

“Engines” of Growth, “Sponges” of Labor: A Study on Economic Transformation and the Kuznets Paradox in Kepulauan Riau

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Abstract: This study investigates the relationship between structural transformation and regional inequality in Kepulauan Riau (Kepri), Indonesia, a province strategically located as an industrial and service hub yet marked by persistent disparities. While the Kuznets hypothesis suggests an inverted-U link between growth and inequality, evidence from archipelagic economies remains limited. The main purpose of this research is to assess whether Kepri follows or diverges from the Kuznets trajectory by analyzing sectoral shifts and their implications for inequality dynamics. Using provincial macro and microeconomic data, this study applies panel data econometrics and productivity decomposition techniques to evaluate both within-sector growth and labor reallocation effects. The results reveal that industrial expansion generates high productivity but limited employment opportunities, while services act as a labor sponge with weak welfare contributions. This dualistic pattern, termed the “structural change penalty,” has amplified inequality across sectors and regions rather than reducing it. The findings underscore the need for stronger industrial linkages, service sector upgrading, and inclusive regional policies to ensure that structural transformation fosters broad-based and equitable development. By shifting the analytical focus from the national to the sub-national level, this study contributes new insights into the role of local governance, spatial politics, and policy choices in shaping divergent development paths in Indonesia.

INTRODUCTION

The relationship between economic growth and income inequality, famously conceptualized by Simon Kuznets (1955) as an inverted U-shaped curve, presents a persistent dilemma for developing economies. The Riau Islands Province (Kepulauan Riau), a key economic zone in Indonesia, exemplifies this challenge in a paradoxical manner. Between 2010 and 2024, the province recorded significant economic growth, yet its Gini coefficient simultaneously increased from 0.293 to 0.357, indicating a rise in inequality that contradicts the later stages of the Kuznets hypothesis. This study posits that the root of this paradox lies in the nature of its structural transformation. To investigate this, we employ the productivity decomposition framework developed by McMillan, Rodrik, & Verduzco-Gallo (2014), which separates overall productivity growth into two key components: gains *within* existing sectors and the effect of labor moving *between* sectors. Therefore, this study aims to answer the question: How do the components of within-sector productivity growth and the structural change effect explain the simultaneous occurrence of economic growth and rising inequality in the Riau Islands?

The issue of “developer’s dilemma” and “structural transformation” has received considerable critical attention regarding the studies of economic development and inclusive growth. The “developer’s dilemma” refers to the conflict that arises when developing countries aim to achieve two potentially conflicting objectives related to income inequality. On one hand, they strive for structural transformation, and on the other, they pursue inclusive economic growth to improve the living standards of the poor. According to Simon Kuznets (1955), structural transformation can naturally lead to rising income inequality unless countered by specific policies. In contrast, achieving inclusive economic growth requires income inequality to remain stable or

even decline, in order to ensure that income gains reach the lower-income segments of the population.

Existing literatures primarily has discussed structural transformation in various developing countries, focusing on its relationship with economic growth, income inequality, and poverty reduction (Alisjahbana, Kim, Sen, Sumner, & Yusuf, 2020; Halim, 2021; Kim, Mungsunti, Sumner, & Yusuf, 2020; S. & P., 2016; Sen, Andy, & and Yusuf, 2020; Arief Anshory Yusuf & Halim, 2021). They analyze how shifts in economic sectors, particularly the manufacturing and services sectors, impact these outcomes in regions like East Asia, South Asia, sub-Saharan Africa, and Latin America. Several authors examine specific country case studies, including Indonesia, China, Thailand, India, Bangladesh, Ghana, South Africa, Brazil, and Chile, detailing their unique trajectories of industrialization, deindustrialization, and tertiarization. The literature also explores the role of political economy, government policies, and technological advancements—like automation—in shaping these development patterns and the challenges of achieving inclusive growth.

Structural transformation in developing countries has been a pivotal component directly influencing economic growth, income inequality, and poverty reduction. The process involves a shift from agriculture to manufacturing and services, reflecting changes in economic structure and employment patterns. However, the relationship between structural transformation, economic growth, and social equity is complex, often yielding mixed results across various nations.

Recent research has shown that significant economic growth resulting from structural transformation is frequently accompanied by increased income inequality (Alisjahbana et al., 2020). For instance, in Ghana, despite notable achievements in growth and poverty reduction since the early 1990s, inequality has escalated, highlighting a problematic trend where the benefits of growth are not uniformly shared among the population. This scenario is echoed in South Africa, where the concentration of wealth has been exacerbated due to inadequate progressive taxation and weakened labor unions, leading to socio-economic divides. Furthermore, policy measures, such as the market-oriented social policies in Chile, have shifted the costs of social services onto families, thereby increasing their financial strain and contributing to inequality. This also occurred in Indonesia, especially Kepulauan Riau.

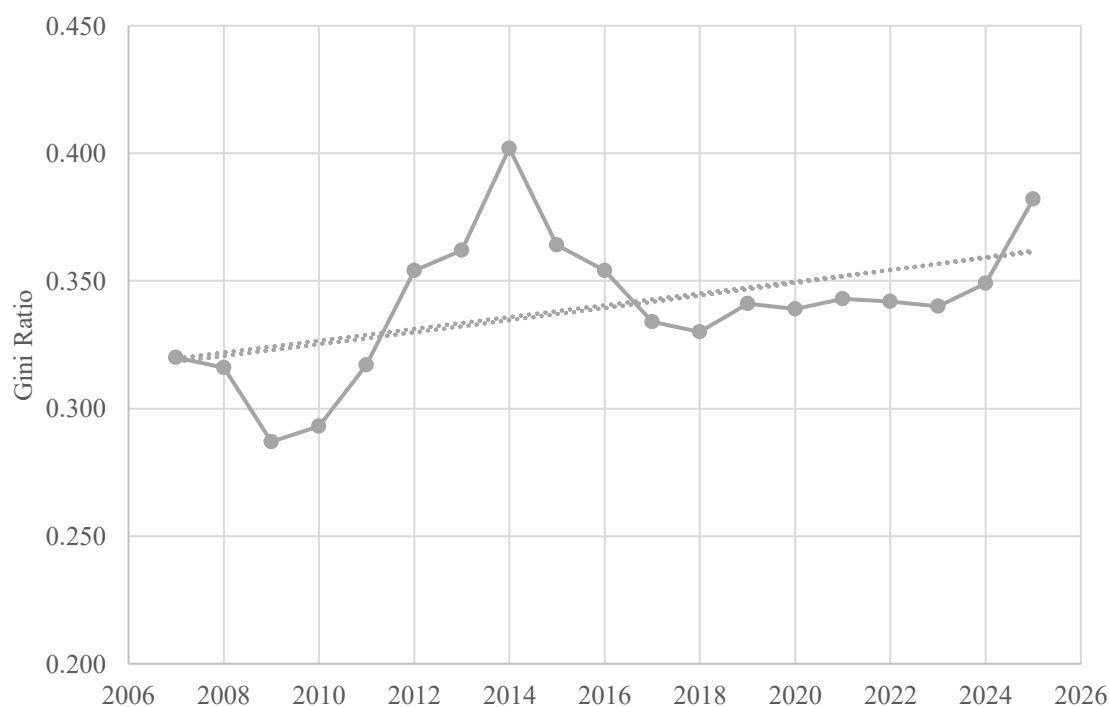


Figure. 1
Gini Ratio Trend in Kepulauan Riau (2007-2025)
Source: Badan Pusat Statistik Indonesia

As can be seen in Figure 1, the trend of the Gini Ratio in Kepulauan Riau shows a fluctuating but gradually increasing pattern of inequality from 2007 to 2025. Inequality was relatively low and stable in the late 2000s but rose sharply in the early 2010s, peaking in 2014 at 0.40 before declining and stabilizing around 0.33–0.34 in the following years. However, starting in 2023, inequality has shown signs of increasing again, reaching 0.38 in 2025. Although the Gini Ratio has not reached extreme levels, the overall upward trend indicates that the province is experiencing persistent structural inequality pressures despite temporary improvements.

While existing studies have clearly established the impacts of structural transformation on economic growth and inequality at the national level, these findings raise important questions when applied to sub-national or local contexts, such as provinces, districts, or cities. Although the dynamics of structural transformation and the developer's dilemma are well-theorized in macroeconomic terms, examining them within decentralized governance settings opens new analytical dimensions and reveals critical gaps in the literature.

While most studies on structural transformation and inequality focus on the national level, this study provides originality by applying the framework at the sub-national level in Indonesia, specifically Kepulauan Riau. This localized approach highlights how decentralized governance, maritime characteristics, and intra-provincial disparities shape development outcomes.

This research seeks to address those gaps by focusing on Kepulauan Riau Province, Indonesia—a region that exemplifies the uneven outcomes of structural transformation within a decentralized and archipelagic state. By shifting the analytical lens to the sub-national level, this study contributes novel insights into how local governance, spatial politics, and policy decisions shape divergent development paths and regional inequality. Riau Islands Province (*Kepulauan Riau*; Kepri) is a region characterized by its maritime geography, economy, and society. With over 96 percent of its area consisting of sea and more than 2,400 scattered islands, Kepri possesses immense potential for developing a sea-based or Blue Economy. However, the dominance of modern industrial and service sectors concentrated in Batam, along with structural disparities among its regencies and cities, presents unique challenges for equitable economic development and regional welfare.

Kepulauan Riau presents a unique and compelling case for investigating the sub-national dynamics of structural transformation and the developer's dilemma. As an archipelagic province at Indonesia's maritime frontier, Kepri embodies a complex interplay of economic, political, and governance factors that are central to this study's objectives. First, Kepri is marked by stark intra-provincial disparities. While Batam has emerged as one of Indonesia's fastest-growing industrial and logistical hubs, benefiting from proximity to Singapore and its designation as a Free Trade Zone, other districts such as Lingga, Anambas, and Natuna remain relatively underdeveloped, resource-dependent, and excluded from major investment flows. This internal divergence reflects the classic symptoms of the developer's dilemma: structural transformation in leading areas accompanied by persistent inequality across regions. Second, Kepri operates under Indonesia's decentralized governance framework, which grants significant autonomy to local governments in managing development planning, budget allocation, and service delivery. This makes it an ideal site to explore how local political institutions, policy decisions, and governance capacities shape uneven development outcomes.

The province also reflects the tensions of policy fragmentation and coordination between city-level governments (e.g., Batam and Tanjungpinang) and island-based regencies. Third, Kepri's strategic geopolitical location at the intersection of major international maritime routes situates it as a sub-national actor with growing involvement in paradiplomatic and cross-border economic activities. This opens up an important line of inquiry into how sub-national international relations—through trade, tourism, infrastructure investment, or security cooperation—affect local development trajectories and exacerbate or mitigate structural inequalities. Fourth, Kepri offers a dynamic policy landscape, with ongoing experiments in digital governance, e-planning, and spatial development strategies. These initiatives allow for the assessment of how technological governance tools are (or are not) being leveraged to foster inclusion, transparency, and equitable service delivery in a geographically fragmented setting. Lastly, Kepri is understudied

in academic literature, especially from a political economy and governance perspective. Most empirical work tends to aggregate provinces into national-level models, thereby overlooking the micro-level manifestations of development dilemmas in frontier and archipelagic contexts.

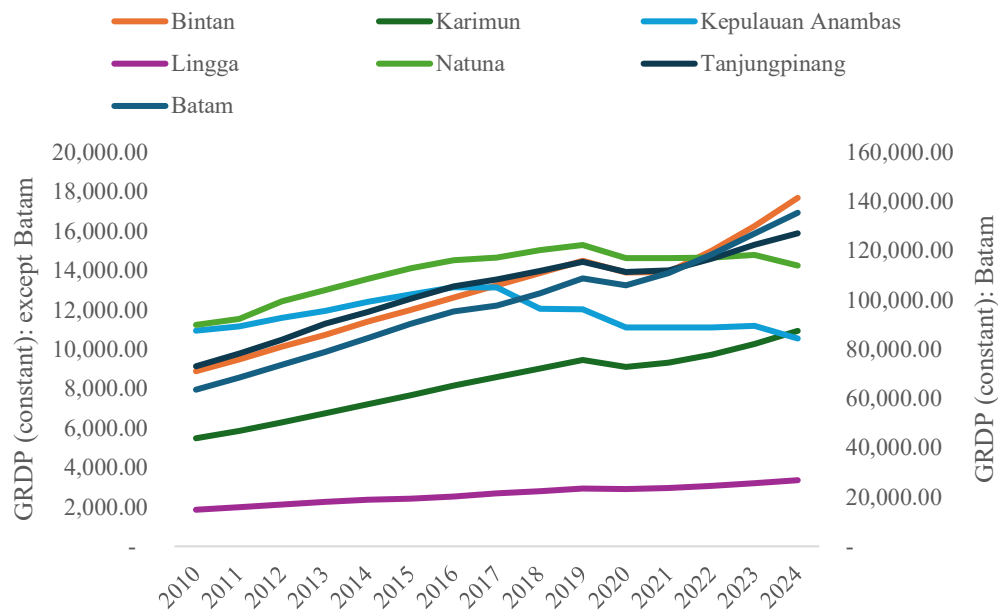


Figure. 2
GRDP (constant) Kepulauan Riau by Regencies (in billion Rp)
Source: Badan Pusat Statistik Indonesia

Figure 2 displays the constant GRDP growth of seven regions in the Riau Islands Province—Bintan, Karimun, Lingga, Natuna, Kepulauan Anambas, Tanjungpinang, and Batam—from 2010 to 2024. The left vertical axis represents GRDP values for all regions *except* Batam, while the right vertical axis is scaled specifically for *Batam*, indicating its significantly larger economic size compared to the others.

From the chart, Batam consistently maintains the highest GRDP throughout the observed period. Starting at around IDR 80 trillion in 2010, it demonstrates steady growth, reaching approximately IDR 140 trillion by 2024. This solid upward trend underscores Batam's position as the economic engine of the province, likely due to its industrial base, proximity to Singapore, and special economic zone status. Among the remaining regions, Bintan shows a notable rise, overtaking other districts by 2023 and reaching around IDR 18,000 billion by 2024. This sharp increase may reflect infrastructure or tourism investments. Tanjungpinang, the provincial capital, also displays strong growth, keeping pace with Bintan until the early 2020s before slightly lagging behind. Natuna, after strong growth from 2010 to 2017, appears to plateau and slightly decline after 2019, possibly due to policy, investment shifts, or demographic constraints. Kepulauan Anambas shows volatile movement, with an early increase followed by a significant dip around 2018 and slow recovery afterward—suggesting economic instability or external shocks affecting the local economy. Karimun maintains moderate growth, dipping slightly around 2020–2021, then climbing again. In contrast, Lingga consistently remains the region with the lowest GRDP, although it shows a gradual upward trend over the 15-year period, indicating slow but stable development. Overall, the chart illustrates increasing regional economic disparities, with Batam pulling away significantly, Bintan and Tanjungpinang catching up, while Natuna, Karimun, and Anambas fluctuate, and Lingga remains persistently lagging. These patterns suggest differing levels of economic structure, resource allocation, and policy effectiveness across the archipelagic regions of Riau Islands Province.

Over the past decade (2010–2024), Kepri has experienced significant structural dynamics. The year 2010 marked a critical starting point as a baseline for a new development decade, followed by an industrial crisis in Batam's shipyard and manufacturing sectors in 2015–2018, which weakened the local economy (Media Center Pemko Batam, 2021). The Covid-19 pandemic

in 2020 further exerted structural pressure, causing an economic contraction of up to –3.8 percent. However, the post-pandemic period indicated strong recovery signals: economic growth returned to a positive trajectory, public and private investments increased, and the Blue Economy strategy began to be mainstreamed into regional development policies.

The concept of the developer's dilemma is highly relevant when analyzing the GRDP trends across the Riau Islands Province (Kepulauan Riau), as illustrated in Figure 1 and 2. This dilemma—where developing regions must balance structural transformation with broad-based, inclusive growth—is evident in the increasing economic disparities between districts and cities in the province over the 2010–2024 period by these consideration as follows:

1. **Structural Transformation vs. Inclusive Growth.** Batam, as the most industrialized and urbanized area, has undergone significant structural transformation, shifting from traditional sectors to manufacturing, logistics, and services. Its GRDP has grown dramatically, signaling success in structural transformation. However, this growth seems to be concentrated, potentially widening the gap with other regions. In contrast, regions like Lingga, Anambas, and Karimun have much slower or unstable economic growth, suggesting they may not have experienced the same level of structural transformation. Their development is still reliant on primary sectors such as fishing and agriculture, which offer lower productivity and income.
2. **Implication for Income Inequality.** The stark differences in GRDP suggest a growing regional income inequality within Kepulauan Riau. According to Kuznets' hypothesis, without strong redistribution or inclusion policies, structural transformation (like Batam's) tends to increase inequality, a hallmark of the developer's dilemma. The underperformance of Natuna and Anambas after 2019, and the plateauing of GRDP in smaller islands, may indicate that economic growth is not broad-based, failing to significantly uplift the poorer or more remote populations.
3. **Policy Tension.** The provincial government faces a dilemma: policies that prioritize Batam-style transformation may exacerbate regional inequality unless balanced by targeted interventions in lagging areas. Alternatively, policies aiming for equalized development across islands might slow down overall economic growth if they discourage specialization or capital concentration.

These conditions underscore the importance of understanding how Structural Transformation (shifts in sectoral contributions to GRDP), Structural Change (changes in labor force structure), and Labor Productivity Change influence economic dynamics and the welfare of communities across the regencies and cities in Kepri. Moreover, a development approach that is inclusive and adaptive to maritime characteristics requires a deep understanding of the relationship between economic structures, regional governance, and the effectiveness of Blue Economy implementation. The data on Income Inequality (Gini Ratio) and GRDP trajectories in Kepulauan Riau reflect the developer's dilemma in practice: successful structural transformation in leading areas like Batam and Bintan is not being matched by inclusive growth across the entire province. Without addressing this imbalance, the region risks deepening inter-district inequality, undermining social cohesion and long-term sustainable development.

Studying structural transformation and the developer's dilemma at the sub-national level is both necessary and overdue. It reveals the uneven terrain of development within countries and equips local policymakers with evidence-based strategies for fostering more equitable and sustainable growth. For regions like Kepulauan Riau, this kind of localized analysis is essential to bridge the gap between growth centers and lagging peripheries—and to ensure that transformation does not come at the cost of widening inequality.

This research addresses the central question: why is economic growth in the Riau Islands Province (Kepri) accompanied by rising income inequality—a trend that challenges the classic Kuznets Curve model. Its primary aim is to dissect this paradox by first identifying and quantifying the dynamics of an inefficient structural transformation, characterized by a massive labor shift from the highly productive industrial sector to the low-productivity services sector. Furthermore, the research seeks to uncover the root cause of this productivity gap by analyzing the fundamental

divide between formal employment in industry and the prevalence of informal jobs in the services sector. Ultimately, by utilizing growth decomposition down to the regency/city level, the study aims to construct a comprehensive "dual economy" model of Kepri, diagnosing its unique development path and providing an evidence-based foundation for formulating more inclusive economic policies. Accordingly, this study seeks to answer the guiding question: *Why does economic growth in Kepulauan Riau coincide with rising inequality, and how do within-sector productivity growth and structural change dynamics explain this paradox?*

RESEARCH METHODS

This study was conducted across all regencies and cities in Kepulauan Riau Province, with each regency/city serving as the unit of analysis. Both regional macroeconomic and microeconomic data from the Central Bureau of Statistics (BPS) and global economic transformation database (ETD) from Groningen Growth and Development Centre (de Vries et al., 2021; Kruse, Mensah, Sen, & de Vries, 2023) are employed. Macroeconomic data include gross regional domestic product (GRDP) at constant prices by economic sector, GRDP per capita, economic growth, and the Gini Ratio. Microeconomic data are drawn from *Sakernas (Survei Angkatan Kerja Nasional)* to capture employment structure and status, *Susenans (Survei Sosial Ekonomi Nasional)* to analyze per capita expenditure and welfare distribution. ETD covers: (1) measures of economic growth and labor inputs for 51 economies in Africa, Asia, and Latin America; (2) 12 sectors of the total economy; (3) time series with annual data from 1990-2018; and (4) variables including value added at constant and current prices, and persons employed in regard to global level analysis.

The research employs quantitative approach using secondary data analysis, combining descriptive, explanatory, and econometric techniques. The research design spans the period 2010, 2018, and 2024. Descriptive analysis is used to illustrate changes in sectoral structure, labor productivity, and welfare distribution across districts. Econometric analysis is conducted using panel data models to assess the relationship between structural transformation, labor productivity, and inequality. Specifically, the Kuznets (Kuznets, 1955) curve framework is applied to test the hypothesis that inequality follows an inverted-U trajectory with respect to per capita income, formulated in equation (1) and Figure 3 as follows.

$$GINI_{it} = \alpha + \beta_1 \ln(Y_{it}) + \beta_2 [\ln(Y_{it})^2] + \varepsilon_{it} \quad (1)$$

Kuznets Curve: Growth vs Inequality

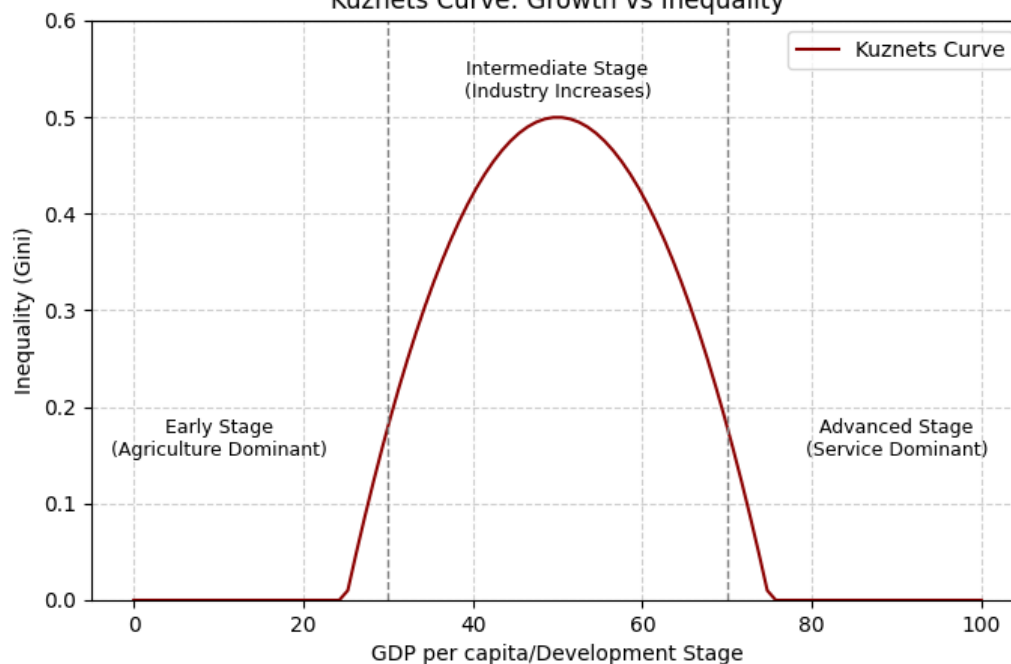


Figure. 3
Kuznets' Model on Economic Growth and Inequality

$GINI_{it}$ is the Gini Ratio in district i at time t , and Y_{it} represents GDP per capita. A positive β_1 and negative β_2 would confirm the inverted-U relationship.

To analyze productivity dynamics, the study applies a decomposition of aggregate labor productivity growth into within-sector effects and structural change effects, following the shift-share approach by Rodrik McMillan and Verduzco-Gallo (2014):

$$\Delta Y_t = \sum_{i=n} \theta_{i,t-k} \Delta y_{i,t} + \sum_{i=n} y_{i,t-k} \Delta \theta_{i,t} \quad (2)$$

Y_t and $y_{i,t}$ refer to economy-wide and sectoral labor productivity levels, respectively, and $\theta_{i,t}$ is the share of employment in sector i . The Δ operator denotes the change in productivity or employment shares between $t - k$ and t (McMillan et al., 2014). The first element of the decomposition represents the weighted average of productivity growth that occurs within sectors themselves, using each sector's initial employment share as the weight. This is referred to as the *within-sector* component of productivity growth. The second element reflects the impact of labor shifting across sectors. It is essentially measured as the product of productivity levels (at the end of the period) and the change in employment shares between sectors. This is called the *structural change* component. When workers move toward sectors with higher productivity, the correlation is positive, and structural change contributes positively to overall productivity growth. This framework highlights that focusing only on productivity within a single sector (such as manufacturing) can give a misleading picture if productivity levels vary greatly across sectors. For example, even if a sector experiences rapid productivity growth, the overall economy may not benefit if that sector's share of employment declines. If the workers leaving that sector are absorbed into lower-productivity activities, aggregate growth could slow down or even become negative.

RESULTS AND DISCUSSION

National and Regional Contexts

The economic development of the Riau Islands is best understood when first contextualized within Indonesia's broader national and regional trajectory. Nationally, Indonesia has undergone a long-term structural transformation typical of a developing economy, with a gradual decline in the employment share of agriculture and a corresponding rise in the services sector since the 1990s (Figure 4).

The sharp decline in the proportion of the workforce in the agricultural sector indicates a massive shift in livelihoods taking place nationally. This shift can be understood as a logical consequence of increased agricultural productivity due to technological modernization and mechanization, which has reduced the need for labor in that sector. At the same time, intensive urbanization is driving the younger workforce to migrate to urban areas in search of more promising employment opportunities in the non-agricultural sector. The increase in the proportion of the workforce in the service sector reflects the growth of service-based economic activities, including trade, transportation, communications, banking, and education and health services, which are becoming increasingly important as per capita income grows. However, the industrial sector, which is theoretically expected to be a bridge between agriculture and services, has shown slow and fluctuating development, indicating that industrialization in Indonesia has not progressed as strongly as expected.

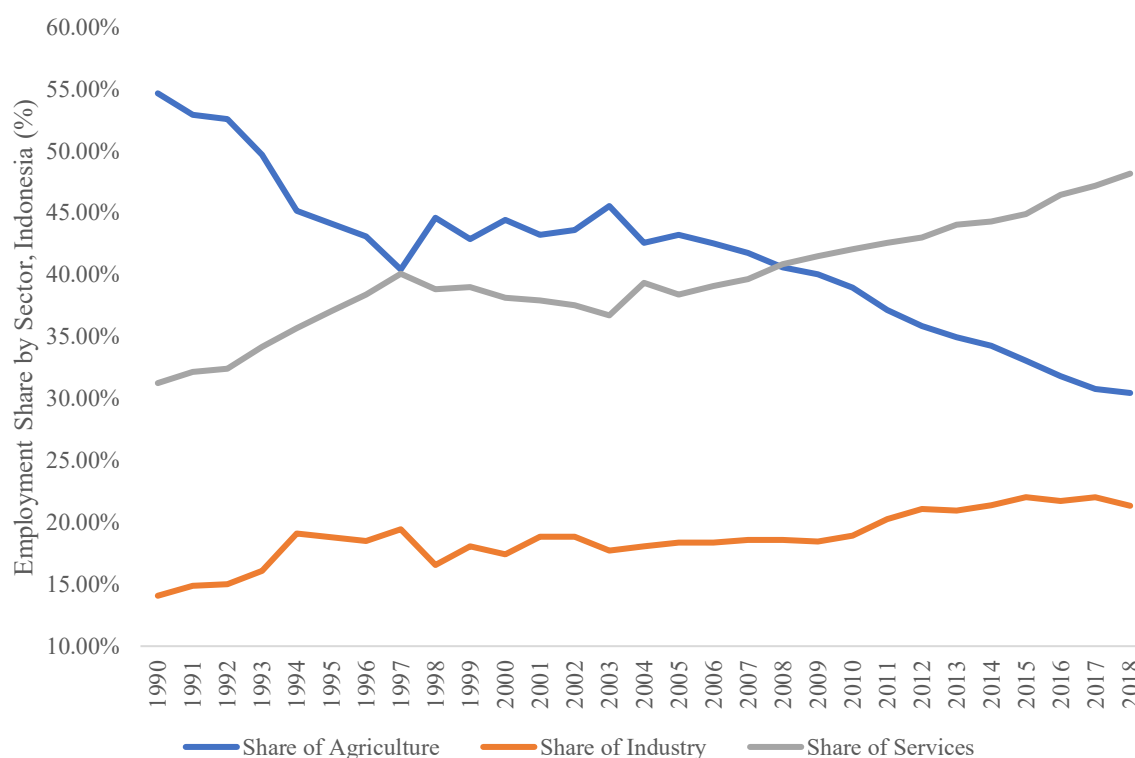


Figure. 4
Indonesia Employment Share by Sector (%)
Source: GGDC/UNU-WIDER Economic Transformation Database (Kruse et al., 2023)

Historically, the nation's productivity growth has been driven by a combination of positive "within-sector" productivity gains and a beneficial "structural change" component, where labor moves to more productive sectors, a pattern common among its regional peers (Figure 5a, 5b, and 5c). The three sets of Figure 5 present the decomposition of labor productivity growth into within-sector productivity gains and structural change for five Asian countries—China, Vietnam, India, Indonesia, and the Philippines—across three distinct periods: 1990–1996, 2000–2012, and 2012–2018.

During the early 1990s (1990–1996) (Figure 5a), China and Vietnam emerged as leaders in productivity transformation. China combined high within-sector productivity growth (5.43) with a strong contribution from structural change (1.54), reflecting its dual process of internal efficiency improvements and labor reallocation from low-productivity agriculture to higher-productivity manufacturing and services. Vietnam also exhibited balanced growth, with within-sector productivity gains of 2.60 and structural change of 1.94, signalling the early success of its post-reform economic transformation. Indonesia, however, demonstrated a different pattern: within-sector productivity was relatively modest at 1.45, but structural change was relatively high at 2.00. This indicates that Indonesia's productivity growth was driven less by efficiency gains within industries and more by labor shifting into more productive sectors, such as from agriculture into manufacturing and services. India's productivity story was largely within-sector driven (2.06), while structural change contributed very little (0.21). The Philippines, in contrast, stagnated, with negative within-sector productivity (-0.02) and very weak structural change (0.29), showing limited industrial dynamism in this period.

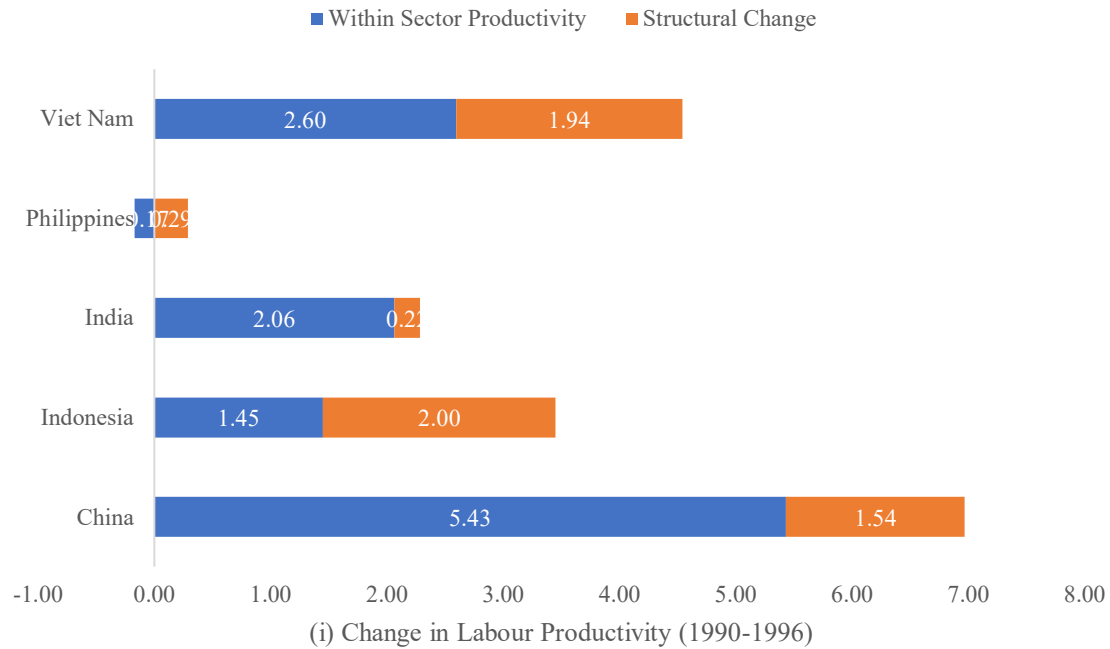


Figure. 5a

Indonesia and Some Asian Countries Economic Transformation, 1990-1996

Source: Authors' own calculation from GGDC/UNU-WIDER Economic Transformation Database (Kruse et al., 2023)

The 2000–2012 (Figure 5b) period marked a dramatic intensification of productivity growth, led by China's unprecedented boom. China recorded extremely high within-sector productivity growth (14.62) alongside strong structural change (4.36), reflecting industrial deepening, large-scale technological upgrading, and urbanization. India also performed well, with strong within-sector gains (6.44) supported by modest structural change (2.00), highlighting its efficiency improvements in services and industry. Vietnam's pattern shifted, with labor reallocation (2.88) becoming the main driver, while within-sector growth slowed to just 0.26, suggesting that its rapid productivity gains came largely from moving workers across sectors rather than upgrading within them. Indonesia again displayed a dual-source growth pattern, with within-sector productivity of 2.36 and structural change of 2.25. This balance suggests that Indonesia in the 2000s benefited both from modernization within industries and from structural shifts, especially as manufacturing and services expanded during a period of relative political and economic stability following the Asian Financial Crisis. The Philippines recorded modest within-sector growth (2.72) and limited structural change (0.96), reflecting slower progress in diversifying its economic base.

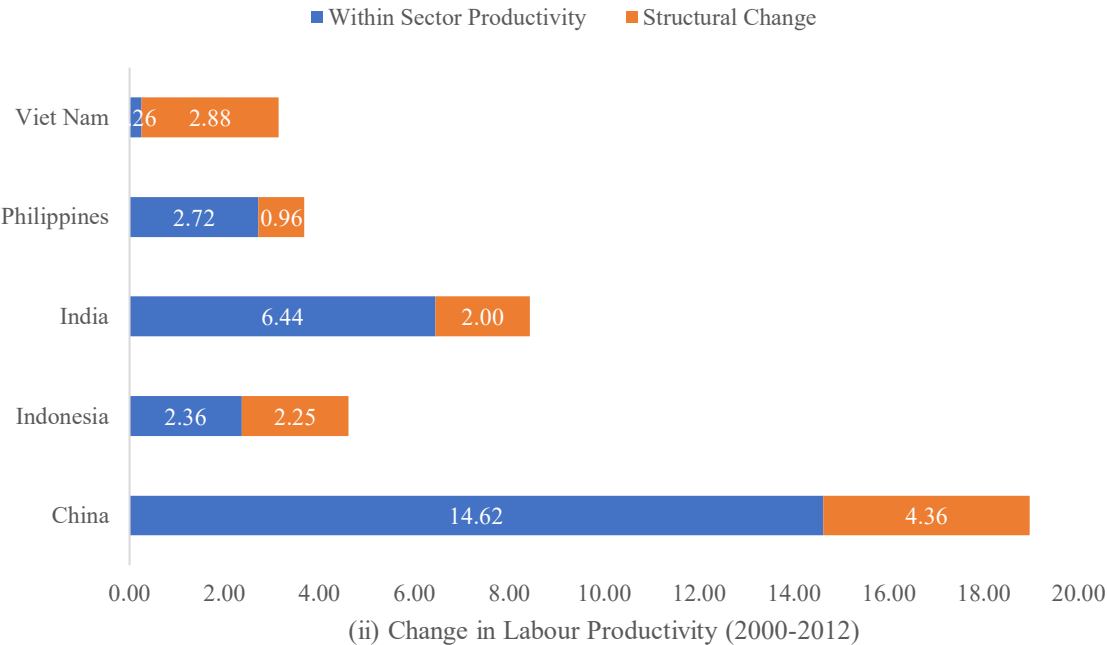


Figure 5b
Indonesia and Some Asian Countries Economic Transformation, 2000-2012
Source: Authors' own calculation from GGDC/UNU-WIDER Economic Transformation Database (Kruse et al., 2023)

In the most recent period (2012–2018) (Figure 5c), growth patterns reveal a slowdown across the region, particularly for China and Indonesia. China remained the regional leader but at a reduced intensity, with within-sector productivity growth of 3.22 and structural change of 1.02, consistent with the transition of a maturing economy that had already undergone rapid industrialization. India sustained its within-sector driven trajectory, recording 3.66 in internal productivity improvements and 0.64 from structural change, supported by expansion in services and industry. Vietnam displayed more balanced contributions in this period, with within-sector productivity at 2.79 and structural change at 0.59, showing that it was gradually shifting toward efficiency-led growth. The Philippines demonstrated its strongest performance yet, with both within-sector productivity (2.82) and structural change (0.81) contributing, reflecting a late but notable improvement in labor reallocation and modernization.

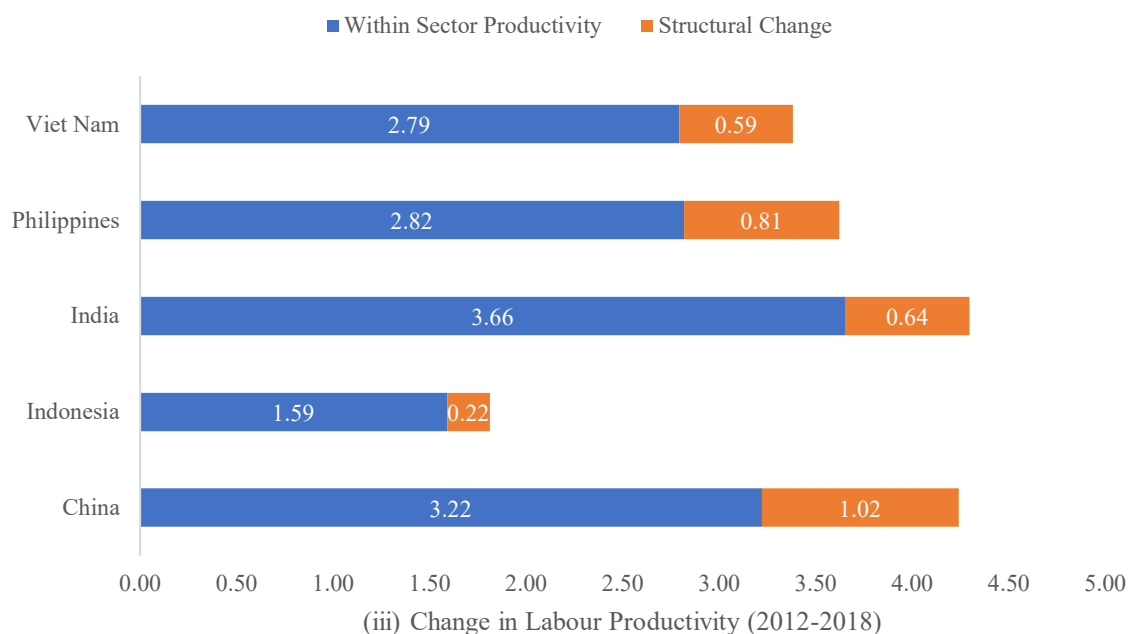


Figure. 5c

Indonesia and Some Asian Countries Economic Transformation, 2012-2018

Source: Authors' own calculation from GGDC/UNU-WIDER Economic Transformation Database (Kruse et al., 2023)

Indonesia, however, diverged negatively during 2012–2018. Its within-sector productivity was relatively low at 1.59, while structural change fell sharply to just 0.22, making it one of the weakest performers in the group. This outcome reflects two interrelated challenges. First, Indonesia's economy has become increasingly dependent on natural resource exports—such as coal, palm oil, and other commodities—which generate income but do not drive sustained labor productivity growth. Resource dependence often produces a “Dutch Disease” effect, where reliance on resource rents discourages investment in manufacturing and tradable sectors. Second, Indonesia has been experiencing “premature deindustrialization,” where the share of manufacturing in GDP and employment peaked earlier and at lower levels compared to East Asian peers. Instead of sustaining industrial deepening, labor shifted toward low-productivity informal services, which limited both within-sector upgrading and the potential for structural transformation. As a result, Indonesia's earlier momentum in both reallocation and efficiency stalled, leaving its productivity performance modest compared to Vietnam, China, and India.

Taking together, these trends reveal contrasting developmental trajectories. China consistently combined strong within-sector productivity with significant structural change, peaking during 2000–2012. Vietnam alternated between balanced growth, structural change-led growth, and eventually a shift toward within-sector improvements. India maintained a within-sector driven path with structural change as a secondary factor. The Philippines experienced stagnation in the early 1990s but gradually improved, particularly after 2012. Indonesia, however, represents a case of diminishing dynamism: while it showed promise in earlier decades through structural reallocation and balanced contributions, it faltered after 2012 due to resource dependence and premature deindustrialization, signaling difficulties in sustaining productivity growth through both within-sector upgrading and structural transformation.

The Provincial Paradox and Severe Productivity Imbalance

The long-term trend of sectoral economic contribution provides a clear picture of the industrial dominance (Figure 6). Over the entire 2010-2024 period, the Processing Industry has been the largest single contributor to the provincial GRDP, with its growth trajectory closely mirroring the overall GRDP growth. While the Service sector has also grown steadily in absolute

economic terms, it remains a distant second, reinforcing the industrial sector's role as the primary engine of economic value.

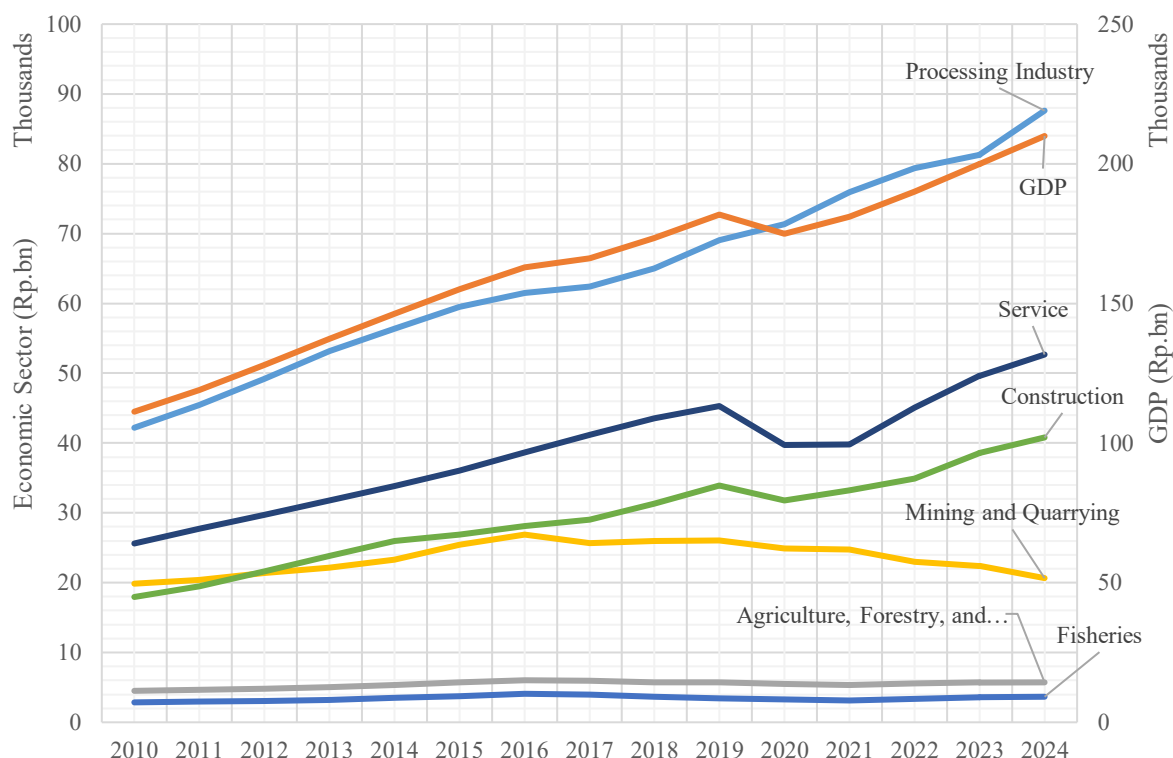


Figure. 6
Kepulauan Riau's GDP Trajectory by Sectors (2010-2024)
Source: Authors' own calculation from Badan Pusat Statistik Indonesia

Kepri's economic growth is clearly dominated by the Industry Sector. This sector consistently contributed the largest to the province's GRDP from 2010 to 2024. This is followed by the services sector, which is increasingly expanding its role in supporting economic growth. Meanwhile, the primary sector, which encompasses agriculture, forestry, and fisheries, presents a contrasting picture. Its contribution to GRDP is relatively stagnant and increasingly marginal compared to the rapid growth of the modern sector.

This phenomenon illustrates the dynamics of development oriented toward industrialization and modernization but indirectly creates "two faces of the economy" in the Riau Islands. On the one hand, there is a modern, capital-intensive economy, integrated with global markets, and concentrated in industrial centres. On the other hand, there is a traditional, labor-intensive, subsistence economy spread across small islands that faces significant challenges in ensuring equitable distribution of development benefits.

From an inclusive development perspective, the lagging behind of the primary sector is an important signal. Fisheries and agriculture, the mainstay of maritime livelihoods, have not shown significant productivity increases. This means that while the province has recorded high economic growth from the industrial and service sectors, the benefits have not fully trickled down to coastal communities reliant on traditional economies. This gap creates a paradox: Riau Islands is a maritime province rich in marine resources, but the welfare of its fishermen has not been optimally improved.

Zooming into the provincial level, the case of the Riau Islands from 2010 to 2024 presents a more complex and concerning picture. While the province experienced consistent economic growth in terms of GDP per capita, this was accompanied by a steady increase in income inequality, with the Gini coefficient rising from 0.293 to 0.357 (Figure 7). This indicates that the benefits of growth have not been equitably distributed.

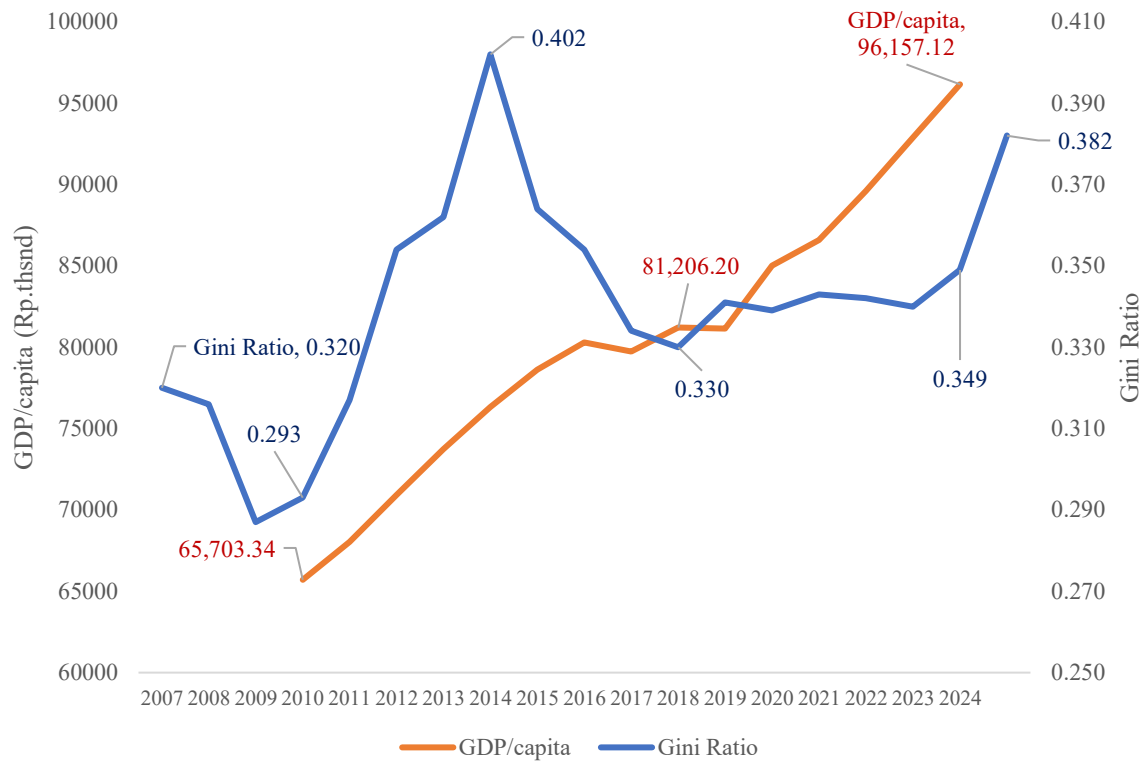


Figure. 7
Kepulauan Riau's GDP/capita and Gini Ratio Trajectory
Source: Authors' own calculation from Sakernas Badan Pusat Statistik Indonesia

The primary driver of this trend is a uniquely rapid and imbalanced structural transformation. Kepri's shift towards a service-based economy has been far more accelerated than the national average, with the services sector's employment share surging from 45.83% to 59.10% in just over a decade (Figure 8). However, this reallocation of labor has created a severe economic imbalance. As of 2024, the services sector employed the vast majority of the workforce (59.10%) but generated only a quarter of the economic output (25.09%). Conversely, the industrial sector produced the lion's share of output (72.18%) with only a third of the workforce (33.83%).

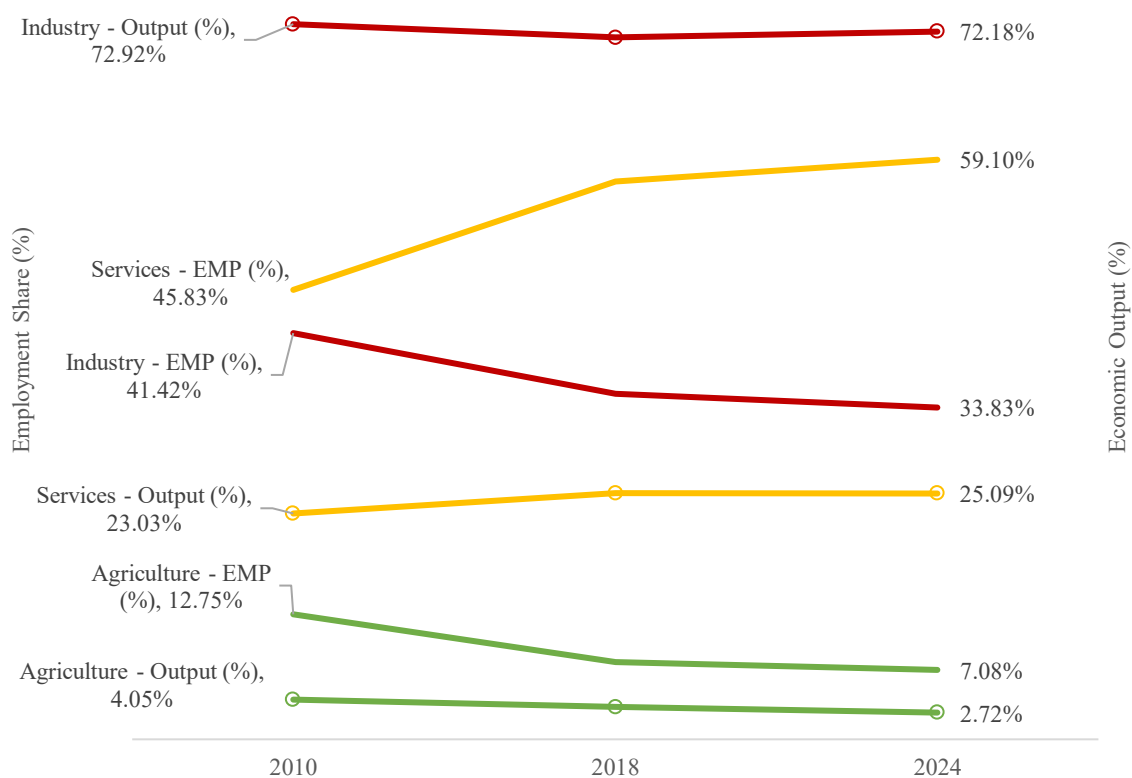


Figure. 8
Kepulauan Riau's Economic Output and Employment Share of Industry, Service, and Agriculture Sector
Source: Authors' own calculation from Sakernas Badan Pusat Statistik Indonesia

This divergence has split the economy into two distinct poles, producing what can be called a “structural change penalty.” On one side, industry functions as the engine—characterized by high formality, high productivity, and high output, but shrinking employment opportunities. On the other side, services act as the sponge—absorbing a growing workforce but offering stagnant formality, low productivity, and limited output. The consequence is rising inequality: while industrial gains concentrate among a smaller segment of the population, the expanding service sector traps much of the labor force in low-productivity jobs. Instead of narrowing gaps, structural transformation in Kepri has deepened them, fueling dualism and amplifying disparities across sectors and regions.

This imbalance reflects a classic case of growth without inclusion. Structural transformation, ideally, should improve productivity both “within sectors” and “across sectors” as workers move from low- to high-productivity activities. Yet, in Kepri, the opposite has occurred: a significant share of labor has been reallocated into low-value-added services, diluting overall productivity gains. This “misallocation effect” undermines the potential benefits of industrial growth, as the majority of the workforce remains disconnected from the engine of the economy.

Policy-wise, this raises urgent concerns. Without interventions to upgrade productivity in the service sector and strengthen linkages between industry and the broader economy, structural transformation will continue to be asymmetric. The result is not only higher inequality but also vulnerability to external shocks, as the region's growth depends disproportionately on industrial output that engages only a fraction of its labor force.

The findings of this study highlight several actionable implications for policymakers in Kepulauan Riau and other Indonesian provinces facing similar dilemmas. First, local governments need to prioritize human capital development through vocational training and digital upskilling, particularly targeted at workers in the service sector who face low productivity and limited

career mobility. Strengthening technical and managerial capacities in tourism, logistics, and retail services can raise labor productivity while reducing informality.

Second, fiscal strategies must be designed to reduce regional disparities. This includes progressive local taxation schemes, expanding fiscal transfers to lagging regencies, and diversifying provincial revenue sources beyond industrial enclaves. Such measures would not only enhance redistribution but also ensure more stable fiscal capacity for long-term development planning.

Third, the integration of industrial and maritime economies offers an untapped pathway for inclusive growth. Batam's industrial base could be more effectively linked to the fisheries, aquaculture, shipping, and marine tourism sectors of outer islands. By strengthening backward and forward linkages between industry and maritime activities, local governments could create new value chains that connect high-productivity hubs with labor-intensive sectors, thereby broadening the benefits of structural transformation.

The Root Cause: a Divide in Job Quality

The productivity gap is explained by job quality. High productivity in Industry is linked to high rates of formal employment, while low productivity in Services is tied to a large informal workforce. This imbalance is quantified by sectoral productivity ratios, which reveal a stark and widening gap (Figure 9). The industrial sector's productivity is exceptionally high and rising (from 1.76 to 2.13), while the services sector's productivity is low and stagnant (0.42). The root cause of this divergence is directly linked to the quality of employment. The industrial sector's high productivity is underpinned by a high and rising share of formal workers (85.85%), whereas the services sector's low productivity corresponds with a lower, stagnant formality rate (63.08%).

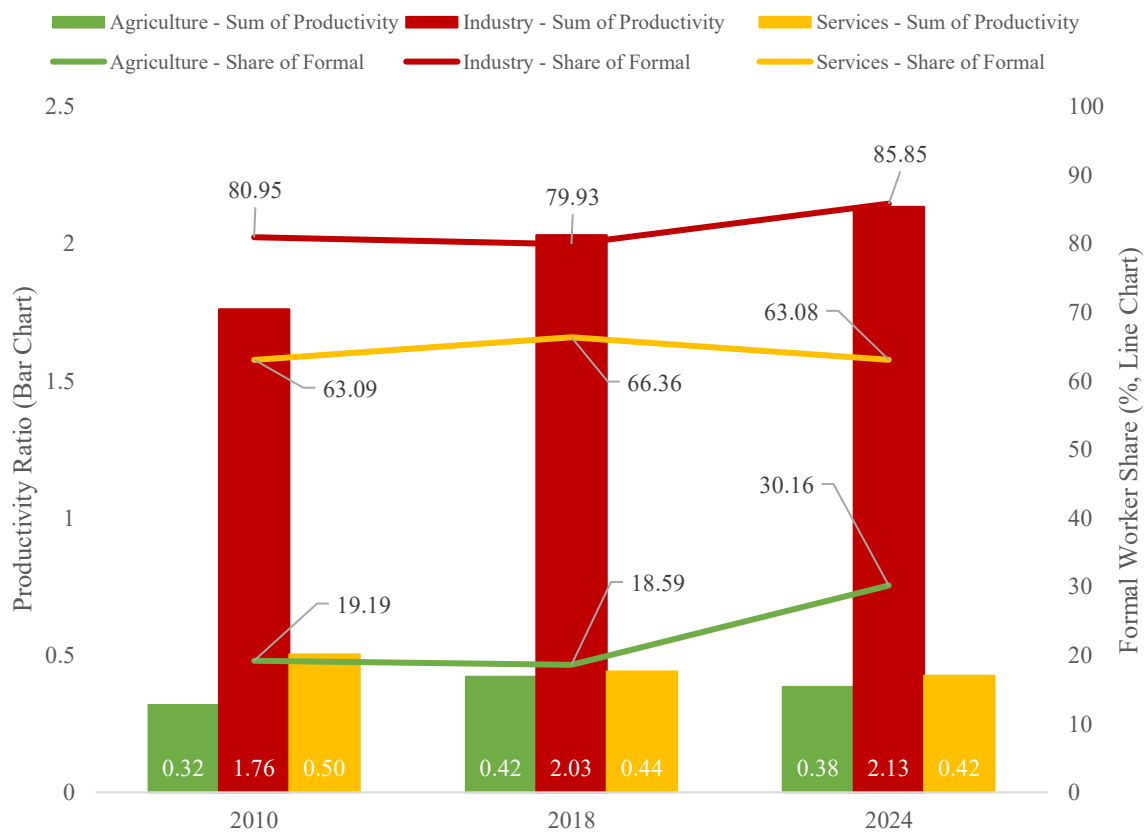


Figure. 9
Kepulauan Riau's Productivity Ratio (Bar Chart) and Formal Worker Share (Line Chart)
Source: Authors' own calculation from Sakernas Badan Pusat Statistik Indonesia

Decomposing Productivity Growth: National Patterns and the Case of Riau Islands

The decomposition of productivity growth into within-sector improvements and structural change offers a useful lens for understanding the dynamics of regional economies in Indonesia. While the national picture illustrates how provinces compare across these two dimensions, a closer look at the Riau Islands (Kepulauan Riau/Kepri) provides further nuance by disaggregating the province into its constituent regencies and cities. Linking both levels of analysis allows us to see not only where Kepri stands in the broader national landscape, but also how internal variations within the province shape, and sometimes contradict, its aggregate profile.

The relationship between the provincial and sub-provincial productivity decompositions reveals a multi-layered economic story, where the macro-level outcome is a direct consequence of its diverse internal dynamics. Figure 10, which compares all Indonesian provinces, firmly places Kepulauan Riau in the "Dual Economy Path" quadrant, characterized by high growth from within-sector productivity but a negative, growth-reducing structural change effect.

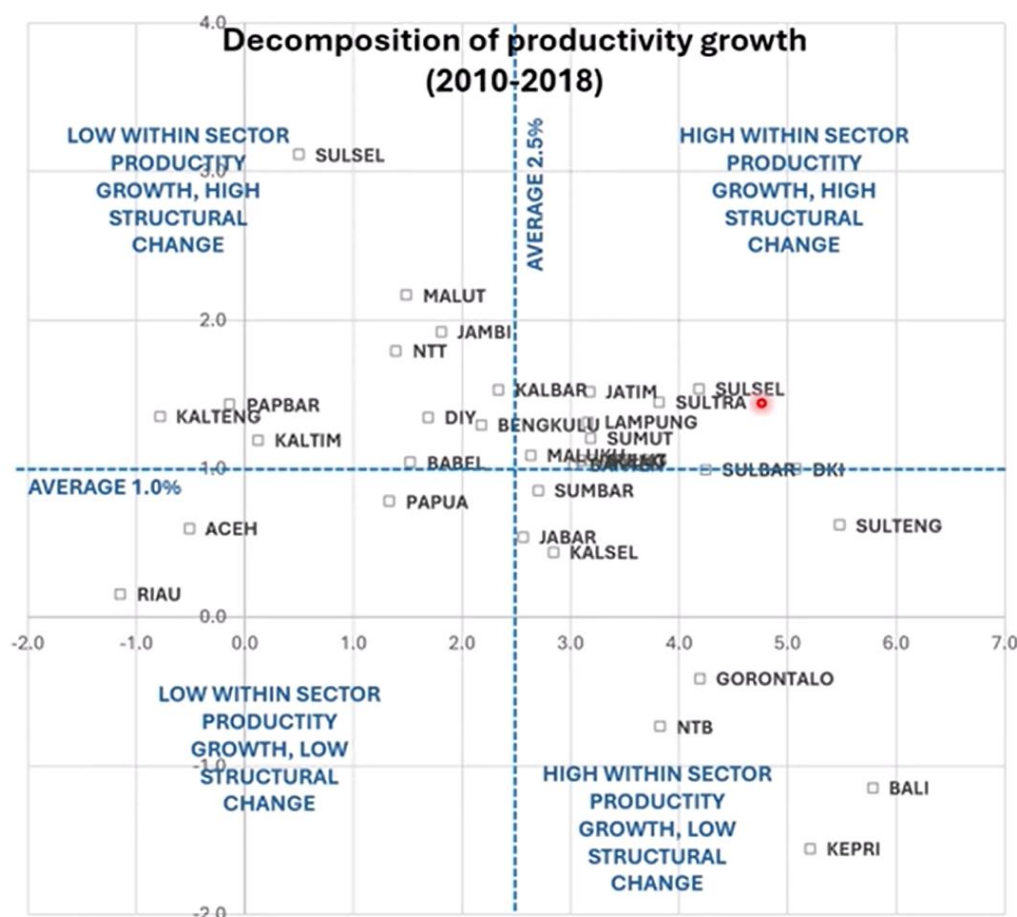


Figure. 10

Decomposition of Indonesia's Provinces Productivity Growth (2010-2018)

Source: Arief Anshory Yusuf, "Empat Strategi Memperkuat Ekonomi Domestik", <https://www.youtube.com/watch?v=3xaSHgBaNbQ>

At the national level, provinces are spread across the four quadrants of the productivity-structural change framework. Regions such as Sulawesi Tenggara and Sulawesi Selatan combine strong within-sector productivity growth with significant structural change, positioning them in the top-right quadrant as examples of robust structural transformation. Bali and the Riau Islands, by contrast, fall into the bottom-right quadrant, characterized by high within-sector productivity but low structural change. This reflects economies driven by capital- and service-intensive activities, such as tourism in Bali and trade-manufacturing in Batam, where productivity growth is concentrated within dominant sectors but labor mobility across sectors is limited. Other provinces, such as Maluku Utara, demonstrate higher structural reallocation than productivity gains, while provinces like Riau and Aceh stagnate with low performance on both dimensions.

A decomposition of productivity growth at the regency and city level for the recent 2018-2024 period reveals a troubling evolution of this dual economy (Figure 11). The main urban centers, Batam and Tanjungpinang, remain in the problematic quadrant of negative structural change, confirming their role as drivers of the provincial trend. Critically, both cities now exhibit negative "Within Sector Productivity," indicating that their existing economic sectors have become less efficient in this period. In stark contrast, regions like Kabupaten Bintan and Kepulauan Anambas continue on a healthier development path, showing strong positive contributions from both within-sector gains and beneficial structural change. Other regions, such as Kabupaten Lingga and Natuna, continue to rely heavily on the structural change component for their limited growth.

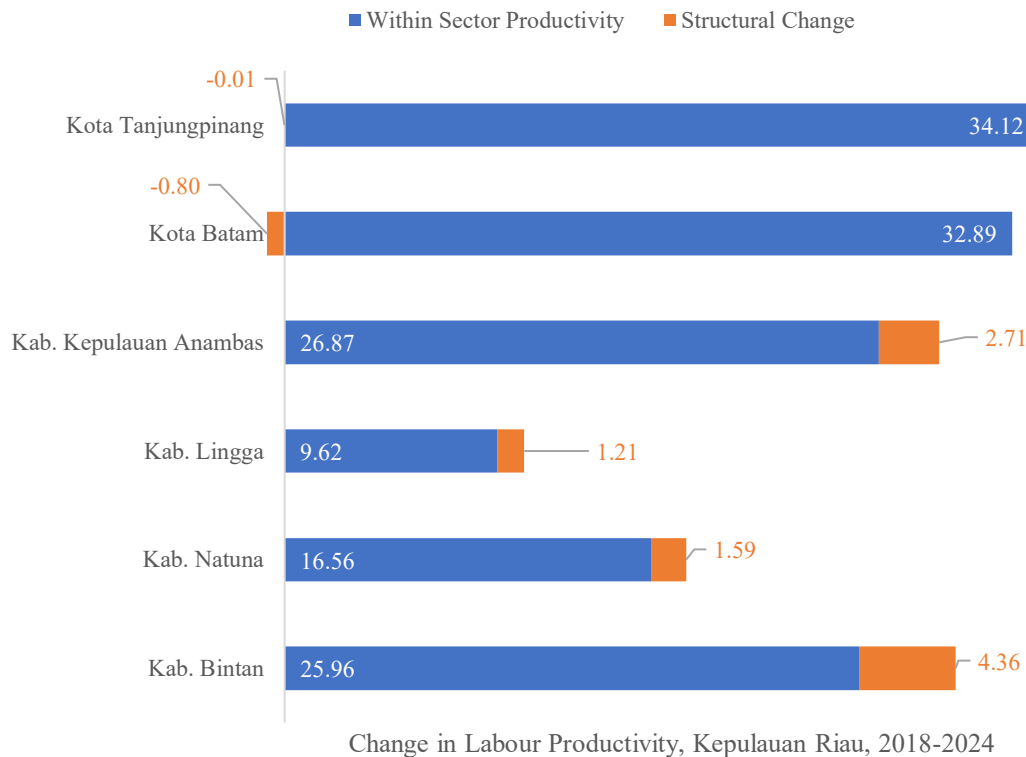


Figure. 11
Kepulauan Riau's Within Sector Productivity (Blue) and Structural Change (Orange), 2018-2024
Source: Authors' own calculation from Sakernas Badan Pusat Statistik Indonesia

Within the Riau Islands, however, a more complex picture emerges. Batam and Tanjungpinang, which dominate the provincial economy, display very high within-sector productivity growth but minimal or negative structural change. Their economic performance is primarily driven by efficiency improvements in manufacturing, trade, and services, achieved through technology adoption, capital deepening, and management practices rather than broad labor reallocation. Meanwhile, regencies such as Bintan and Anambas demonstrate both rising productivity and positive structural change, suggesting diversification into tourism, fisheries, and offshore oil and gas. Natuna shows moderate productivity growth with positive structural change, consistent with its evolving role in energy and fisheries, whereas Karimun and Lingga lag behind with low productivity and structural stagnation due to dependence on traditional sectors. This provincial diagnosis is explained by Figure 12, which decomposes this result into its constituent regencies and cities. It shows that the provincial average is overwhelmingly driven by its two largest urban economies, Batam and Tanjungpinang, which also fall squarely in the "Dual Economy" quadrant and whose economic weight dictates the provincial trend. This dynamic, however, is not uniform across the province. The analysis reveals a healthier, "Ideal Path" in regions like Kabupaten Bintan, which exhibits balanced growth from both high within-sector productivity and positive structural change. Concurrently, other regions like Kabupaten Lingga and Natuna are on a "Structurally Transforming" path, relying on labor reallocation for growth

rather than fundamental improvements in their existing sectors. Therefore, the provincial-level "dual economy" is not a monolithic condition but an aggregated result where the significant negative structural change penalty generated by its urban cores overshadows the more sustainable development patterns occurring elsewhere, highlighting the critical need for geographically differentiated economic policies.

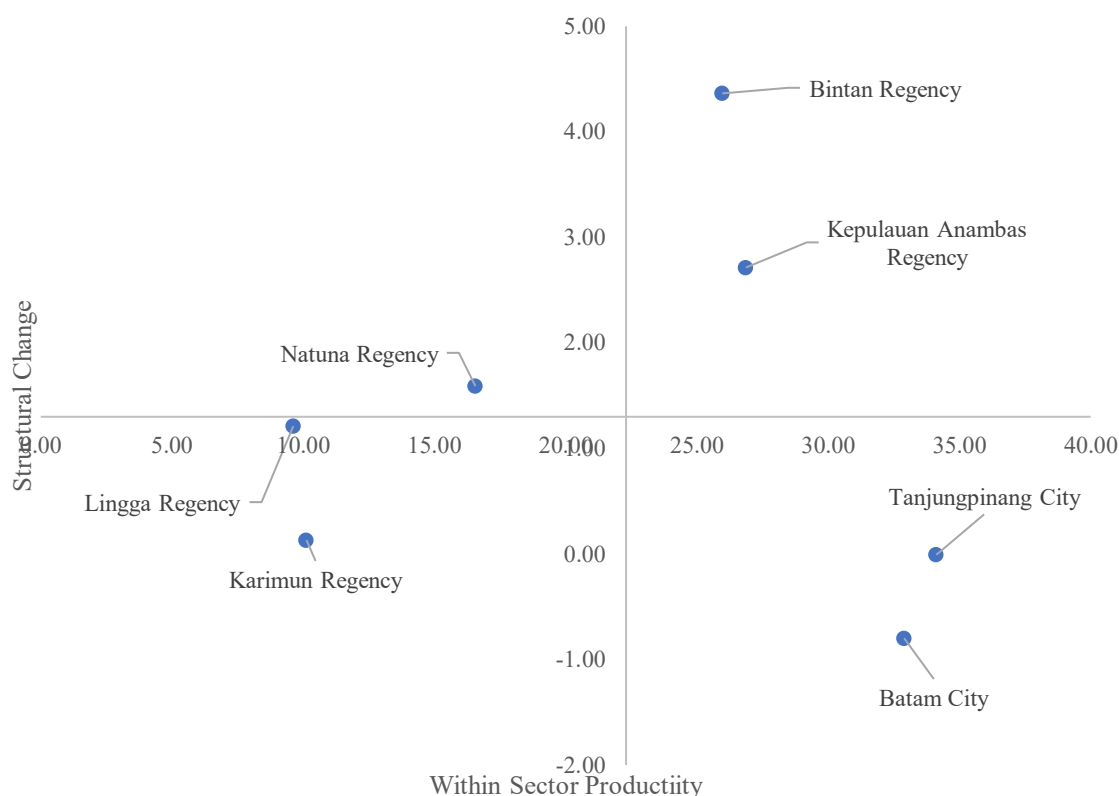


Figure. 12
Kepulauan Riau's Sub-Provincial Economic Transformation Quadrant (2018-2024)
Source: Authors' own calculation from Sakernas Badan Pusat Statistik Indonesia

Taken together, these findings highlight a paradox: while Kepri as a whole appears in the national chart as a province with limited structural transformation, this aggregate result is heavily shaped by Batam and Tanjungpinang, whose economic weight overshadows the more dynamic reallocation occurring in Bintan, Anambas, and Natuna. This underscores the importance of looking beyond provincial aggregates to capture the heterogeneity of regional development. For policymakers, the implication is clear: Kepri requires differentiated strategies. Batam and Tanjungpinang need policies that encourage sectoral diversification and labor reallocation, while the outer islands demand productivity upgrading, improved connectivity, and integration into larger economic circuits. Theoretically, this reflects the tension between "productivity deepening" within dominant sectors and "structural upgrading" across sectors, with Kepri demonstrating the former more strongly than the latter.

Kuznets' Curve Revisited

Ultimately, this development path places the Riau Islands in a paradoxical position relative to classic economic theory. On one side, industry functions as the engine—characterized by high formality, high productivity, and high output, but shrinking employment opportunities. On the other side, services act as the sponge—absorbing a growing workforce but offering stagnant formality, low productivity, and limited output.

The consequence is rising inequality: while industrial gains concentrate among a smaller segment of the population, the expanding service sector traps much of the labor force in low-

productivity jobs. Instead of narrowing gaps, structural transformation in Kepri has deepened them, fueling dualism and amplifying disparities across sectors and regions.

The province has achieved a service-dominant employment structure—a characteristic of an "Advanced Stage" economy in the Kuznets Curve model—while still being on the upward-sloping part of the curve where inequality is actively rising (Figure 13).

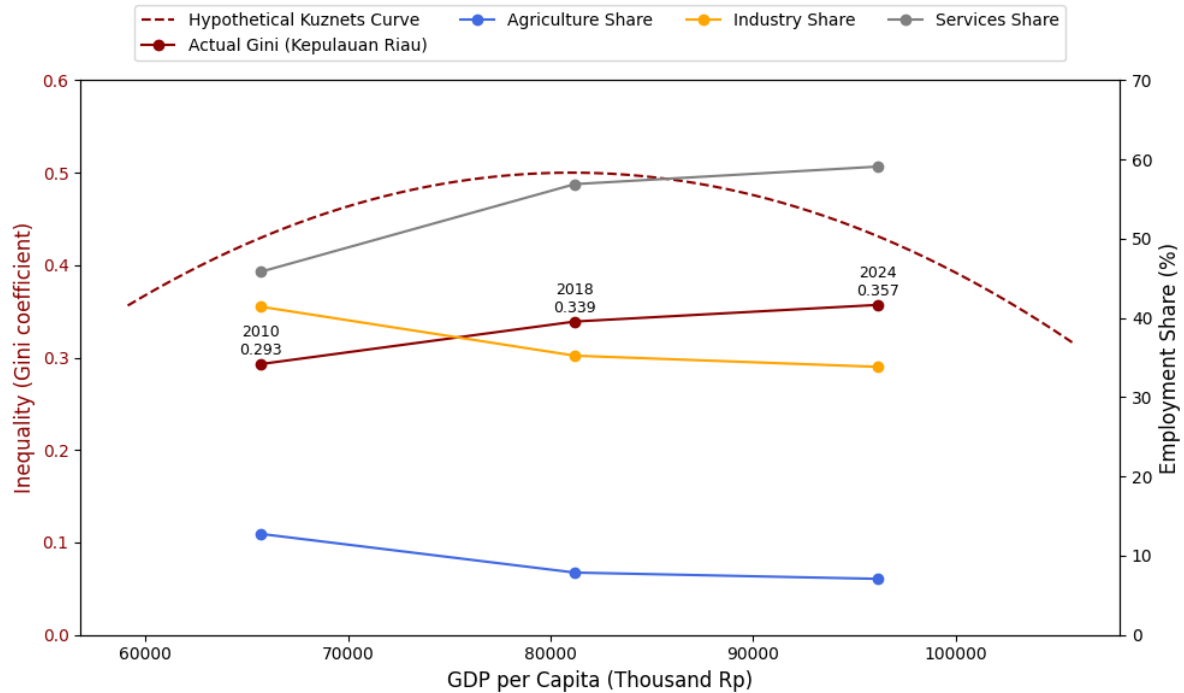


Figure. 13
Kepri's Structural Change in Kuznets' Model
Source: Authors' own calculation from Sakernas Badan Pusat Statistik Indonesia

Figure 13 provides an insightful picture of the relationship between economic growth, structural transformation, and inequality in Kepulauan Riau. The Kuznets Curve hypothesis suggests that as GDP per capita rises, inequality should initially increase (due to uneven benefits of industrialization) and then decrease once economies mature and wealth is more evenly distributed. However, the actual Gini coefficient trajectory in Kepulauan Riau (2010–2024) shows a steady increase—from 0.293 in 2010, to 0.339 in 2018, and reaching 0.357 in 2024—without turning downward as predicted by the Kuznets Curve. This indicates that inequality is worsening even as GDP per capita rises, meaning Kepulauan Riau does not follow the classic Kuznets pattern.

A closer look at the structural transformation trends shed light on this divergence. The share of employment in agriculture has consistently declined, dropping below 10% by 2024. Industry's employment share has also fallen slightly, from around one-third in 2010 to below 30% in 2024. In contrast, services have absorbed most of the labor force, expanding from about 40% in 2010 to above 60% in 2024. While this shift toward services is typical of a modernizing economy, in Kepulauan Riau it has not been accompanied by equitable income distribution. The services sector appears to be polarized—dominated by high-value activities (such as trade, logistics, finance, and possibly tourism) concentrated in urban centers like Batam and Tanjungpinang, while other parts of the province remain dependent on less productive sectors such as small-scale agriculture, fisheries, and informal trade.

The persistence of rising inequality suggests structural transformation in Kepulauan Riau is incomplete and uneven. Instead of creating broad-based gains, the concentration of employment in services has amplified spatial and sectoral disparities: urban regions benefit from high-productivity services while peripheral regencies lag behind. This is consistent with dualistic growth, where modern sectors expand but traditional sectors stagnate, leaving gaps in productivity and wages.

The roots of this outcome can be traced through the productivity decomposition framework. The first component—within-sector productivity growth—is strong in Kepri’s industry. Capital-intensive manufacturing and related activities boost output per worker, but because industrial employment shares are declining, these gains accrue only to a limited group. By contrast, within-sector productivity in services is stagnant, with low levels of technological adoption, weak skill formation, and minimal capital deepening. Thus, while industry raises the numerator of productivity, services dilute it through a swelling denominator of labor with little improvement in efficiency.

The second component—between-sector or reallocation effects—should ideally enhance productivity when workers move from low- to high-productivity sectors. In Kepri, however, the opposite occurs: labor has shifted disproportionately from agriculture and informal trade into low-value-added services, not into formal industry. Because the reallocation vector points toward low-productivity sectors, the aggregate outcome is a negative structural change effect. Instead of structural transformation driving convergence, it produces divergence.

This dynamic directly translates into inequality. Industrial productivity growth is captured as concentrated rents among firms and workers in the shrinking formal sector, while the bulk of the workforce in services experiences stagnant or even declining relative income. In essence, the composition of growth itself becomes unequal: output expands faster than employment inclusiveness. This structural mismatch fuels income polarization, reinforcing the “two poles” of Kepri’s economy.

In broader terms, Kepri demonstrates a causal sequence:

1. Industrial upgrading without labor absorption → rising output but concentrated benefits.
2. Labor absorption without productivity growth in services → stagnant earnings for the majority.
3. Misaligned structural reallocation → aggregate productivity drags down instead of lifts up.
4. Combined effect → growth becomes decoupled from equity, generating a structural change penalty.

If left unaddressed, this trajectory risks locking Kepri into a low-equilibrium trap, where sectoral shifts continue but fail to deliver inclusive welfare gains. Without policies to boost productivity in the service sector and create stronger forward-backward linkages between industry and the broader economy, inequality will deepen even as headline growth persists.

Structural Transformation and Inequality Paradox in Kepulauan Riau

The findings of this study challenge one of the most enduring propositions in development economics: the expectation that economic growth, mediated through structural transformation, follows a Kuznets-type inverted U-curve in which inequality first rises during industrialization and later falls as labor reallocates into higher-productivity sectors. In the case of Kepulauan Riau (Kepri), however, this trajectory does not hold. Instead, the province’s transformation has deepened inequality, driven by an unusual configuration of sectoral dynamics in which labor is increasingly absorbed into low-productivity services while output remains concentrated in high-productivity industry. The outcome is a severe productivity imbalance, a “structural change penalty” that has locked the economy into dualism and amplified disparities both within and across sectors.

This discussion situates these findings in the broader literature on structural transformation, labor reallocation, and inequality. It argues that the Kepri case reveals the limitations of applying canonical development models to subnational economies characterized by openness, enclave industrialization, and service-led growth. By unpacking the causal mechanisms underlying Kepri’s divergence, this section contributes to a deeper understanding of how structural transformation can under certain conditions exacerbate inequality rather than reduce it.

The Kuznets curve hypothesis posits that inequality rises in the early stages of growth as capital-intensive industrialization benefits a minority, but eventually declines as labor shifts into

higher-productivity, higher-wage sectors, especially manufacturing ((Kuznets, 1955; Riggs, Hobbs, Hobbs, & Riggs, 2012). Kepri's trajectory, however, departs from this expected pattern. Rather than channeling workers into the province's high-output industrial base, structural change has pushed a majority of labor into services, where productivity remains low and formality stagnant.

Between 2010 and 2024, the share of employment in services rose dramatically from 45.83 percent to 59.10 percent, while the sector's contribution to output lingered at just 25.09 percent. In contrast, industry contributed 72.18 percent of output but employed only 33.83 percent of the workforce. Instead of reducing inequality, this reallocation has entrenched disparities. The highly productive industrial economy generates concentrated wealth, while the swelling service economy traps a majority of workers in precarious, low-wage employment.

This pattern underscores a key critique of the Kuznets curve: its assumption of uniformity in structural transformation pathways. Sen and Baymul (2019) argue that inequality trajectories are not universally inverted-U shaped but instead depend on institutional and sectoral conditions. Similarly, Yusuf, Anglingkusumo, and Sumner (2021), in their cross-district analysis of Indonesia, show that structural transformation does not always reduce inequality and may even reinforce it under certain labor market configurations. The Kepri case aligns with these critiques, demonstrating how structural change, when service-led and imbalanced, produces inequality instead of mitigating it.

The central mechanism driving inequality in Kepri is what can be termed a structural change penalty: the reallocation of labor into sectors that absorb workers but fail to deliver productivity or income gains. Decomposition analysis highlights the dual nature of this penalty. On one side, industry operates as the economy's engine—capital-intensive, formal, and highly productive, but shedding labor as technological upgrading and global value chain integration favor efficiency over job creation. On the other, services function as the sponge—absorbing labor displaced from other sectors but without productivity growth, wage formalization, or strong linkages to industrial output.

The coexistence of an engine and a sponge produces a bifurcated economy. Industry drives GDP growth but does not provide broad-based employment, while services employ a majority of workers but do not generate proportional income. The mismatch between where people work and where value is created creates a structural gap that translates directly into inequality. This resonates with earlier theoretical warnings that growth may concentrate disproportionately in narrow sectors, leaving broader segments of society excluded (Li, Squire, & Zou, 1998).

Kepri's industrial base is heavily shaped by Batam's role as a special economic zone and node in regional production networks. This industrialization has been capital-intensive, foreign-investment-driven, and export-oriented, generating high productivity but limited labor absorption. Industrial firms have increasingly favored automation, skilled labor, and lean production, which raises output but reduces employment elasticity. Such enclave-style growth, while raising output, does not automatically translate into broader social welfare improvements (Abdullah, Doucouliagos, & Manning, 2015).

At the same time, Kepri has experienced what scholars term "premature tertiarization." Services expanded before industry could fully absorb labor or achieve deeper linkages with the rest of the economy. Much of this expansion has been in low-value-added services such as trade, retail, transport, and hospitality—sectors that provide employment but at low productivity levels. In Indonesia more broadly, similar patterns have been observed, where service sector growth has not closed inequality gaps, especially in rural and less industrialized areas (Setyadharma, Oktavilia, Utami, & Noormalitasari, 2021; Sutomo, 2022).

Finally, Kepri's labor market is characterized by segmentation between the industrial core and the service periphery. Workers in industrial enclaves benefit from higher wages, formality, and access to global networks, while the majority employed in services remain trapped in informal, low-paying, and precarious conditions. Migrant labor inflows, both domestic and cross-border, further swell the service labor pool, increasing competition and depressing wages. These patterns echo historical findings that unequal access to political and economic institutions can entrench disparities even in the midst of growth (Acemoglu & Robinson, 2000).

Placing Kepri in the national context reveals additional insights. At the aggregate level, Indonesia has broadly conformed to a Kuznets-like trajectory: inequality rose during the early years of post-Suharto growth, then plateaued and began to modestly decline (Maika et al., 2013; Sutomo, 2022). However, this national pattern conceals significant subnational divergence. Provinces such as Java and Kalimantan have experienced more balanced labor reallocation into industry and services, with stronger productivity upgrading, while Kepri exemplifies the risks of enclave-driven growth.

Recent work by Panjawa et al. (2023) confirms that Indonesian inequality dynamics are highly regionalized, with provinces showing distinct inequality trajectories that deviate from national averages. Kepri's case illustrates how subnational contexts—marked by openness, trade dependence, and migratory labor markets—can diverge sharply from aggregate national models.

The productivity imbalance in Kepri has several implications for inequality and development. First, the decoupling of employment and output undermines inclusive growth. While GDP may rise, the majority of workers remain excluded from its benefits, leading to a disconnect between growth and welfare. Second, the concentration of output in industry without corresponding employment creates an enclave economy in which industrial prosperity coexists with widespread service-sector precarity. Third, the structural change penalty limits the poverty-reducing potential of growth, as labor absorption occurs in sectors with limited upward mobility.

This aligns with comparative evidence showing that without strong redistribution mechanisms or productivity upgrading, structural transformation can actually widen gaps in human development and social outcomes (Maika et al., 2013; Arief A Yusuf et al., 2021). For Indonesia, where regional inequality has long been shaped by uneven growth, the Kepri case underscores the importance of monitoring structural change at the provincial and even district levels.

The Kepri case underscores the need to revisit canonical development models. The Kuznets hypothesis, while influential, is insufficient to explain inequality trajectories in contexts where structural change unfolds through enclave industrialization and premature tertiarization. Similarly, Lewis's dual-sector model must be updated to account for new forms of dualism not between agriculture and industry, but between high-productivity industrial enclaves and low-productivity services.

Policy discussions must therefore move beyond the assumption that growth will automatically translate into equity through structural transformation. Instead, attention should focus on the quality of structural change: whether labor reallocation leads to productivity upgrading, whether services evolve into knowledge-intensive sectors, and whether linkages between industry and services are strengthened to spread gains more broadly (Halim, 2021; Sen & Baymul, 2019; Arief A Yusuf et al., 2021; Arief Anshory Yusuf & Halim, 2021).

CONCLUSION

This study has revealed that structural transformation in the Riau Islands (Kepri) has not delivered the inclusive development gains often associated with economic modernization. Instead of narrowing disparities, the province's economic restructuring has created what can be described as a "structural change penalty." Industrial sectors remain capital-intensive and highly productive but increasingly detached from labor absorption, while the service sector functions as a sponge that absorbs large segments of the workforce without generating proportional productivity or income gains. As a result, economic growth in Kepri has been accompanied by widening inequality both across sectors and among regions, highlighting the limits of assuming that structural transformation naturally translates into equitable development.

Theoretically, this research contributes to the broader debate on the Kuznets hypothesis and the developer's dilemma by showing how sub-national economies may diverge from canonical models. By applying productivity decomposition and Kuznets' framework to the provincial level, the study underscores the importance of localized dynamics, particularly in archipelagic and decentralized governance contexts. The findings demonstrate that while industry may function as the "engine" of growth and services as the "sponge" of labor, the absence

of meaningful linkages between the two produces a dualistic economic structure. This perspective enriches comparative development literature by emphasizing how enclave industrialization and premature tertiarization can generate inequality trajectories that differ markedly from the classic inverted-U pattern.

For policymakers, these findings underline the need for targeted interventions that make structural transformation more inclusive. Upgrading service sector productivity through vocational training, digital literacy programs, and the formalization of micro and small enterprises is essential to raise incomes where most of the workforce is employed. At the same time, fiscal reforms that strengthen redistribution and diversify provincial revenue can reduce inter-regional disparities. Most importantly, industrial development in Batam and other growth centers should be better integrated with the maritime economy—fisheries, aquaculture, logistics, and marine tourism—that remains underdeveloped despite Kepri's strategic geography. Revitalizing the maritime sector and creating stronger industrial-service linkages would not only generate more balanced employment opportunities but also provide a sustainable foundation for reducing inequality in the long run.

Future studies could expand in several directions. First, microdata-based approaches—using household or firm-level surveys—would provide a clearer understanding of how workers experience and navigate structural change. Second, comparative studies across Indonesian provinces, or between archipelagic and mainland economies, could highlight whether Kepri's dualism is unique or part of broader national patterns. Third, integrating environmental and maritime perspectives—particularly how blue economy policies intersect with structural transformation—would enrich both academic debates and policy design. Finally, employing advanced methodologies such as difference-in-differences, spatial econometrics, or computable general equilibrium (CGE) models could sharpen the causal identification of structural transformation's impacts.

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