quotient can serve as a useful proxy for localization dynamics when the scale of the local economy is considered explicitly. Indonesian evidence reaches a similar practical conclusion. Tanjung et al. (2021) use static and dynamic specialization to establish leading agricultural subsector priorities in Bangka Belitung, while Hasrianti Silondae et al. (2024) apply LQ to identify local-chicken production base areas and distinguish superior, static, and potential locations. Saragih et al. (2024) further demonstrate that combining LQ, Dynamic Location Quotient (DLQ), and Shift-Share produces more informative development priorities than relying on a single indicator. These studies support the use of LQ for current base status and DLQ for the direction of relative specialization rather than treating one cross-sectional coefficient as a complete measure of sectoral strength.

The dynamic interpretation of specialization is closely connected to the literature on regional diversification and capability accumulation. Boschma (2017) argues that regions tend to diversify into activities related to capabilities already present in the local economy, which makes relatedness a central mechanism of structural change. Miguelez & Moreno (2018) find that regional innovation benefits from related local knowledge and from external knowledge flows that match the existing regional knowledge base. Balland et al. (2019) extend this logic by combining relatedness with knowledge complexity and show that movement into more complex activities can be attractive but difficult unless new activities build on locally available capabilities. Fritz & Manduca (2021) likewise show that economic complexity is meaningful at the metropolitan scale and is associated with substantial differences in regional economic outcomes. Rocchetta & Mina (2019) add that technological coherence, rather than diversification alone, can strengthen adaptive resilience. Taken together, this literature implies that a non-base sector with DLQ above one should not automatically be dismissed as unimportant; it can represent an emerging capability whose relative position is strengthening and whose development may be supported by related local assets.

Shift-Share decomposition and regional competitiveness

Shift-Share analysis complements specialization measures because it decomposes observed sectoral change into components associated with benchmark-wide growth, the growth profile of the sector in the benchmark economy, and a place-specific competitive effect. Pizzuto (2020) uses the regional shift component from a multiple-bases formulation as an indicator of endogenous regional competitiveness and shows that competitiveness helps explain heterogeneous responses to the Great Recession. Methodological research has progressively refined the conventional framework. Ruault & Schaeffer (2020) develop a scalable formulation that incorporates spatial concentration, industry emergence, and extreme growth events; Montanía et al. (2021) introduce spatial shift-share effects that distinguish national, neighborhood, and regional contexts; Scarffe (2021) shows that conventional shift-share can be viewed as an index-number problem and proposes an unbiased decomposition; Luo & Yang (2023) revisit the Esteban-Marquillas framework to separate industrial-structure and competitiveness effects more fully; and Montanía et al. (2024) propose a comprehensive formulation that captures interactions between geographical and sectoral conditions. These extensions do not invalidate the conventional three-component model used for transparent regional diagnosis, but they clarify that its competitive component is relative to the chosen benchmark and should not be read as a causal estimate.

Applications of Shift-Share across different economic contexts confirm the diagnostic value of separating structural and competitive sources of change. Giannakis & Bruggeman (2017) combine Shift-Share and input-output approaches to show substantial sectoral and spatial heterogeneity in the resilience of Greek regions during crisis. Sheng et al., (2021) employ a shift-share framework to decompose changes in green investment across China and reveal that differences in industrial structure and regional performance jointly shape investment change. Visagie & Turok (2022) decompose regional growth dynamics in South Africa and show that national weakness can conceal important differences in regional and sectoral trajectories. The implication for district-level analysis is important: a sector may record rapid absolute growth and still have a negative differential shift when the same sector grows even faster in the benchmark region.

Conversely, a relatively slow-growing sector can display a positive competitive effect if its local

performance exceeds the benchmark-sector trajectory. Thus, growth, specialization, and competitiveness are related but empirically distinct dimensions.

Economic structure, resilience, and post-shock transformation

A broader regional-resilience literature helps explain why sector composition and local capabilities matter for post-shock transformation. Bristow & Healy (2018) find that innovative regions in Europe were more likely to resist or recover rapidly from the global financial crisis, indicating that innovation capacity is part of the resilience mechanism. Cainelli et al. (2019) show that related variety can operate as a short-run shock absorber in Italian local labor markets, while Ezcurra & Rios (2019) identify quality of government as an important determinant of regional resilience in the European Union. Kitsos et al. (2019) demonstrate that local industrial embeddedness also influences resilience in the United Kingdom. Martin & Gardiner (2019), examining four recessions across British cities, find persistent geographical differences in resistance and recovery, suggesting that repeated shocks can alter long-run urban growth paths. Martini (2020) similarly links resilience to economic structure and demonstrates that the effects of specialization vary across crises and stages of recovery. This evidence suggests that sectoral priorities should be interpreted within the wider institutional, technological, and structural characteristics of a region, not solely from the magnitude of GRDP growth.

The post-pandemic evidence strengthens this argument. Hu et al. (2022) show that the resistance of Northeast Chinese cities during COVID-19 was associated with industrial structure, specialization, variety, innovation, openness, and local state agency. Duran & Fratesi (2023) demonstrate that resilience estimates and their determinants can change when region-specific business-cycle turning points are used instead of a common national cycle. Wang & Li (2022) find that regional scale, resources, and higher-level trajectories condition resilience across Chinese cities. More recent studies move beyond simple sector shares: Zhang & Tian (2024) construct a multidimensional assessment of regional economic resilience and identify heterogeneous drivers across Chinese provinces; Qiao & Ji (2024) show through stress testing that the structure of inter-industry networks materially affects regional resilience; and Çınar & Ünsal

(2026) find that related and unrelated variety play distinct roles in the resistance and recovery of Turkish regions. Collectively, these studies indicate that post-shock regional transformation depends on the interaction of specialization, diversification, network structure, innovation, institutions, and local agency.

Synthesis of previous studies and research gap

The 30 previous studies reviewed above yield four consistent lessons for the present research. First, current specialization and dynamic strengthening should be distinguished: LQ identifies the current economic base, whereas DLQ indicates whether a sector's relative position is improving or weakening. Second, Shift-Share adds information that LQ cannot provide by separating benchmark growth, industry-mix effects, and local competitive performance. Third, contemporary regional research shows that competitive outcomes are path-dependent and influenced by related capabilities, innovation, embeddedness, governance, network structure, and the nature of the shock. Fourth, Indonesian applications confirm that integrated sector-classification tools can translate these concepts into actionable regional priorities.

Nevertheless, there is limited evidence that jointly evaluates static specialization, dynamic specialization, and competitive decomposition for Banjarnegara using the complete 17-industry real-GRDP structure for the 2021-2025 post-pandemic period. This study addresses that gap by integrating LQ, DLQ, and Shift-Share in one diagnostic framework. The contribution is deliberately diagnostic rather than causal: it identifies whether a sector is currently specialized, whether its relative specialization is strengthening, and whether its local growth outperforms the same industry in Central Java, thereby creating a more defensible basis for sector prioritization than rankings based only on size or absolute growth.

To operationalize this synthesis, the study uses the analytical framework presented in Figure 1. The framework connects sectoral specialization, dynamic prospects, and competitive performance to an integrated classification of regional development priorities.

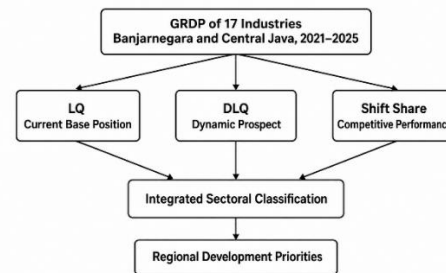


Fig 1. Analytical Framework of the Study

Source: Authors' conceptualization based on the integrated LQ, DLQ, and Shift-Share approach.

METHODS

This study uses a quantitative descriptive-comparative design. The unit of analysis is the 17 GRDP industries classified under the 2010 base-year industrial classification. All industries are included; therefore, the study uses a census of sectors rather than a sample. Banjarnegara Regency is the local economy and Central Java Province is the benchmark economy. The observation period is 2021-2025, representing four annual growth intervals. Secondary data were collected through documentation of official tables in the 2026 publications Gross Regional Domestic Product of Banjarnegara Regency by Industry 2021-2025 and Gross Regional Domestic Product of Jawa Tengah Province by Industry 2021-2025. All calculations use GRDP at 2010 constant prices to isolate real output changes from price effects. The 2025 figures are very preliminary in both publications.

The research instrument is a sector-by-region data matrix containing sectoral and total GRDP for the initial and final years. The official aggregate total is used in the denominator of LQ and DLQ. Because the sum of rounded Banjarnegara sector values for 2025 differs from the official total by IDR 0.02 billion, the official BPS total of IDR 19,008.78 billion is retained for ratio calculations; the small discrepancy is treated as a rounding artifact.

Static Location Quotient measures current specialization. For industry i in Banjarnegara j with Central Java R as the reference region, LQ is calculated as:

$$LQ_{it} = \left(\frac{Y_{ijt}}{Y_{jt}} \right) / \left(\frac{Y_{irt}}{Y_{Rt}} \right)$$

where Y_{ijt} Banjarnegara industry i GRDP, Y_{jt} is total Banjarnegara GRDP, Y_{irt} is Central Java industry i GRDP, and Y_{Rt} is total Central Java GRDP. LQ greater than one denotes a base sector, LQ equal to one indicates proportional specialization, and LQ below one denotes a non-base sector.

Dynamic Location Quotient measures the change in relative specialization. Following the growth-based form used in regional sector analysis, DLQ is calculated as:

$$DLQ_i = \left(\frac{(1 + g_{ij}) / (1 + g_j)}{(1 + G_i) / (1 + G)} \right)^4$$

where g_{ij} is the compound annual growth rate of industry i in Banjarnegara, g_j is the compound annual growth rate of total Banjarnegara GRDP, G_i is the corresponding industry growth rate in Central Java, G is total Central Java growth, and t equals four. When the same endpoint-based compound growth convention is used consistently, this expression is algebraically equivalent to LQ2025 divided by LQ2021. DLQ above one indicates strengthening relative specialization, whereas DLQ below one indicates weakening relative specialization. Values very close to one are interpreted as broadly stable rather than as a sharp structural change (Saragih et al., 2024; Tanjung et al., 2021).

Classical Shift-Share is then applied to the same constant-price data. To avoid ambiguity, this study reports three components: Regional Share (NS), Industry Mix (IM), and Competitive Effect (CE). NS is equivalent to the conventional national-share term, but the benchmark in this study is Central Java Province.

The formulas are:

$$NS_i = Y_{ij0}(r_R)$$

$$IM_i = Y_{ij0}(r_{iR} - r_R)$$

$$CE_i = Y_{ij0}(r_{ij} - r_{iR})$$

$$\Delta Y_i = NS_i + IM_i + CE_i$$

Here r_R is total Central Java growth, r_{iR} is Central Java industry growth, and r_{ij} is Banjarnegara industry growth. IM greater than zero indicates that the benchmark industry grows faster than the overall benchmark economy. CE greater than zero indicates that Banjarnegara outperforms the same industry in Central Java and is therefore interpreted as a relative local competitive advantage. The three methods are integrated into a strategic typology rather than treated as substitutes.

RESULT

Banjarnegara's real GRDP increased by approximately IDR 3.47 trillion between 2021 and 2025. The sectoral pattern was highly heterogeneous. Transportation and storage recorded the highest proportional expansion, followed by accommodation and food services and other services, while manufacturing produced the largest absolute sectoral increase. Table 1 presents the static and dynamic specialization results.

Table 1. Location Quotient and Dynamic Location Quotient by Industry

Industry	LQ 2021	LQ 2025	DLQ	Interpretation
Agriculture, Forestry, and Fishing	2.240	2.239	0.999	Base; broadly stable/slightly weakening
Mining and Quarrying	2.374	2.488	1.048	Base; strengthening
Manufacturing	0.417	0.455	1.092	Non-base; strengthening
Electricity and Gas	0.321	0.317	0.988	Non-base; weakening
Water Supply, Waste Management, and Recycling	0.664	0.677	1.020	Non-base; strengthening
Construction	0.689	0.713	1.035	Non-base; strengthening
Wholesale and Retail Trade; Motor Vehicle Repair	1.135	1.143	1.007	Base; strengthening
Transportation and Storage	1.298	1.236	0.952	Base; weakening
Accommodation and Food Service Activities	0.666	0.644	0.967	Non-base; weakening
Information and Communication	0.783	0.754	0.963	Non-base; weakening
Financial and Insurance Activities	1.014	1.013	0.999	Base; broadly stable/slightly weakening
Real Estate Activities	0.926	0.915	0.989	Non-base; weakening
Business Activities	1.025	1.018	0.994	Base; broadly stable/slightly weakening
Public Administration, Defence, and Compulsory Social Security	1.290	1.304	1.010	Base; strengthening
Education	1.479	1.487	1.006	Base; strengthening
Human Health and Social Work Activities	1.519	1.498	0.986	Base; weakening
Other Services	1.493	1.485	0.995	Base; broadly stable/slightly weakening

Source: Authors' calculations from BPS-Statistics Banjarnegara Regency (2026) and BPS-Statistics Jawa Tengah Province (2026).

As presented in Table 1, the Location Quotient (LQ) analysis identifies nine base

industries in Banjarnegara Regency in 2025, indicating their relatively greater economic specialization compared with Central Java Province. Mining and quarrying exhibits the highest LQ (2.488), followed by agriculture, forestry, and fishing (2.239), and human health and social work activities (1.498). These findings highlight the importance of primary industries and selected service activities in Banjarnegara's economic structure. The Dynamic Location Quotient (DLQ) results further reveal differences in the direction of industrial specialization. Mining and quarrying (1.048), wholesale and retail trade (1.007), public administration (1.010), and education (1.006) demonstrate strengthening relative positions, while transportation and storage (0.952) and human health and social work activities (0.986) exhibit weakening trends despite remaining base industries. Among non-base industries, manufacturing records the highest DLQ (1.092), suggesting an improvement in its relative

specialization, although its LQ remains below unity. Overall, these findings indicate that Banjarnegara's economic structure combines established specialized industries with emerging opportunities for diversification. However, LQ and DLQ primarily capture relative specialization and its changes over time rather than the underlying sources of economic growth.

To provide a more comprehensive understanding of regional economic dynamics, the analysis proceeds to the Shift-Share approach, which decomposes industry-level GRDP changes into benchmark growth (NS), industry-mix effects (IM), and local competitive effects (CE). Table 2 presents this decomposition for Banjarnegara Regency during 2021–2025, allowing the identification of industries whose growth is associated with favorable sectoral structures or local competitive advantages.

Table 2. Shift-Share Decomposition of Banjarnegara GRDP Change, 2021-2025

Industry	Growth (%)	NS	IM	CE	Net Change	Shift Position
Agriculture, Forestry, and Fishing	9.85	986.12	-551.21	1.66	436.57	Slow mix; competitive
Mining and Quarrying	4.82	183.68	-184.08	40.24	39.83	Slow mix; competitive
Manufacturing	27.55	481.07	-118.99	233.89	595.97	Slow mix; competitive
Electricity and Gas	22.35	1.30	0.09	-0.08	1.31	Fast mix; less competitive
Water Supply, Waste Management, and Recycling	11.30	1.71	-1.02	0.18	0.87	Slow mix; competitive
Construction	28.80	254.73	24.04	51.02	329.79	Fast mix; competitive
Wholesale and Retail Trade; Motor Vehicle Repair	20.17	579.41	-77.43	23.42	525.40	Slow mix; competitive
Transportation and Storage	100.85	109.49	435.62	-48.68	496.42	Fast mix; less competitive
Accommodation and Food Service Activities	53.25	75.18	122.08	-17.26	180.00	Fast mix; less competitive
Information and Communication	30.30	168.91	98.01	-36.80	230.12	Fast mix; less competitive
Financial and Insurance Activities	10.75	96.81	-49.82	-0.20	46.79	Slow mix; less competitive
Real Estate Activities	24.38	61.37	9.42	-3.52	67.27	Fast mix; less competitive
Business Activities	33.27	13.55	7.17	-0.45	20.27	Fast mix; less competitive
Public Administration, Defence, and Compulsory Social Security	17.58	109.67	-29.33	6.34	86.69	Slow mix; competitive
Education	25.22	199.70	19.54	7.23	226.47	Fast mix; competitive
Human Health and Social Work Activities	20.57	49.87	-0.11	-3.64	46.12	Slow mix; less competitive
Other Services	38.12	83.10	61.52	-2.19	142.43	Fast mix; less competitive

Source: Authors' calculations from BPS-Statistics Banjarnegara Regency (2026) and BPS-Statistics Jawa Tengah Province (2026).

Four industries record LQ values above one and DLQ values above one: mining and quarrying, wholesale and retail trade, public administration, and education. Manufacturing, water supply and waste management, and construction record LQ values below one and DLQ values above one. Agriculture, financial and insurance activities, business activities, human health and social work activities, transportation and storage, and other services remain base sectors with DLQ values at or below one.

The Shift-Share decomposition shows that construction and education have both positive industry-mix and competitive effects. Manufacturing records an industry-mix effect of IDR -118.99 billion and a competitive effect of IDR 233.89 billion, the largest positive competitive effect among the industries. Transportation and storage records an industry-mix effect of IDR 435.62 billion and a competitive effect of IDR -48.68 billion.

Across all industries, the rounded Regional Share components sum to approximately IDR 3,455.67 billion, the Industry Mix components to IDR -234.50 billion, and the Competitive Effect components to IDR 251.16 billion. The sum of rounded sectoral net changes is IDR 3,472.32 billion, compared with the official aggregate GRDP increase of IDR 3,472.30 billion; the IDR 0.02 billion difference reflects source-data rounding.

DISCUSSION

Integrated Sectoral Classification and Development Priorities

The combined application of Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Shift-Share analysis provides a multidimensional

understanding of Banjarnegara Regency's economic structure and development potential. While LQ identifies industries with relatively high regional specialization, DLQ captures changes in that specialization over time, and Shift-Share analysis distinguishes the effects of provincial economic growth, industry-specific trends, and local competitive performance. Integrating these indicators is particularly important because a sector's established economic position does not necessarily indicate its future growth potential or competitive strength. Accordingly, the present study develops an integrated sectoral priority typology that translates the empirical findings into differentiated regional development strategies.

mTable 3 classifies the 17 industries into four strategic groups based on their structural characteristics, dynamic specialization, and competitive performance. These groups distinguish established competitive bases, emerging competitive sectors, favorable-growth industries facing local competitive constraints, and mature base industries experiencing relative structural pressure. The integrated classification reveals that regional economic development cannot be adequately guided by static specialization alone. Industries with high LQ values may remain economically important while experiencing declining relative specialization or unfavorable industry-mix effects. Conversely, industries that have not yet achieved base status may exhibit strong competitive performance and increasing specialization, indicating opportunities for future economic transformation. The differences among these indicators are therefore not analytical inconsistencies but provide complementary information about the structural position, growth trajectory, and competitive characteristics of individual industries.

Table 3. Integrated Sectoral Priority Typology

Strategic Group	Diagnostic Criteria	Industries	Policy Direction
Consolidate established competitive bases	LQ > 1; DLQ > 1; CE > 0	Mining and quarrying; wholesale and retail trade; public administration; education	Maintain specialization while strengthening productivity, institutional quality, economic linkages, and sustainability.
Accelerate emerging competitive sectors	LQ < 1; DLQ > 1; CE > 0	Manufacturing; water supply, waste management, and recycling; construction	Strengthen productive capabilities, investment, infrastructure, supplier networks, and market access.
Close competitive gaps	IM > 0; CE < 0	Electricity and gas; transportation and storage; accommodation and	Improve productivity, connectivity, business scale,

in favorable-growth activities		food services; information and communication; real estate; business activities; other services	digital adoption, and service quality to reduce performance gaps with the provincial benchmark.
Renew mature bases under relative pressure	LQ > 1; DLQ ≤ 1; IM ≤ 0	Agriculture, forestry, and fishing; financial and insurance activities; human health and social work activities	Promote technological upgrading, diversification, efficiency, downstream linkages, and resilience.

Source: Authors' integrated interpretation of LQ, DLQ, and Shift-Share results.

Established Specialization and the Need for Structural Renewal

Agriculture, forestry, and fishing remain one of Banjarnegara's most highly specialized industries, with an LQ of 2.239 in 2025. This value indicates that agriculture occupies a substantially larger share of the regency's economy than of Central Java's economy. However, its DLQ of 0.999 suggests that this relative specialization has remained broadly stable, with a marginal weakening tendency. The negative industry-mix effect of IDR 551.21 billion further indicates that agriculture belongs to a provincial industry group that expanded more slowly than the overall provincial economy. Nevertheless, its positive competitive effect of IDR 1.66 billion suggests that local agricultural performance slightly exceeded the corresponding provincial industry benchmark.

These findings illustrate the distinction between economic specialization and structural transformation. Agriculture continues to provide an important foundation for Banjarnegara's economy, but its established position does not automatically make it the strongest source of future economic acceleration. This interpretation is consistent with regional development research emphasizing that traditional economic specialization can support stability while simultaneously creating challenges for structural adaptation (Giannakis & Bruggeman, 2017; Martini, 2020).

The policy implication is that agricultural development should move beyond maintaining existing production activities toward increasing value added and strengthening interindustry linkages. Potential interventions include improvements in agricultural productivity, post-harvest processing, product standardization, market access, and the development of agro-processing activities. Stronger connections between agriculture, manufacturing, transportation, and trade could facilitate economic diversification while preserving the benefits of Banjarnegara's existing agricultural specialization.

Financial and insurance activities and human health and social work activities display related challenges. Both remain base industries, with LQ values of 1.013 and 1.498, respectively, but their DLQ values fall below unity and their competitive effects are negative. The financial sector exhibits an almost neutral competitive effect of -0.20 billion IDR, whereas health and social work activities record a negative effect of IDR 3.64 billion. These results indicate the need to distinguish between maintaining essential economic functions and achieving relative competitive improvement. Financial services should prioritize accessibility, efficiency, and support for productive enterprises, while health-related services require improvements in service capacity, quality, and institutional resilience.

Emerging Competitive Sectors and Opportunities for Economic Diversification

Manufacturing represents the most prominent emerging competitive industry identified in this study. Although its LQ increased from 0.417 in 2021 to only 0.455 in 2025, remaining below the threshold for base-industry classification, its DLQ reached 1.092, the highest among all 17 industries. More importantly, manufacturing recorded a positive competitive effect of IDR 233.89 billion, substantially exceeding the competitive effects of other industries. Its GRDP growth of 27.55% further demonstrates meaningful expansion during the study period.

This combination of indicators suggests that manufacturing has begun to strengthen its relative economic position despite its comparatively limited contribution to Banjarnegara's overall industrial structure. The findings support the argument that regional economic diversification does not necessarily originate from industries that already dominate the local economy. Instead, diversification may emerge through the gradual accumulation of productive capabilities and the recombination of existing regional resources, knowledge, and industrial relationships (Balland et al., 2019; Boschma, 2017).

From a regional development perspective, manufacturing deserves strategic attention because it offers opportunities to increase value added, strengthen supply chains, and reduce excessive dependence on primary economic activities. However, its relatively low LQ also indicates that the industry has not yet developed the structural prominence observed at the provincial level. Policy interventions should therefore emphasize targeted capability development rather than assuming that manufacturing has already become a dominant regional growth engine.

A particularly relevant direction is the development of manufacturing activities connected to Banjarnegara's existing agricultural resources and local production capabilities. Agro-processing, food manufacturing, packaging, and related supplier activities may provide opportunities for building industrial linkages, although the suitability of specific subsectors would require additional evidence at a more disaggregated industry level. Such an approach is consistent with smart-specialization principles, which emphasize the development of economic activities related to existing regional capabilities rather than the indiscriminate promotion of unrelated industries.

Construction also exhibits favorable development characteristics. Its LQ increased from 0.689 to 0.713, while its DLQ reached 1.035. The industry recorded positive industry-mix and competitive effects of IDR 24.04 billion and IDR 51.02 billion, respectively. These results indicate that construction benefited from both favorable provincial industry dynamics and relatively stronger local performance. Its strategic importance extends beyond its direct contribution to GRDP because construction activities may support the provision of infrastructure required by other productive sectors.

Water supply, waste management, and recycling similarly demonstrates strengthening specialization and a positive competitive effect, although its relatively small absolute contribution suggests that its immediate economic impact remains limited. Its importance should therefore be considered not only in terms of growth contribution but also in relation to environmental services, resource efficiency, and sustainable regional development.

Taken together, these industries suggest that Banjarnegara has opportunities to broaden its economic structure through targeted industrial development, supporting infrastructure, and

improvements in productive capabilities.

Education, Institutional Capacity, and Enabling Sectors

Education occupies a particularly favorable position in the integrated classification. Its LQ increased from 1.479 to 1.487, accompanied by a DLQ of 1.006. The industry also recorded positive industry-mix and competitive effects of IDR 19.54 billion and IDR 7.23 billion, respectively. This combination indicates that education is an established base industry whose relative specialization and competitive performance strengthened during the study period.

However, the economic significance of education should not be interpreted solely through its direct GRDP contribution. Education also plays an enabling role in regional development by supporting human capital formation, workforce adaptability, and the development of skills relevant to emerging industries. These functions are particularly important when a region seeks to diversify its economic activities and strengthen manufacturing capabilities.

The findings therefore suggest that educational development should be connected more explicitly to regional economic priorities. Collaboration among educational institutions, local government, and productive enterprises could improve the alignment between workforce competencies and industrial requirements. Vocational education, entrepreneurship development, and industry-oriented training may contribute to strengthening local productive capabilities, provided that these interventions respond to demonstrated labor-market needs.

Public administration, defence, and compulsory social security also remains a base industry, with an LQ of 1.304, a DLQ of 1.010, and a positive competitive effect of IDR 6.34 billion. Nevertheless, its role differs fundamentally from that of market-oriented industries. A high LQ in public administration reflects relative economic concentration in government-related activities rather than conventional export competitiveness. Consequently, the appropriate policy objective is not simply to expand public administration as an economic sector but to improve administrative effectiveness, coordination, regulatory quality, and the delivery of public services.

This distinction highlights the importance of interpreting quantitative regional economic indicators in accordance with the institutional and functional characteristics of individual industries.

Regional development studies have emphasized the significance of institutional capacity, innovation, and adaptive governance in shaping economic resilience and long-term development opportunities (Bristow & Healy, 2018; Ezcurra & Rios, 2019; Hu et al., 2022).

High-Growth Industries and Local Competitive Gaps

The results also reveal an important distinction between absolute economic growth and relative competitive performance. Transportation and storage recorded the highest cumulative growth rate among the industries examined, reaching 100.85% during 2021-2025. Nevertheless, its competitive effect was negative at IDR 48.68 billion, while its DLQ declined to 0.952. This indicates that transportation expanded substantially in absolute terms but grew more slowly than the corresponding industry at the provincial level.

A similar pattern emerges in accommodation and food service activities, which recorded growth of 53.25%, a positive industry-mix effect of IDR 122.08 billion, and a negative competitive effect of IDR 17.26 billion. Information and communication also experienced substantial growth of 30.30%, accompanied by a positive industry-mix effect of IDR 98.01 billion and a negative competitive effect of IDR 36.80 billion.

These findings demonstrate that industries may benefit from favorable broader economic trends without achieving superior local performance. The positive industry-mix effects indicate that the corresponding industries grew relatively rapidly at the provincial level, whereas the negative competitive effects suggest that Banjarnegara did not fully match those industry-specific provincial growth rates. This interpretation reflects the analytical purpose of Shift-Share analysis, which separates broader industry dynamics from location-specific performance differences (Montanía et al., 2021; Pizzuto, 2020).

The negative competitive effects should not be interpreted as evidence of absolute industrial decline. Instead, they identify opportunities to improve local performance relative to the provincial benchmark. In transportation, policy priorities may include improvements in logistics connectivity, distribution efficiency, and integration with agricultural and manufacturing supply chains. Accommodation and food service activities may benefit from improvements in service quality, business management, and connections with local tourism and food

production. Information and communication requires attention to digital infrastructure, workforce capabilities, and the adoption of digital technologies by local enterprises.

Electricity and gas, real estate, business activities, and other services exhibit comparable combinations of positive industry-mix effects and negative competitive effects. Although their economic functions differ, the common policy challenge is to improve the capacity of local enterprises and institutions to capture growth opportunities already present in the broader provincial economy.

Differentiated Development Strategies for Established Base Industries

Mining and quarrying and wholesale and retail trade are among the industries that combine established specialization with strengthening relative positions and positive competitive effects. Mining recorded the highest LQ in 2025 (2.488), a DLQ of 1.048, and a positive competitive effect of IDR 40.24 billion. These findings indicate a relatively strong and strengthening economic specialization. Nevertheless, mining also recorded a negative industry-mix effect of IDR 184.08 billion, suggesting that its favorable local competitive performance occurred within a provincial industry that expanded more slowly than the overall provincial economy.

Accordingly, mining development should not be evaluated solely in terms of output growth or specialization. Resource depletion, environmental management, and the long-term sustainability of economic benefits should also inform policy decisions. Strengthening environmental safeguards, improving operational efficiency, and encouraging productive linkages with other industries may help ensure that mining contributes to broader regional development.

Wholesale and retail trade presents a different economic profile. With an LQ of 1.143, a DLQ of 1.007, and a positive competitive effect of IDR 23.42 billion, the industry demonstrates established specialization and modest competitive strengthening. Unlike mining, trade plays a central role in market distribution and the circulation of goods and services within the regional economy. Its development potential is therefore closely related to improvements in logistics, market infrastructure, distribution networks, and the commercialization of locally produced goods.

These differences demonstrate why industries assigned to the same statistical priority group should not automatically receive identical policy

interventions. Quantitative classifications provide an initial basis for identifying priorities, but effective regional development strategies must also consider economic functions, environmental implications, institutional responsibilities, and interindustry relationships.

Theoretical Contributions and Regional Policy Implications

The findings reinforce the value of integrating static specialization, dynamic specialization, and competitive performance in regional economic analysis. Previous Indonesian studies have demonstrated the usefulness of combining LQ, DLQ, and Shift-Share methods to identify leading industries and support regional economic planning (Tanjung et al., 2021; Saragih et al., 2024). The present study builds on this approach by emphasizing the analytical significance of differences among the indicators.

Three findings are particularly important. First, agriculture illustrates that a highly specialized industry may remain structurally important without exhibiting strong relative growth momentum. Second, manufacturing demonstrates that an industry may possess substantial emerging competitive potential even when its current specialization remains below the base-industry threshold. Third, transportation and storage shows that rapid absolute growth can coexist with weakening relative specialization and negative competitive performance. These patterns challenge the assumption that established specialization, rapid growth, and competitive advantage necessarily occur together.

Theoretically, the findings contribute to place-based regional development perspectives by demonstrating the importance of considering existing economic structures alongside changing industrial capabilities and local performance. The results are also consistent with evolutionary economic geography, particularly the proposition that economic diversification is shaped by the development and recombination of regional capabilities (Boschma, 2017; Balland et al., 2019). However, the indicators used in this study do not directly measure innovation, knowledge spillovers, or interindustry relatedness. Consequently, these theoretical connections should be interpreted as explanatory perspectives rather than direct empirical tests.

From a policy perspective, the results suggest that Banjarnegara should adopt a differentiated sectoral development strategy rather than

concentrating resources exclusively on industries with the highest LQ values. Established competitive industries require productivity improvements and sustainable management; emerging competitive sectors need targeted investment and capability building; rapidly growing but relatively less competitive industries require interventions to close performance gaps; and mature base industries need upgrading and diversification.

The implementation of these priorities should also consider the complementary roles of different industries. Agricultural upgrading may create opportunities for manufacturing development, while improvements in construction, transportation, education, and public administration can strengthen the infrastructure, human capital, and institutional conditions supporting regional economic transformation. Such coordination may produce broader development benefits than isolated sector-specific interventions.

Nevertheless, the proposed typology should be understood as a diagnostic framework rather than a definitive investment ranking. LQ, DLQ, and Shift-Share results are sensitive to the selected benchmark, observation period, and level of industrial aggregation. Furthermore, positive competitive effects identify relative performance differences but do not establish their underlying causes. Future research could therefore incorporate employment, labor productivity, interindustry linkages, investment, environmental sustainability, and more detailed subsectoral data to validate and refine the identified priorities.

Overall, the integrated analysis indicates that Banjarnegara's development prospects depend not only on preserving its established economic strengths but also on strengthening emerging productive capabilities and improving performance in industries where favorable growth opportunities have not yet translated into relative competitive advantages. A development strategy that combines structural renewal, related diversification, and institutional coordination offers a more balanced foundation for sustainable regional economic transformation.

CONCLUSION

This study examined the economic structure, sectoral specialization, and competitive performance of Banjarnegara Regency during 2021-2025 by integrating Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Shift-

Share analysis. The findings reveal that established economic specialization does not necessarily correspond to stronger growth prospects or competitive performance. Agriculture remains a major base industry but exhibits limited relative growth momentum, while mining, trade, public administration, and education demonstrate strengthening specialization and positive competitive effects. Manufacturing emerges as a particularly promising sector, recording the highest DLQ and largest positive competitive effect despite remaining a non-base industry. Conversely, transportation, accommodation and food services, and information and communication experience substantial absolute growth but exhibit negative competitive effects, indicating weaker performance relative to the provincial benchmark. These findings highlight the importance of integrating structural specialization, dynamic change, and competitive performance when identifying regional development priorities. Theoretically, this study contributes to regional economic development literature by demonstrating the analytical value of a multidimensional sectoral classification. Practically, the results suggest that regional policies should prioritize agricultural upgrading, capability development in emerging industries, improvements in local competitiveness, and stronger interindustry linkages to support sustainable economic diversification. Nevertheless, the analysis is limited by its reliance on aggregated industry-level GRDP data, a single provincial benchmark, and a relatively short observation period. Future research should incorporate employment, productivity, investment, interindustry linkages, and environmental indicators, alongside more disaggregated sectoral data, to provide a more comprehensive assessment of regional economic transformation.

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