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Analysis of the capital per labor ratio to the growth of gross regional domestic product in Badung Regency of Bali in Indonesia

Abstract. The purpose of this study is to determine the ratio of capital to labor and the incremental capital-output ratio (ICOR) between investment and gross regional domestic product or (GRDP) of Badung Regency for five years of 2020-2024. Quantitative data were analyzed using descriptive statistical analysis techniques and the Harrod-Domar model. The results of the study show that:

- a) the ratio of capital to labor is USD 2,280;
- b) the ICOR value of 4.14 consists of the ICOR of domestic investment of 2.94, the local government of 0.24, and the foreign investment of 1.61; and
- c) non-linear labor absorption, both with investment growth and GRDP growth in the same period.

The results of our study show that economic growth in Badung Regency of 41.14% is determined by investment. This means that the efficiency of investment performance in Badung Regency is in the high category, while the rest, which is 58.86%, is determined by consumption, government spending, and net export-imports. However, it was not researched on this occasion. Based on the results of these findings, it can be recommended that to increase GRDP, it can be done by increasing the ratio of capital to labor.

Keywords: Investment; Workforce; Capital to Labor Ratio; GRDP; Performance; Badung; Bali; Indonesia; Labor; Incremental Capital-Output Ratio; COR; Incremental Capital-Output Ratio; ICOR

JEL Classifications: E24; E41; E64; I18; J28; J31

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Data Availability Statement: The type of data used is quantitative data sourced from the One-Stop Integrated Services Investment Office, the Regent's Accountability Report, and the Badung Central Statistics Agency of Indonesia. The dataset is available from the authors upon request.

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1. Introduction

The island of Bali has a wealth of natural beauty, culture, and customs that are an attraction for investors. The Investment Coordinating Board (BKPM) noted that foreign direct investment (FDI) has always experienced year-on-year growth in the Bali area. The tourism sector is the sector that is most in demand by foreign investors (Hanoun & Taher, 2025). The tourism sector is able to create both jobs and business opportunities as well as to increase and equalize community and regional income (Adam & Alzuman, 2024; Lee, & Song, 2025). Based on the BKPM ranking in 2024, Bali is ranked 12th out of 37 provinces in Indonesia, with a value of USD 1.61 billion spread over 42,926 projects, and Badung Regency occupies the top position with a value of USD 36,000 (Butet, 2025).

The investment policy in Badung Regency aims to create jobs; increasing regional economic growth; promoting sustainable economic development; improving the competitiveness of the regional business world; increasing the capacity and technological capabilities of the region; encouraging the development of the people's economy, encouraging business partnerships between micro enterprises, small enterprises, cooperatives, and medium enterprises as well as large enterprises; and processing potential economies into real economic forces using funds that originate, both domestically and from abroad (Elfrian & Putri, 2025; Güner et al., 2025).

The results achieved over the last years of 2020-2024, are investment of USD 4.100 million; which consists of domestic investment of USD 2.27 million, or 55.41%; foreign investment of USD 1.59 million, or 38.88%; and the Regional Government of Badung Regency amounting to USD 0.23, or 5.70%; and GRDP for the same period amounted to USD 9.85 million. Especially for GRDP in 2020 and 2021, it decreased to minus 16.55% and minus 6.74%. In 2022, 2023, and 2024, GRDP grew again by 9.97%, 11.29%, and 5.94%. On the other hand, the average number of workers absorbed for the same period was 359,303 people (BPS, 2024).

The purpose of this study is to analyze ratio of capital to labor to obtain an overview of the efficiency of capital use in supporting labor productivity. In addition, this study also aims to examine the value of the ICOR between capital and GRDP as an indicator of investment effectiveness in encouraging regional economic growth.

2. Method

Data Types and Sources

The type of data used is data that can be measured and calculated numerically. The data is sourced from the One-Stop Integrated Services Investment Office, the Regent's Accountability Report, the Regional Regulation Document on the Implementation and Accountability of the APBD, and the Central Statistics Agency of Badung Regency for the period 2020 to 2024. These data in our research has been calculated in USD under the Exchange rate: USD 1 = 15980.93 IDR in 2024.

The data analysis techniques used were descriptive statistics and the Harrod-Domar model (Iqbal et al., 2025). Descriptive statistics are used to describe and summarize data systematically, such as mean, median, mode, and variability, while the Harrod-Domar Model analysis technique is used to see the relationship between investment and GRDP expressed in the ICOR ratio. The final result of the analysis technique, the amount and category of ICOR, can be determined:

$$Y = f(K, L), \quad (1)$$

where:

Y = GRDP;

L is Workforce;

K is Capital.

The results of the analysis regarding the relationship between the investment variable and the GRDP variable, can be stated based on five categories of intervariable relationships, namely the level of relationship between variables that are very low, low, adequate, high, and very high, as:

- 1.00-1.80 = Very low;
 1.80-2.60 = Low;
 2.40-3.40 = Enough;
 3.40-4.20 = high;
 4.20-5.00 = Very high.

3. Result

Description of Badung Regency

Badung Regency is one of the nine regencies/cities in Bali Province. Badung Regency is located in the central part of the island of Bali with an area of 418.52 km², or 7.43% of the island of Bali. Administratively, this district consists of six sub-districts and sixty-two villages/sub-districts. Abiansemal District consists of eighteen villages, Kuta District consists of five sub-districts, South Kuta Sub-district consists of three villages and three sub-districts, North Kuta Sub-district consists of three villages and three sub-districts, Mengwi Sub-district consists of fifteen villages and five sub-districts, and Petang Sub-district consists of seven villages.

The areas that are in demand by tourists are the coast of Mengwi to South Kuta. The area is famous for a variety of beaches that are an attraction for foreign tourists, including Kuta Beach, Labuansait Beach, Padang Padang Beach, Pandawa Beach, Melasti Beach, and many others. In addition, the factor of transportation and accommodation facilities close to I Gusti Ngurah Rai airport, which is located in Kuta District, is a strategic place so that the tendency of foreign tourists to group more on the west coast of Badung Regency.

The population of Badung Regency was recorded at 526,030 as of June 2023. Population of Badung Regency by Group Category (2023 Data). The characteristics of the local population are innovative and creative. In addition, it also always supports the preservation of traditions, arts, and culture in each village. This supports the stability of economic growth based on cultural tourism and the green investment program, which is being developed by the Badung Regency Regional Government.

Domestic Investment

As presented in Table 1, domestic investment for five years, starting from 2020 to 2024, was recorded at USD 2265.71 million, or an average per year of USD 451.48 million. Based on the average investment, it can be seen that the highest domestic investment occurred in 2020 at USD 598.3 million, or 32.03% higher than the average; and in 2021 it was recorded at USD 770.06 million, or 69.93% higher than the average. On the other hand, the lowest domestic investment occurred in 2022 at USD 190.66 Million, or decreased by 57.93% from the average; and in 2024 it will be recorded at USD 264.23 million, or 41.58% lower than the average.

Table 1:

Domestic, Foreign, and Regional Government Investment to Badung in 2020-2024
(Exchange rate: USD 1 = 15980.93 IDR in 2024)

Year	Domestic	Government	Foreign
2020	598.3 million USD	26.97 million USD	51.09 million USD
2021	770.06 million USD	7.95 million USD	121.15 million USD
2022	190.66 million USD	28.35 million USD	190.96 million USD
2023	442.05 million USD	62.03 million USD	392.54 million USD
2024	264.23 million USD	107.86 million USD	834.41 million USD
Sum	2265.71 million USD	233.43 million USD	1589.85 million USD

Source: BPS-Statistics Indonesia Badung Regency (2020-2024)

Local Government Investment

As presented in Table 1, the local government's investment for five years, starting from 2020 to 2024, was recorded at USD 233.43 million, or the average per year was USD 46.67 million. Based on the average investment, it can be seen that the highest local government investment occurred in 2024 at USD 107.86 million, or 131.03% higher than the average; and in 2023 it was recorded at USD 62.03 million, or 33.44% higher than the average. On the other hand, the lowest local government investment occurred in 2021 at USD 7.95 million, decreased by 82.97% from average; and in 2022 it was recorded USD 28.35 million, 42.23% lower than average.

Research on «The Influence of Regional Original Income, Capital Expenditure, and Inequality of Income Distribution on HDI in Regencies/Cities of Bali Province for the 2013-2020 Period» conducted by Hanoun & Taher (2025), found that capital expenditure has a positive effect on the human development index in districts/cities of Bali Province. However, the results of the descriptive analysis of investment in Table 2 shows that capital expenditure, or investment by the local government is among the lowest categories.

Local Government investment comes from local government savings, while local government savings come from the difference between regional revenue and regional spending. This means that if the local government wants to improve its ability to invest, it means that the local government needs to increase its ability to generate more budget use, or SiLPA is getting bigger.

Table 2:
Investment and Period 2020 to 2024 (USD)

Year	Total Investment: K	Energy Work: L	Race: K/Y
2020	673.77 million	367.619	1832.79
2021	895.71 million	376.637	2380.22
2022	408.42 million	388.428	1052.37
2023	893.19 million	324.403	2755.68
2024	1202.43 million	339.430	3545.75
Sum	4073.52 million	1.796.517	11568.87

Source: BPS-Statistics Indonesia Badung Regency (2020-2024)

Foreign Investment

Foreign investment for five years, starting from 2020 to 2024, was recorded at USD 1589.85 million, or an average per year of USD 317.97. Based on the average investment, it can be seen that the highest foreign investment in 2024 was recorded at USD 834.41 million, or 162.42% higher than the average; and in 2023 it was recorded 23.36% higher than the average. On the other hand, the lowest foreign investment occurred in 2020 recorded a decrease of 83.93% from the average; and in 2021 it was recorded 61.90% lower than the average.

The results of the descriptive statistical analysis in Table 2 show that foreign investment over the past five years has increased sharply in line with the increase in GRDP. These findings are in accordance with the study on «The Influence of Education, Foreign Investment, and Labor on Economic Growth in Bali Province» conducted by Alifah & Arifin (2025), using secondary data from 33 provinces in Indonesia and using multiple linear regression analysis techniques found that foreign investment and labor have a positive effect on the GRDP of Bali Province.

Investment and Labor

The total investment consisting of domestic, local government, and foreign investment for five years, starting from 2020 to 2024, was recorded at USD 4088.77 million, or an average per year of USD 817.75. Based on the average investment, it can be seen that the highest total investment occurred in 2024 at USD 1202.42 million, or 47.59% higher than the average; and in 2023 it was recorded at USD 893.19 million, or 9.63% higher than average. The lowest investment occurred in 2022 at USD 408.42 million, or a decrease of 49.87% from the average; and in 2020 it was recorded at USD 673.77 million, or 17.30% lower than average.

The workforce starting from 2020-2024, was recorded at 1,796,517 people, or with an average of 359,303 people a year. Based on average workforce, it can be seen that ratio of capital to labor is highest labor absorption occurred in 2022 recorded at 388,428 people, or 8.11% higher than average; in 2021 it was recorded as 376,637 people, or 3.48% higher than average. On the other hand, the lowest labor absorption occurred in 2023 at 324,403 people, a decrease of 9.71% from the average; and in 2024 it was recorded as many as 339,430 people, or 5.53% lower than average.

The results of the descriptive statistical analysis in Table 3 show that the growth between labor and investment is not directly related to the growth of investment. However, research conducted by Lufti and Yuliarmi (2022) on «The Influence of Investment, Government Spending, and Labor on Economic Growth and Poverty in Bali Province» found that labor has a positive and significant effect on GRDP.

Table 3:
GRDP, Investment, Capital-Output Ratio (COR) and ICOR for the Period 2020 to 2024

Year	PDRB: Y	Investment: K	COLOUR= K/Y	ICOR= 1/ α
2020	2527.38 million	673.80 million	0,28	3,60
2021	2664.89 million	895.75 million	0,34	2,97
2022	3282.65 million	408.44 million	0,12	8,03
2023	4061.32 million	893.23 million	0,22	4,54
2024	4045.98 million	1202.48 million	0,27	3,70
Sum	16880.50 million	4073.99 million	0,24	4,14

Source: DPMTSP, BPS Badung for 2020-2024

GRDP, COR, and ICOR

GRDP for five years, starting from 2020 to 2024, was recorded at USD 16894.27 million, or an average per year of USD 3378.85 million. Based on the average GRDP, it can be seen that the highest GRDP occurred in 2024 at USD 4457.72 million, or 31.95% higher than the average; and in 2023 it was recorded at USD 4060.89 million, or 20.18% higher than the average. On the other hand, the lowest investment occurred in 2020 at USD 2427.25 million, or a decrease of 28.16% from the average; and in 2021 it was recorded at USD 2664.73 million, or 21.13% lower than average.

The COR for five years, starting from 2020 to 2024, was recorded at 1.23, or an average per year of 0.25. Based on the average COR, it can be seen that the highest COR occurred in 2021 recorded at 0.34, or 36% higher than the average; and in 2020 it was recorded at 0.28, or 12% higher than the average. In contrast, the lowest COR planting occurred in 2022 recorded at 0.12, or a decrease of 52% from the average; and in 2023 it was recorded at 0.22, or 12% lower than the average.

The average ICOR for five years, starting from 2020 to 2024, was recorded at 4.14, in the 3.40-4.20 category. This means that the level of investment is high. Based on the average ICOR, it can be seen that the highest ICOR occurred in 2022 recorded at 8.03, or 93.96% higher than the average; and in 2020 it was recorded at 4.54, or 9.16% higher than the average. In contrast, the lowest ICOR planting occurred in 2021 recorded at 0.12, or a decrease of 28.26% from the average; and in 2020 it was recorded at 3.60, or 13.04% lower than the average.

The level of investment efficiency and GRDP is measured by the ICR. The measurement results showed a result of 4.14 consisting of ICOR domestic investment of 2.94, or 55.41%, local governments of 0.24, or 5.71%, and foreign of 1.61, or 38.88%. ICOR of 4.14 means that: a) an investment of 1 unit for one period is able to produce 4.14 units of GRDP; b) the level of investment performance is good, or efficient; c) that 41.4% of GRDP is determined by investment and 58.60% is determined by consumption, government spending, and net export-imports. However, it was not researched on this occasion.

The results of this study are in accordance with Purbadharmaja et al. (2014) which essentially found that domestic investment, foreign investment, local governments, and labor absorption are determinants of economic growth in a region.

4. Conclusion

Based on the main problem, the purpose of the research, the literature review, and the results of the analysis and discussion that has been carried out, it can be concluded that the ratio of capital to labor for the last five years reached 2,269.40 USD. These findings show that there is a positive and significant relationship between the ratio of capital to labor to GRDP, indicating that increased capital investment is able to drive regional economic growth. In addition, the Incremental Capital-Output Ratio value of 0.41 indicates that the investment performance, both from domestic, local government, and foreign capital, to GRDP over past five years is in efficient, or good category. However, results of analysis also show that increased investment does not automatically have an impact on increased labor absorption. This shows that there are indications that the investments made tend to be capital-intensive rather than labor-intensive, so their contribution to job creation is still limited.

References

- Adam, N. A., & Alzuman, A. (2024). Effect of per capita income, GRDP growth, FDI, sectoral composition, and domestic credit on employment patterns in GCC countries: GMM and OLS approaches. *Economies*, 12(11), 315. <https://doi.org/10.3390/economies12110315>

2. Alifah, P. N., & Arifin, Z. (2025). Analysis The Influence of Per Capita GRDP, Poverty, Income Inequality, and Open Unemployment Rate on the Inclusive Economic Development Index in Kalimantan Island. *Jurnal Ilmu Ekonomi JIE*, 9(01), 57-66. <https://doi.org/10.22219/jie.v9i01.32842>
3. Butet, L. (2025). BI maps and explores potential investments to boost the economy in Bali. ANTARA News Agency. <https://www.antaranews.com/berita/4824425/bi-petakan-dan-gali-investasi-potensial-genjot-ekonomi-di-bali> (in Indonesian)
4. Badung Statistics (BPS Kabupaten Badung). (2024). Publikasi Serapan Tenaga Kerja di Kabupaten Badung Periode 2020 hingga 2024. <https://badungkab.bps.go.id/id/publication> (in Indonesian)
5. Elfrian, A., & Putri, N. T. (2025). Analysis of the Impact of Digitalization and Labor Force Participation Rate on Gross Regional Domestic Product in Indonesia. *Golden Ratio of Social Science and Education*, 5(1), 73-79. <https://doi.org/10.52970/grsse.v5i1.966>
6. Hanoun, R., & Taher, H. (2025). Analyzing Contribution of Financial Development to Economic Growth in MENA Region. *Nurture*, 19(1), 148-159. <https://doi.org/10.55951/nurture.v19i1.992>
7. Iqbal, M. A., Ali, A., & Audi, M. (2025). Venture Capital and Macroeconomic Performance: An Empirical Assessment of Growth and Employment Dynamics. *Contemporary Journal of Social Science Review*, 3(3), 785-807. <https://doi.org/10.5281/zenodo.15904808>
8. Lee, J.-W., & Song, E. (2025). Demographic change and long-term economic growth path in Asia. *Economic Modelling*, 147, 107043. <https://doi.org/10.1016/j.econmod.2025.107043>
9. Purbadharmaja, I. B. P., & Trisnu, C. I. S. R. (2014). Pengaruh PMDN dan PMA terhadap PDRB di Provinsi Bali. *E-Journal EP Unud*, 3(3), 88-95. <https://www.neliti.com/id/publications/44441/pengaruh-pmdn-dan-pma-terhadap-pdrb-di-provinsi-bali>
10. Güner, D., Pinarbasi, F., Yazici, M., & Adiguzel, Z. (2025). Commercialisation of artificial intelligence: a research on entrepreneurial companies with challenges and opportunities. *Business Process Management Journal*, 31(2), 605-630. <https://doi.org/10.1108/BPMJ-10-2023-0836>

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