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Geographical Indication (GI) in the wine industry: Does it matter?

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ABSTRACT

Despite the increasing competitiveness of South Africa's wine industry globally and the industry's outstanding number of geographical indications (GIs), the impact of these GIs on wine exports has not been assessed (and if it has been assessed such work is not publicly available or not seen by the authors). Understanding the impact of the GIs is critical in enhancing informed policy decisions towards securing more geographical indicators for wines and other products. In addition, the unearthed evidence may be the basis for more government interventions in support of the initiative while protecting the good reputation in communities where production occurs. Based on E-Bacchus database for GI, we use the gravity flow model framework to empirically analyse the effect of GI on South Africa's wine exports to the European Union (EU). Three proxies are used to capture the impact of GI. Results suggest that GI fosters South Africa's wine exports into the EU irrespective of the proxy used. With respect to the dummies, GI leads to an increase in South Africa's wine exports by about 170 percent (0.169, p<0.1). When the actual number of GI names was used, the estimated coefficient (0.007, p<0.1) also suggests that GI enhances wine exports into the EU by 0.7 percent. While using the difference between the number of GI names for South Africa and EU, findings show that GI is associated with 87 percent increase in wine exports. Conclusively, GI positively impact on South Africa's wine exports into the EU.

1.0 INTRODUCTION

The export performance of South Africa's wine industry has improved over the years, with over 50 percent of the wine produced destined for export market since the mid-2000s. The competitiveness of South Africa's wine industry has generally been assessed and findings suggest that a number of factors influence the industry's good performance. Identified factors (good or bad) include macroeconomic factors, market size, crime and theft, inefficient governance systems, inadequately educated workforce and infrastructure limitations, among others (Esterhuizen & Van Rooyen, 2006; Srivastava et al., 2006; Van Rooyen et al., 2011). The existing literature is, however, largely based on qualitative analytical methods such as the Porter's Diamond Approach, implying that findings of these studies do not quantitatively pin down the impact of the identified factors on the response variable (i.e. quantity of wine, value of wine traded, growth rates in wine trade). Furthermore, the role of Geographical Indication (GI) in international markets remains a silent feature in all the studies yet South Africa's wines globally exhibit an outstanding footprint in this domain.

Europe, which is South Africa's key export market for wines has a high level of protection for GI names of wines and spirits unlike other agricultural goods and these names are protected by the Alcohol and

Tobacco Tax and Trade Bureau (TTB) (Kuźnar, *n.d*). In terms of trade, GI is perceived as a strong policy tool through which commodities may become more profitable and competitive while preserving the unique characteristics of agricultural product(s) (Ponte & Ewert, 2009; Cusmano, et al., 2010; Dogan & Gokovali, 2012; Agostino & Trivieri, 2014). In addition, Rannekar (2004), Blakeney (2009), Bramley et al (2009), WIPO (2009), Belletti et al (2015) and Chabrol et al. (2015) argue that GI is at the forefront of enhancing local sustainable development while protecting indigenous knowledge. Biénabe and Marie-Vivien (2015) recognise the need for interdisciplinary empirical based analyses to better understand the GI concept, so that governments in the Southern countries may intervene. Thus, this paper provides the empirical analysis to fill this knowledge gap.

We undertake econometric analysis using panel data for 19 European Union (EU) importers while keep track of the various phases of growth identified by Van Rooyen et al. (2011) that South Africa's wine industry has gone through since 1996. First, the competitive phase (1996-2000). During this period, Van Rooyen et al. (2011) notes that South Africa's wine industry was tasked to produce internationally accepted "new world" wines, characterised by less tannins, non-grassy and fruity, among other attributes. During the same period, South Africa faced stiff competition from Australia which aggressively conquered the United Kingdom (UK), South Africa's major wine export market. In response to the competition, the industry embarked on using advanced innovations, hence giving rise to increased volume of wine exported. Between 2000 and 2005, South Africa become a key player in the wine industry globally, a phase hereafter referred to as the Phase of excellence.

During this phase, the industry embraced the Vision 2020 and set up the South African Wine and Brandy Company (SAWB) to coordinate industry activities. In addition, government partnership arrangements anchored on the Wine Industry Strategy Plan (WIP) were also initiated, among other developments. Many concepts aligned to the uniqueness of South Africa's wines came to light, and over 100 protected GI names of wines were registered. This phase witnessed the integration of modern lifestyles amongst the various wine stakeholders (Ndaga et al, 2010). The period post 2005 to present is referred to as the constrained competitive phase, which is characterised by a relative decline in the industry's competitiveness as compared to the performance of the industry in other competing countries. Esterhuizen and Van Rooyen (2006) and Van Rooyen et al. (2011) provide a detailed account of constraining factors the industry faces.

1.1 Geographical indication (GI) overview

Geographical indication (GI) is a generic term used to describe the various legal mechanisms used to protect geographical designators that inform consumers about the geographic origin of a product and the product's quality and characteristics (Hughes, 2016, Juma et al., 2016). In terms of intellectual property (IP)

rights, GI refers to the use of a particular name, which is usually derived from a geographical location, as being the exclusive right of producers who reside in that area (DTI, 2016a). Agricultural products typically have qualities that are influenced by specific local factors, such as climate and soil, which are unique and distinguishable from products produced elsewhere. Hence, GI labels are generally perceived as measures through which specific products may have access to niche markets of high value. Globally, there are 2885 names of the geographical indications for wines, broadly categorised as: protected designation of origin (PDO), name of origin and protected geographical indication (PGI). The category of PDO and name of origin are beyond the scope of this paper. According to the E-Bacchus[1], a database for the names of protected GIs and protected traditional terms, South Africa accounts for 35% of third countries involved in wine trade and slightly more than 5% of all countries worldwide.

The uniqueness of South Africa's wine producing areas and farms became legally protected after the establishment of a scheme entitled, "*Wine of Origin*" in 1972, through which wines made from vintage or specific cultivars was also protected. As presented in in Figure 1, the EU has 459 protected GI names, with Italy assuming the largest number (129).
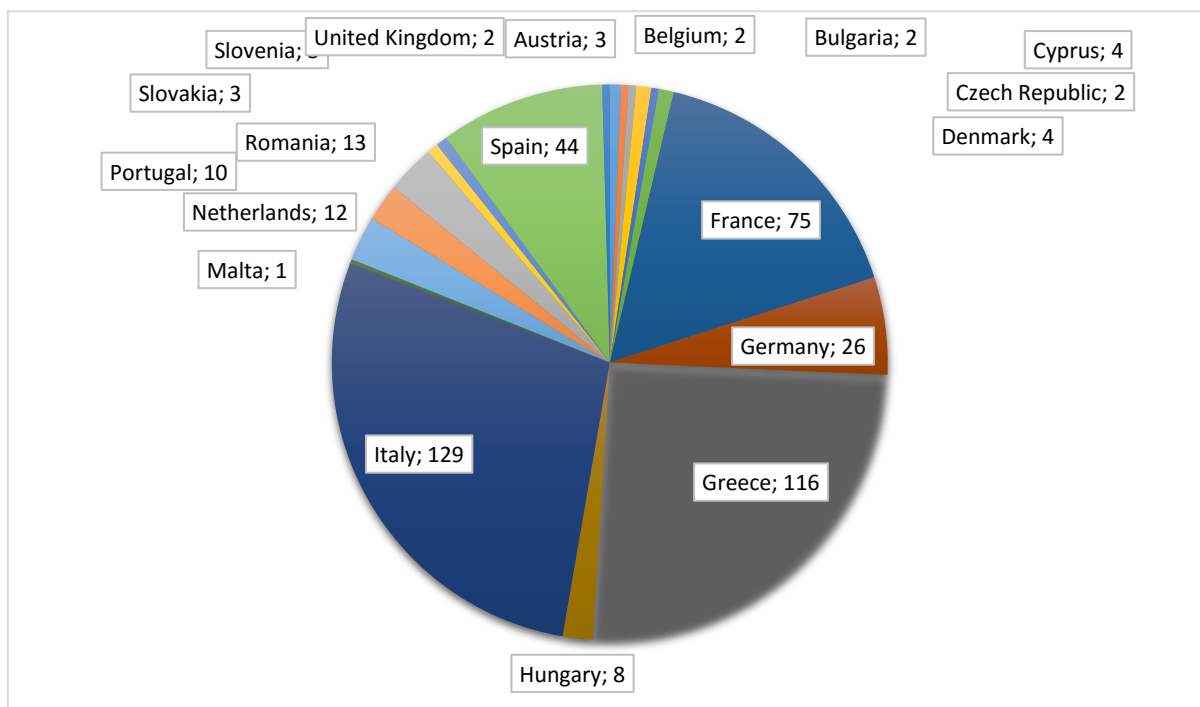
Source: Authors' calculation based on E-Bacchus database

Figure 1: Distribution of protected GI names among EU member states

For the third countries, there are 437 protected GI names in the wine industry wine, with South Africa accounting for 153 names. Table 1 shows the distribution of wine GI names by country while Appendix A provides a list of protected GI names of South Africa's wines.

Table 1: Distribution of wine GI names by country

Country	Number of wines with GI name	% share of all GI names
Albania	36	8.24
Australia	78	17.85
Bosnia and Herzegovina	7	1.60
Canada	7	1.60
Chile	61	13.96
Georgia	18	4.12
Montenegro	9	2.06
Republic of Moldova	2	0.46
Republic of Serbia	29	6.64
South Africa	153	35.01
Switzerland	37	8.47
Total	**437**	

 Source: Authors' calculation based on E-Bacchus database

1.2 Protecting GIs in South Africa and Europe

The conclusion of the Economic Partnership Agreement (EPA) between the SADC Group (Botswana, Lesotho, Mozambique, Namibia, Swaziland and South Africa) and the European Union (EU) on 15 July 2014 set a new precedent for the marketability of South Africa's trademarks abroad. The Department of Trade and Industry (DTI) (2016b) confirmed that both the European Union (EU) and South Africa (SA) have submitted the required notifications in regard to the protection of their respective Geographic Indication (GI) in accordance with Protocol 3 of the SADC-EU EPA. The protection covers more than 100 South African GIs, including wine, spirit and beers names as well as agricultural products, and 253 EU GIs. Geographic Indications form an important part of agricultural branding and are closely linked to national branding. GIs by their nature, are a tool of international trade. For this reason, affording protection to GI is a multi-

jurisdictional exercise. At the international level, protection of intellectual property is organised under a number of treaties.

South Africa is party to the following multilateral treaties in IP:
- Berne Convention for the Protection of Literary and Artistic Works (Berne Convention), since October 1928;
- Paris Convention for the Protection of Industrial Property (Paris Convention), since December 1947;
- World Intellectual Property Organisation (WIPO) Convention, since March 1975;
- The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), since January 1995;
- Budapest Treaty (Deposit of Micro-organisms), since December 1997;
- Patent Cooperation Treaty (PCT), since March 1999.

The TRIPS Agreement is overseen by the World Trade Organisation (WTO) and incorporates the substantive measures imposed by the Berne and Paris conventions while the rest are administered under the authority of WIPO.

While treaties provide an important tool for enforcement across borders, they do not in and of themselves ensure enforceable protection of GIs. Therefore, for those who make fraudulent use of such trademarks, prosecution has to be entrenched in the national law. Further complicating matters, is the issue of such fraudulent usage taking place in a potential export market. In that instance, it is not only necessary for the GI to be recognised in the jurisdiction it originates from, but also for the country where the infringement is happening to (*i*) recognise the use of international GIs, (*ii*) have legislation in place to impose a penalty. It is in this regard where the provisions of the EPA are of significance to the use of South African GIs in Europe and vice versa. At present, South Africa does not have specific legislation regarding the use of GI.[2] The protection of GIs is achieved through four main legislative measures, *viz*; The Trade Marks Act 194 of 1993, Liquor Products Act 60 of 1989, The Merchandise Marks Act 17 of 1941, and The Protection of Traditional Knowledge legislation (to a lesser extent)[3].

The South African Trade Marks Act allows for the registration of both "Certification Marks" and "Collective Marks". The certification mark is used to indicate that the goods are of a certain quality or geographic origin, and a collective mark is used to indicate that the producer belongs to the certifying organisation. The wine industry has applied the Liquor Products Act 60 of 1989 to protect wines based on historical geographic origin. The "wine of origin" concept is controlled and enforced by the Wines and Spirits Board which gives certification to producers according to the region from which their product originates. On 14

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[2] ibid.
[3] Intellectual Property Amendment Act 28 of 2013, Protection, Promotion, Development and Management of Indigenous Knowledge Systems Bill of 2015.

February 2014, a few months before concluding the EPA negotiations, the DTI gave notice of its intention to prohibit the use of the listed European food and drink GIs in terms of section 15 of the Merchandise Marks Act, not including alcoholic products, i.e. those seeking protection under the Liquor Products Act. The Traditional Knowledge legislation makes reference that GI can be registered as certification marks or collective marks under the Trade Marks Act.

The overall objective of the Merchandise Marks Act is to make provision concerning the marking of merchandise and of coverings in or with which merchandise is sold and the use of certain words and emblems in connection with business. Section 15 of the Merchandise Marks Act states that the Minister of Trade and Industry can prohibit either absolutely or conditionally, the use of any mark or word in connection with any trade or business. Thus, the use of the Merchandise Marks Act to prohibit the use of GIs is not peculiar in South Africa. Some of the proposed protected GI names will probably be registered under the Liquor Products Act 60 of 1989, or the Trade Marks Act of 1993, but government would still need to prohibit the use of some of the product names under section 15 of the Merchandise Marks Act. This is an inherent complex nature of South Africa's food laws, where several regulations and ministries have overlapping responsibilities[4].

In this regard, the developments in Europe, which has a longer history of GI protection, could prove informative. While free-riding, i.e. the fraudulent use of a protected GI name for the purpose of passing off a similar product as its region-specific equivalent, is a major problem, the other concern faced by those hoping to rely on GIs as a branding and competitiveness tool is the issue of quality. In Europe, the success of GIs, has been attributed to a combination of two complementary, specialised mechanisms of governance that reduce the cost of enforcement while simultaneously ensuring that characteristics are preserved and quality maintained (Barcala et al, 2013). Therefore, a solid institutional arrangement is very important. In Europe, quality standards as well as authentic use are monitored at the local level by reallocating the rights entrenched into GIs, which originally belonged to the state, to a domestic "first-line" governing body which sets quality specifications, performs quality controls and decides on membership.

The so-called "second-level" mechanism is charged with overseeing international enforcement and governs bilateral relationships among members. This also serves the purpose of ensuring quality to make it more difficult to pass off counterfeit products as the "real deal" so to speak. This is achieved by allowing members of the governing body to effectively co-brand, i.e. develop their own brand alongside the GI model, and implement valuable quality improvements above the minimum specifications while maintaining the residual claims of these improvements. These two mechanisms complement each other by aligning

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[4] n 4.

participants' incentives across the board. All parties are interested in being entitled to use GI membership to protect their interests. In contrast, South Africa, has no formal institutional arrangements. However, there is much scope for mobilising industry to apply its intrinsic knowledge in this regard. One impediment might be the provisions of the Competition Act 89 of 1998. It is advisable at this time to consider how IP protection and competition regulation overlap in South Africa and begin to consider how conflicts might be resolved.

1.3 South Africa's wine trade

In terms of wine trade, South Africa is a net exporter of wine, with about 63% of wine exports destined for the 27 EU member state. As illustrated in Table 2, the United Kingdom (UK) accounts for the largest share (20.1 percent) of South Africa's wine exports in the EU, followed by Germany (14.1 percent) and others.

Table 2: Top importers of South African wine in the EU

Importer	Trade indicator			
	2015 exports (US$ '000)	Share in South Africa's exports (%)	2015 quantity exported (Tons)	Unit value (USD/unit)
Total	734831	100		
EU 27 Aggregation	460680	62.7		
UK	147449	20.1	105512	1397
Germany	103701	14.1	84680	1225
Netherlands	50169	6.8	22040	2276
Sweden	48545	6.6	24737	1962
Denmark	31367	4.3	20063	1563
Belgium	22823	3.1	13105	1742
France	19285	2.6	25113	768
Finland	13859	1.9	6838	2027
Ireland	6855	0.9	2305	2974
Czech Republic	3667	0.5	3850	952

Source: (Trade Map database)

In relation to EU countries with protected wine GI names presented in Figure 1 earlier on, trade statistics seem to suggest that countries with more protected GI names import less of South Africa's wine. For instance, Italy which has the highest number of protected GI names (129) is a net exporter to South Africa. With the exception of 2009 and 2013, South Africa is a net importer of wine from Italy. Generally, EU states

with protected GI names import less of South Africa's in comparison with those that do not. However, affirmation of this school of thought requires empirical evidence.

2.0 Relevant literature review

Existing literature mainly focuses on the determinants of competitiveness of South Africa's wine industry (Esterhuizen & Van Rooyen, 2006; Van Rooyen et al., 2011). Other work, for example Ndaga et al (2009) epicentres on domestic consumption while Conningarth economists (2015) evaluated the macro-economic impact of the wine industry in South Africa. There is however very limited empirical analysis relating to impact evaluation on trade; with a complete lack of research insight on protected GI names for the wine industry in South Africa. Work by Biénabe and Marie-Vivien (2015) somehow identifies with our study but their focus was on Basmati and Rooibos.

The limited reviewed literature therefore focuses on studies from other countries. For example, Agostino and Trivieri (2014; 2016) used a dummy variable in a gravity model framework to assess the effect of GI on wine exports from major EU producers (France, Italy and Spain) over a 15 years' period (1995-2009). Their findings suggest that GIs foster higher exports values and volumes, especially towards high income export markets. Roselli et al (2016) used hedonic price model to analyse the effect of GIs among other factors on the pricing of olive oil in the United States. They found that GIs lead to higher prices, hence making the product more profitable. Curzi and Olper (2011) used firm level data to assess how quality influences the export behaviour of Italian food firms. Study findings reveal that products labelled 'Made in Italy' exhibit lower export intensity, particularly in developing countries. Thus, leading to a controversial conclusion that GIs do not necessarily enhance export competitiveness among Italian food firms.

3.0 METHODS

The gravity flow model analytical framework developed by Tinbergen (1962) and Poyhonen (1963) was used, based on panel data of South Africa's wine exports into the European Union (EU), spanning a period of 20 years (1996-2015). Only 19 EU member states[5] were considered in this paper given that they at least had one protected GI. We used the modified version of the Poisson model, that is, the negative binomial regression (NBR) to control for two estimation problems. Namely, zero trade flows and over-dispersion exhibited by the dependent variable (wine exports by value). The generic specified model was expressed as follows:

$$EXP_{kjt} = gi_{k/jt} + lnX_{1kt} + lnX_{1jt} + Z_{k/jt} + \varepsilon_{ijt}$$

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[5] EU states considered are Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Malta, Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, United Kingdom

Where subscripts *k*, *j*, and *t* denote South Africa (exporter), importing EU member state (*j* = 1, ..., 19), and year respectively. *ln* represents the natural log while *gi* represents the various scenarios used to capture the effect of GIs on wine exports as detailed in Table 3. Z is a vector of other variables included in the model. Detailed description of some of the variables is presented in Appendix B.

Table 3: Variables and data sources

Variable	Factor	Proxy used	Data source
EXP	Export performance	Value of South Africa's wine export (R)	DAFF (2017)
X_{1k} and X_{1j}	Market size for South Africa and the EU states	Real per capita GDP (Constant US$ 2010)	World Bank's Development Indicators (WBDI)
gi (X_{2k}, X_{2j} and lngi_{kj})	Geographical indicators for South Africa and the EU, respectively	Three proxies were used. *i)* A dummy variable (=1 if country had a GI name, =0 otherwise); *ii)* ii) the actual number of GI names, and *iii)* the natural log of the difference in the number of GI names between South Africa and EU states (lngi_{kj})	E-Bacchus database
X_{3k}	Production capacity	Quantity of wine produced by South Africa in litres	FAOSTAT database
X_{3j}	Production capacity	Quantity of wine produced by the EU in litres	FAOSTAT database
X_{4k}	Crime and theft	Property-related crime: actual reported cases and rates per 100,000 of the population	IRR (2016)
X_{5k}	Inefficient governance systems	Government Effectiveness: Estimate	World Bank's governance indicators
X_{6k}	Inadequately educated workforce	% share of the non-educated 15% or more of country's population	Barro-Lee's indicator
X_{7k}	Export promotion	Statutory levy expenditure on export promotion (2006-2015)	NAMC annual publications

X_{8k}	Investment in Agric sector	Percentage of arable land equipped for irrigation	FAOSTAT (2016)
X_{9j}	Protectionism by the EU	Total ad valorem equivalent tariff	MacMap & Wits databases
X_{10j}	Contiguity	Length of coastline EU state (Kms)	
X_{11k}	Trade facilitation	Time to export (days) by South Africa	WBDI
X_{12k}	South Africa's export capacity	Export capacity index, expressed as a proportion of South Africa's wine exports with respect to the world's wine exports divided by the share of South Africa's wine production with respect to what is produced globally.	FAOSTAT database & DAFF (2017)
X_{13kj}	Third country effect on trade	Multilateral trade resistance term	Computed based on WBDI data and distance between trading partners

Prior to the econometric analysis, diagnostic tests were carried out to ascertain the properties of the series. Diagnostic tests undertaken include Pearson's correlation test for multicollinearity, Kernel density function for normality and descriptive analysis to test for over-dispersion.

4.0 FINDINGS AND DISCUSSION

4.1 Diagnostic test results

Based on Pearson's correlation test results, variables exhibit no severe multicollinearity, hence they are appropriate for time series analysis. However, descriptive analysis results (Table 4, Appendix C) reveal that the variance of South Africa's wine exports by far exceeds the mean value in both time period considered in this paper (that is 1996-2005 and 2005-2015). This implies that data series for wine exports (dependent variable) exhibit the problem of over-dispersion, hence the Ordinary Least Squares (OLS) estimation technique could not be used. Moreover, the series were also not normally distributed as can be seen in Figure 3. This strongly affirmed why the NBR estimation technique was used.
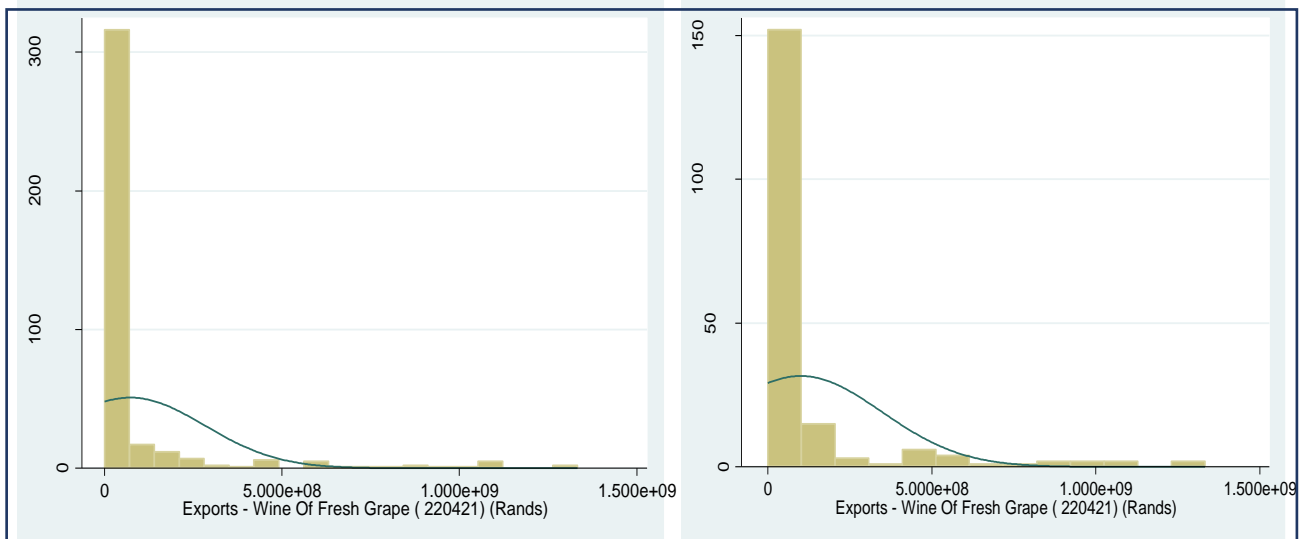
Figure 3 : Kernel's Density normality function for wine exports (R). Panel on left is for 1996-2015 period while the panel on right is for the 2005-2015 period.

Source: Authors' calculation

4.2 Empirical results

Results (Table 5) indicate that GIs play a fundamental role in fostering the export performance of the wine industry. This generally sends a signal that consumers value the information availed on the GI labels. Depending on the proxy used, the impact of GIs on the value of wine exports ranges between 0.7 percent (*number of GI names used*) to 169 percent (*difference in number of GI names used*). Since the dummy variables [*gi* (X_{2k}) and *gi* (X_{2j})] and the proxy based number of GI names were not transformed into natural logs, the estimated coefficients must not be interpreted as elasticities.

Table 5: The impact of protected GI names on South Africa's wine exports

Variable GI scenarios	Dummy (1996-2015)	Number of GI names (1996-2005)	Difference between the number of GI names for SA and EU (2005 -2015)
$\ln X_{1k}$	3.24 (4.37)	-0.57 (4.32)	6.79 (13.59)
$\ln X_{1j}$	2.23*** (0.13)	2.24*** (0.13)	2.34*** (0.15)
_gi_ (X_{2k})	**0.99* (0.56)**	**0.007* (0.004)**	-
_gi_ (X_{2j})	**-0.66*** (0.24)**	**-0.01*** (0.002)**	-
ln_gi_$_{kj}$	-	-	**0.87*** (0.11)**
$\ln X_{3k}$	0.76* (1.93)	0.72* (1.87)	-1.71 (6.12)
$\ln X_{3j}$	-6.51e-07***	-5.49e-07***	-6.00e-07***

	(4.11e-08)	(4.09e-08)	(3.64e-08)
$\ln X_{4k}$	2.76**	2.34**	1.19
	(1.14)	(1.13)	(2.16)
$\ln X_{5k}$	-0.23	-0.01	-0.02
	(1.78)	(1.65)	(1.53)
$\ln X_{6k}$	0.52	0.45	0.31
	(0.34)	(0.32)	(1.02)
$\ln X_{7k}$	-2.26e-08	-2.44e-08	-0.02
	(1.72e-08)	(1.59e-08)	(0.30)
$\ln X_{8k}$	6.56	8.59	-
	(6.34)	(5.97)	
$\ln X_{9j}$	-0.03	-0.03*	-
	(0.02)	(0.02)	
X_{10j}	-1.52e-05	3.39e-05*	-
	(2.75e-05)	(2.73e-05)	
$\ln X_{11k}$	-	-	-0.50
			(1.38)
$\ln X_{12k}$	-0.49	-0.40	0.58
	(0.61)	(0.58)	(0.73)
X_{13kt}	8.87***	7.76***	7.58***
	(0.60)	(0.42)	(0.39)
Constant	-98.8**	-65.46**	-47.69
	(40.34)	(37.63)	(54.49)
Observations	380	380	191
Wald chi^2	1562.48	1831.47	1783.10
Pseudo R^2	0.030	0.031	0.035
Log likelihood	-5829.98	-5824.95	-3175.80

*, **, *** denote levels of significance at 10 percent, 5 percent and 1 percent, respectively. In parentheses are robust standard errors.

Source: Authors' calculation

Following the transformation into percentage change in the value of wine exports[6], the statistically significant coefficients (0.99 and 0.007) of the non-logarithmic variable (*gi* (X_{2k})) for the geographical indication in the second and third columns imply that protecting of wine geographical names leads to 1.69 percent and 7.02 percent increase in the value of South Africa's wine exports, respectively. This positive trend was expected given that GIs are seen as marketing tools that differentiate related products based on quality attributes. In addition, protected wine GI names command higher prices given that some consumers may be interested in buying wine of a specific origin and quality attributes unlike the other standard wines. GI variables in this case are associated with the factors "*opportunities in "environmentally aware" markets of wine*" and "*quality production services and processes*" identified by Van Rooyen et al. (2011) as being among the most competitiveness enhancing factors in the industry. Furthermore, study findings concur with those by Malorgio et al (2008), WIPO (2009) and Agostino and Trivieri (2014; 2016). On the contrary, the EU's increasing number of protected wine GI names has a deterrent effect on South Africa's wine exports into the EU. This negative relation was also expected given that if the EU has more protected wine

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[6] The specified formula was used : *% change = {exp (coefficient) − 1}.*

GIs, it implies that their consumers will be in position to appreciate their own products, hence buy more of domestically produced wine than imports from South Africa.

When GIs were proxied as a difference between the number of GI names for SA and EU and the transformed into the logarithmic form (**lngi_{kj},**) the statistically positive coefficient (0.87) means that South Africa's having more protected wine GI names leads to about 90 percent increase in the value of wine exports to the EU. Therefore, the results generally support the notion that protected wine GI names are effective tools in enhancing the value of wine exports to the EU. Other factors that have a significantly positive impact on the value of South Africa's wine exports include; EU's market size (lnX_{1j}), South Africa's production capacity (lnX_{3k}) and the third country effect on trade (lnX_{13k}). The afore mentioned factors were also among the top five competitiveness enhancing factors identified by Esterhuizen and Van Rooyen (2006), and Van Rooyen et al. (2011). On the contrary, crime and theft was found to positively enhance the value of wine exports to the EU yet Esterhuizen and Van Rooyen (2006), and Van Rooyen et al. (2011) identify it as a key competitiveness constraining factor to the wine industry. This peculiar finding may be due to the large time span used (1996-2015) given that results based on a shorter time span (2005-2015, *fourth column*) suggest that the factor is insignificant.

5.0 CONCLUSION

In the modern globalised world, Geographical Indications (GIs) have become of both political and economic significance as marketing tools and drivers through which to attain rural development. They are perceived as a vehicle through which rural communities can penetrate into domestic and international markets to benefit from their cultural/natural identities while conserving indigenous knowledge. Following the increasing competitiveness of South Africa's wine industry in the international markets coupled with the fact that South Africa commands a large share of protected wine GI names among third countries, we analysed the impact of these GI names on South Africa's wine exports. Our analysis contributes to the better understanding of the role of GI to South Africa's wine industry. The analysis used panel data based on gravity flow model framework while taking into consideration of the zero trade flows and over-dispersion. Findings generally suggest that GIs boost the value of South Africa's wine exports into the EU. Notably, results vary considerably, ranging from 1.69 percent (minimum) to an 87 percent (maximum) depending on the proxy used.

Presence of more protected wine GI names in the EU has a deterrent effect on South Africa's exports into the EU. This is a crucial observation for South Africa's wine industry, implying that there is need to have more wines with protected GI names if there is hope in remaining competitive in the EU market. To add, given that South Africa's wines have a good reputation in the EU, among other international markets, there is need for the industry players to work towards implementing quality assurance policies so as to avail

consumers with the right information and discourage wine producers who may masquerade or misrepresent by providing wrong information. This will help to minimize the likelihood of opportunists, hence uphold the good reputation of South Africa's wines. The main limitation of our work lies in failure to isolate exports of wines with protected GI names from other standard wines. Secondly, from the EU, only one category of GIs (PGI) was considered in the analysis. Thus, further research is required to only focus on wine with protected GI names, and also to account for the protected designations of origin (PDO) in the EU. PDO is a subset of geographical indications (PGI) but with much more strict conditions as outlined under regulation no. 1151/2012 of the EU.

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Appendix A: Protected GI names of South Africa's wines

Boberg	Darling*	Overberg*	Swellendam
Breede River Valley	Douglas	Paarl*	Tulbagh*
Calitzdorp	Klein Karoo*	Robertson*	Tygerberg*
Cape Point	Lutzville Valley	Stellenbosch*	Worcester*
Coastal Region*	Olifants River*	Swartland*	

* denotes that the GI name is further differentiated into other specific names

Source: E-Bacchus database

Appendix B: Computation of selected variables

The natural log of the difference in the number of protected GI names between South Africa and EU states ($\ln gi_{kj}$) was computed as follows;

$$\ln gi_{kj} = \ln\left(X_{2k} - X_{2j}\right)$$

X_{2k} and X_{2j} represent the number of protected wine GI names by South Africa and each of the EU states respectively.

Multilateral trade resistance term (X_{13kt}) is a proxy for trade barriers South Africa encounters while trading with the EU. Computation of the proxy follows the framework proposed by Baier and Bergstrand (2009) and extended by Carrère et al. (2009).

$$X_{13kt} = \sum_{k}(X_{1kt}/X_{wt})\,lnD_{kj}$$

Where X_1 and X_w denote gross domestic product of South Africa and the World respectively, while lnD is the natural log of the distance in kilometres between economic centres of South Africa and each of the EU member states considered in this paper. The subscripts are as earlier described.

Appendix C: Diagnostic test results

    i)   Over-dispersion

Table 4: Descriptive analysis of exports - Wine of Fresh Grape (220421) (Rands)

Period	Observations	Mean	Std. Dev	Variance	Minimum	Maximum
1996-2015	380	7.27e+07	2.09e+08	4.37e+16	0	1.33e+09
2005 - 2015	191	1.00e+08	2.47e+08	6.12e+16	0	1.33e+09

Source: Authors' calculation