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## RESEARCH ARTICLE

WILEY

# Estimating the economic impact of tourism in German wine regions

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## Abstract

With an economic impact of EUR 291 billion, Germany is the number-one European country in terms of tourism revenue. German wine regions have a long history of production, but the value of these regions as tourism destinations has only recently received recognition. In the last few years, wine tourism has gained increasing importance and is believed to result in sustainable development by creating jobs while at the same time preserving a region's heritage. The aim of this paper is to estimate the economic impact of tourism in German wine regions in order to help stakeholders make the right policy and investment decisions. Therefore, a modified multiplier model was developed that allows for the economic impact of wine tourism to be assessed. By collecting 4,448 questionnaires in all 13 German wine regions, travelers provided information about their travel behavior, expenditures, and socio-demographic characteristics. After conducting segmentation, the economic impact of tourism as well as wine tourism was estimated for each of the wine regions. The results show that tourism in German wine regions has an economic impact of EUR 26.4 billion, providing 384,878 people with their primary income. Due to higher expenditures, wine tourists show a disproportionately high economic impact of EUR 5.0 billion, which makes this niche market generate income for 71,846 people. The right investments in this lucrative market could help balance regional economic disparities and achieve sustainable tourism development in the country.

## KEYWORDS

economic impact, Germany, multiplier model, tourism, wine, wine tourism

## 1 | INTRODUCTION

Germany is the fourth richest country in the world (World Bank, 2019). However, wealth is not equally distributed within the country. One of the main imbalances is found between rural areas and urban agglomerations (Friedrich-Ebert-Stiftung [FES], 2019). Ninety percent of the country's territory is rural. These areas are important because of their recreational value, their cultural landscapes, and their natural resources. In order to assure sustainable development in these regions,

people have to be prevented from moving away by creating equal living conditions to those present in cities (BMEL, 2018). One way to stimulate economic development in these rural regions is tourism, as it generates income while at the same time promoting cultural heritage and traditions (World Travel & Tourism Council [WTTC], 2012).

In terms of the total contribution to GDP, Germany, as a travel destination, ranks first in Europe. Including the indirect effects, the travel and tourism sector accounts for EUR 291 billion (8.6% of GDP), resulting in about 5.4 million jobs, which is roughly 12% of the total

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employment in the country (WTTC, 2019a). This makes it more important than any other industry that is typically associated with Germany. The sector leaves mechanical engineering (EUR 252 billion), the chemical and pharmaceutical industry (EUR 196 billion), and the information technology sector (EUR 134 billion) far behind (Welt, 2019). With a predicted long-term tourism growth rate of 1.2%, the country ranks 183 out of 185 countries. Domestic tourism is very strong within the country, at 85% of the total contribution (WTTC, 2019a). Worldwide, domestic tourism accounts for 71% of the total tourism contribution (WTTC, 2019b). Domestic tourism, especially in industrialized countries such as Germany, can help in “counter balancing regional imbalances in terms of income and employment levels” (Fletcher, 1989, p. 515).

Wine-growing in Germany has more than 2,000 years of tradition behind it (Wines of Germany, 2019). However, German wine regions have only recently been seen as touristic-relevant destinations (Szolnoki, 2018). Over the last few years, wine tourism has been identified as a growing niche market (UNWTO, 2016). More importantly, it has been recognized as an approach to achieve sustainable rural development as it promotes both the tangible and the intangible heritage of a destination. It plays an important role in terms of natural resource and cultural preservation while generating substantial economic and social benefits. Also, it responds to customers' evolving needs and expectations of experiencing a destination's culture and lifestyle (UNWTO, 2017).

Many destinations have realized that wine tourism benefits not only the wineries, but all areas of the regional economy. Germany, as a large saturated market with high levels of domestic tourism, appears to be ideal for effective wine tourism development. In order to make the right policy and investment decisions, empirical evidence is crucial (WTTC, 2018). This paper aims to develop a model for measuring the economic impact of wine tourism using a modified Keynesian income multiplier model. Thus, regional imbalances between rural and urban areas could be leveled and sustainable development in German wine regions could be achieved.

## 2 | LITERATURE REVIEW

Visitors to tourism destinations spend money on goods and services, creating economic impacts. This money flows into the destination's economy and impacts value added, income, employment, and so on. To analyze the economic impacts of tourism, several methods/models are currently being used. The most used models are the input-output (I-O) and the computable general equilibrium (CGE) and multiplier models. These differ considerably in terms of complexity, data demands, underlying assumptions, and in the precision of their results (Klijs, Heijman, Maris, & Bryon, 2012). The choice of methodology is “determined by the main purpose of the research, the resources available for the study, the time constraint imposed on the researchers, and the structure of the economy in question” (Fletcher, 1989, p. 515). The most broadly used method for estimating the economic impact of tourism is I-O modeling. By taking into account inter-sectoral purchases, I-O models allow for the modeling of economic

impacts across sectors. As an alternative to I-O models, CGE models have been introduced. They can be seen as extended I-O models (Klijs, 2016). Authors such as Dwyer, Forsyth, and Spurr (2004) have proposed them as an improvement to I-O models since they include resource constraints and feedback effects. Due to their detail and flexibility, they “potentially lead to more realistic outcomes” (Klijs, 2016, p. 135).

The I-O and CGE models need information about the demand as well as the supply side of the destination, mainly in the form of I-O tables. On a local level, however, this information (especially supply) is often not available. In the case of missing I-O tables, the researcher either has to create them or draw on a model that does not depend on the use of I-O tables; that is, a multiplier model (Klijs, 2016). Multiplier models “provide a measure of the effects of an exogenous change in final demand on the sales output of industries in the economy” (Dwyer, Forsyth, & Dwyer, 2010, p. 424). The most frequently used multiplier models are Export Base (e.g. Chang, 1981), the ad hoc multiplier (e.g. Archer & Owen, 1972; Milne, 1987), and the Keynesian multiplier (e.g. Archer, 1977; Archer & Fletcher, 1996). Compared to the I-O and CGE models, they are relatively transparent, efficient, and comparable (Klijs, 2016).

Since the 1990s, there has been an increase in the number of papers published on wine tourism (Gómez, Pratt, & Molina, 2018). However, there are only two scientific publications on the topic of the economic impact of wine tourism. Kim and Kim (2002) determined the economic impact of wine tourism in Michigan using I-O modeling. Foltz, Woodall, Wandschneider, and Taylor (2007) measured the contribution of the grape and wine industry to Idaho's agribusiness and tourism sector. By using a multiplier model, the authors found that “wine tourism has higher direct and indirect labor content than wine production” (Foltz et al., 2007, p. 86). Usually, economic impact studies in the wine industry are available in the form of industry reports. Often, the methodology is not revealed. However, due to there being scant scientific evidence in the relevant research field, an overview of the existing results and used methods is given below (see Table 1). To make the results more comparable, all other currencies were converted into Euros.

In this paragraph, all reports using I-O modeling will be described. In the United States and Canada, the IMPLAN (impact analysis for planning) system, a variation of I-O models (IMPLAN, 2019), was the chosen method. Results for 2017 in the United States show that 15 million travelers in the country could be called wine tourists. These predominately domestic visitors are responsible for 43 million unique winery visits every year. The economic impact of wine tourism in the United States is EUR 15.8 billion. Therefore, 187,729 jobs in the United States rely directly on wine tourism (Wineamerica, 2017). In California, 23.6 million wine-touristic visits (2018) generate an annual economic impact of EUR 6.5 billion. Interestingly, the state is accountable for about 81% of the country's wine production, but only for about 40% of the economic impact from wine tourism (California Wines, 2019). This could indicate that the volume of produced wine does not translate into the amount of tourist expenditure. In Canada, the estimated number of wine tourists in 2015 was 3.7 million. These tourists generate a total impact from wine-related tourism of EUR 1.4 billion (Canadian Vintners Association, 2017). For Australia (2014),

**TABLE 1** Existing economic impact studies on wine tourism

	Source	Method/Model	Number of wine tourists (million)	Wine tourist expenditures (EUR billion)
United States	Wineamerica, 2017	Input–output (I–O)	15	15.8
Argentina	ACOVl, 2018	Multiplier	1.5	1.4
Australia	Wine Australia, 2015	I–O	0.6	5.4
Canada	Canadian Vintners Association, 2017	I–O	3.7	1.4
France	Atout France, 2017	Multiplier	10	5.2
Italy	Città del Vino, 2016	Multiplier	4–6	2.6

the estimate was about 60 million visitor nights to Australian wineries. Using I–O modeling, the final estimation of the economic impact was EUR 5.4 billion (Australian Grape and Wine Authority, 2015).

In France, the economic impact of wine tourism was calculated using a multiplier model. Here, the estimated number of wine tourists in 2016 was 10 million. They generate EUR 5.2 billion annually. When looking at the 2009 results (7.5 million wine tourists), the growth rate is higher than 30% (Atout France, 2017). In Argentina, the economic impact was calculated using a self-developed approach that included four variables: number of wineries, visitors to wineries, direct income from wine tourism, and other non-measurable benefits. The results show that 1.5 million wine tourists generate about EUR 1.4 billion in 2017 (ACOVl, 2018). Italy received four-to-six million international wine tourists (14 million wine-touristic visitor days) in 2015. By multiplying the visitor days with the average expenditure of EUR 193, the estimated economic impact is EUR 2.6 billion (Città del Vino, 2016).

In Germany, the *Deutsches Wirtschaftswissenschaftliches Institut für Fremdenverkehr* (DWIF) carries out economic impact analyses for many tourism destinations, including states, travel regions, and even districts. Also, it conducted economic impact studies in two German wine regions, Franconia (2012) and Mosel (2016). The method that was used was the Keynesian income multiplier. By collecting long-term economic data on tourism, the DWIF calculated direct and indirect income multipliers.

The results show that in the Mosel wine region, there were 7.2 million overnight stays and 18.0 million day trips (in total, not just wine-related). Together they created an economic impact of EUR 1.3 billion, giving 22,780 people their primary income (DWIF, 2017). In the German wine region of Franconia, 13.5 million overnight stays and 62.5 million day trips were undertaken annually. The tourists generated EUR 3.2 billion, providing the primary income for 64,500 people (DWIF, 2013a).

As the above-listed results show, there are only a few studies that have dealt with the economic impacts of wine tourism. As it currently stands, there are no existing studies showing the overall economic impact of wine tourism in Germany. Furthermore, the economic impact of tourism within German wine regions is not known.

In choosing an appropriate model, the I–O and CGE models are the most accepted and most frequently used methods. However, one problem came up early: The geographical boundaries of the German wine regions have not yet been officially defined. Often they stretch across district and even state borders. Without this information, visitor numbers cannot be retrieved from the Statistical

Offices. Thus, the demand side is difficult to model. More importantly, in order to apply one of these methods, I–O tables would have to be available, but in Germany, these tables are only available for the state level. In order to create I–O tables, a suitable committee that consists of key players and information-producing units has to be founded. It is possible to create hybrid models or models derived completely from survey data (Klijs, 2016). In our case though, with 13 different regions to consider, the time constraint and the resources available were limiting factors. Thus, we drew on a “model that does not depend on an I–O table, that is, a multiplier model” (Klijs, 2016, p. 16).

### 3 | RESEARCH DESIGN

#### 3.1 | Model specification

This paper uses a Keynesian income multiplier model for measuring the economic impact of wine tourism in Germany. The approach is appropriate for modeling the demand side on the regional level when supply data cannot be obtained. The model follows the reasoning that inflows of money into a tourism destination lead to income for companies and inhabitants. Companies and inhabitants then increase their consumption and savings. Successive consumption again increases income, which translates into savings and consumption. This cycle continues on repeat. In each round, so-called leakages (e.g. savings) reduce the effects (Schaffer, 1999).

For each individual wine region, the calculation of the annual economic impact was carried out in the following steps:

(1) Gross tourist spending  $S^g$

$$S^g = N \sum_{s=1}^k e_s$$

where  $N$  is the total annual number of visitor days and  $e$  is the mean daily expenditure in each sector  $s$  of the economy (1, 2, ...,  $k$ ).

(2) Net tourist spending  $S^n$

$$S^n = S^g - \sum_{s=1}^k \text{VAT}_s N e_s$$

where  $\text{VAT}_s$  is the value-added tax for each economic sector.

(3) Direct regional income (from tourism spending)  $RI^d$

$$RI^d = \sum_{s=1}^k (S^n m^d)$$

where  $m^d$  is the direct income multiplier; that is, the amount of income generated through the inflow of money.

(4) Indirect regional income (from tourism spending)  $RI^i$

$$RI^i = \sum_{s=1}^k (S^n - RI^d) m^i$$

where  $m^i$  is the indirect income multiplier; that is, the amount of income generated through prepaid suppliers that are necessary for maintaining the touristic service quality. These include the supply and procurement of goods (e.g. bread from the local bakery, electricity from energy providers), provision of services (e.g. insurances, bank loans) and investments in structural maintenance (e.g. renovation work by craftsmen). The induced effects of tourism are not captured in this model.

(5) Total regional income (from tourism spending)  $RI$

$$RI = RI^d + RI^i$$

The final step is the calculation of the income equivalents  $IE$ ; that is, the number of people who would be able to live off the income generated by tourist expenditure. It must not be confused with the number of jobs. Since an income often supports more than one person, the number of jobs would be lower. This approach was chosen because it describes income effects more accurately than the calculation of job numbers.

(6) Total income equivalents  $IE$

$$IE = \frac{RI}{RI^c}$$

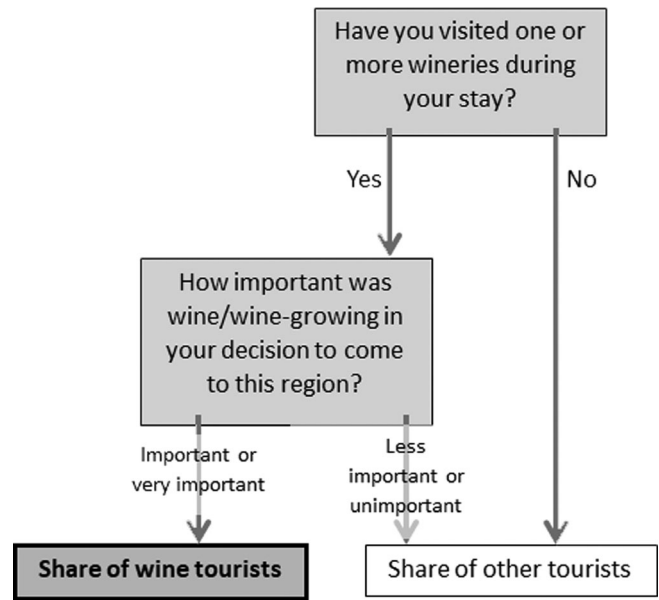
where  $RI^c$  is the average annual income of an employed person in the German tourism sector.

In order to find out the share of the economic impact generated by wine tourists, the calculation was done twice for every region: Once for all tourists in German wine regions and the second time only for wine tourists. The method on how to distinguish between wine tourists and other tourists will be explained in the following subchapter (see also Figure 1).

### 3.2 | Data collection and extrapolation

In order to calculate the economic impact according to the method above, we needed to obtain the following variables:

- The total annual number of visitor days  $N$ ;
- The mean daily expenditure in each economic sector  $e_s$ ;
- The income multipliers  $m^d$  and  $m^i$ ;
- The average income per capita of a person that is employed in tourism  $RI^c$ ; and
- The share of wine tourists.



**FIGURE 1** Decision tree to determine the share of wine tourists

In order to retrieve the annual number of overnight stays from the German Federal Statistical Office (Destatis), it was necessary to determine which German districts are located in wine regions since the borderlines of the wine regions have not been officially defined. Within the country, there are 401 districts that are divided into 294 rural districts and 107 independent cities (Destatis, 2018). To define which of them lie within German wine regions, all of them were examined. In some cases, the district was attributable to more than just one wine region. In other cases, only a portion of the district could be referred to as wine region. Hence, a factor that represents the district's share of what could be called a wine region was created in coordination with the relevant regional associations (tourism and winegrowers associations). After double-checking with the experts, we had a final version of all the relevant districts and their partial wine areas. Then the number of overnight stays, all of which were from the year 2017, could be obtained from the Federal Statistical Office (numbers do not include Peer-to-Peer accommodations such as Airbnb). Since many of the districts lay only partially in German wine regions, the number of overnight stays was then multiplied by the same factor. To exclude the underage population, we only interviewed consumers who had a minimum age of 16 years. The official statistics show that 92% of the German population is at least 16 years old (Destatis, 2019). Therefore, the number of overnight stays was then multiplied by a factor of 0.92. Now, we had the final number of overnight stays in each of the 13 German wine regions. In order to obtain the number of day trips, we used regional conversion factors from the Federal Ministry for Business and Energy (Bundesministerium für Wirtschaft und Energie [BMWi]) that allow for the conversion of the number of overnight stays into the number of day-trippers (BMWi, 2014). Finally, we had the final number of visitor days  $N$ .

It is possible to use multipliers from earlier studies (e.g. Auld & McArthur, 2003). In our case, the multipliers were obtained from the

DWIF (2013b, 2015, 2016a, 2016b, 2017, 2018). We took a look at six different reports and then built arithmetic means.  $m^i$  was found to be constant at 30% across all sectors, which is supported by Mayer, Müller, Woltering, Arnegger, and Job (2010). In the same reports,  $m^d$  ranged from 65 to 68%, leading to a mean value of 67%. The mean value for the regional income per capita  $Rf^c$  of an employed person in the German tourism sector was acquired from the German Federal Statistical Office (Destatis, 2019).

The mean daily expenditure per visitor was gained through a face-to-face survey. Using an interviewer-administered questionnaire, respondents provided information about their travel motivation, wine activities, duration of their stay, visitor type (overnight visitor vs. day-tripper), their type of accommodation, and their daily travel expenditure for accommodation, gastronomy, entertainment, food, wine (purchase of regionally produced bottles of wine), and "other/rest." The survey was conducted during two interview periods (March 1, 2017 to June 10, 2017 and April 24, 2018 to June 8, 2018). The target groups for the survey were tourists in German wine regions. A heterogeneous basic population is not known since wine regions stretch across districts and states. Still, interviewers were instructed to choose respondents according to their sex and age brackets (equally distributed), with a minimum age of 16 years. In order not to just interview wine-oriented tourists, the interviews were not conducted at wineries or wine festivals, etc., but at eight to 10 "wine-neutral" interview locations per wine region (e.g. city centers or cultural sights). The interview locations were selected by the regional tourism and/or winemakers' associations. To assure a sufficiently large data pool, the goal of the survey was to collect at least 300 questionnaires in each region, leading to 3,900 questionnaires for Germany as a whole. In total, 4,913 questionnaires were collected, of which 4,478 were usable, delivering an overall rate of 91%.

To find out the share of wine tourists, we used a segmentation method developed by Tafel and Szolnoki (2019) that segments tourists in German wine regions by travel motivation and wine activities. The authors interviewed 1,735 tourists in six German wine regions at wine-neutral interview locations. To divide visitors into wine tourists and other tourists, respondents were asked two successive questions, described in the decision tree in Figure 1.

If visitors had visited a winery during their stay and also considered wine/wine-making to be an important or very important in their travel motivation, they are called Primary Wine Tourists which are considered "real" wine tourists (Tafel & Szolnoki, 2019). For this work, the share of wine tourists was determined for each region individually.

## 4 | RESULTS

### 4.1 | Survey areas

In Germany there are 13 German wine regions that are formed by 72 districts (53 rural districts and 19 district-free cities). Although this paper aims at strengthening rural areas, cities located in the wine regions are not excluded because they are important source markets

for visitors, especially those undertaking day trips (Soontiens, Dayaram, Burgess, & Grimstad, 2018). The defined wine-growing districts are located in eight different federal states. Federal states in Germany are mainly governed separately and investments also occur on the state level. Therefore, this paper's findings will prove most useful if the results are shown for the relevant states, even if the figures were calculated separately for each wine region. Also, the results are more easily accessible if they are produced for less than 13 separate regions. The East German states of Saxony, Saxony-Anhalt, and Thuringia were cumulated into one category and will be called East German states (EAST) for the rest of this paper. The final relevant states are Baden-Württemberg (BA-WÜ), Bavaria (BAV), Hesse (HE), Rhineland-Palatinate (RL-P), and EAST. It is important to mention that these names and abbreviations do not refer to the whole states, but to the share of the states that can be called wine regions. Figure 2 shows the extent of the wine regions on a map of Germany (illustrated with district and state borders). The 13 encircled numbers stand for the 13 wine regions (see Table 2).

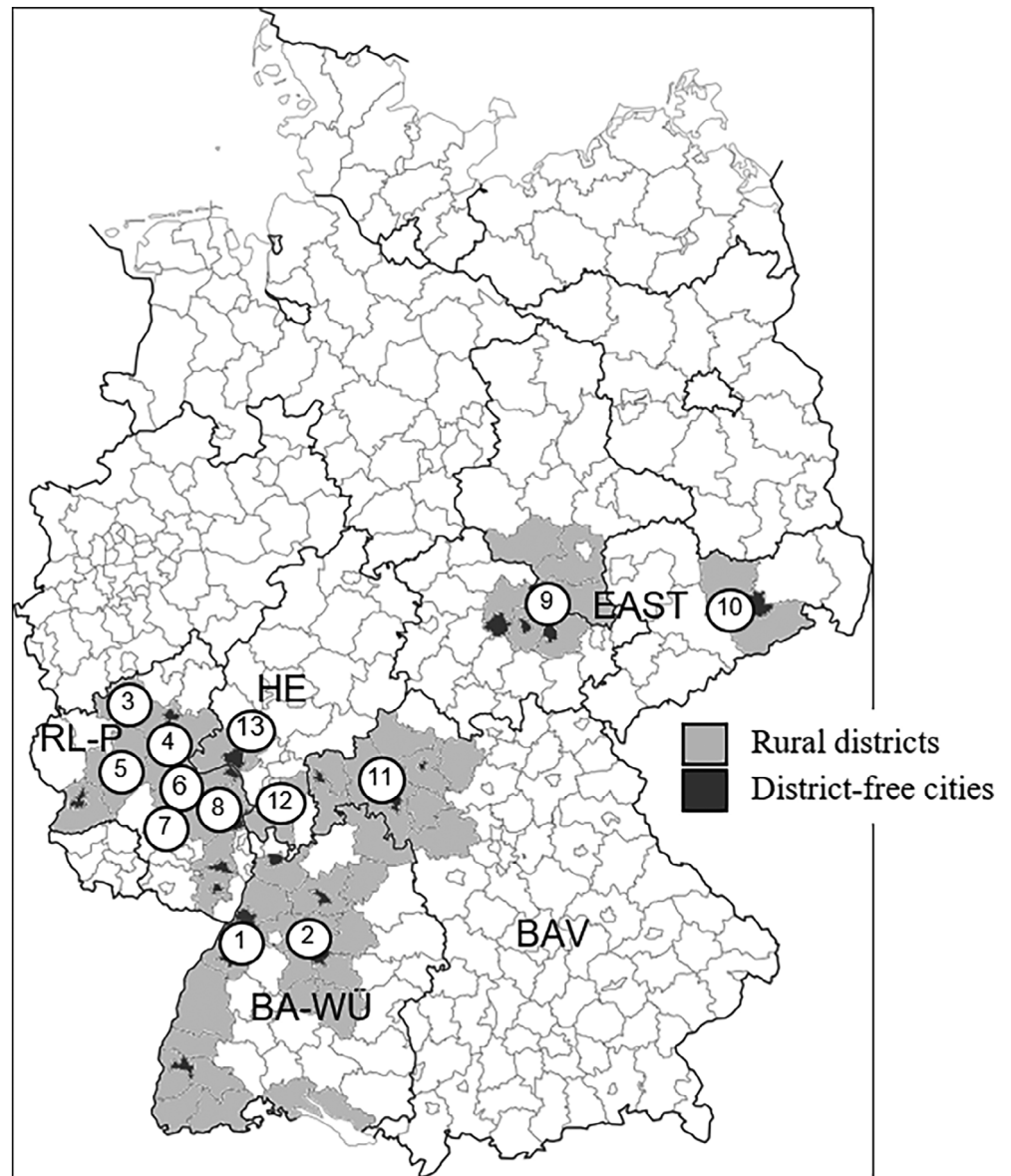
Table 2 shows the wine regions that are numbered in Figure 2. Also, it shows the areas of the wine regions, the district-free cities, and the federal states they are located in. The area sum of all the districts that lie in wine regions is 33,475 km<sup>2</sup>, which represents 9.4% of Germany's surface area being denoted as a wine region. The number of inhabitants in these regions is 8,662,606, which is roughly 10.4% of the German population. Thus, the population density in the German wine regions is slightly higher (259 inhabitants per km<sup>2</sup>) than the average (232 inhabitants per km<sup>2</sup>) (Destatis, 2018).

Figure 3 shows the cumulated geographical area for the wine regions in each state, the visitor density, and the share of wine tourists. Also, the y-axis shows the visitor days per year. The area of the wine regions in the states ranges from 607 km<sup>2</sup> (Hesse) to 13,164 km<sup>2</sup> (Baden-Württemberg), and the share of wine tourists ranges from 9.5% (Hesse) to 16.0% (Bavaria). The highest visitor density is found in the wine regions of Hesse (18,908), and the lowest ones are in the East German and Bavarian wine regions (both at around 6,000).

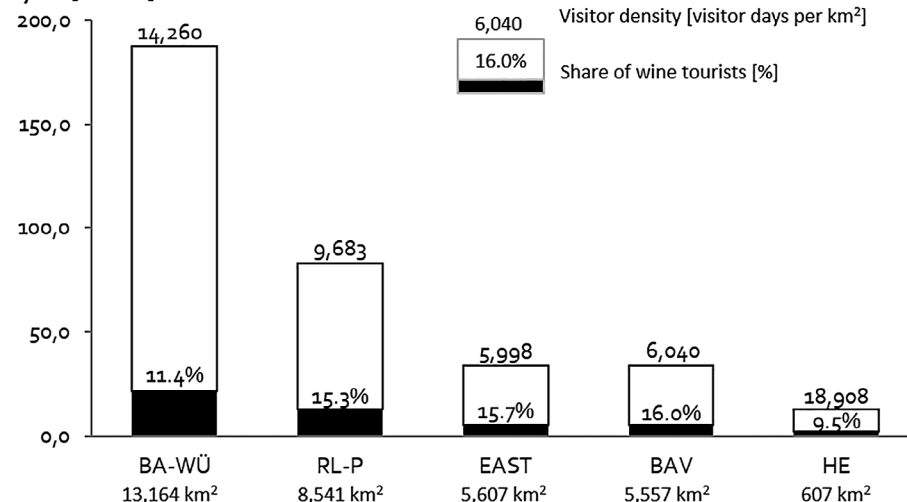
### 4.2 | Visitation and wine-touristic visitations

With a count of 187.7 million visitor days, the wine regions in Baden-Württemberg received more visitors than the other states combined (53.8%). Here, it should be mentioned that big cities such as Stuttgart contribute to this high number, especially in terms of the day trips that are taken. The share of wine tourists on the other hand is the second lowest (11.4%) in this state. Rhineland-Palatinate, with its six wine regions, ranks second with a total of 82.7 million visitor days (23.7%). Except for Mainz, there are no cities with more than 200,000 inhabitants in this state, which is why most of the tourism here can be counted as rural. Summing up, more than three quarters (77.5%) of all visitor days in German wine regions are undertaken in two states. These two states, however, cover eight of the 13 German wine regions.



**FIGURE 2** Map of the wine regions in Germany**TABLE 2** Complementary information about German wine regions (see Figure 2)

No.	Wine regions	State/Category	Size (km <sup>2</sup> )	District-free cities within the region
1	Baden	Baden-Württemberg (BA-WÜ)	9,438	Baden-Baden, Karlsruhe, Heidelberg, Freiburg im Breisgau
2	Württemberg		3,726	Stuttgart, Heilbronn
3	Ahr	Rhineland-Palatinate (RL-P)	534	-
4	Middle Rhine		1,170	-
5	Mosel		2,967	Koblenz, Trier
6	Nahe		1,010	-
7	Palatinate		1,658	Landau in der Pfalz, Neustadt an der Weinstraße
8	Rheinhessen		1,202	Mainz, Worms
9	Saale-Unstrut	East German States (EAST)	4,385	Jena, Weimar
10	Saxony		1,222	Dresden
11	Franconia	Bavaria (BAV)	5,557	Aschaffenburg, Schweinfurt, Würzburg
12	Hessische Bergstraße	Hesse (HE)	315	-
13	Rheingau		292	Wiesbaden

**Visitor days per year [million]****FIGURE 3** Total visitor days, share of wine tourists, and visitor density for the year 2017**TABLE 3** Visitor characteristics of tourists in German wine regions, divided by states (significant differences occur between <sup>a</sup> and <sup>b</sup>)

Variable	n	Baden-Württemberg		Rhineland-Palatinate		Bavaria		East Germany		Hesse	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Sex	4,410	50.7%	49.3%	52.2%	47.8%	48.0%	52.0%	44.1%	55.9%	52.8%	47.2%
Age	4,395	47.1 <sup>b</sup>		47.6 <sup>b</sup>		45.4 <sup>b</sup>		52.2 <sup>a</sup>		47.2 <sup>b</sup>	
Visitor type	4,463	Day	Overnight	Day	Overnight	Day	Overnight	Day	Overnight	Day	Overnight
		56.9%	43.1%	50.4%	49.6%	40.6%	59.4%	42.1%	57.9%	63.1%	36.9%
Accommodation	2,063										
Hotel		–	47.9%	–	46.8%	–	50.3%	–	47.7%	–	47.6%
Guesthouse		–	5.3%	–	10.3%	–	12.4%	–	14.3%	–	15.7%
Winery		–	3.0%	–	8.2%	–	9.2%	–	0.7%	–	6.0%
Holiday apartment		–	8.0%	–	10.1%	–	5.2%	–	9.7%	–	6.0%
Camping		–	7.2%	–	8.6%	–	6.5%	–	7.0%	–	5.4%
Youth Hostel		–	8.0%	–	2.8%	–	4.6%	–	3.3%	–	1.5%
Friends/relatives		–	17.9%	–	9.5%	–	8.5%	–	14.3%	–	13.0%
Other		–	2.7%	–	3.8%	–	3.3%	–	3.0%	–	4.8%
Mean overnight stays	2,065	3.7		3.1		2.3		3.3		2.4	

The wine regions in East Germany in terms of size, visitor days, and the share of wine tourists show almost identical numbers to the Bavarian wine regions. The state of Hesse is home to two small wine regions, which have a geographical area of only 607 km<sup>2</sup>. Also, the state has the lowest share of wine tourists (9.5%). However, the state has the highest visitor density of all five “states” (18,809 visitor days per square kilometer). Thus, despite their size, the wine regions in this state perform best in this regard.

Wine tourists account for about 45.7 million visitor days, which is 13.1% of all visitor days in the German wine regions. Of these, around 40.1 million are day trips and the remaining 5.7 million are overnight stays. Taking the average length of stay for an overnight stay as 2.4 nights, there are 2.3 million wine tourists who stay overnight.

Furthermore, dividing the number of wine-touristic day trips by a factor of 8 (average day visits per year), there are 5 million more wine tourists in Germany. To sum up, there are 7.3 million wine tourists visiting German wine regions every year.

### 4.3 | Visitor characteristics

Table 3 shows the visitor characteristics in each region. The highest share of women can be found in the East German wine regions (56%). The mean age is fairly similar in each state, except for East Germany. Here, the mean age (52.2 years) is significantly higher than in the other states (45.4 to 47.6 years). The highest share of day visitors was



**TABLE 4** Structure of tourist expenditure in Euros per person per day in German wine regions, divided by states

	Baden-Württemberg		Rhineland-Palatinate		Bavaria		East Germany		Hesse	
	Day	Overnight	Day	Overnight	Day	Overnight	Day	Overnight	Day	Overnight
n	351	266	1,050	1,032	106	155	222	306	614	360
Mean daily expenditure	72.53	122.57	69.81	116.75	62.93	122.09	69.68	117.94	62.47	129.44
Accommodation	-	37.5%	-	35.8%	-	36.0%	-	37.2%	-	33.9%
Gastronomy	38.8%	28.1%	42.1%	32.9%	37.2%	32.0%	42.1%	29.5%	41.1%	32.4%
Entertainment	29.0%	17.7%	24.0%	14.3%	21.5%	12.2%	27.6%	18.5%	21.4%	16.1%
Food	13.7%	7.1%	13.1%	7.6%	15.8%	7.4%	12.0%	6.3%	16.7%	8.9%
Wine	6.5%	2.6%	9.1%	2.6%	12.0%	5.5%	6.6%	1.4%	7.4%	2.3%
Other/rest	11.9%	7.0%	11.8%	6.8%	13.5%	6.9%	11.8%	7.1%	13.4%	6.5%
Total mean expenditure	75.57		78.45		69.41		76.29		68.89	

**TABLE 5** Economic impact of tourism in German wine regions in Euros and income equivalents, divided by states

	Baden-Württemberg		Rhineland-Palatinate		Bavaria		East Germany		Hesse	
	Total	Wine tourism	Total	Wine tourism	Total	Wine tourism	Total	Wine tourism	Total	Wine tourism
Gross tourist spending (EUR million)	14,186	2,231	6,488	1,368	2,330	723	2,566	514	790	103
Direct regional income (EUR million)	3,817	598	1,743	366	628	194	689	138	213	28
Indirect regional income (EUR million)	2,404	377	1,098	230	396	122	434	87	134	17
Total regional income (EUR million)	6,221	975	2,841	596	1,024	316	1,124	225	347	45
Income equivalents (total number)	207,168	32,479	94,620	19,855	34,099	10,531	37,420	7,482	11,571	1,498

found for the wine regions of Hesse (63.1%) and the lowest share was in the Bavarian wine regions (40.6%). Overnight guests mostly stay in hotels (47 to 50%). The highest share of guests sleeping in wineries was in Bavaria (9.2%), followed by Rhineland-Palatinate (8.2%). In East Germany, the share of people sleeping in wineries was only about 0.7%. The longest stays for overnight visitors were found to be in the wine regions of Baden-Württemberg (3.7 nights). At 2.3 nights, the shortest average stay of overnight guests was in the Bavarian wine regions.

#### 4.4 | Structure of the expenditure

Table 4 illustrates the structure of the expenditure of both day-trippers and overnight visitors in each state. The highest overall expenditure was in the wine regions of Rhineland-Palatinate (EUR 78.45) and the lowest was in Bavaria (EUR 69.41), so the difference is EUR 9.04. In all states, most of the daily expenditure was either spent on accommodation (overnight guests) or on gastronomy (day-trippers). Overnight visitors spent about 35% of their daily expenditure on accommodation and another 30% in restaurants. Day-

trippers spent about 40% of their daily expenditure in restaurants and another 25% on entertainment. In three cases (Baden-Württemberg, Bavaria, and Hesse), the overnight visitors in wine regions spent a similar amount of money on both accommodation and gastronomy. The average daily spending amount on locally produced bottled wine is EUR 5.09. The highest share spent on wine was in the Bavarian wine regions: Here, day-trippers spent 12.0% and overnight guests spent 5.5% of their daily expenditure on this category. The lowest share of money spent on wine was in the East German wine regions. However, the highest share of expenditure was spent on entertainment in these regions (overnight visitors: 20.9%; day-trippers: 32.3%), together with the wine regions in Baden-Württemberg.

#### 4.5 | Economic impact

Table 5 summarizes the estimated economic impact of tourism and of wine tourism in German wine regions. The wine regions in Baden-Württemberg have the highest economic impact with a gross tourist spending of EUR 14.2 billion, of which EUR 2.2 billion was generated

by wine tourism. Wine regions in Rhineland-Palatinate, with EUR 6.5 billion of gross tourist spending, experienced less than half of the economic impact of Baden-Württemberg. However, due to a higher share of wine tourists (15.3%), the impact of wine tourists of EUR 1.4 billion is reasonably good. Hesse, on first sight, appears to experience a small economic impact. However, considering its size of only 607 km<sup>2</sup>, it performs quite well as it is the most significant region in terms of gross tourist spending per km<sup>2</sup>.

Summing up, tourism in the German wine regions has an economic impact of EUR 26.4 billion. It produces EUR 7.1 billion of direct and EUR 4.5 of indirect regional income. This leads to a total regional income of EUR 11.6 billion resulting in 384,878 income equivalents. The share of wine tourists in terms of visitor days is around 13%. Due to higher expenditures, the economic impact of wine tourism in Germany adds up to about 19% (EUR 5.0 billion), translating into the primary income of 71,846 people.

## 5 | DISCUSSION

### 5.1 | Conclusions

The aim of this work was to estimate the economic impact of wine tourism in Germany to provide empirical evidence for policy and investment decisions. Therefore, a new model was developed. After defining the districts that are located within wine regions in accordance with regional tourism and wine experts, it became clear that 9.4% of German land can be called a wine region. The total number of visitation days to German wine regions divides into 45.7 million overnight stays and 303.3 million day trips. The final results show that, including indirect effects, tourists within German wine regions spend EUR 26.4 billion annually. The estimated number of wine tourists in Germany is 7.3 million. They produce 13% of all the touristic visitor days in German wine regions. Due to higher travel expenditures, they generate an above average economic impact of 19% (EUR 5.0 billion).

If compared with official numbers about Germany, it becomes clear that the overall economic impact of EUR 26.4 billion is about 9.4% of the overall direct and indirect impact of the travel and tourism sector in Germany (EUR 291 billion) (WTTC, 2018). Thus, the share of German wine regions covering the country and the share of tourism in these regions align precisely. The Federal Statistical Office notes that there were 459.4 million overnight stays in Germany in 2017 (Destatis, 2018). Furthermore 2,947.6 million day trips were undertaken (BMW, 2014). Hence, 10% of all overnight stays and 10.3% of all day trips in Germany were spent within wine regions in 2017. This figure also almost matches the defined wine-region area and the economic impact of tourism in these regions.

Even though wine tourism has been playing an increasingly important role in scientific research, economic impact studies are scarce. In the United States, Canada, and Australia, I-O models were

used. Due to missing supply data, this approach could not be applied in our case. Therefore, the results are difficult to compare. Studies that used a similar approach to ours were conducted in France and Italy. In France, 10 million wine tourists created an economic impact of EUR 5.2 billion in 2016 (Atout France, 2017), and in Italy, tourist expenditures in 2015 amounted to EUR 2.6 billion, generated by four-to-six million wine tourists (Città del Vino, 2016). Our estimations show that in terms of the number of wine tourists, Germany lies right in the middle (7.2 million). The economic impact of EUR 5.0 billion on the other hand is about the same as in France and twice as high as for Italy. Since in France and Italy the amount of produced wine is significantly higher than in Germany, it could be assumed that wine tourism should be a much stronger sector, too. However, as is seen in the case of California (81% of U.S. wine production, 40% of the economic impact of wine tourism in the United States), a higher amount of produced wine does not necessarily translate into a higher economic impact. Also, in Germany, domestic tourism, at 87% of tourist spending, is stronger than in France (70%) and in Italy (77%) (WTTC, 2018). Therefore, domestic wine tourism could be assumed to be higher, too. Furthermore, since Germans have a higher income, travel expenses are probably also higher.

The DWIF conducted economic impact studies in two German wine regions. Even if the authors did not investigate the economic impact of the niche market of wine tourism, they used a similar model to the one proposed in this work. Hence, in two regions, their studies provide a benchmark for comparing our results. The DWIF (2013a) found that in the German wine region of Franconia, the economic impact of tourism amounted to EUR 3.2 billion in 2012, providing an income for 64,500 people. Our results for Bavaria (Franconia is the only wine region in this state) show an economic impact of EUR 2.3 billion, giving 37,347 people an income. In this case, our results are below the estimated impact determined in the previous study (DWIF, 2013a). Another study conducted in 2016 in the Mosel wine region showed that EUR 1.3 billion was earned annually from tourism, which translates into an income for 22,780 people (DWIF, 2017). Although not shown separately in this work due to the state-level approach, our results for this wine region show EUR 1.7 billion in tourism earnings, resulting in 26,659 regional incomes. In sum, compared to previous studies, one wine region was estimated to be 24% higher and the other one 28% lower. If we assume that the rest of the regions have a similar range in terms of discrepancies, the results for all German wine regions could be considered congruent with those the DWIF would find if they were to conduct studies in all German wine regions.

This paper introduces a way to measure the economic impact of wine tourism using a modified Keynesian income multiplier model. It is effective for estimating economic impacts in countries where data, especially on the supply side, are hard to obtain. It is the first scientific publication measuring the economic impact of wine tourism in a whole country.

## 5.2 | Practical implications

Wine tourism in combination with a strong domestic tourism market can provide a robust tool for sustainable development and for leveling regional imbalances, especially in industrialized countries such as Germany (WTTC, 2018). Imbalances in the country occur mainly on two levels: First, due to the migration of people from rural areas to urban agglomerations, and second, due to the strong structural differences between East and West Germany (FES, 2019). In the following paragraphs, implications for regional associations and public authorities are given that can contribute to achieve a sustainable development in German wine regions.

It may appear contradictory, but to counter the imbalances between rural and urban populations, cities can provide a strong source market for tourists. The urban population in the cities in wine regions can undertake day or weekend trips for recreational purposes and thus generate economic impacts in their surroundings. Cities that are located close to wine regions can be taken into account, too. Frankfurt, for example, has at least six wine regions within a 1.5-hr driving distance. Thus, some of the purchase power of urban agglomerations can partially flow back into rural areas and therefore contribute to sustaining and furthering the structure in these regions. Consequently, wine regions and undertaking trips to them should be promoted in urban agglomerations that are strategically well located.

Imbalances between East and West Germany due to the separation of the country until 1990 have been a constant topic in German politics. The relevant East German states of Saxony, Saxony-Anhalt, and Thuringia show the highest migration rate in Germany (Destatis, 2019). Our results show that the structure of the East German wine regions is very similar to the Bavarian wine region of Franconia, which is one of the most successful wine tourism destinations in the country (in terms of cooperation and promotion). Hence, one of the biggest practical implications is to strengthen the structurally disadvantaged East German states through wine tourism. Here, investments could benefit the Eastern half of Germany by generating job opportunities and thus preventing people from moving to West Germany. Also, there are strategically interesting cities in and around the East German wine regions that could be targeted as well. There are historic cities such as Weimar and Dresden that lie directly in the wine regions and receive many tourists. Also, there are cities such as Leipzig (the fastest-growing city in Germany) and Erfurt that lie within an hour's travel from these wine regions. So, providing day trips from these cities to the surrounding wine regions would probably be of benefit. Furthermore, Berlin, as the capital and biggest city in Germany, is only about 2 hr away. Thus, this would be a perfect source market for weekend trips. Of course, targeting the right client base should play a role: Our results show that the share of women in East German wine regions is higher than in the other wine regions. In addition, more money is spent on entertainment. Only 0.7% of the respondents in this region slept in wineries. This share is at least four times lower than in any other German wine region. This could indicate that there is too little supply in this regard. Hence, more wineries should probably offer the opportunity of sleeping on site. Perhaps new wineries could open that specialize in the field of accommodation. These could offer entertainment programs that

include wine in their activities. Considering the high percentage of women, female trip packages like bachelorette parties could make sense.

Another Problem in Germany is the increasing mean age of the German population. The mean age of German citizens is 44 years and 4 months (Destatis, 2018). In our results, the age range was from 45 to 52 years old, so it was even slightly higher than the German average. This could indicate that the willingness to undertake trips to wine regions may increase. Generally speaking, the results showing the nature of the travelers (sex, age, visitor type, accommodation type, etc.) identify visitor groups that could be helpful for targeted destination management.

## 5.3 | Limitations and future research recommendations

To apply the proposed model, the number of day-trippers has to be determined. In Germany, there is a report by the Federal Ministry for Business and Energy that allows for the regional conversion of the number of overnight stays into the number of day-trippers. This may not be the case in other countries. Then, the number of day-trippers would have to be estimated for each respective region. In the case of Germany, the distance to big cities positively influences the number of day-trippers per overnight stay. This can be a helpful insight for converting the number of overnight stays into the number of day-trippers.

Since wine regions sometimes stretch across several states and even districts, we defined the districts that lie in these regions. In some cases, districts could not be counted solely as a wine region. Thus, the share of the districts that can be called a wine region had to be determined and double-checked with regional experts. This procedure has shown to be very time-consuming. If a similar study was to be conducted, it could be more useful to go one step further and define the relevant communities (not districts) that lie in the wine regions. This would eliminate the problem of defining a share of the districts that can be called a wine region.

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