



Gender inequality in HDI and per capita expenditure: a probabilistic distribution and spatial data analysis

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ABSTRACT

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This research investigates gender disparities within Indonesia, focusing on disparities in Human Development Index (HDI) and per capita expenditure. Through comprehensive data analysis, including data visualization, descriptive statistics, and hypothesis testing, the study uncovers substantial differences in both HDI and per capita expenditure between men and women in the year 2020. The results indicate that, on average, men have higher HDI and per capita expenditure levels. The analysis reveals a significant discrepancy in HDI, with a p-value of 3.137×10^{-14} , signifying that men possess a higher average HDI than women. Similarly, in the case of per capita expenditure, the analysis underscores notable gender disparities, with a p-value of 7.465×10^{-18} , illustrating that men exhibit a higher average per capita expenditure than women. These findings highlight the enduring gender inequalities in Indonesia, emphasizing the necessity for targeted interventions by policymakers, regional authorities, and stakeholders to rectify these imbalances and foster gender equality, essential for both social equity and sustainable economic development.

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1. Introduction

Gender equality, a subject of enduring global importance, holds a distinct place within the national discourse of Indonesia [1]. Despite the enactment of numerous international and national legal protections, gender disparities persist, deeply entrenched in cultural legacies and societal norms. Gender is a multidimensional concept, encompassing differences in roles, behaviors, activities, and socially constructed traits [2].

The pursuit of gender equality is not only an ethical mandate but a fundamental human right, essential to ensuring that men and women enjoy equitable opportunities across diverse aspects of life [3]. These disparities manifest in the division of roles into "public" and "domestic." [4] Public roles encapsulate income-generating activities outside the home [5], while domestic roles involve non-income-generating tasks within the household. These role distinctions perpetuate societal stereotypes and gender biases.

However, the impact of gender inequality transcends ethics; it reverberates through economic, social, and cultural dimensions [6]. As highlighted by the National Population and Family Planning Board of Indonesia [7], these disparities are socially constructed and dynamic. While economic growth appears promising, it remains insufficient to uplift all segments of society, especially those in underprivileged areas [8]. Women, both globally and in Indonesia, bear a disproportionate burden of poverty and deprivation, constrained by limited access to education, employment opportunities, healthcare, and essential services [9].

Recognizing the gravity of these disparities, the Ministry of Women's Empowerment and Child Protection has stressed the importance of quantifying gender inequality [10]. This quantification is achieved through the application of key indicators, including the Human Development Index (HDI) and the Gender Development Index (GDI) [11], [12]. While the HDI quantifies human development, it lacks the capacity to capture gender-specific disparities in quality of life [13]. In contrast, the GDI integrates the same indicators as the HDI but incorporates a gender-sensitive lens [14]. An GDI score closer to 100 indicates a narrower gap in human development between men and women [15].

In the pages that follow, this article ventures into the interplay between gender inequality, as mirrored in the GDI, and per capita expenditure in Indonesia [16]. The GDI offers a window into the extent of gender inequality in human development, while per capita expenditure serves as a barometer of individual and household economic status [17]. Our goal is to navigate the complex relationship between these variables, illuminating the far-reaching ramifications of gender inequality on economic well-being and the broader social and developmental fabric.

Our research embarks on a journey of exploration in this domain. Before we embark on our own study, it is imperative to look to the literature landscape. Previous studies, highlighted in the subsequent literature review, have paved the way for our own investigation, presenting both insights and limitations. By dissecting the strengths and weaknesses of these studies, we aim to set the stage for our research and uncover the gaps in the existing body of knowledge.

2. Method

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads—the template will do that for you.

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

2.1. Literature Review

This section undertakes a comprehensive analysis of prior research efforts to explore the intricate dynamics of gender inequality, human development, and economic growth within the context of

Indonesia [18], [19]. Each of these studies has contributed valuable insights to the subject matter, yet each also carries certain limitations. The critical examination of these strengths and weaknesses forms the basis for our own research and sheds light on areas necessitating further exploration.

One of the reviewed studies has advanced our understanding of gender inequality by offering an explanation that is notably accessible to a broad readership [20], [21]. However, it is not without limitations. Insufficiencies in the clarity and transparency of the research methods employed pose a concern. A detailed, unambiguous elucidation of data collection and analytical processes remains notably absent. Moreover, the discussion regarding the analysis methods utilized in this study remains obscured, highlighting the imperative need for a clear, explicit methodology within the domain of gender inequality research [4], [22]. Transparency and comprehensive methodological disclosure are integral to ensuring the credibility and replicability of findings.

Another study significantly contributes to the exploration of the relationship between gender inequality and economic growth [23], [24]. A key strength lies in its utilization of data from a reputable source, thus augmenting the credibility of the research. Furthermore, the study's analysis extends across various related fields, affording a comprehensive overview. Nonetheless, this study harbors limitations. Its exclusive focus on a specific region, to the exclusion of a broader national context, hinders the generalizability of its findings. It is imperative for future research endeavors in this domain to transcend regional boundaries and encompass a more diverse spectrum of Indonesian regions to ensure a holistic understanding of the national landscape.

The study that elucidates the influence of gender inequality on the survival strategies of impoverished farmworker households in a specific village [25] is distinctive for its lucid and well-structured research methodology. However, its limitations are conspicuous. Notably, several critical indicators, essential for a comprehensive understanding, remain insufficiently explained. This shortfall creates gaps in the research's comprehensiveness, underscoring the necessity for thorough indicator explanations to facilitate robust insights.

Another study distinguishes itself through the profusion of clear, well-referenced materials, substantially bolstering the credibility of its research [26]. The presentation of research findings is notably clear and accessible. Nevertheless, this study exhibits weaknesses, particularly concerning data visualization. The utilization of dot points results in unclear data visualization, potentially impeding comprehension and impairing the effectiveness of data representation. Streamlining the data visualization process holds the potential to enhance the research's clarity and impact.

A different study benefits from numerous supporting references that buttress its credibility [27]. Nevertheless, it possesses notable weaknesses in terms of its analysis methodology, data visualization, and the lucidity of its conclusion. The analysis methodology remains incomplete and vague, potentially undermining the replicability of the research. Furthermore, a dearth of data visualization detracts from the accessibility and comprehensibility of the research's findings. The conclusion of this study falls short of effectively representing the research's results, emphasizing the pivotal importance of crafting clear, comprehensive conclusions within the domain of gender inequality research.

In summation, the extant body of research on gender inequality in Indonesia has enriched our understanding, albeit marked by notable limitations. Addressing these limitations while fostering a deeper understanding of the intricate interplay between gender inequality, the Gender Development Index (GDI), and per capita expenditure remains the primary objective of our research. This involves

advancing a meticulous methodology, comprehensive data analysis, and transparent data visualization, among other improvements, to promote a more comprehensive examination of this critical subject.

2.2. Data Collection

Data collection is a critical phase in this study, forming the cornerstone upon which our subsequent analysis is built. In this context, we categorize data sources into two primary types: primary data and secondary data.

- **Primary Data** constitutes information gathered through direct empirical research, involving individuals or entities directly engaged with the subject under investigation [28]. This approach relies on three primary data collection techniques [29].
 - **Observation**, as the name suggests, involves the direct and systematic observation of the object or subjects central to our study. This method affords us the opportunity to gather real-time insights and firsthand data, providing a rich source of information.
 - **Interviews** are structured question-and-answer sessions conducted with individuals who hold authoritative positions or have direct involvement in the research subject. This technique allows us to tap into the expertise and perspectives of key figures related to our study.
 - **Questionnaires** are instrumental in collecting primary data. These tailored lists of questions are distributed to respondents closely linked to the subject matter, offering a structured approach to data gathering.
- On the other hand, **Secondary Data** comprises information obtained from external sources or research conducted by third parties. Secondary data sources prove invaluable as they provide insights into the research topic without necessitating direct interaction [30]. For our study, secondary data sources are curated from trusted repositories, such as the UNPAS Repository.

The data collection techniques deployed in this study are tailored to the research objectives :

- **Field Research** is a fundamental approach, designed to procure primary data directly. This encompasses three key methods.
 - **Observation**, which offers the unique advantage of providing a real-time, firsthand perspective by directly observing the subject matter within its natural context.
 - **Interviews** with pertinent authorities and individuals closely connected to our research focus. These structured question-and-answer sessions enable the collection of primary data and insights from key informants.
 - **Questionnaires** are a structured tool, allowing us to gather primary data by posing a series of questions to respondents directly affiliated with the subject matter.
- **Library Research** serves as a vital avenue for collecting secondary data. It involves an in-depth exploration of relevant literature and books linked to our research subject. This approach allows us to tap into the theoretical foundations that underpin our study.
- **Internet Research** is another significant data collection technique. It entails the collection of data from websites and online sources that are pertinent to our research topic. This method provides access to a wealth of online information, which is particularly valuable in the digital age.

The culmination of these data collection techniques and methodologies will enable us to acquire a comprehensive dataset for our study. This dataset will serve as the basis for our in-depth analysis of gender inequality in Indonesia concerning Human Development Index (HDI) and per capita expenditure.

2.3. Measurement of Gender Equality

The measurement of gender equality is a pivotal aspect of this study, enabling us to gauge disparities in the context of the Human Development Index (HDI) and per capita expenditure [12], [27]. A meticulous assessment of these measurements helps provide a comprehensive understanding of gender inequality in Indonesia. The Ministry of Women's Empowerment and Child Protection offers guidance on how to ascertain gender inequality, chiefly by examining the gap between the Gender Development Index (GDI) and Human Development Index (IPM) values.

The Gender Development Index (GDI) is a central metric in our analysis. It represents the ratio between the HDI values of women and men [31], [32]. This index varies between 0 to 100 percent, where a higher GDI value indicates a narrower development gap between men and women. In essence, GDI, much like HDI, is influenced by key components encompassing life expectancy (AHH), literacy rate (AMH), average years of schooling (RLS), and per capita expenditure. These elements are integral to understanding the dimensions of gender inequality in Indonesia.

Gender equality and justice are of paramount importance in the Indonesian context. The Government of the Republic of Indonesia has taken significant steps to address gender inequality, evident through the issuance of Presidential Instruction Number 9 of 2000 on Gender Mainstreaming in National Development. Gender mainstreaming is a central strategy in the formulation and evaluation of national development policies and programs. However, despite these efforts, gender prejudice still persists in numerous facets of life. Women continue to face discrimination in terms of equal rights, access to education and healthcare resources, employment opportunities, and political engagement.

In our analysis, we aim to explore the relationship between gender inequality and key indicators, particularly HDI and per capita expenditure. The GDI provides a robust framework to assess these disparities, as it delves into the differences in the development achievements of men and women, thus shedding light on the extent of gender inequality in Indonesia.

Our investigation employs a combination of statistical methods, including hypothesis testing and thematic mapping, to quantify these disparities and present a comprehensive picture of gender inequality. The results of this analysis will not only contribute to a deeper understanding of the challenges faced by women in Indonesia but will also provide critical insights for policymakers and stakeholders to craft targeted interventions aimed at addressing gender inequality.

2.4. Descriptive Analysis

In this section, we delve into a comprehensive and detailed analysis of the data, aiming to provide a profound understanding of the gender disparities in the Human Development Index (HDI) and per capita expenditure in Indonesia. Descriptive analysis is a fundamental step in this process, serving as the bedrock upon which our subsequent statistical investigations are built [33].

- Frequency Distribution [34] is the initial facet of our descriptive analysis. This involves organizing the data systematically into categories, rendering it comprehensible and facilitating insights into the distribution of HDI and per capita expenditure across different genders. We explore various types of frequency distributions, such as ungrouped frequency distributions, rank order

distributions, grouped frequency distributions, and distribution graphs. These different representations offer nuanced perspectives on the data, shedding light on its inherent patterns and disparities.

- Central Tendency Measurement is crucial for pinpointing the central values within our dataset. Measures of central tendency, including the mean, median, and mode, provide insights into where the data cluster most frequently. This analysis unveils the average, middle, and most frequently occurring values, allowing us to understand the typical values of HDI and per capita expenditure for each gender [35]. This information is critical in determining the central position of these variables and helps identify whether there are significant deviations from these central tendencies, indicating disparities.
- Variability Measurement aids in comprehending the degree of dispersion within the quantitative data. By calculating interquartile range, quartile deviation, mean deviation, standard deviation, and coefficient of variation, we assess the variability of HDI and per capita expenditure. Variability measurements offer critical insights into the homogeneity or heterogeneity of the data, informing us about the spread of data points. Understanding the variability is pivotal in assessing the degree to which data points deviate from the central tendencies, helping to identify disparities and outliers.
- Mean (Average), which is a vital component of our analysis, offers a detailed assessment of the typical values of HDI and per capita expenditure [36]. By calculating the mean (1), we gain insights into the average HDI and per capita expenditure for each gender, providing a quantitative measure of what can be considered the norm within our dataset.

$$\text{Mean} = \frac{\sum_{i=1}^n x_i}{n} \quad (1)$$

- Standard Deviation (S) (2) and Variance (S²) (3) provide a comprehensive understanding of the spread of data points. These metrics help quantify the extent to which data points deviate from the mean. A high standard deviation and variance signify significant disparities within the data, indicating the presence of outliers and deviations from the norm. By assessing these measures, we uncover the degree of variability in HDI and per capita expenditure and identify gender-based disparities.

$$s^2 = \frac{\sum_{i=0}^n (x_i - \bar{x})^2}{n-1} \quad (2)$$

$$s = \sqrt{\frac{\sum_{i=0}^n (x_i - \bar{x})^2}{n-1}} \quad (3)$$

In this analysis, we consider four types of data: nominal data, ordinal data, interval data, and ratio data. Each data type is assessed in accordance with its characteristics, revealing the various dimensions of gender disparities in HDI and per capita expenditure. Understanding the data types aids in selecting appropriate measures of central tendency and variability.

The analysis extends to evaluating the significance of gender-based disparities and understanding the implications of these disparities on human development and economic well-being. This detailed descriptive analysis sets the stage for our subsequent statistical tests and thematic mapping, offering a robust foundation for understanding gender inequality in Indonesia.

2.5. T-Test Analysis

In this section, we dive into a comprehensive and in-depth analysis using the t-test, a statistical method that allows us to rigorously assess whether there are significant differences in the Human Development Index (HDI) and per capita expenditure [37], [38] between genders in Indonesia. The t-test is an indispensable tool for investigating the significance of gender disparities in these key indicators.

The t-test serves as a crucial means of determining the presence of statistically significant disparities. It is particularly valuable when the conditions for the z-test are not met, as is often the case when working with real-world data where population standard deviations are not readily available.

- **T-Test for Equal Variances (Pooled T-Test):** This method is employed when the variances of HDI and per capita expenditure for men and women are assumed to be equal. By conducting the t-test under these conditions, we can ascertain whether there are significant differences in the means of HDI and per capita expenditure between genders. The pooled t-test is a robust approach for investigating gender-based disparities in these critical metrics. The formula for the pooled t-test is as (4).

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad (4)$$

$$S_p = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \quad (5)$$

Here, ' \bar{x}_1 ' and ' \bar{x}_2 ' represent the sample means for men and women, ' S_p ' is the pooled standard deviation, and ' n_1 ' and ' n_2 ' are the sample sizes for men and women, respectively. The degrees of freedom are determined as $df = n_1 + n_2 - 2$.

- **T-Test for Unequal Variances:** In situations where it is inappropriate to assume that the variances of HDI and per capita expenditure are equal between genders, we turn to the t-test for unequal variances. This method allows us to investigate gender disparities in HDI and per capita expenditure while accounting for differing variances. The formula for the t-test for unequal variances is as (6).

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_p \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad (6)$$

Here, ' \bar{x}_1 ' and ' \bar{x}_2 ' represent the sample means for men and women, ' s_1^2 ' and ' s_2^2 ' are the sample variances for men and women, and ' n_1 ' and ' n_2 ' are the sample sizes for men and women, respectively. Degrees of freedom are calculated as $df = n_1 + n_2 - 2$.

By employing these t-tests, we can rigorously evaluate whether the disparities in HDI and per capita expenditure between genders are statistically significant. This analysis goes beyond mere observation, offering statistical evidence to support or refute the presence of gender-based disparities in these critical indicators.

The results of these t-tests are pivotal in shaping our understanding of gender inequality in Indonesia. They provide quantitative insights into whether the disparities in HDI and per capita expenditure are substantial or if they can be attributed to random variation. This deep analysis using the t-test enables us to draw robust conclusions regarding gender inequality and inform policy and interventions aimed at addressing these disparities

2.6. Proposed Method

Our research methodology is meticulously designed to investigate and assess gender inequality in the Human Development Index (HDI) and per capita expenditure in Indonesia. It combines a series of well-defined steps to provide a deep and comprehensive understanding of the disparities between men and women.

- **Data Collection and Exploration:** Our research leverages secondary data sources, primarily drawing from the official website of the Central Statistics Agency (BPS). This trusted data source ensures the reliability and integrity of our analysis. Data exploration is a critical initial step, during which we meticulously examine the gathered data. Visual assessment through box plots aids in identifying and subsequently removing outliers that could potentially compromise the accuracy of our analysis.
- **Descriptive Analysis and Hypothesis Testing:** Our research delves into a detailed descriptive analysis of HDI and per capita expenditure data. This entails calculating fundamental descriptive statistics, including means, standard deviations, and quartiles. These statistics offer a comprehensive perspective on the distribution and central tendencies of these critical indicators for both genders. Hypotheses are formulated based on visual insights and subsequently subjected to statistical testing using the two-sample t-test. This rigorous analysis method assesses the statistical significance of disparities between men and women, assuming equal variances.
- **Thematic Mapping for Spatial Insights:** To gain spatial insights into gender disparities, we employ thematic mapping, a powerful visualization tool. Data is categorized into clusters denoting low, medium, and high disparities, providing a clear regional overview of gender inequality in HDI and per capita expenditure. This thematic mapping aids in identifying regions in need of targeted interventions and informs policy evaluations. It paints a comprehensive picture of how these vital metrics are distributed across Indonesia.

In conclusion, our research methodology is structured to offer a comprehensive and rigorous analysis of gender disparities. By combining data collection, exploration, descriptive analysis, hypothesis testing, and thematic mapping, it equips us to investigate, understand, and address gender inequality in HDI and per capita expenditure, ultimately contributing to informed policy decisions and interventions.

3. Results and Discussion

In this section, we delve deeper into the results obtained from the analysis of gender disparities in Human Development Index (HDI) and per capita expenditure in Indonesia. Our examination comprises several subsections, each offering a more detailed analysis of the findings.

3.1. HDI Disparities between Genders

In this subsection, we scrutinize the disparities in HDI between men and women in Indonesia. Researchers initiated the analysis by visualizing HDI data through box plots to identify outliers (Fig. 1). The presence of outliers was evident in both men's and women's HDI data for the year 2020.

These outliers, potentially skewed data, were systematically removed to ensure data integrity before proceeding with further testing. Visualizing the HDI data through box plots provided valuable insights into variations in the average HDI between men and women.

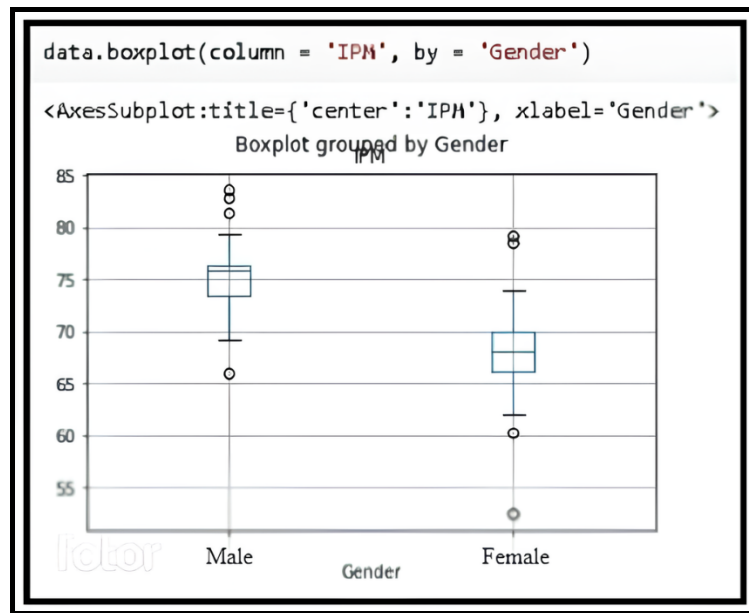


Fig. 1. Boxplot displaying the distribution of Human Development Index (HDI) values by gender in 2020, with outliers removed for analysis

Descriptive analysis was then applied to the refined HDI data, which excluded outliers. This statistical exploration unveiled essential insights into the HDI data (Fig. 2). With 58 HDI data points, it became evident that the average HDI was approximately 71.7424, with a standard deviation of 4.0288. The data ranged from a minimum of 62.97 to a maximum of 79.27. The quartiles presented values of 68.255 (Q1), 72.285 (Q2), and 75.660 (Q3), providing an in-depth understanding of the data's distribution and central tendencies.

	IPM
count	58.000000
mean	71.742414
std	4.029953
min	62.970000
25%	68.255000
50%	72.285000
75%	75.660000
max	79.270000

Fig. 2. Descriptive statistics of HDI data, including the number of data points, average HDI, standard deviation, minimum and maximum values, and quartiles, after removing outliers

- Hypothesis Testing for HDI:** To ascertain whether a significant gender disparity exists in HDI, we employed the two-sample t-test, with a critical significance level of 1% ($\alpha=0.01$). Our hypothesis testing yielded a test statistic (t-hitung) value of 10.1041. The p-value, shown in Figure 1, is 3.137×10^{-14} . Consequently, we confidently rejected the null hypothesis (H_0), concluding that there is indeed a statistically significant difference in the average HDI between men and women in Indonesia. Importantly, the analysis revealed that the average HDI for men surpasses that of women.

3.2. Per Capita Expenditure Gender Disparities

In this subsection, we explore disparities in per capita expenditure between men and women in Indonesia. Researchers used box plots to visualize and identify outliers in both men's and women's per capita expenditure data for the year 2020 (Fig. 3).

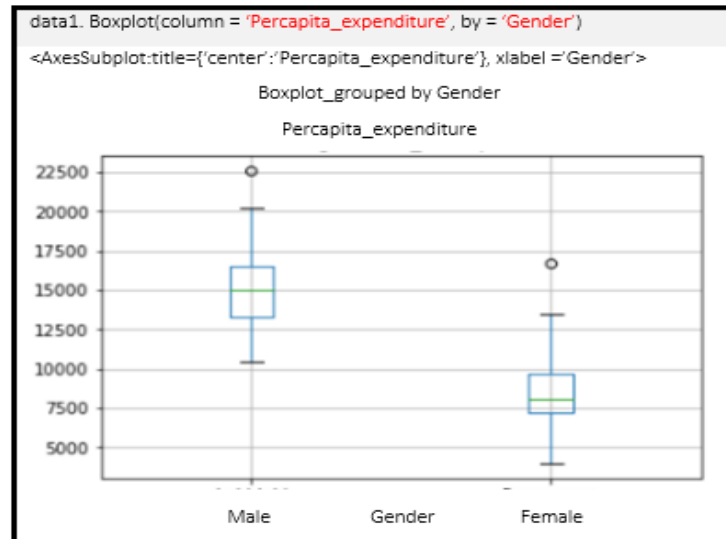


Fig. 3. Boxplot depicting Per Capita Expenditure by Gender in 2020, with the removal of outliers for subsequent analysis

After the identification of outliers, descriptive analysis was performed on the refined per capita expenditure data (Fig. 4). This analysis provided detailed insights into the characteristics of per capita expenditure data.

Percapita_expenditure	
count	66.000000
mean	11570.818182
std	3938.471394
min	3999.000000
25%	8025.750000
50%	11748.000000
75%	14860.500000
max	20222.000000

Fig. 4. Descriptive statistics of Per Capita Expenditure data, illustrating the number of data points, average per capita expenditure, standard deviation, minimum and maximum values, and quartiles after the removal of outliers

Findings mirrored those of the HDI data statistics. The per capita expenditure data consisted of 58 data points, with an average of approximately 71.7424 and a standard deviation of 4.0288. The data ranged from a minimum value of 62.97 to a maximum value of 79.27. Quartiles were measured at 68.255 (Q1), 72.285 (Q2), and 75,660 (Q3), mirroring the data's distribution and central tendencies. These statistics mirrored the findings for HDI, offering a consistent perspective on per capita expenditure for men and women.

- **Hypothesis Testing for Per Capita Expenditure:** To evaluate whether significant gender disparities exist in per capita expenditure, we applied the two-sample t-test, maintaining a critical significance level of 1% ($\alpha=0.01$). Our hypothesis testing produced a test statistic (t-hitung) value of 11.8892, coupled with a p-value of 7.465×10^{-18} . This robust statistical evidence led us to reject the null hypothesis (H_0), indicating a substantial difference in the average per capita expenditure between men and women. The analysis demonstrated that, similar to HDI, the average per capita expenditure for men was notably higher than for women.

3.3. Spatial Distribution of Gender Disparities

To gain a more comprehensive understanding of gender disparities in Human Development Index (HDI) and per capita expenditure, we conducted spatial visualization using thematic maps. These maps effectively cluster HDI and per capita expenditure into three categories: low, medium, and high. The aim was to identify regions with significant gender-based disparities and inform potential policy interventions.

- **HDI Thematic Maps:** Our thematic mapping exercise focused on comparing the HDI distribution between men and women. As displayed in Fig. 5, the thematic maps revealed noteworthy disparities in the classification of HDI between genders. Notable differences emerged in several provinces, including Riau, West Sumatra, Central Kalimantan, North Kalimantan, Central Java, East Java, Central Sulawesi, South Sulawesi, and North Sulawesi. The disparities in HDI classification between men and women within these regions signify the persistence of gender inequality in terms of HDI.

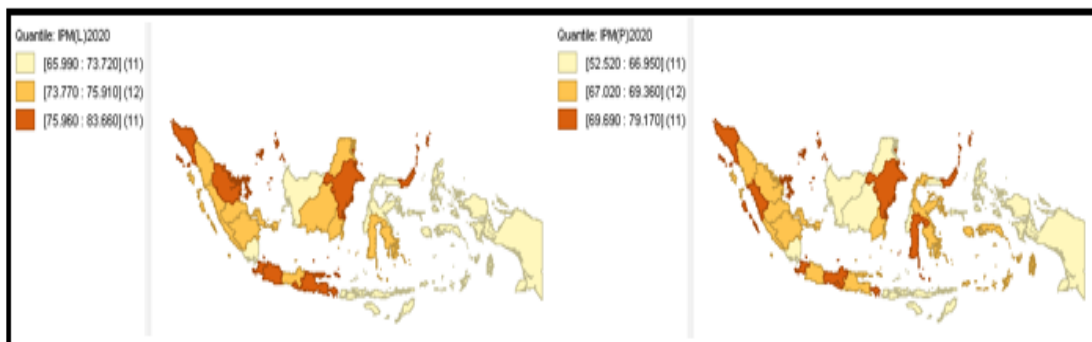


Fig. 5. Thematic Maps of Men's and Women's HDI

- **Implications for Policy:** The observed gender disparities in HDI within specific regions underscore the need for targeted policy interventions to address these inequalities. It is crucial for policymakers to focus on these regions to enhance gender equality and ensure that both men and women have equal access to opportunities that contribute to human development.
- **Per Capita Expenditure Thematic Maps:** In addition to analyzing HDI, we conducted a similar thematic mapping exercise for per capita expenditure by gender. Fig. 6 illustrates the thematic maps, revealing disparities between men's and women's per capita expenditure. Significant differences were observed in provinces such as Aceh, Riau, West Sumatra, Jambi, South Sumatra, Central Kalimantan, South Kalimantan, East Kalimantan, Central Java, Sulawesi Island, and Maluku. Notably, the entire island of Sulawesi showed a tendency for per capita expenditure to be dominated by women, while Riau and North Kalimantan areas exhibited a preference for men. These variations can be attributed to different cultural and socio-economic factors.

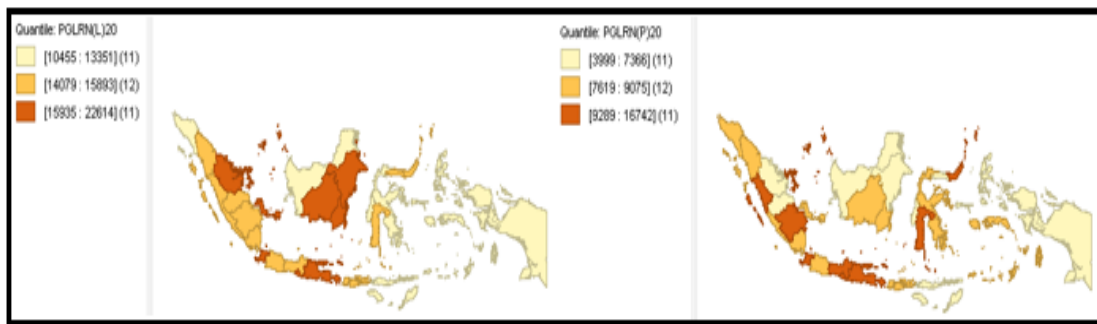


Fig. 6. Thematic Maps of Men's and Women's Per Capita Expenditure

- Policy Implications:** The disparities in per capita expenditure indicate that targeted interventions are needed in specific regions to address gender-based differences. These variations can be attributed to cultural factors and demand tailored policies that address local needs and conditions. As such, policymakers should consider these findings in developing more equitable and effective strategies to reduce gender disparities in per capita expenditure.

3.4. Policy Implications and Further Considerations

Our study offers critical insights into the gender disparities in HDI and per capita expenditure in Indonesia. These findings hold significant implications for policymakers, as addressing these disparities is paramount for ensuring more equitable economic growth. Gender disparities not only impact the welfare of women but also have wider implications for men and children, as well as overall economic development.

Existing policies related to gender equality in Indonesia reveal both progress and challenges. While the ratification of CEDAW through Law no. 7 of 1984 marked an important milestone, there is a need for more comprehensive and effective implementation of gender-related policies. Alarming issues, such as rising maternal mortality rates (MMR), underscore the urgency of addressing gender-related targets.

The work of gender activists, NGOs, and civil society plays a crucial role in advocating for gender equality and challenging societal norms and biases. It is clear from our research that ongoing efforts to reduce gender inequality are imperative. Furthermore, policies should aim to address the issue not only at a practical level but also on an institutional and knowledge level.

The success of programs like MAMPU highlights the potential for change in Indonesia. Expanding and adapting these initiatives at the local level is crucial to achieving lasting and meaningful progress in gender equality. Gender equality touches on all aspects of human life, including the economic, social, cultural, political, and health domains. Achieving gender equality requires collaborative efforts from government, civil society, and the private sector, recognizing its far-reaching consequences.

In light of these findings, it is clear that gender disparities in HDI and per capita expenditure persist. Spatial visualization, in the form of thematic maps, has identified regions requiring targeted policy interventions. These maps highlight the necessity of tailored approaches to address gender disparities effectively.

Our research emphasizes the importance of data-driven decision-making and multi-faceted strategies to promote a more equitable society and foster economic growth. It also underscores the significance of achieving gender equality not just for women but for the entire population and the nation's development

as a whole. Future research should further explore these disparities and assess the impact of policy changes on gender equality and economic growth in Indonesia.

4. Conclusion

This research has provided critical insights into the gender-based disparities in Human Development Index (HDI) and per capita expenditure in Indonesia. The analysis, using a combination of visual representations and statistical tests, confirmed the existence of significant differences in both HDI and per capita expenditure between men and women. Men, on average, exhibited higher HDI and per capita expenditure, highlighting areas where gender inequality persists.

These findings hold substantial implications for Indonesia. Gender inequality not only affects individual well-being but also has broader economic repercussions, hindering overall economic growth. It is crucial for the Indonesian government, alongside regional authorities and stakeholders, to prioritize policies that address these disparities. Targeted interventions in regions with significant gender inequalities, as revealed by thematic maps, can help to reduce these discrepancies and promote gender equality. This research reinforces the importance of ongoing efforts to create a more equitable society and emphasizes the need for informed policymaking to effect meaningful change in the country.

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