Doctoral School of Management

“COLLECTION OF THESES”

annexed to the Ph.D. dissertation of

Péter Gál

Factors determining wine prices in Hungary, especially regarding geographical indications

Supervisor:

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professor

Budapest, 2020

Department of Agricultural Economics and Rural Development

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Table of contents

1 Methods 4
1.1 A systematic literature review 4
1.2 Research questions 5
1.3 Hypothesises 6
1.4 Models 8
2 Results of the dissertation 11
2.1 Factors impacting wine prices on the Hungarian market 11
2.2 The role of geographic indications 12
3 Conclusions 14
4 Main references 19
5 List of the author's publications of the topic 21

1 Methods

The purpose of the dissertation was to reveal the factors influencing wine prices in the Hungarian market. The focus of my study is on the factors that resolve the information asymmetry between the sellers and the buyers (consumers) of wines, and how these elements explain the differences in prices between individual wines.

The history of winemaking and consumption goes back thousands of years (Lőrincz and Barócsi, 2010), and this tradition is deeply embedded in Western culture. However, from a scientific point of view, wine is not only a popular topic for consumption or production. According to Storchmann (2012), winemaking, wine and especially good wine, is first and foremost important for economists because of its large price differences, long ageing potential (during which it can also increase its value), the relationship between the price and vintage and the fact that its quality, being an experiential good, can only be assessed after it has been consumed.

In terms of its diversity, the world of wine stands out significantly from other sectors of agriculture. This variety also appears on the market, and it is not common that any agricultural product to be priced so differently by their producers or sellers.

1.1 A systematic literature review

In order to get a comprehensive overview of the empirical findings on wine price determinants, a broad online search was conducted using the following databases: Web of Science, Scopus, JSTOR, ProQuest and Science Direct. The combination of keywords “wine” “price” “determinant” were used – these search items had to appear in the title, abstract or keywords of the sources.

The initial search resulted in 756 findings, and after removing duplicates, 695 entries remained. In order to ensure that only relevant articles are included in the final analysis, Covidence online software was used. All articles were screened independently by each author, and possible conflicts were then discussed personally. In the end, 46 articles remained.

The systematic review of the literature on wine price determinants showed that five main factors impact wine prices: origin (geographical indications and country of origin), expert ratings, objective quality (chemical composition, the weather of the harvest year, and the age of the

wines), traditional labelling elements (grape variety, vintage year and individual brand) and other factors.

In the case of origin, most of the papers reviewed consider geographical indications, and some of them include country of origin. The results suggest that for GIs, most of the impact strongly depends on the actual geographical name rather than merely using any geographical indication, which implies the importance of collective reputation.

Expert ratings seem obvious to impact wine prices. Although the intuition proves to be right, major methodological problems arise with that factor, that is seldom dealt with correctly. Still, all the papers that study the relation of expert ratings (points) and prices revealed positive impact. However, adding character descriptions to the label may associate with lower prices.

Good weather conditions (rainfall before the growing period, low rains before the harvest), higher concentrations of chemical compounds and the age of wines seem to impact wine prices positively.

The three traditional labelling elements seem to have a role in wine prices as well. Wines made of different grape varieties sell at different prices. Harvest years that have a good reputation for the quality may have a severe impact on prices. Winery reputation (or individual brands) may be the reason for price variations between wines with the same GI from the same year and same varietal.

There are some other factors like organic production methods or qualification, macroeconomic cycles, or winery size that may impact wine prices, too.

1.2 Research questions

The research questions were:
MAIN QUESTION 1: What factors explain the differences in wine prices in the Hungarian wine market?
MAIN QUESTION 2: What internal and external factors explain the market value of Hungarian GIs in the Hungarian wine market?

Therefore, the study included two steps, one for each main question. In the first step, the aim was to reveal the factors influencing wine prices in the Hungarian market. The second step of the research intends to explore in detail the role of geographical indications.

1.3 Hypothesises

The hypothesises of the first step were:

H1.1 Certain geographical indications have a positive impact on the price.

This hypothesis lies on the assumption that *theoretically*, a geographical indication possesses certain added value on the market. This added value ensures that the producers use it despite the additional costs involved. In contrast, I expect some geographical indications not to have significant added value.

I assume this hypothesis does not stand up to scrutiny for any geographical indication. As literature showed, GIs are expected to have a positive price premium under certain conditions regarding the producer group (Carter, 2015), the interconnection of individual and group reputation (Patchell, 2008 or Castriota and Delmastro, 2012), the motivation for investing in quality (Fishman et al., 2018), consumer legibility (Tregear and Gorton, 2005). Each observed GI would get its own dummy variable, as the reference group would be the wines without geographical indication (so, in theory, the possibility of negative price premium exists).

Therefore, when examining this relationship, it is expedient to examine the impact of each GI one by one instead of grouping them.

Furthermore, the impact of labelling crus (parcels) should be assessed by adding a common dummy to the model for single vineyard wines.

H1.2 Good individual brands have a positive price premium.

Although individual brands are not the most important element for the Hungarian consumers, (Szolnoki and Totth, 2019), it is assumed that individual brands serve as an important factor in achieving price premium for wines. Hungarian producers often do not use consciously geographical indications and attribute far greater importance to the individual brands (which are usually the most prominent element on wine labels).

H1.3 The concentration of compounds would be positively linked to prices.

According to an alternative formulation of this hypothesis, in general, the more concentrated (or, the less diluted) a wine is, the higher its price may be. An evident cost reason supports this hypothesis: the production of more concentrated wines costs more. The question is whether this is present in the price or not.

H1.4 The age of the wine is positively related to the price.

I assume that the price of more mature wines is higher than that of younger Ones. The higher cost of production justifies this, but the consumers' belief that wines will only get better and better over time may have a more serious impact, too.

H1.5 The quantity (lot size) negatively impacts the price.

Obviously, the less the available quantity is, the more the price will be (because of various reasons such as lower selling pressure, higher average cost). From another point of view, the assumption is that wine makers are better off producing and selling higher priced wines in a smaller quantity (for reasons of quality control capacities etc.).

H1.6 Wines of fashionable varietals or the colour red cost more.

Colour and varietal names are commonly used for the differentiation, the explanation or the marketing of wines. Therefore, I assume that wines of fashionable varietals (e.g. international red varieties) and colours (red) tend to cost more than other wines.

Given their policy relevance, the second step aims to reveal the factors influencing the performance of geographical indications on the market by testing the following hypothesises:

H2.1 The market value of a GI linked to a homogenous producer community is high.

The more homogenous the group of producers is, the easier the collective action is; hence, higher prices and revenues can be reached. As geographical indications are of a collective nature, their management requires high quality collective action. Group homogeneity is an important issue of collective action (Carter, 2015; Evans and Guinnane, 2007, Olson, 1965).

H2.2 The stricter the rules of using a GI, the higher its market value will be.

GIs, by theory and the assumption of the lawmaker, signal distinctive product quality. Thus, the wine quality (e.g. quality standards or rules on organoleptic characteristics) set in the product specification shall be easily and meaningfully differentiated. The stricter (the more defined) are the rules on the use of a GI, the more specific the quality of the wines bearing it will be. It is clear from the theoretical background described above that the use of GIs, in this case, reduces information asymmetry much more, and the smaller the information asymmetry, the more likely it is that a quality surplus will be realised at the price of the product.

H2.3 The higher the barriers to entry are, the higher the market value is.

Barriers to entry hinder new competitors to enter the market and contribute to higher prices by lowering the amount of supply and the level of competition. In case of geographical indications, the most effective barrier is the delimitation of the production area. Determining such an area is theoretically based on viti-vinicultural factors such as (micro-)climate or soil. However, from an economic point of view, it serves as an effective entry barrier as a newcomer may not use the geographical name for products originating or produced outside the delimited area.

H2.4 The better the geographic area of a GI is, the higher the market value will be.

As place of origin is an important factor of wine quality, it is obvious that the better the delimited area is, the higher the quality level will be, which is assumed to impact the market value.

1.4 Models

In the first step of the study, several hedonic price indices were specified (as it is applied in the literature presented), which may be described as follows:

$$\ln P = \beta_0 + \beta_i * GI_i + \beta_1 * SV + \beta_j * IB_j + \beta_2 * SFE + \beta_3 * SUGAR * WHITE + \beta_4 * SUGAR * NONWHITE + \beta_5 * AGE + \beta_6 * \ln Q + \beta_k * CW_k + \varepsilon$$

where:

P: price

GI_i: GI dummies,

SV: dummy for single-vineyard wines,

IB_j: individual brand dummies,

SFE: concentration of sugar-free extract,

SUGAR: sugar content,

WHITE: white wine dummy,

NONWHITE: dummy for rosé or red wines,

AGE: age of the wine,

Q: lot size,

CW_k: colour and varietal dummies.

Hedonic price index is an obvious method to assess the factors impacting wine prices. Rosen's (1974) model regards goods as an aggregate of their characteristics. Therefore, differences in

prices reflect differences in the set of features. These models are often applied in the literature of wine economics, however, as Unwin (1999) denotes, the execution of the methodology is usually not flawless as competition is not perfect on wine markets, model specification is rather data-driven, and multicollinearity distorts significance levels. On the other hand, Thrane (2004) advocates that hedonic price indices are meaningful if econometric methods are well applied and results are interpreted in a good manner. Hedonic price indices are not intended to estimate consumer behaviour, but are basically supply-oriented, that is, how some supply side characteristics impact prices.

Several models were applied because of two main factors. First, certain geographical indications are segmented into two or three quality levels using additional terms to the name itself (e.g. Eger Superior or Villány Prémium). To deal with this phenomenon, two different approaches were applied: (A) these geographical indications were treated as one single name or (B) two or three separate names (depending on the actual number of quality levels). Moreover, as heteroskedasticity occurred, (1) robust standard error models were used instead of ordinary least squares models (White, 1980). Furthermore, (2) quantile regressions were also run (for the first decile, the first quartile, median, the third quartile and the ninth decile). There are two advantages of using quantile regression models in this case: tackling heteroskedasticity (as suggested by Di Vita et al, 2015) and the distortion of averages by outliers.

In order to provide an alternative approach of the analysis of determinants of wine prices, Partial Least Squares (PLS), a relatively new methodology for estimating Latent Variable Path Models (LVPLS) was used in the first step.

As the number of GIs observed is obviously limited, the methodologic room for manoeuvre is majorly restricted in the second step. Even multiple OLS regression analysis including all variables would face substantial methodological obstacles, as the thumb rule suggests including 10-20 observations per estimated parameter (Harrel [2015 p.72-73] describes 15 observations per parameter as “a good average requirement”).

Therefore, the study used simple solutions, as even the scope of multivariate regression was limited.

First, restricted models are estimated to test each hypothesis separately. Then, as group heterogeneity and yield are not assumed to be independent of each other, extended models including yield, barriers to entry and the quality of the geographic area are estimated:

$$MV = \beta_0 + \beta_1 * YIELD + \beta_2 * BE + \beta_3 * LANDQUAL + \varepsilon$$

where:

MV: market value of the GI, measured by the ln of mean price and the price premia estimated in the first step

YIELD: maximal yield for using the GI

BE: barrier to entry, the percentage of the area covered by authorised varietals compared to the whole size of the delimited area

LANDQUAL: land quality, average cadastral points of the delimited area

2 Results of the dissertation

The study aimed to reveal the determinants of wine prices on the Hungarian off-trade market with a particular focus on geographical indications.

2.1 Factors impacting wine prices on the Hungarian market

In the first step of the study, six hypothesises were developed regarding the price determinants:

1. Certain (but not all) geographical indications have a positive impact on the price.
2. Good individual brands have a positive price premium.
3. The concentration of compounds is positively linked to prices.
4. The age of the wine is positively related to the price.
5. The quantity (lot size) negatively impacts the price.
6. Wines of fashionable varietals or the colour red cost more.

The first five hypothesises were accepted as all results confirmed them, and the sixth hypothesis was partially accepted.

The study confirmed that the use of geographical indications may allow producers to achieve a price premium, hence can be a vehicle of maintaining the presence of traditional quality products in the market despite the potential higher costs. Thus, GIs may be incentives for investment to quality. The high variance of the estimated price premia prove that it is not the use of any GI in general which generates higher prices, but there are rather some geographical indications with higher, some with lower, some without and some even with a negative price premium. This highlights the importance of the factors explaining the market value of GIs detailed in the second step of the research.

The study showed that – considering wine prices – a positive return on investment in quality on the Hungarian wine market is possible at the individual level as well.

Wines of good individual brands cost significantly more on the off-trade market, the price premia that can be achieved is well above the average GI price premium even in the case of Tier2 wineries.

The increase of concentration of the wine (or, in other words, selling less water packaged in a wine bottle) means higher prices. Sugar content has a contradictory impact on the price, depending on the colour; white wines with more (rather residual) sugar content cost more, while rosés and reds with more (rather added) sugar cost less. However, this is in line with the

assumptions regarding quality, and the heterogeneity of wines as residual sugar content means riper grapes, and sweetening means uniform flavours. Ageing is also an individual effort to raise quality (in the case of certain types of wine), and the analysis of prices showed that it may pay off as well.

The quantity marketed impacts the price in a negative way, suggesting that not only it is harder to sell wines higher-priced wines in large lots, but vice-versa, expensive wines shall be released to the market in limited volume.

Intuition suggested that a large extent of the differences in wine prices may be attributed to varietal composition. The results showed, that if considered alone, the effect of the grape variety is statistically significant on prices. Nevertheless, the complex models proved the contrary, as in reality, some other factors explain the differences in wine prices that seemed to be caused by varietal composition. Based on the results, the market importance of grape varieties apparently does not include their impact on the price.

The models also suggest that wines with a low concentration of extracts and significant levels of sugar content (i.e. semi-sweet) are sold in the lower segment of the market, characterised by fierce competition. Here, batches must be larger for the sake of efficiency and the concentration of chemical compounds are low for lower costs. Meanwhile, the higher end of the market shows the signs of monopolistic competition with product differentiation, higher quality level, higher prices and smaller batches.

2.2 The role of geographic indications

Given their policy relevance, the second step of the study aimed to reveal the factors influencing the market value of geographical indications. Four hypothesises were developed:

1. The market value of a GI linked to a homogenous producer community is high.
2. The stricter the rules of using a GI, the higher its value will be.
3. The higher the barriers to entry are, the higher the market value is.
4. The better the geographic area of a GI is, the higher the market value will be.

The estimations of the second step confirmed all hypothesises and showed that local rules on using a GI and the structure of the producers are interdependent.

The analysis underlined the role of collective action as the more homogenous a producer group is, the more likely they behave and think similarly about the geographical indication(s) they

use. This draws attention to a new dimension of the positioning of new GIs or repositioning existing ones. To have a meaningful differentiation, a GI shall reflect on special product quality. This can be attained more easily if the quantity of products labelled with the same GI does not vary by group members on a large scale.

The role of delimited production area is an essential issue in case of GIs regarding the link between origin and the quality of the final product. The actual size and quality of the production area is an important policy tool as it serves as a barrier to entry into the market. Thus, all initiatives on the enlargement of the production area shall be treated with particular caution.

The valuable information on GI products is not that they are generally special in some mystical way – it is *why* they are special. A well-functioning GI shall bear this information and market organisation policies shall reflect that.

3 Conclusions[1]

The results suggest that the Hungarian wine market can be divided into two segments by the supply side. Wines with a higher concentration of compounds (sugar-free extract) are made in lower quantities and sold at higher prices. At the other end of the market, larger batches are produced of wines with low concentration of compounds and sold at a lower price. Given higher sugar levels are typically a result of sweetening in rosés and reds rather than the use of overripe grapes (which is more typical to whites, especially Tokaj wines) whose must does not ferment completely. Thus, the ambiguous relationship of sugar content and price is entirely in line with theory suggesting that homogenous wines shall be produced in large quantities and sold at an average price.

The models also suggest that wines with a low concentration of compounds (and possibly sweetened) are sold in the lower segment of the market, characterised by fierce competition. Here, batches must be larger for the sake of efficiency and the concentration of chemical compounds are low for lower costs. Meanwhile, the higher end of the market shows the signs of monopolistic competition with product differentiation, higher quality level, higher prices and smaller batches.

The place of origin has always been an essential factor of the wine market and labelling geographical names on wines has a long tradition. As the origin is the key of the real, non-reproducible uniqueness of wines, it may be a profitable strategy for wineries of a wine producing country with versatile and good production zones to produce wines that carry characteristics related to their geographical origin.

The results suggest that theoretical price-increasing role of GIs manifests in two ways in the Hungarian off-trade wine market. GI use in general (i.e. the use of *any* GI) primarily shows its impacts in the lower price segments, and as the price of wines increases, the differences between the GIs becomes more prominent.

Thus, investing in quality and common branding may have different (decreasing) probabilities of positive returns. Geographical indications with a positive mark-up in higher market segments include, in particular, names of small geographic areas or with rigorous local regulations. In the absence of these, the price premium for even the more famous (e.g. Szekszárd) will run out in

[1] The dissertation, this paper and in particular this section, contains the author's analysis and conclusions based on scientific results, which may confirm, substantiate, but do not bind the author's position on the topic published or transmitted on other platforms for other purposes.

the higher segments. All in all, it can be concluded, that an investment to quality, and therefore, stricter rules are needed to increase price premia.

The above seems to be proved interestingly by certain GI regulations, which can hardly be called simple, and are segmented into several quality levels using additional terms to the name itself. On the other hand, the present research confirms that these systems function well and apparently achieve their goal.

The different models showed that in the middle price segment, the price premia of 25-40% of the GIs examined are not significant statistically. This fact raises serious questions about the worth of the use of these names. If they are willingly branded as low-segmented collective brands (such as the PGI Duna-Tisza közi), this is a positive phenomenon as they are fulfilling their role; they distinguish the low-priced products of the community from the more expensive ones. However, this group also contains GIs, where, based on their estimated market position, the returns of the cost of using the name are questionable.

Based on the results of the models described in the dissertation, we can find a total of six designations of origin (all of them are names of wine distrcits and they represent almost the third of the 21 PDOs examined of this kind) with a worse market position than the name of the given wine region (regardless of whether they are PDOs or PGIs). There are three other PDOs where the market position can be considered the same as that of the regional GI. In these cases, there are few arguments in favour of using the name of the wine district instead of the better positioned, possibly better known, or better sounding name of the wine region.

All in all, instead of the PDO/PGI dichotomy, the segmentation of the wine market in Hungary from the point of view of origin shall be based on the added value of GIs.

The results suggest that the lower and the higher end of the wine market shall be treated in a different regulatory manner, and therefore, the control of wine products shall be adjusted to their market situation. Wines sold at larger quantities (and lower prices) shall be controlled on the spot instead of the strict and time-consuming ex-ante control process before their release to the market. On the other hand, wines sold in low quantities and at higher prices (often using GIs or individual terms benefitting of a good reputation) shall be controlled rigorously before entering the market (including strict organoleptic tests).

Geographical indications are of particular importance for the regulation of the wine market, as the Member States have a room of manoeuvre in the single European market practically only in this field, but only indirectly, by shaping the framework. GIs are a quite regulated field of

the sector. On the one hand, a large amount these regulations are created by the local communities (mainly specific rules), on the other hand, some vital framework legislation exists, provided by the EU or national governments. This study highlights the vital role of producers' communities in the market success of geographical indications. Thus, policies aimed at empowering and strengthening these communities may result in more valuable GIs as well.

One of the most important lessons of this research on GIs is that wine market policies (such as horizontal rules on GI systems) shall make the differences in quality rules more transparent. A classification of GIs by easy-to-understand quality standards (based on simple indicators of grape and wine quality) may serve as a useful tool. This means that even though GIs shall be treated equally in terms of legal protection, from a marketing or market organisation point of view, different policy approaches shall aim them.

Based on the above, a GI policy works well if it encourages producer communities to decide on the exact market positioning of the GIs they manage and promotes relevant distinction. Given the possibly conflicting interests, especially in the case of existing names, multilevel systems such as Villány and Eger can be a realistically possible compromise solution. Still, the volume placed on the market is so low in the case of so many not positioned GIs that we can talk about bad habits rather than real differences of interest.

Given the vital role of producer communities, difficulties of direct regulatory intervention, and positive research results on regional and national hierarchical systems, the creation of a general framework well-reflecting their market position would serve as the optimal policy option to facilitate the market role and value-adding function of GIs. In other words, as the current designation of origin / geographical indication dichotomy does not really mean a substantial distinction between GIs, I consider it appropriate to create new categories of geographical indications that rely heavily on price and market positioning. Such a system, in addition to leaving the decision-making freedom of the producer communities, facilitates the market prevalence of the geographical indications concerned by providing a framework regulation for each category. This way, geographical indications with higher and lower (possibly negative) implicit prices could be better distinguished. Moreover, the law could set more precise general quality thresholds, and the messages of the various community wine marketing programs would become more credible.

Producers tend to position their single vineyard wines high, which is reflected in the relatively high shadow price of vineyard names on the label. Therefore, it seems to be worth to introduce special regulation on the use of these names as well.

In the light of the above, I propose splitting both PDOs and PGIs into categories of high and low implicit prices. An important principle arising from respect for the free choice of producer communities and avoiding forced decisions is that the new categories shall be the ones that are positioned higher and therefore have stricter rules.

The regulatory framework for the new categories shall pursue to set an appropriate minimum quality level. In order to maintain credibility, comprehensive quality control is needed for these categories, based on rigorous and consistent sensory evaluation (including wine style), which is the most effective way to control the end product. In these categories, for reasons of quality, it is appropriate to establish stricter rules than the existing ones[2] for the quality of the grapes. On the other hand, it is not justified to tighten up the framework for existing categories ("védett eredetű" and "tájbor") and, in some cases, it is possible to relax them (for example, by rethinking controls prior marketing and speeding up the process).

Table 1

Placing existing and potential new GIs in the proposed framework

		EU GI category	
		PDO	**PGI**
market positioning	**high**	names of units smaller than wine districts*, names of certain wine districts*, higher quality tiers of names of wine districts	names of wine regions*
	low or ignored	names of certain wine districts*, lower quality tiers of names of wine districts	names of very large units, other names

*according to the choice of the relevant producer group in the case of existing names

Source: Own composition

As shown in Table 44, the proposed new system is based on the realities of the wine market described by this study, therefore it is based on the existing and functioning solution for PDOs Eger and Villány, which surmounts conflicting interests by introducing several classification levels.

Additional features of the proposed new framework:

- a principle for the orderly presentation of the diverse Hungarian wine origins,
- additional basis for examining applications for protection of new, non-existent geographical indications.

[2] see Art. 13/A of law No. XVIII of 2004 on grape-growing and wine management

Suggesting new names for the new categories lays out of the scope of my study, as it may require consideration of some aspects not addressed here. In this respect, it is worth relying on European examples (for example: Austria – DAC / qualitätswein, Italy – DOCG / DOC) or the wine communication pyramid developed by the Hungarian Tourism Agency (MTÜ, 2017).

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Law No. XVIII of 2004 on grape-growing and wine management (Hungary)

5 List of the author's publications of the topic

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Gál, P. (2017): Factors influencing the success of geographical indications. Presentation and paper at Enometrics XXIV in Bologna, Italy

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Gál, P., Martinovich L., Molnár E. A., Mikesy G., Polgár J., Mishiro M., Katona Z. (2014): The Hungarian system of geographical indications and the preparation of product specifications. Presentation at the: Xth International Terroir Congress 2014 in Tokaj-Eger, Hungary

Gál, P. (2017): How can geographical indications influence wine prices? Estimating price premiums for Hungarian geographical indications Presentation at the 11th Annual AAWE Conference in Padua, Italy

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Conference poster with paper

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Conference poster

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