Application of Multiple Regression Analysis in modeling the role of the hotel industry in a country's economy

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ABSTRACT
The aim of this paper is to present the relationship between independent variables that represent one of the indicators of hotel operations and their importance for the country's economic development as measured by gross domestic product in the activities of providing lodging and food and beverage services. The research sample consists of hotel enterprises located on the territory of the Republic of Croatia that provided yearly financial statements from 2002 to 2018. Multiple linear regression analysis revealed a strong significant link between the set variables within the model, indicating that the given independent variables are significant predictors of gross domestic product in the activity of providing accommodation and food and beverage preparation and service, confirming the positive impact of hotel operations on economic development.
Keywords: hotel industry, economy, Croatia, multiple regression analysis

1. INTRODUCTION

The impact of the tourism industry on the economic growth and development of the country is the most revised and discussed topic in the professional literature (Brida, et al., 2017). In addition, the literature is full of alternative explanations of the economic transformation within which the role of tourism development in terms of job creation is more sharpened, which has a positive effect on increasing living standards, the national product and foreign exchange income (Folarin, et al., 2017). It is the hotel industry that is an important component of the before-mentioned contribution. The global economy is seeing increasing international ownership of many hotel and restaurant chains that have become major players worldwide (Brida, Cortes-Jimenez & Pulina, 2016). The hotel sector is regarded as a cyclical industry, one that is highly sensitive to economic conditions (Bodie et al., 2008). This is because hotel companies have larger fixed expenses (costs incurred by all businesses regardless of their degree of production) than variable costs (costs that increase or decrease as the company produces more or less). Hotel enterprises with large, fixed costs are extremely susceptible to business conditions since they are unable to minimize expenses as production declines in reaction to dropping revenues during economic downturns. As a result, hotel earnings will rise in tandem with sales, as costs do not vary to adjust for revenue fluctuations (i.e., small changes in business conditions can have profound effects on hotel profitability). High fixed costs, as Graham and Harris (1999)

pointed out, necessitate hotels to maintain high incomes to exist and create appropriate profits. Aside from the economic environment, tourist expansion or growth can have a significant impact on hotel firms' corporate success. On but one hand, expanding the tourism sector or activities immediately boosts hotel industry development by raising occupancy rates and thus sales revenue. However, the growth of tourism can greatly improve the business environment, which has an indirect impact on hotel company success. Previous research has shown that increasing tourism can help to boost economic development (Balaguer and Cantavella-Jorda, 2002, Dritsakis, 2004, Fayissa et al., 2008, Gunduz and Hatemi-J, 2005, Kim et al., 2006, Lee and Chang, 2008, Proenca and Soukiazis, 2008). Chen (2007b) showed that better economic conditions resulting from tourism, and expansion can boost corporate earnings and improve the financial performance of tourism-related businesses. To put it another way, the development of tourism is predicted to boost hotel company performance. The environment in which all businesses function is referred to as the economy (Bodie, Kane, and Marcus, 2008). As a result, the company's prospects are inextricably linked to the status of the economy (or economic climate). Specifically, changes in the enterprise's business are directly linked to the expansion and contraction of the business cycle. According to Bodie and colleagues (2008), the economic climate may have a higher impact on profitability than the company's industry success. Economic conditions can have an impact on the performance of hotel businesses. Moderate growth and economic development are the key characteristics that indicate the economy's macroeconomic stability. Tourism was originally thought to contribute a negligible economic contribution to destinations (Vanhove, 2011), but this statement was quickly debunked by the government, experts, and researchers who recognized the significant economic potential that tourism brings (Nunkoo, Seetanah, Jaffur, Moraghen, & Sannassee, 2011). (2020). Tourism is an important source of revenue for many developing countries, and it has a favorable effect on the balance of payments and the population's living standards (Paramati, Alam, and Chen 2017). Many academics have been able to investigate the relationship between economic growth and tourism thanks to the economic functions of tourism (Nunkoo et 2020). According to Li, Jin, and Shi, the momentum of tourist activities that are evident through economic elements can be examined through numerous different consequences (2018). According to Brida, Pereya, and Devesa (2008), one technique to investigate tourist activity is to look at it in three different ways: direct, indirect, and induced. According to Scheyvens & Russell (2012) and Lee (2009), tourism has a key role in, increasing social welfare, relieving poverty, and capital accumulation. Furthermore, tourist efficiency and productivity are aspects that have a favorable impact exactly on the allocation of economic resources to minimize costs, increase performance, and maintain high tourism competitiveness within tourism-related activities (Hong, 2009; Goncalves, 2013). In comparison to the rest of the economy, catering activities "hotels and restaurants" show above-average GDP and employment growth; however, salary growth in the industry does not follow the same pattern but follows average wage growth. Instead of paying employees, the team opens up the opportunity of investing surplus funds in business development. Employee dissatisfaction, which is a major aspect of the provision of (in)quality service in this sector, is a negative consequence of poorer wage growth, which remains much lower than the national average (Matzler and Renzl, 2007). Because production costs are determined by labor productivity, it is a major indication of corporate performance. It also determines the level of economy and profitability. It is also distinguished from other economic indicators by the fact that it is an important indicator of development and economic development dynamics, and that it is dependent on the country's degree of material well-being and the fulfillment of individual residents' material requirements. Productivity is defined as "the relationship between the number of goods or services produced and the working time spent on their implementation, that is, the amount of labor that participated in this production with normal strain" in a broad sense. In a narrow sense, productivity or net productivity is defined as "the relationship between the number of goods or services produced and the working time spent on their implementation, that is, the amount of labor that participated in this production with normal strain" in a narrow sense (Sunajko, 2010).

2. LITERATURE REVIEW

The Lee and Kwon Study (1995) emphasizes the importance of receiving foreign tourists as an economic driver of growth, stating that tourism creates jobs through its multiplier impact. Tourism revenue is a significant role in the local economy and has an impact on development because it contains foreign currency (Hazari, 1993). Foreign currency has an impact on growth since it allows for the import of inputs, which stimulates the overall economy (Balaguer and Cantavella-Jorda, 2002). The fact that tourism accounts for a fifth of state revenue indicate how important it is in Croatia (Đorđević, Ganjto, Vrenko, 2017). Škuflić and Mlinarić (2015), who conducted their research using a dynamic panel, underline the importance of the hotel industry in the Republic of Croatia. The profitability of the previous period, the size of the company, its age, liquidity, solvency, capital productivity, and labor productivity were all factors considered in their study. The findings of their study show that all variables, except for the enterprise's age, have a favorable impact on the increase of hotel profitability. Mlinarić (2015) conducts their research using a dynamic panel. The profitability of the previous period, the size, age of the business, liquidity, solvency, capital productivity, and labor productivity were all factors considered in their study. The findings of their study show that all variables, except for the variable age of the business, have a positive impact on the growth of hotel profitability. Nasir, Wu, and Guerrero investigated the relationship between tourism and economic growth using variables such as the number of luxury hotels, hotel price index, and exchange rate in their research on the case of Andalusia and Spain (2015). They confirm that foreign tourism has contributed to Andalusia's economic growth by using multiple regressions. The survey by Salchow, Bayramli, and Aliyeva (2019) on the case of Kazakhstan similarly employed multiple regression. The authors confirmed the statistical significance of the relationship between tourism and export earnings, i.e., the findings of their study demonstrate that tourism activities have a favorable impact on economic growth based on exports. Singh, Johnson, and Mandelbaum used a correlation coefficient-based time series analysis to estimate the performance of the hotel market (2016). The correlation study revealed that macroeconomic variables such as gross domestic product, unemployment, and the consumer price index influenced hotel company performance indicators and vice versa. The Exantin survey aims to determine the impact of tourists' overnight stays in hotels and capital expenditures by all sectors directly involved in tourism on tourism's overall contribution to GDP (2012). The author indicates that, with the exception of the variable of overnight stays in Albania, all factors are positively related using multiple regressions. Using multiple regressions, the author concludes that all factors are positively related, with the exception of the variable of overnight hotel stays, which shows no significant findings. Ridderstaat, Croes, and Nijkamp (2014) and Dogra and Bulut (2015) investigated the two-way relationship between tourism and the economy (2018). On the other hand, research has been conducted on the impact of macro factors and non-macro factors on the hotel industry shares of Chinese hotels (Chen, 2007). The findings of the study revealed that both macro and non-macro factors can be important drivers of hotel stock returns, according to regression analysis. In their study, Li, Tavitiyaman, and Chen (2020) focus on predicting visitor patterns in China. To examine the impact of the before-mentioned variables on tourism developments in China, the authors employed multiple regressions with variables such as aircraft routes, hotel numbers, and Mongolian and Russian gross domestic product. The study's findings supported the favorable influence of the examined variables in favor of expanding travel trends to China. Studies on the example of Pakistan by Khalil et al. (2007), on the example of Taiwan and South Korea by Ching-Fu and Chiou-Wei, and on the example of Pakistan by Khalil et al. (2007) have all confirmed the tourism-driven hypothesis of economic growth (2009). Although the development of the tourism business is expected to have a direct positive influence on hotels, it can have an indirect impact on the hotel industry through its ability to enhance the state of the economy, hence improving hotel corporate performance. Tourism expansion has been shown to help the economy in empirical studies (Balaguer and Cantavella-Jorda, 2002, Dritsakis, 2004, Gunduz and Hatemi-J, 2005, Kim et al., 2006). Within a micro-study for U.S. entrepreneurs, authors Tang and Jang (2009) conclude that GDP growth is significantly influenced by revenues from the sale of hotels and restaurants and casinos.

The tourism-driven growth theory, suggested by Balaguer and Cantavella-Jorda (2002), states that tourism expansion is an important factor in the development of the Spanish economy. The hypothesis was supported by empirical results based on co-integration and causation testing. The findings of co-integration tests established a long-term link between tourist benefits and GDP, and causation tests revealed that tourist expansion can lead to economic development. Dritsakis (2004) investigated whether tourism may contribute to Greece's long-term economic prosperity. The link between tourism and GDP revenues has been discovered. Furthermore, there was a two-way causal relationship between GDP growth and tourism revenues. To put it another way, tourism revenue and GDP growth could be boosted. Turkey, like many developing countries, has targeted tourism as part of its economic growth plan, according to Gunduz and Hatemi (2005). They investigated whether tourist expansion contributed to Turkey's economic growth, putting the tourism-driven growth hypothesis to the test. The survey's findings revealed that tourism development can lead to economic growth, confirming the tourism-driven growth theory' applicability to Turkey. Kim et al. (2006) investigated the causal relationship between tourism expansion (as measured by the number of total foreign visitor arrivals) and economic growth (GDP growth) in Taiwan. The results of the cointegration and causation tests revealed the two components' long-term equilibrium connection and two-way causation. To put it another way, a growing economy can lead to increased tourism, while an increase in the number of foreign tourists to Taiwan can help the economy thrive. Similarly, international tourist spending boosted African economies (Fayissa et al., 2008), and tourism improved living standards in four Southern European nations (Greece, Italy, Portugal, and Spain) (Proenca and Soukiazis, 2008). Using the heterogeneous panel co-integration technique, Lee and Chang (2008) examined long-term trends and causal linkages between tourist development and economic growth for OECD and non-OECD countries (including those in Asia, Latin America, and Sub-Saharan Africa). After offering a heterogeneous effect on the country, they discovered a globally co-integrated relationship between GDP and tourist development. Furthermore, tourist development in non-OECD nations has had a bigger influence on GDP than in OECD ones. Tourism development could lead to economic growth in OECD countries in the long run, with two factors reinforcing each other in non-OECD countries. Furthermore, Chen, Kim, and Liao (2009) pointed out that the tourism industry has experienced significant growth since the Taiwanese government modified its weekend policy in 2001, and that foreign institutional investments in tourism firm stocks have increased since then. They added that international institutional investors increased their holdings in tourist equities because they anticipate a beneficial impact of weekend policy changes on tourism company profitability and are enthusiastic about the industry's future performance. They also demonstrated that boosting foreign shares can improve the performance of tourist equities while lowering the risk of them returning.

3. DATA AND VARIABLES

The focus of this study is on the activities of hotel firms in the Republic of Croatia that produced yearly financial accounts, as well as their impact on the country's economic development from 2002 to 2018. At the macro level, relevant annual data from the financial statements of hotel corporations were employed. The Financial Agency provided the data on the activities of hotel companies used in the model (FINA). The Croatian Bureau of Statistics provided data on the gross domestic product in the activities of providing accommodation and serving food and beverages at constant prices. For a period of 17 years, the data is tracked (2002-2018). The major goal of this study is to see how ten independent factors influence gross domestic product in the activities of providing lodging and food and beverage service as one the indicators of hotel operations: (1) number of hotel employees, (2) profit, (3) average net salary in hotels, and (4) assets, (5) investments in new fixed assets, (6) employed with higher professional qualifications, (7) labor productivity, (8) income, 9) income tax, and 10) average net salary per employee.

4. RESULTS OF MULTIPLE LINEAR REGRESSION

The hotel's impact on economic growth will be evaluated using the multiple linear regression method. The primary goal of multiple linear regression analysis is to predict or estimate the mean value of the dependent variable Y using known values for various independent variables. The multivariate technique of analysis includes regression analysis, whereas the explanatory method of analysis does not (Kulcsar, 2009:59). The simultaneous relationships that two or more independent variables can have over a single dependent variable are studied using multiple regression analysis (Lefter, 2004:364). An econometric model of multiple linear regression was used to prove the claim that "the business of hotel firms plays an essential role in the economic development of the country." Multiple regression was chosen because it investigates the relationship between one dependent variable and one or more independent variables, according to Kulcsar's (2009) role model. The model was implemented using the STATA programming model. Five models of multiple regression were run to confirm the relevance of hotel operations and the notion that they are substantially responsible for the country's economic development. The same dependent variable was used in the models, while independent variables changed. The results of the model are shown in Table 1.

Table 1. Empirical evidence

	Dependent variable lnGDP_cons				
Variable	1.Model (P>t)	2.Model (P>t)	3.Model (P>t)	4.Model (P>t)	5.Model (P>t)
Lnprofit	0.000***				
Lnassets	0.000***				
Lninv		0.061*			
Lnedu		0.000***			
Lnempl			0.001***		
Lminctax			0.036**		
Lnwage				0.000***	
Lnprod				0.000***	
Lninc					0.000***
lnAverage_wage					0.000***
R-squared	0.9882	0.9596	0.7419	0.9874	0.9881
Adj R-squared	0.9865	0.9538	0.7022	0.9856	0.9864
F-statistic	584.04	166.12	18.68	548.36	580.40
Observation	17	17	17	17	17
Multicollinearity*	1.24	1,04	1.20	9.28	9.54
Heteroskedasticity **	0.2557	0.8171	0.716	0.7795	0.8108

Note: p-values in parentheses *** p<0.01, **p<0.05,*p<0.1
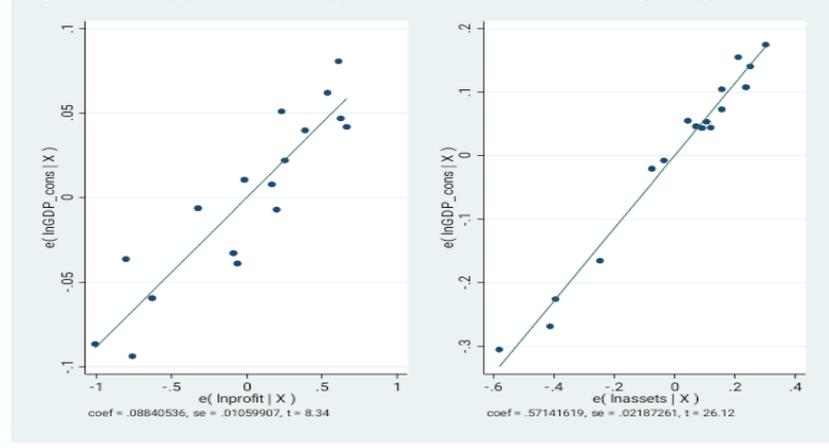*VIF: Multicollinearity VIF<5**, VIF<10*
**Breusch-Pagan / Cook-Weisberg test for heteroskedasticity p > 0,1
Source: Authors' calculations.

Figure following on the next page

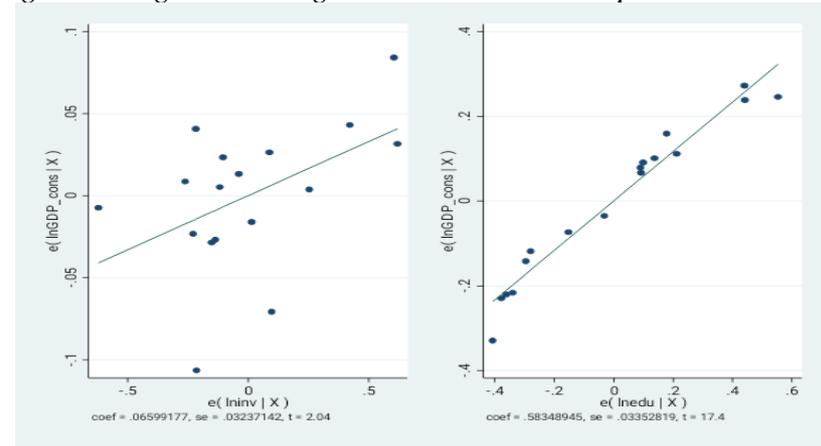*Figure 1. Regression diagnostic added-variable plots first model*

Source: author's calculation

The equation for multiple linear regression is:

$$\text{lnGDP\_cons} = -1.677688 + 0.0884054_{\ lnprofit} + 0.5714162_{\ lnassets}$$

The findings of multiple regressions on the given variables demonstrate that profit has a positive and significant impact on GDP (B = 0.09, p 0.001), as does asset impact on GDP (B = 0.57, p 0.001). An increase of one in hotel profits results in a 0.0884054 billion Croatian kuna increase in the gross domestic product. In addition, increasing the assets of hotel enterprises by one improves the gross domestic product by HRK 0.5714162 billion. The set model's coefficient of determination is $R^2 = 0.9882$, implying that the chosen multi-regression model explained 98.82 percent of all variations. That is, the hotel industry accounts for 98.65% of the variance in the variable of gross domestic product. The model supports the premise and emphasizes the relevance of hotel operations in the country's economic development. In addition to the p<0.001 threshold of significance, the model is significant, and the hypothesis that hotel businesses play a role in the country's economic development, that is, linkages, is validated.

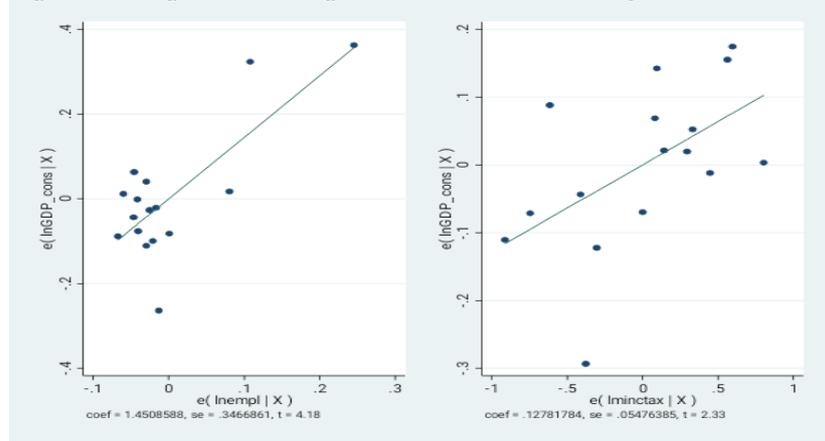*Figure 2. Regression diagnostic added-variable plots second model*

Source: author's calculation

The equation for multiple linear regression is:

$$\text{lnGDP\_cons} = 4.008482 + 0.0659918_{\ lninv} + 0.5834895_{\ lnedu}$$

The results of the multiple regressions on the given variables demonstrate that investments in new fixed assets have a positive and substantial impact on GDP (B = 0.07, p0.1), as does the impact of higher-qualified personnel in hotels on GDP (B = 0.58, p0.001). An increase of 1 in new fixed asset investments results in an increase of HRK 0.0659918 billion in gross domestic product. Furthermore, increasing the number of employed workers with a higher education by one boost the gross domestic product by HRK 0.5834895 billion. The set model's coefficient of determination is $R^2 = 0.9596$, indicating that the chosen multi-regression model explained 95.96 percent of all variances. In other words, the hotel industry accounts for 95.38 percent of the variance in the variable of gross domestic product. The model supports the premise and emphasizes the relevance of hotel operations in the country's economic development. In addition to the level of significance at p<0.1, the model is significant, and the premise that hotel businesses play a role in the country's economic development, that is, links, is validated.

Figure 3. Regression diagnostic added-variable plots third model
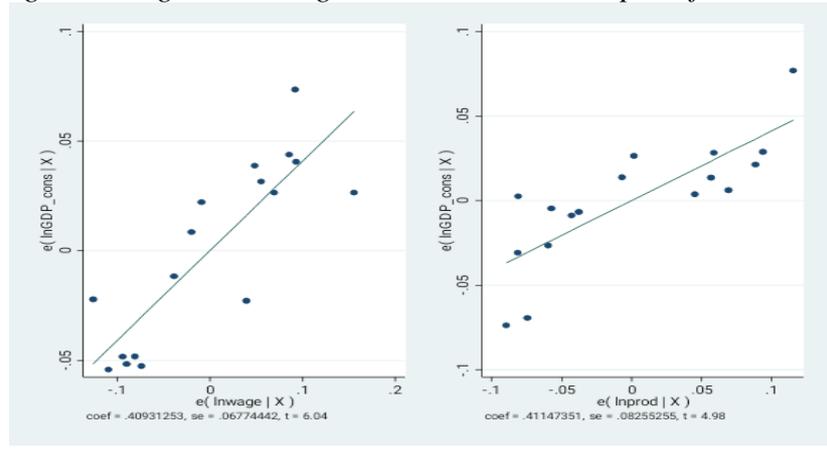

Source: author's calculation

The equation for multiple linear regression is:

$$\text{lnGDP\_cons} = -6.522134 + 1.450859\,_{lnempl} + 0.1278178\,_{lninctax}$$

Employees have a positive and substantial impact on GDP (B = 1.45, p0.001), as does the impact of tax revenues on GDP (B = 0.13, p0.05), according to the findings of multiple regressions performed on the specified variables. In other words, increasing the number of hotel employees by one result in an increase in the gross domestic product of HRK 1.450859 billion. Furthermore, if tax revenues created by hotel companies through their operations grow by HRK 0.1278178 billion, the gross domestic product increases by HRK 0.1278178 billion. The set model's coefficient of determination is $R^2 = 0.7419$, implying that the chosen multi-regression model explained 74.19 percent of all variances. In other words, the hotel industry accounts for 70.22 percent of the variance in the variable of gross domestic product. The model supports the premise and emphasizes the relevance of hotel operations in the country's economic development. In addition to the level of significance at p<0.05, the model is significant, and the premise that hotel businesses play a role in the country's economic development, that is, links, is validated.

Figure following on the next page

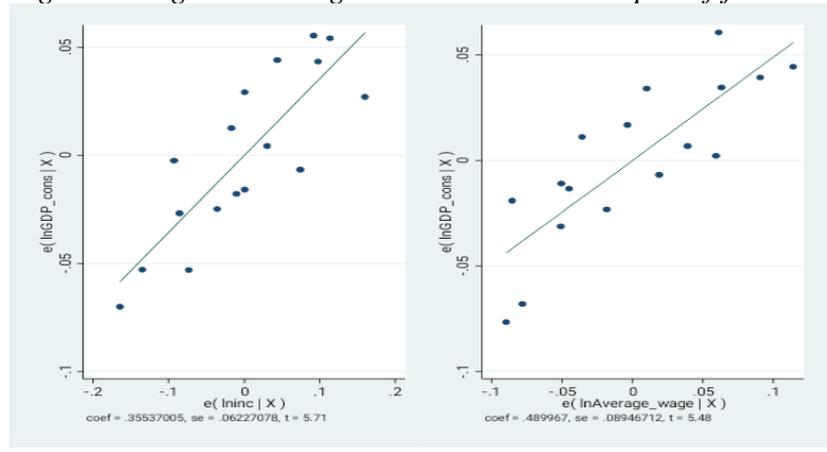*Figure 4. Regression diagnostic added-variable plots fourth model*

Source: author's calculation

The equation for multiple linear regression is:

$$\text{lnGDP\_cons} = 1.32582 + 0.4093125_{\,lnwage} + 0.4114735_{\,lnprod}$$

The influence of net wages and wages on GDP, as well as the impact of labour productivity on GDP (B = 0.41, p0.001), is positive and significant (B = 0.41, p0.001), according to the results of multiple regressions on the given variables. In other words, a 1 rise in total net salaries and wages in hotel companies results in an HRK 0.4093125 billion gain in the gross domestic product. Furthermore, if the productivity of hotel work increases by one, the gross domestic product rises by HRK 0.4114735 billion. The set model's coefficient of determination is $R^2 = 0.9874$, implying that the chosen multiession model explained 98.74 percent of all variances. In other words, the hotel industry accounts for 98.56 percent of the variance in the variable of gross domestic product. The model supports the premise and emphasizes the relevance of hotel operations in the count significances development. In addition to the level of significance at p<0.01, the model is significant, and the premise that hotel businesses play a role in the country's economic development, that is, links, is validated.

Figure 5. Regression diagnostic added-variable plots fifth model

Source: author's calculation

The equation for multiple linear regression is:

$$\text{lnGDP\_cons} = -0.2884906 + 0.3553701_{\,lninc} + 0.489967_{\,lnAwerage\_wage}$$

The results of the multiple regressions conducted on the given variables demonstrate that income has a positive and substantial impact on GDP (B = 0.36, p0.001), as does the average net wage per employee (B = 0.49, p0.001).

In other words, a 1 rise in hotel revenues results in an HRK 0.3553701 billion increase in the gross domestic product. Furthermore, if the average net salary per employee is increased by one, the gross domestic product rises by HRK 0.489967 billion. The set model's coefficient of determination is $R^2 = 0.9881$, implying that the chosen multi-regression model explained 98.81 percent of all variances. That is, the hotel industry accounts for 98.74% of the variance in the variable of gross domestic product. The model supports the premise and emphasizes the relevance of hotel operations in the country's economic development. In addition to the level of significance at p0,001, the model is significant, and the idea that hotel businesses play a role in the country's economic development, that is, links, is validated.

5. CONCLUSION

In terms of economic growth, Croatia's hotel industry is one of the most prominent among all tourism operations. The data from 2002 to 2018 spans a period of economic boom, bust, and recovery, illuminating the link between hotel businesses and economic growth. The authors confirm the positive link between hotel operations and economic development after conducting multiple linear regression analyses to assess the impact of certain indicators of hotel operations on a gross domestic product, the activity of providing accommodation, and the preparation and serving of food and beverages. It is suggested that future scholars look at the role of hotel operations in the economic development of other countries. When assessing how much other countries rely on hotel company activities, a comparative analysis of the impact of hotel company operations by selected countries is recommended.

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