Size versus Region – Identifying Suitable Benchmarking Factors Explaining Sufficient Heterogeneity between Wine Businesses

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Abstract

◦*Purpose* – To assess a wine producer's economic sustainability it is useful to benchmark its economic indicators against a suitable reference group. Existing research mainly compares wine businesses either by region or by size alone. There is a research gap concerning which of the two benchmarking factors might be more suitable or whether both factors are required.
◦*Design/methodology/approach* – Using the framework of economic sustainability benchmarking figures by Loose *et al.* (2021), the effects of region and size as well as the effect of their interactions on 11 economic indicators were estimated through ANOVA and the estimation of effects sizes. The analysis is based on business data of 382 German wine estates as averages across six agricultural years (2014-2019).
◦*Findings* – Region and size both had a significant influence on (partially differing) eight out of 11 benchmark indicators. Wine estates from distinct regions more strongly differed in their primary indicators of production factors, price and yield as well as secondary indicators of cost and productivity. Contrarily, wine estates of diverse size groups more strongly differed in their tertiary indicators of profitability and return, which closely relate to economic sustainability.
◦*Practical implications* – This is the first study to simultaneously assess wine estates' differences by region of origin and size. The two factors discriminate different economic indicators and complement each other. They should both be utilised for suitable economic indicators when benchmarking wine businesses.

Key words: economic sustainability, benchmarking, effect size, input factors, yield, costs, profitability

1. INTRODUCTION

Businesses want to compare and benchmark themselves to the most suitable reference group with the highest relevance. In the past, the region or country of origin has been frequently used, in order to compare performance in various fields of the wine industry (Garcia *et al.*, 2012; Tomljenović and Getz, 2009; Vrontis *et al.*, 2011; Corkindale and Welsh, 2003). There are fewer studies analysing the effect of business size on winery performance (Sellers and Alampi-Sottini (2016). The question whether the region of origin or size is a more meaningful factor for benchmarking winery performance is important for benchmarking tools, such as the digital dashboard on economic sustainability developed by Bennett and Loose (2022).

1.1 Why benchmarking is important

Benchmarking requires the measurement of the difference between the current performance level of an organization and the best practically possible level, in order to identify causes for each deviation (Camp, 2007). It is a continuous process of measuring against the best. A very important part of benchmarking is identifying companies against which to benchmark. While there are multiple bases against one can choose to benchmark, benchmarking against product competitors is compulsory. A certain level of comparability is essential here, as primary business performance drivers should be similar (Camp, 2007; Bogetoft Pedersen, 2012). Size is a potentially limiting factor in terms of comparability Camp (2007), because it affects the degree of automation or distribution activity otherwise direct product competitors. To further understand, if a wineries size or region of origin can have a stronger influence on comparability, this paper establishes potential influences of both factors on business success and sustainability. So far, there is no research available on the relative effect of size and region on economic performance indicators for small and medium sized businesses in the wine sector. This study aims at filling this research gap.

1.2 The Wine sector Business Analysis

In search for benchmarking figures for a core framework of economic sustainability in the wine industry, Loose *et al.* (2021) conceptualised multiple factors. This paper draws on this framework by including a similar benchmark structure with a total of seven factors (Figure 1). They are operationalised by two independent external variables estate size and region of origin and eleven benchmark indicators, which represent the dependent variables.

Land, capital and labour represent traditional economic input factors, the latter two are operationalised as asset coverage and labour intensity. Jointly the input factors result in raw output of wine, measured as yield in hectolitres per hectare. The wine price represents the market valuation of the wine, measured as average price from dividing turnover by production volume. Cost per litre is derived from total cost and imputed renumeration of family staff divided by production volume. Efficiency is operationalised as labour productivity that represents the turnover per worker. Similar, area productivity relates the turnover to the production factor land (vineyard area). The final set of benchmarks of profit and return are most comprehensive by relating revenue and cost per output (profit per litre), revenue and cost

(operational result), as well as revenue and cost per unit of capital (returns). The dependent performance indicators are defined in detail in Table 5 in the Appendix.

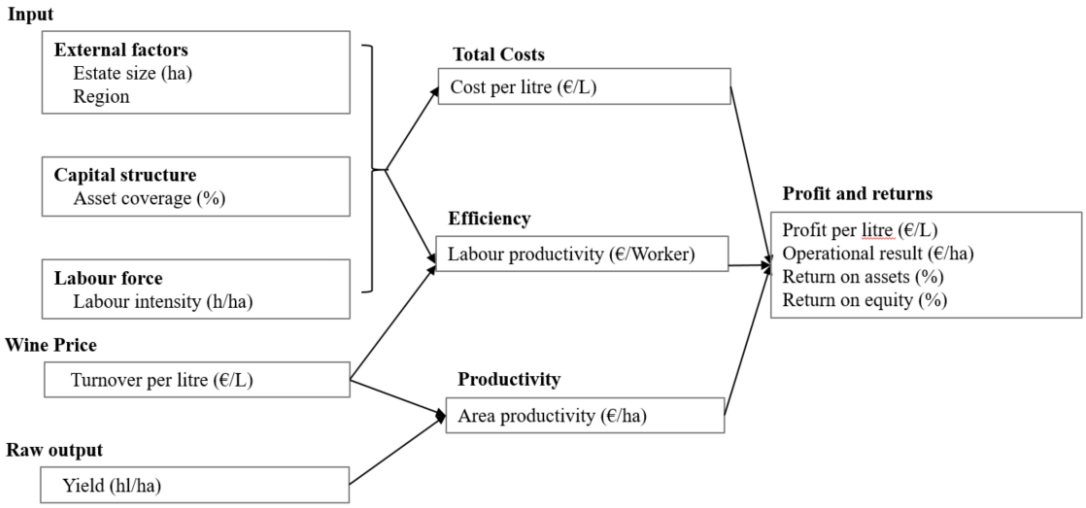

Figure 1 A framework of economic sustainability benchmarking figures (based on Loose et al. (2021))

This framework offers an adequate overview of the economic sustainability of a single wine business Loose *et al.* (2021). So far it remains unknown, by which factor to choose the sample of businesses to preferably benchmark the indicators against. This is an essential question to answer, to gain the most meaningful results for wine businesses.

2 EFFECTS OF WINE REGIONS AND SIZE

2.1 The influence of wine regions in the wine sector

Generally, two potential influencing factors tied to the region of origin can be distinguished (Table 1). Space limitations prevent a detailed discussion.

Table 1: Regional factors of influence on performance indicators

Cause	Category	Influential Factor
Structural (Production)	Climactic	– Intensity of sunshine ((László Makra) *et al.*, 2009; Agosta *et al.*, 2012) – Precipitation (Agosta *et al.*, 2012; (László Makra) *et al.*, 2009) – Mean temperature (Agosta et al., 2012)
	Geologic	– Water retention capacity of the soil (Hofmann and Schultz, 2015) – Evapotranspiration (Hofmann and Schultz, 2015)
	Geographic	– Steep Slopes (Strub and Loose, 2021) – Vineyard area distribution (Galindro et al., 2018; Pomarici et al., 2021) – Regional differences in cost and access to labour (McCorkle *et al.*, 2019)
	Technological	– Manual labour (Loose and Pabst, 2020a) – Mechanization (Strub and Loose, 2021)
Market (Sales)	Marketing	– Reputation (Ling and Lockshin, 2003; Bicknell and MacDonald, 2012; Riscinto-Kozub and Childs, 2012; Landon and Smith, 1997; Delord et al., 2015)
	Distribution and margin	– Attractiveness for wine tourism (Tafel and Szolnoki, 2020) – Cellar doors, self-marketing without loss of margin but higher cost (Loose and Pabst, 2020a) – Sales through intermediaries that require margin (Loose and Pabst, 2020b)

The first factor relates to structural differences, caused by climatic, geologic, geographic and technological differences, which mainly affect the production of wine. These effects are expected to impact yield and the degree of mechanisation affecting cost. The second factor relating to the wine market summarises differences in regional reputation and differences in the utilisation of sales channels, influencing turnover per litre. These effects will carry over to the indicators of the second layer with total costs, efficiency and profitability, to some extent (H1a to H7a in Table 6 the Appendix).

Performance indicators of profit and returns are tightly connected and depend on previous indicators of labour intensity, pricing, yield, cost, efficiency as well as productivity and their interactions. Some of these effects, such as pricing and costs are expected to offset. For instance, smaller regions with higher costs benefit from higher prices and higher area productivity. Because of these offsetting-effects, it is expected that region has no effect on these indicators of profit and returns (H8a – H11a).

2.2 Influence of business size in the wine industry

The other overarching factor analysed in this study, is business size. Existing research suggests two major factors of how size affects business performance (Table 2). As supported by a large number of studies, size can have a positive effect on efficiency and considerably reduce relative costs through economies of scale (Arcas *et al.*, 2011; Silberston, 1972; Duffy, 2009). This is expected to effect labour intensity and productivity, cost per litre and as a result, all profitability indicators, as listed in H1b to H11b in in Table 6 the appendix.

Table 2: Factors of influence on performance indicators through business size

Category	Influential Factor
Economies of scale	– Decreasing costs per unit (Silberston, 1972; Arcas *et al.*, 2011; Duffy, 2009) – Minimum efficient plant size (Junius, 1997; Duffy, 2009) – Consolidation (Perretti, 2020; Sellers-Rubio *et al.*, 2016) – Technological advancements, efficient equipment and machinery (Perretti, 2020; Tudisca *et al.*, 2013)
Sales through intermediaries	– Limited geographical scope, reduced turnover per litre because of margin required for sales through intermediaries (Pomarici *et al.*, 2021) – Larger wine estates have higher share of sales through intermediaries (Loose and Pabst, 2018) – Small wine estates have higher average prices

The second factor relates to the role of intermediaries. Smaller wine estates are more able to sell their production volume directly to consumers, e.g. through cellar doors. Expanding wineries outgrow their geographical vicinity and cannot solely rely on direct consumer sales, forcing them to adapt their pricing structure in order to be able to successfully serve intermediaries (Loose and Pabst, 2020a). This second factor is expected to impact price.

3 METHODOLOGY

This study only focusses on wine estates, which represent approximately 27% of total German production volume (Loose and Pabst, 2018). Data was provided by the Hochschule Geisenheim University business analysis. Averages for 11 key attributes and performance indicators to be

benchmarked were calculated across six agricultural years from 2013/2014 to 2018/19. This is required to avoid distortions from strong annual differences, e.g. related to yield.

The data set comprises business data of 382 German wineries, spanning across eight regions and divided into four size categories. The size categories where defined equal to those of Wetzler *et al.* (2021), resulting in the following data structure (Table 3).

Table 3: Sample structure - wine estates per region and size category (n=382)

Region	Size Category				Total
	<5ha	5-10ha	10-20ha	>20ha	
Baden	6	8	13	10	37
Franken	5	17	19	6	47
Mosel	19	20	9	0	48
Nahe	1	5	15	2	23
Pfalz	1	10	41	24	76
Rheingau	3	7	6	6	22
Rheinhessen	0	18	50	34	102
Wuerttemberg	1	6	17	3	27
Total	36	91	170	85	382

There are major structural differences between the regions, which are also reflected in the data set. While the Mosel region has the largest number of wineries belonging to the first size category by far (<5ha), Pfalz and Rheinhessen contain predominantly large winery structures, with the majority belonging to the third (10-20ha) and fourth (>20ha) size categories.

In order to estimate the effects a two-factor ANOVA in SPSS was conducted, also taking into account interaction effects between region and size. Depending on the hypothesis the corresponding indicator was selected as the dependent variable with the size category and the region being chosen as the two fixed factors as well as their interaction effect. Hypothesis are tested according to F-statistics and significance values are provided. Partial eta-squared was computed as effect size, indicating which of the two fixed factors explains more variance, followed by a Tukey-B Post-Hoc Test. The reference values of 0.01 (small), 0.06 (medium) and 0.14 (large) suggested by Cohen (1988), Miles and Shevlin (2008) were applied to assess the magnitude of effect sizes.

4 RESULTS

The detailed results of ANOVA and post-hoc tests are provided in the Appendix in Table 7 to Table 12. Hypothesis tests are summarised in Of the total of 11 indicators, we found eight significant effects for both factors region and size. Although the amount is equal, the distribution across the three layers is not. There are more significant differences for region than for size in the first two layers - two of them are large (yield and cost per litre). For the third layer the effect of the factor size clearly dominates with all four indicators being medium strongly positively affected by size. On the contrary, there are only small differences between regions for the two return indicators.

Table 4. Because of space limitations the individual results cannot be presented and discussed in full detail in this conference paper.

All of the 11 indicators were significantly affected by either region, size, or both factors. The interaction term of region and size was never statistically significant and was always exceeded in effects size by at least one of the two main effects region and size.

- *For the first layer* region had a large effect on yield and two medium strong effects on labour intensity and price (turnover per litre). Size had a medium sized negative effect on labour intensity and a small positive effect on asset coverage, contrary to our expectation.
- *For the second layer* region had a large effect on cost per litre, a medium effect on area productivity and a small effect on labour productivity. For size we found a medium strong positive effect on labour productivity and a small negative effect on cost per litre.
- *For the third layer* of profitability and return size had a medium strong positive effect on all four benchmark indicators. Region only had two small effects on return on assets and return on equity.

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Table 4: Summary of the results of hypothesis tests and effect sizes

Layer	Benchmark		Factor	Hypothesis	Test, *p*	Effect size	Magni-tude*
1	Asset coverage	H1a	Region	No difference	Confirmed, n.s.	0.029	
		H1b	Size	Negative effect	Not confirmed, positive	0.022	small
	Labour intensity	H2a	Region	Difference	Confirmed, <0.001	0.119	medium
		H2b	Size	Negative effect	Confirmed, <0.001	0.121	medium
	Turnover per litre	H3a	Region	Difference	Confirmed, <0.001	0.130	medium
		H3b	Size	Negative effect	Not confirmed, n.s.	0.005	
	Yield	H4a	Region	Difference	Confirmed, <0.001	0.190	large
		H4b	Size	No effect	Confirmed, n.s.	0.013	
2	Cost per litre	H5a	Region	Difference	Confirmed, <0.001	0.211	large
		H5b	Size	Negative effect	Confirmed, <0.05	0.023	small
	Labour productivity	H6a	Region	Difference	Confirmed, <0.05	0.040	small
		H6b	Size	Positive effect	Confirmed, <0.001	0.064	medium
	Area productivity	H7a	Region	Difference	Confirmed, <0.001	0.097	medium
		H7b	Size	Negative effect	Not confirmed, n.s.	0.006	
3	Profit per litre	H8a	Region	No difference	Confirmed, n.s.	0.032	
		H8b	Size	Positive effect	Confirmed, <0.001	0.101	medium
	Operational result	H9a	Region	No difference	Confirmed, n.s.	0.037	
		H9b	Size	Positive effect	Confirmed, <0.001	0.106	medium
	Return on assets	H10a	Region	No difference	Not confirmed, p<0.05	0.040	small
		H10b	Size	Positive effect	Confirmed, <0.001	0.109	medium
	Return on equity	H11a	Region	No difference	Not confirmed, p<0.05	0.048	small
		H11b	Size	Positive effect	Confirmed, <0.001	0.092	medium

Notes: *classification of magnitude according Cohen (1988), Miles and Shevlin (2008), factor with larger effect size highlighted in grey for each benchmark indicator.

5 DISCUSSION AND OUTLOOK

For holistic benchmarking of economic sustainability, a flexible approach ideally taking multiple factors into account is needed. Both the region of origin and the size group showed varying degrees of effect size and influence on multiple indicators. However, generally, the influence of one factor was mostly distinctly stronger for each indicator. As these differences were distributed unequally across the three benchmark layers, none of both factors showed consistently dominant effects across the board. Therefore, future benchmarking frameworks would need to permit changing reference groups for different indicators. While benchmarking by size, as suggested by Camp (2007), was clearly more suitable for indicators of profits and returns, indicators of the first two layers would benefit highly from being benchmarked against businesses of the same region of origin, due to its' predominantly stronger effect sizes in these areas.

These findings are, of course, limited to the German wine sector and could be further validated by business data in other countries. Additionally, other important factors could influence benchmarks, although not all of which are observable or measurable (e.g. personality traits etc.). These could be taken into account and expanded upon in future studies to further deepen the understanding of concrete influences on benchmarking factors.

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APPENDIX

Table 5: Definitions of all performance indicators

Layer	Factor	Benchmark	Definition
1	Input	Capital structure Asset coverage	Equity and middle & long-term liabilities, divided by the value of all fixed assets
		Labour force Labour intensity	Total number of working hours required per year, divided by the winery size (h/ha).
	Wine Price	Turnover per litre	Approximation of the average sales price per litre of wine (€/L).
	Raw output	Yield	Yield according to the official grape yield declaration in hectolitres per hectare (hl/ha).
2	Total Costs	Total cost per litre	Sum of operating costs, plus imputed wages of family staff divided by the total quantity of wine processed (€/L).
	Efficiency	Labour productivity	Total turnover divided by the number of workers (€/Worker).
	Productivity	Area productivity	Turnover per hectare of vineyard area (€/ha).
3	Profit and returns	Profit per litre	The operating result reduced by the imputed family wage, divided by the total quantity of wine processed (€/L)
		Operational result per year including family wages per hectare	Total operational result after the deduction of imputed family wage, divided by total vineyard area (€/ha)
		Return on assets	The operating result reduced by the imputed family wage, divided by the total capital employed (%).
		Return on equity	Total profit reduced by extraordinary results as well as imputed family wage, divided by the total equity (%).

Table 6: Hypothesis about the effect of region and size on the benchmark indicators

Layer	Benchmark	Hyp.	Factor	Hypothesis
1	Asset coverage	H1a	Region	No previous indications of how structural or market factors might affect asset coverage. No difference expected.
		H1b	Size	Larger companies are expected to have more debt, negative effect.
	Labour intensity	H2a	Region	Difference expected because of structural factor of degree of mechanisation that differs between regions.
		H2b	Size	Because of economies of scale through mechanisation, a negative relationship with size is expected. Larger wine businesses are expected to have lower labour intensity.
	Turnover per litre	H3a	Region	Difference expected because regions differ strongly in the market factor reputation and utilisation of distribution channels.
		H3b	Size	Because of the increasing utilisation of intermediaries with growing size, a negative relationship is expected. Larger wine businesses are expected to have lower turnover per litre.
	Yield	H4a	Region	Difference expected because of structural differences in climate and geology that affect yield.
		H4b	Size	No differences are expected.
2	Cost per litre	H5a	Region	Difference expected because regions differ in the degree of mechanisation.
		H5b	Size	Because of economies of scale through mechanisation, a negative relationship with size is expected. Larger wine businesses are expected to have lower cost per litre.
	Labour productivity	H6a	Region	Difference expected. The differentiating effects of price and mechanisation are expected to interact and partially offset. The effect will be smaller than for price.
		H6b	Size	Depends on price, yield and degree of manual labour that partially offset. While price decreases with size, the amount of manual labour decreases because of efficiency and mechanisation. Efficiency gains will outweigh the negative effect of price. Larger wine businesses are expected to have higher labour productivity.
	Area productivity	H7a	Region	Difference expected. The differentiating effects of price and yield are expected to interact and partially offset. The effect will be smaller than for price.
		H7b	Size	The total effect depends on price and yield. Because yield is expected to be independent of size, area productivity will decrease with size. Larger wine businesses are expected to have lower area productivity.
3	Profit per litre	H8a	Region	Indicators of profit and returns are tightly connected and depend on previous indicators of labour intensity, pricing, yield, cost, efficiency as well as productivity and their interactions. Some of these effects, such as pricing and costs, are expected to offset. For instance, smaller regions with higher costs benefit from higher prices and higher area productivity. Because of these offsetting-effects, region is not expected to have an effect on the indicators of profit and returns (H8a – H11a).
		H8b	Size	As for region, the effect depends on previous indicators and their interactions. Because costs (labour productivity) are expected to decrease (increase) with size efficiency gains are expected to outweigh the negative effect of area productivity. Size will have a positive relationship with the indicators of profit and returns (H8a – H11a).
	Operational result	H9a	Region	No difference expected.
		H9b	Size	Positive effect
	Return on assets	H10a	Region	No difference expected.
		H10b	Size	Positive effect
	Return on equity	H11a	Region	No difference expected.
		H11b	Size	Positive effect

Table 7: Partial Eta-squared values of Asset Coverage, Labour intensity, Turnover per litre and Yield

	Partial Eta-squared			
Source	Asset coverage	Labour intensity	Turnover per litre	Yield
Corrected Model	0.139	0.486	0.200	0.286
Intercept	0.815	0.801	0.605	0.889
Region	0.029	0.119 ***	0.130 ***	0.190 ***
Size Group	0.022 *	0.121 ***	0.005	0.013
Region * Size Group	0.096	0.067	0.057	0.047

* significant at p <0.05; ** significant at p < 0.01; ** significant at p < 0.001.

Table 8: Partial Eta-squared results for Cost per litre, Labour productivity and Area productivity

	Partial Eta-squared		
Source	Cost per litre	Labour productivity	Area productivity
Corrected Model	0.356	0.229	0.170
Intercept	0.753	0.651	0.723
Region	0.211 ***	0.040 *	0.097 ***
Size Group	0.023 *	0.064 ***	0.006
Region * Size Group	0.060	0.049	0.038

* significant at p <0.05; ** significant at p < 0.01; ** significant at p < 0.001.

Table 9: Partial Eta-squared results for profit per litre, operational result, return on assets and return on equity

	Partial Eta-squared			
Source	Profit per litre	Operational result	Return on assets	Return on equity
Corrected Model	0.233	0.245	0.246	0.211
Intercept	0.000	0.002	0.001	0.001
Region	0.032	0.037	0.040 *	0.048 *
Size Group	0.101 ***	0.106 ***	0.109 ***	0.092 ***
Region * Size Group	0.044	0.046	0.056	0.038

* significant at p <0.05; ** significant at p < 0.01; ** significant at p < 0.001.

Table 10: Post-Hoc results for Asset Coverage, Labour Intensity, Turnover per litre and Yield

	Asset Coverage			Labour Intensity			Turnover per litre			Yield	
Region	mean (%)	Tukey-B	**Region**	mean (h/ha)	Tukey-B	**Region**	mean (€/L)	Tukey-B	**Region**	mean (hl/ha)	Tukey-B
Franken	129		Rheinhessen	615	a	Rheinhessen	3.31	a	Baden	61	a
Rheinhessen	130		Nahe	704	ab	Pfalz	4.01	a	Rheingau	62	a
Nahe	136		Pfalz	709	ab	Wuerttemberg	4.67	ab	Nahe	64	a
Baden	137		Wuerttemberg	860	bc	Nahe	4.68	ab	Franken	70	ab
Mosel	139		Franken	937	c	Franken	4.93	abc	Wuerttemberg	75	bc
Pfalz	139		Rheingau	973	c	Mosel	5.69	bc	Mosel	76	bc
Rheingau	147		Baden	989	c	Baden	5.88	bc	Pfalz	81	c
Wuerttemberg	159		Mosel	1155	d	Rheingau	6.36	c	Rheinhessen	85	c
Size Group	mean (%)	Tukey-B	**Size Group**	mean (%)	Tukey-B	**Size Group**	mean (%)	Tukey-B	**Size Group**	mean (%)	Tukey-B
5-10ha	130	a	20ha+	620	a	20ha+	4.23	a	5-10ha	70	a
20ha+	133	ab	10-20ha	724	a	10-20ha	4.26	a	10-20ha	76	ab
10-20ha	140	ab	5-10ha	937	b	5-10ha	4.98	ab	0-5ha	78	b
0-5ha	149	b	0-5ha	1457	c	0-5ha	5.61	b	20ha+	80	b

Table 11: Post-Hoc results for Cost per litre, Labour Productivity and Area Productivity

	Cost per litre			Labour Productivity			Area Productivity	
Region	mean (€/L)	Tukey-B	**Region**	mean (€/wk*)	Tukey-B	**Region**	mean (€/ha)	Tukey-B
Rheinhessen	3.38	a	Franken	61,280	a	Rheinhessen	24,298	a
Pfalz	4.16	ab	Baden	66,404	ab	Nahe	26,475	a
Nahe	4.90	bc	Wuerttemberg	67,500	ab	Pfalz	29,471	ab
Wuerttemberg	5.29	bcd	Mosel	67,550	ab	Franken	30,491	abc
Franken	5.47	cd	Rheingau	70,220	ab	Wuerttemberg	31,329	abc
Mosel	6.20	de	Nahe	70,437	ab	Baden	31,505	abc
Baden	6.47	de	Rheinhessen	73,791	ab	Rheingau	35,538	bc
Rheingau	7.26	e	Pfalz	85,281	b	Mosel	37,909	c
Size Group	mean (€/L)	Tukey-B	**Size Group**	mean (€/wk*)	Tukey-B	**Size Group**	mean (€/ha)	Tukey-B
20ha+	4.25	a	0-5ha	49,767	a	10-20ha	28,261	a
10-20ha	4.43	a	5-10ha	59,279	a	20ha+	29,312	a
5-10ha	5.53	b	10-20ha	73,800	b	5-10ha	29,416	a
0-5ha	6.99	c	20ha+	92,270	c	0-5ha	38,905	b

*wk = worker

Table 12: Post-Hoc results for Profit per litre, Operational Result, ROA and ROE

	Profit per litre			Operational Result			ROA			ROE	
Region	mean (€/L)	Tukey-B	**Region**	mean (€/ha)	Tukey-B	**Region**	mean (%)	Tukey-B	**Region**	mean (%)	Tukey-B
Mosel	-0.03		Rheingau	19		Nahe	0.00		Franken	-0.04	a
Rheingau	0.02		Mosel	135		Franken	0.00		Nahe	-0.03	ab
Franken	0.07		Nahe	655		Baden	0.01		Rheingau	0.01	ab
Nahe	0.10		Franken	820		Mosel	0.01		Baden	0.01	ab
Baden	0.14		Baden	1,205		Rheingau	0.02		Mosel	0.01	ab
Wuerttemberg	0.24		Wuerttemberg	1,780		Wuerttemberg	0.02		Wuerttemberg	0.01	ab
Rheinhessen	0.24		Rheinhessen	1,972		Rheinhessen	0.04		Rheinhessen	0.03	ab
Pfalz	0.37		Pfalz	2,875		Pfalz	0.04		Pfalz	0.05	b
Size Group	mean (€/L)	Tukey-B	**Size Group**	mean (€/ha)	Tukey-B	**Size Group**	mean (%)	Tukey-B	**Size Group**	mean (%)	Tukey-B
0-5ha	-0.72	a	0-5ha	-4,584	a	0-5ha	-0.05	a	0-5ha	-0.07	a
5-10ha	-0.07	b	5-10ha	-445	b	5-10ha	-0.01	b	5-10ha	-0.04	a
10-20ha	0.34	c	10-20ha	2,552	c	10-20ha	0.04	c	10-20ha	0.03	b
20ha+	0.51	c	20ha+	4,053	c	20ha+	0.06	c	20ha+	0.08	b

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