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Quantifying the Multiplier Effect of the Hospitality Sector

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Abstract: *This research examines the economic impact of tourism in N. Macedonia, focusing on the hospitality sector (hotels and restaurants). Using Symmetric Input-Output (SIOT) tables, the study quantifies the multiplier effect by analyzing the direct and indirect impacts of the hospitality sector on the national economy. The study reveals that the hospitality sector has the highest multiplier (2.293) compared to all other sectors, underscoring its crucial role in stimulating economic activity. A change in tourist expenditure within this sector triggers a significant ripple effect, generating increased demand for goods and services across various industries that support the hospitality sector. This finding highlights the importance of creating a prosperous and sustainable hospitality sector. Policymakers and industry stakeholders can use its high multiplier effect to promote economic growth and development across a wide range of interconnected industries within the national economy.*

1. INTRODUCTION

The tourism sector, with the hospitality industry at its core, is widely recognized as a critical driver of economic development in many countries. In the context of N. Macedonia, the hospitality sector—comprising hotels, restaurants, and related services—has been identified as a significant contributor to the national economy (Trajkov & Biljan, 2019). The complex connections between this sector and other economic activities highlight its potential to stimulate growth, create employment, and foster overall economic prosperity (Trajkov et al., 2019). Understanding these relationships requires sophisticated analytical tools that can capture the complex interactions within the economy.

One such tool is input-output analysis, which has been extensively employed in economic studies to assess the interdependencies between different sectors. This method enables the precise determination of the necessary input from one sector required to produce a unit of output in another, thereby providing a clear picture of how economic activities are interconnected (Surugiu, 2009). By calculating multipliers, input-output analysis also facilitates the quantification of both direct and indirect impacts of a sector on the broader economy. These multipliers are particularly important in understanding how initial changes in spending within one sector, such as tourism, can have far-reaching effects across various other industries.

The study applies symmetric input-output (SIOT) tables to the hospitality sector in N. Macedonia to quantify its multiplier effect. The hospitality sector's ability to generate significant economic impact through both direct spending and its ripple effects on related industries underscores its

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importance within the national economy. By examining how increased tourist spending in hotels and restaurants can cascade through the economy, we aim to explain the sector's role in stimulating demand across various interconnected industries. This analysis provides insights into the sector's capacity to generate economic growth beyond its immediate contributions.

The impact of the hospitality sector extends beyond the margins of hotels and restaurants, resulting in many supplier industries. For instance, higher tourist spending in the hospitality sector increases demand for goods and services from suppliers such as food producers, cleaning services, and other auxiliary industries. This increased demand leads to job creation and income generation in these supplier industries, which in turn stimulates further spending and economic activity across the economy. The multiplier effect, therefore, not only reflects the direct economic contributions of the hospitality sector but also highlights its broader role in supporting interconnected industries and driving overall economic development.

While a higher multiplier effect indicates a more interconnected economy, it also suggests potential challenges regarding value-added within the hospitality sector itself. The extensive diffusion of economic benefits across various industries may lead to a lower concentration of value-added within the hospitality sector, raising important considerations for policymakers. This study aims to provide a comprehensive overview of how the hospitality sector in Macedonia can be utilized to maximize its economic contributions while addressing potential challenges related to value distribution and sectoral interdependencies.

2. LITERATURE REVIEW

The multiplier effect in economic analysis is a widely studied concept that reflects how initial spending in one sector can generate additional economic activity across other sectors (Trajkov et al., 2019). This concept has been extensively applied in the study of tourism and hospitality due to the sector's capacity to stimulate economic growth, create employment, and enhance the overall economic development of a region or country (Nugraha & Veronika, 2022).

Research has consistently demonstrated that the hospitality sector, encompassing hotels, restaurants, and related services, serves as a significant driver of economic growth (Majeed, 2023). It contributes significantly to a nation's economy through direct spending by tourists. There are studies that emphasize the hospitality sector's ability to generate both direct and indirect economic benefits (Khan et al., 1995). Direct impacts include the immediate revenue generated by hospitality services, while indirect impacts arise from the increased demand for goods and services supplied to the sector (Surugiu, 2009). These findings align with the broader understanding of tourism's role as a catalyst for economic development, particularly in regions where the sector represents a substantial portion of the national economy (Sibel & Arslanturk, 2012).

The application of input-output analysis to quantify the multiplier effect of the hospitality sector is well-established in the literature. Leontief (1936) originally developed the input-output model, which has since been adapted for various sectors, including tourism and hospitality. Key components of the I-O model include the transaction matrix, final demand vector, and total output vector. The I-O model is used to calculate multipliers, which measure the impact of a change in one sector on the overall economy (Nguyen & Tetsuo, 2017). Certain studies highlight that the Input-Output (I-O) framework as a valuable tool for economic analysis still has certain limitations. The model assumes homogeneous sector output, fixed commodity input structure, and constant

return to scale. These limitations mean the I-O model may not capture real-world complexities, such as changes in production ratios or price fluctuations. However, understanding these limitations allows researchers to present their findings in perspective (Hara, 2012).

Studies by Fletcher (1989), Kim and Byung-Gook (2015) have shown that input-output analysis can effectively measure the economic linkages between the tourism and hospitality sector and other industries. These studies highlight that the hospitality sector often has a high multiplier effect, meaning that spending in this sector significantly influences the broader economy. Certain studies use the I-O framework to calculate income, output, and employment multipliers, which quantify the broader economic effects of tourist spending. The income multiplier measures the increase in total income, the output multiplier measures the increase in total output, and the employment multiplier measures the increase in employment resulting from an initial increase in tourist spending. These interconnected multipliers provide a comprehensive understanding of the economic impact of tourism on a region or country. (Khan et al., 1995)

In the context of N. Macedonia, recent studies have begun to explore the economic impact of the tourism sector using symmetric input-output (SIOT) tables. Research by Trajkov et al. (2019) has underscored the tourism sector's pivotal role in driving economic activity in N. Macedonia. The study demonstrated the sector's strong interconnections with other economic sectors and its significant multiplier effect. Given the recent release of new symmetrical I-O tables by the State Statistical Office, it would be valuable to calculate the multiplier effects of the hospitality sector using this updated data and expand the analysis to include a broader range of industries that interact with the hospitality sector. This would provide a more comprehensive and accurate assessment of the sector's economic impact and inform policy decisions accordingly.

The existing literature provides a robust foundation for understanding the economic impact of the hospitality sector through the lens of the multiplier effect. The application of input-output analysis, particularly using symmetric input-output tables, has proven to be a valuable method for quantifying these effects. As evidenced in studies of various economies, the hospitality sector's high multiplier emphasizes its crucial role in stimulating economic growth, creating jobs, and driving broader economic development. Targeted policies and investments in the hospitality sector could provide significant economic benefits, making it a crucial area of focus for both researchers and policymakers.

3. METHODOLOGY

The methodology for the research is based on input-output analysis, which examines inter-sectoral relationships within a national economy. Input-output analysis determines how much input from one economic sector is required to produce a unit of output in another sector and calculates multiplication coefficients for specific sectors. These coefficients help measure both the direct and indirect impacts of each sector on the overall economy.

The European System of Accounts recommends using statistical tables of supply and use of goods and services to construct analytical input-output tables (State Statistical Office, 2013). The analysis relies on symmetrical input-output tables that describe technological and economic relationships in the national economy. There are two main types of symmetrical input-output tables: "activity-by-activity" tables and "product-by-product" tables. Activity-by-activity tables describe the relationships between different activities, such as the use of products from other activities, while

product-by-product tables illustrate the relationships between products, indicating how much of each product is required to produce other products.

In Macedonia, the State Statistical Office produces product-by-product tables. These tables can be integrated into macroeconomic models to analyze relationships between supply and use, focusing particularly on final use components and industrial production levels. SIO tables contain data on around 100 products that are produced across different economic activities (SSO, 2024). For the purposes of this research, an aggregation of these products has been carried out based on economic activities, following the National Classification of Activities (NKD Rev. 2) (SSO. n.d.) and the Classification of Products by Activity (KPD2015) (SSO, 2016) as provided in Table 1.

Table 1. Sectoral aggregation by product

KPD2015	Code	Description
A	A01	Agriculture, hunting, forestry, fishery and pisciculture
B	A02	Mining and quarrying
C	A03	Manufacturing
D	A04	Electricity, gas, steam and air-conditioning supply
E	A05	Water supply and waste management
F	A06	Construction
G	A07	Trade (wholesale and retail)
H	A08	Transport and storage
I	A09	Hotels and restaurants
J	A10	Information and communication
K	A11	Financial intermediations
L	A12	Real estate services
M(69-70)	A13	Legal and accounting
M(71-75)	A14	Professional, scientific and technical activities
N	A15	Administrative and support services
O-U	A16	Other activities of national economy

Source: Own processing

The aggregated input-output table provides significant information about intersectoral dependencies and allows for the calculation of output multipliers within a given economic sector. The table shows the total intermediate consumption at basic prices, which is essentially the sum of consumption in each of the analyzed economic sectors, and the total final use at basic prices. The sum of intermediate consumption and total final use gives us the total use of goods and services at basic prices.

The equation is:

$$X=FU+E+BI+FCE+IC \quad (1)$$

where:

X – Total use of goods and services at basic prices
FU – TTotal final use at basic prices
E – TExports of goods and services (FOB)
BI – TGross investments (investments in fixed assets + changes in inventories)
FCE – Total final consumption expenditures (households, government consumption, non-profit institutions)
IC – TIntermediate consumption

Additionally, for each product within a given economic activity, the total supply at basic prices is provided, which includes total production and imports, represented as:

$$Y=P+I \tag{2}$$

where:
Y is the total supply,
P is total production, and
I is imports.

Furthermore, total production (P) is defined as:

$$P=VA+IC \tag{3}$$

where:
VA is the added value, and
IC is intermediate consumption at purchase prices (including taxes on products minus subsidies).

Finally, the added value (VA) is defined as:

$$VA=CE+T+CFC+NOS \tag{4}$$

where:
CE represents compensation of employees,
T represents other net taxes on production,
CFC is consumption of fixed capital (depreciation), and
NOS is net operating surplus.

The previously calculated data in aggregated symmetrical I-O tables can be used to compute the technical coefficients, or the so-called input-output coefficients, for each economic sector using the following formula:

$$a_{ij} = \frac{x_{ij}}{Y} \tag{5}$$

where:
a_{ij} is the technical or input-output coefficient,
x_{ij} is the interindustry transaction (intermediate input from sector *i* to sector *j*), and
Y is the total output of sector *j*.

After calculating all the a_{ij} values, they can be arranged in a matrix A. This matrix shows the direct input requirements for each sector, with each row representing inputs from one sector and each column representing outputs to another sector. These coefficients are crucial for understanding the flow of goods and services in an economy and for conducting further analyses, such as assessing the impact of changes in final demand on output across sectors (multiplier effects). From the Matrix A containing the technical coefficients, a multiplier for each economic sector can be determined using the following model:

$$q = [I - A]^{-1} * f$$

where:

q total output vector
f final demand vector,
A is the matrix of technical coefficients, and
I is the identity matrix.

The result q is a vector that shows the total output required in each sector to satisfy the final demand f. The matrix $[I - A]^{-1}$ is also known as the Leontief inverse matrix, which is used to determine both the direct and indirect intersectoral effects. The multipliers derived from the Leontief inverse provide a comprehensive measure of the total economic impact of changes in a sector. These multipliers indicate how much the total output in the economy will change in response to a change in final demand in a particular sector.

4. RESULTS

Our analysis reveals a critical finding: the hospitality sector has the highest multiplier effect (2.293) compared to any other sector in Macedonia's economy. This means that for every unit of expenditure in the hospitality sector, the economy experiences a significant increase in total output, nearly 2.3 times the initial spending. The magnitude of this multiplier highlights the sector's extensive linkages with other industries, making it a powerful driver of economic growth. A small change in tourist spending within hotels and restaurants, therefore, triggers substantial indirect demand across various sectors that provide goods and services to the hospitality industry.

Table 2. Output multipliers of the sector Hotels and restaurants in Macedonian economy

	Direct effects	Indirect effects	Combined impact
Agriculture, hunting, forestry, fishery and pisciculture	0.107	0.147	0.254
Mining and quarrying	0	0.009	0.009
Manufacturing	0.137	0.305	0.442
Electricity, gas, steam and air-conditioning supply	0.113	0.152	0.265
Water supply and waste management	0.009	0.014	0.023
Construction	0.011	0.029	0.04
Trade (wholesale and retail)	0.127	0.18	0.307
Transport and storage	0.011	0.04	0.051
Hotels and restaurants	0.01	1.022	1.032
Information and communication *	0.045	0.064	0.109
Financial intermediations	0.017	0.035	0.052
Real estate services	0.028	0.035	0.063
Legal and accounting	0.073	0.092	0.165
Professional, scientific and technical activities	0.059	0.077	0.136
Administrative and support services	0.042	0.054	0.096
Other activities of national economy	0.023	0.038	0.061
Gross Value Added	0.188		
OUTPUT MULTIPLICATOR	1	2.293	3.293

Source: Own calculations

Manufacturing emerges as the most influential sector in the hospitality industry, with a direct effect of 0.137 and an indirect effect of 0.305. This relationship suggests that manufacturing supplies essential goods such as furniture, kitchen equipment, and linens, which are critical for hotel and restaurant operations. The high indirect effect underlines the pivotal role manufacturing plays in sustaining the broader supply chain of the hospitality sector, thus supporting the industry's ability to function effectively and meet consumer demands.

The trade sector, comprising wholesale and retail activities, also plays a crucial role, with a combined direct and indirect effect of 0.307 on the hospitality industry. Wholesale suppliers are responsible for providing key inputs such as food, beverages, and other consumables, while retail outlets serve as distribution points for consumer goods required by hotel guests. This significant combined effect illustrates the importance of a well-functioning trade sector in ensuring the availability of essential products that enable the hospitality industry to thrive.

The utilities sector, which includes the supply of electricity, gas, steam, and air-conditioning, significantly impacts the hospitality sector with a combined effect of 0.265. These utilities are indispensable for maintaining operational efficiency and ensuring guest comfort within hotels and restaurants. The strong link between utilities and hospitality underscores the critical nature of infrastructure support in enabling the sector to provide quality services, thereby enhancing the overall guest experience and sustaining the industry's contribution to the economy.

Legal and accounting services have a significant impact on the industry, with direct and indirect effects quantified at 0.073 and 0.092 respectively. Legal services play a crucial role in navigating regulations and managing contracts, while accounting ensures financial compliance and integrity. Information and communication technologies also hold considerable importance, with direct and indirect impacts of 0.045 and 0.064, respectively. These technologies facilitate efficient reservation management, effective guest communication, and robust marketing strategies. Lastly, the transport and storage sector is vital, with direct and indirect impacts of 0.011 and 0.04. This sector is essential for the timely delivery of goods, the smooth movement of guests, and effective inventory management.

5. CONCLUSION

In conclusion, the research points out the significant role of the hospitality sector in the Macedonian economy, highlighting its high multiplier effect of 2.293. This metric reveals how changes in tourist spending within hotels and restaurants create a substantial ripple effect, stimulating demand across diverse industries such as manufacturing, trade, utilities, legal and accounting services, information and communication, and transport and storage. The hospitality sector's influence extends far beyond its immediate boundaries, impacting a wide range of sectors and driving overall economic growth.

The findings indicate that the hospitality sector is a crucial driver of economic development in N. Macedonia. Using the sector's high multiplier effect, policymakers and industry stakeholders can effectively stimulate economic activity and promote sustained growth. Investments in infrastructure, such as the development of tourist destinations, and strategic tourism promotion can enhance the visitor experience, thereby amplifying the sector's positive economic impact.

For policymakers, this research provides valuable insights into the potential benefits of prioritizing the hospitality sector in economic planning. Funding for infrastructure projects, targeted marketing campaigns to attract tourists, and initiatives to improve the tourist offerings are practical applications of these findings. These investments not only enhance the hospitality sector but also contribute to greater economic prosperity and job creation across other industries.

Industry stakeholders can leverage the research to develop more effective marketing strategies by emphasizing the sector's broader economic benefits. By collaborating with local suppliers and promoting the hospitality sector's role in driving regional economic growth, businesses can

strengthen their positioning and contribute to a thriving local economy. Additionally, future research could explore how different types of tourism impact the multiplier effect and examine how government policies and industry practices affect the sector's efficiency and sustainability.

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