

Bulgarian Wine Market: Hedonic Analysis of Wine Quality and Reputation Effects during Transition

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Abstract: In this paper we analyse the impact of the restructuring on the wine system in Bulgaria and we develop a hedonic pricing model for estimation of wine quality, regional and varietal reputation effects in Bulgarian wine market. We show that wine quality has significant and positive impact on wine prices. Red wines of local varieties, namely Gamza, are with diminishing significance and importance, while white wines from local varieties (in our case Misket) increase their image in consumers' tastes and preferences. Our results reveal that there is significant regional reputation on the market and wines are sold with significant price discounts compared to Svishtov Cabernet Sauvignon wines. With time, price discounts are rapidly diminishing for white wines and increasing for red wines, and regional reputations are losing significance, with an increase in the coefficients. We show that Bulgarian wine market is segmented and when estimating the impact of regional reputation on wine prices, and respectively on consumers' willingness to pay, the differences in the both segments - red wine market and white wine market - should be taken into account in order more accurately the effect of different factors on retail wine market prices and consumers' behaviour to be captured.

JEL classification: C50, D12, D40, P31, Q13

Key words: hedonic pricing, wine quality, regional reputation, varietal reputation, wine market, restructuring, transition, Bulgaria

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1. Introduction

Bulgaria is one of the most important wine producers and wine exporters of the former communist countries. In 1989, the country's wine production was around 15% of Eastern Europe's wine output¹, but its wine export was accounting for 34% of Eastern Europe's wine export in volume and 48% of Eastern Europe's wine export in value. Transition changes in Bulgaria had a tremendous impact on the wine industry and wine market. Ten years later, Bulgarian wine production is with 43% less than the pre-reform level and in 2000 accounts to some 130,0 mln. liters². Wine grape vineyards are reduced with 25% and export in value is 60% of the pre-reform level (126,6 mln. USD in 1999; see figures 1 and 8)³. However, unit value of wine exports, and especially of wine imports, are increasing after 1994. Consumption of wine per capita has declined significantly, and in 1999 is only 39.6% of the pre-reform level.

All these immense changes in the wine system raised several important questions related with the future of the industry. The issues of wine quality, as well as the wine processors' policies towards consumers, appear to be the most important amongst them. Different ownership structures caused changes in regional differentiation and development and further enhanced changes in the quality of the wine output. Combined with the expected investments in processing facilities after the end of the privatisation in the sector, establishment of new wineries and vineyards, consumers' perceptions and willingness to pay for certain brands of wines originating from certain regions become the most important investment decisions' determinant. Hence the importance of the effect of wine quality, regional and varietal reputations on the consumers' willingness to pay for wines sold on the domestic market and their impact on wine market prices.

In this paper we develop a hedonic pricing model for the Bulgarian wine market and show the impact of wine quality, regional and varietal reputation on wine prices. We display that the Bulgarian wine market is fragmented and when estimating reputation effects

¹ Former Soviet Union (FSU) is excluded.

² Home-made production is not included.

³ For analysis of the developments in wine systems, policy and trade in the Central and Eastern Europe and FSU see Noev and Swinnen (2002).

on wine prices, this fragmentation (the market of white wines as distinct from the market of red wines) should be taken into account.

The paper is organised as follows: We first discuss the impact of the economic, structural and institutional reforms in Bulgaria on the wine consumption pattern. Then we describe the regional development in terms of wine output and variety differentiation as well as changes in the vine-area and wine grape yields. Section four presents our model and the data that we use. After the analysis of the econometric results in section five, we study the market fragmentation of Bulgarian wine market. Section seven concludes the paper.

2. Consumption pattern

Important changes in wine consumption have taken place in Bulgaria during transition. Consumption fell sharply after the start of the reforms with declining real incomes and continue to fall most of the 1988-1999 period (figure 2 and table 2), together with decline in GDP (Noev and Swinnen, 2002). However, Bulgarian wine consumption pattern differs significantly compared to the pattern followed by other transition countries and Russia (figure 2).

Home made wines account for more than half of the Bulgarian wine output, and in 2000 their share is almost 60% (table 8). The importance of home-made wine increased during transition due to increased number of subsistence households, land fragmentation, decline in real incomes as well as the slowly implemented economic reforms. Per capita consumption of purchased wine continue to decline, and from 16.4 liters in 1989 it reached some 6.5 liters in 1999 (table 2). Contrary to the processes in other transition economies, wine consumption in Bulgaria has not been replaced in the beginning of the reforms by consumption of strong alcohol and beer, which also declined throughout the first eight years of the transition period. Only after the economic crisis in 1996/97, consumer's preferences shifted towards beer. Imposed excise duties further increased the price of wines, which combined with the decline in incomes and the low purchase power of the population, enhanced the substitution process.

The strong income elasticity of wine consumption even in transition countries with a tradition of wine consumption, such as Bulgaria, can be seen from the data in table 3, which show that per capita wine consumption in the highest income group is almost twice the average, and more than five times than in the lowest group - although also these numbers

should be interpreted with care given the large amount of home wine production in Bulgaria (Noev and Swinnen, 2002).

3. Regional Description

Vineyard area

Hugely fragmented land ownership and significant reduction in the size of wine grape vineyards characterised the transition of wine system in Bulgaria. Total wine vineyard area declined which was strongly caused by negative price developments (Noev and Swinnen, 2002; see figure 3). Figures 4 and 5 present the development of wine grape vineyards in the North regions versus the South regions of the country. They suggest that important differences emerged between both parts of the country. While the decline in the wine grape vineyards in the North regions is higher than the average for the country, the reduction of the vineyards in the South regions is less than the average level. Moreover, the decline has been halted more or less in the South in 1994, while the negative trend in the North part continued until 1996, with exception of the region of Russe, where increase in wine grape vineyards started in 1995.

Wine grape yields

The impact of the reforms can be seen more significantly from the moving averages of the wine grape yields in figures 6 and 7. They show diverging patterns within the country. Yields in the South regions were more strongly affected by the economic, structural and institutional reforms⁴. However, total decline in the yields since 1996 indicates that major disturbances has appeared in the wine sector. This is to great extent positively correlated with the enhancing of land restitution⁵ and wine industry restructuring⁶, and with the major economic crisis in 1996/97.

⁴ On average, yields in the South regions are higher than those in the North part of the country due to the climate conditions. As a consequence, they are usually higher than the average yields for the country.

⁵ Land restitution ended in 2000.

⁶ Different privatisation procedures and approaches have been applied in Bulgarian wine industry. The most used were the managerial buy-outs, together with the mass privatisation process. Foreign direct investments are rare (Vinprom Russe, Vinprom Popovo). Production co-operatives are also taking part in wine production, the most significant example being LVK "Gamza" Suhindol.

Farm ownership structure

Bulgarian wine grape growers in 2000 amounted to some 23,000, with wine processors going beyond the number of 130, of which around 50 of large-scale size. According to official data, individual farmers dominate the downstream sector. Their total share is 87%, and they cultivate 76% of all vineyards in the country (tables 4 and 5). Wine-grape production co-operatives are considerably less and are mostly presented in the East (7%) and South (6%) regions, although they cultivate respectively 32% and 20% of the vineyards there⁷. This differs from the grape farms' ownership structure in the South-West region where 99% of the vineyards are cultivated by individual farmers. Other business units growing grapes, different than individual farms and co-operatives, are still with small share (table 5) and cultivate insignificant part of the vineyards (table 4).

Wine grape varieties

Different wine grape varieties are grown in Bulgaria, with red wine varieties having the largest share (52% from all vineyards), followed by the white wine varieties (32%) and table grapes (9%). About 18 red wine grape vineyards cover 63% of the wine grape area in Bulgaria, while the rest 47% belong to some 25 white wine grape varieties. From the red varieties, dominant share has the variety Pamid (35.4%), followed by Merlot (17.5%) and Cabernet Sauvignon (16.3%). Three white grape varieties - Rkatziteli, Dimiat and Misket - are grown on more than 60% of the white wine grape area.

The South region accounts for more than 45% of all red wine grape vineyards in the country (36,583 ha), with 46% more than in the North region (table 6). On the contrary, 42% of the white wine grapes are concentrated in the East region. In the South-West region are only 7.5% of all wine vineyards, but 97.7% (9,248 ha) of them are red varieties, with 51.4% (4,756 ha) from the variety "Shiroka Melnishka Loza".

⁷ Bulgaria is divided by the Ministry of Agriculture and Forestry (MAF) into 4 main viticulture regions - North, East, South and South-West. The National Vine and Wine Chamber divides the country into 5 regions (Sub-Balkan region appears distinctly from the South region), four of them with the same name as the aforementioned classification of the MAF, but covering different territory. Additionally, the National Statistical Institute uses the administrative division of the country when collecting and publishing data. All these differences create difficulties in analysing data, and sometimes make it impossible. In our analysis we use the division of the MAF.

Wine output

In 2000, the South region remains the largest producer of wine (about 507,000 hl), significantly more than the wine produced in the East (400,000 hl) and in the North regions (333,000 hl)⁸. More than a half of the red quality⁹ and table wines are produced in the South region, while 66% of the quality white wines are produced in the East region (table 7). The North region has the most diversified wine output structure, and including the home produced wine, it holds the largest share (35%) of the produced wine among all wine regions. However, and most importantly, quality wines present only small part of the wine production. Table 8 shows that only one third (31.8%) of the production of red wines in the South region are quality wines, while for the East (19.7%) and North regions (10.2%), and especially the South-West region (5.2%) the numbers are considerably low. On average, for the country, only one fifth of the red wines are quality wines. More or less the same is the situation with the white quality wines, which represent only 29% of the white wines produced in the East region, and only 17% of the white wines produced in the North region.

4. Hedonic pricing model for Bulgarian wine market

Ridker and Henning (1967) considers a good as comprised of a vector of attributes that could be unequally defined by that vector of attributes. Implicit in the price paid for the good is a price paid for each of these attributes at the level observed. If a good's price can be assumed to be determined within a single competitive market, variations in market price associated with changes in the level of a particular attribute can be inferred to describe the value added implicitly by increments or decrements to that attribute (O'Neill and Philips, 1999). The techniques to infer valuations by using market prices which reflect a range of different criteria are known as hedonic pricing techniques.

Hedonic regressions estimate the locus of intersections of the demand curves of different consumers with varying tastes and the supply functions of different firms with possibly varying technologies of production (Griliches, 1990). They could be viewed as an "approximation" to the true value of consumer welfare (Triplett, 1990). Difficulties in

⁸ Home-made wine (column 4 in table 7), which according to official data accounts to some 1,8 millions hl or 60% of all produced wine in the country, is excluded.

⁹ According to the legislation, there are two categories of wines: quality and table wines. Quality wines are those wines that are produced from grapes originating from officially determined viticulture region, micro region, or vineyard.

interpreting hedonic methods could arise from a situations where there are only discrete numbers of goods, so that consumers are not optimising in a marginal fashion over the choice of characteristics (Feenstra, 1995). Other factors, like the role of transactions costs, possible market segmentation in limiting competition, and the extent to which consumers can be assumed to be fully informed with respect to the number of attributes to be considered in relation to a certain good, could provide grounds for questioning the reliability of estimates, as noticed also by O'Neill and Philips, 1999.

Many studies¹⁰ (Shapiro, 1983; Golan and Shalit, 1993; Oczkowski, 1994; Nerlove, 1995; Landon and Smith, 1997, 1998; Combris, Lecocq and Visser, 1997; Schamel, Gabbert and Witzke, 1998; Schamel, 2000; Roberts and Reagans, 2001; Schamel and Anderson, 2001; etc.), none of them related to transition countries, estimate the implicit prices for wine quality attributes¹¹. All of them are based on the hypothesis that any product represents a bundle of characteristics that define quality and their theoretical framework is provided in the seminal paper of Rosen (1974) who suggests that consumers evaluate product attributes when making purchasing decision and that there are competitive implicit markets that define implicit prices for embodied product attributes (Schamel and Anderson, 2001).

In applying hedonic functions for estimation of implicit prices, the identification problem always arises, as mentioned first by Rosen (1974)¹². The problem has been recently discussed, and hedonic pricing approach has been criticised¹³, but no further suggestions for the use and application of other techniques for understanding the behaviour of wine consumers have been made. In order the identification problem to be solved, Schamel (2000), and, Schamel and Anderson (2001), point out that supply and demand conditions should be separated.

The model

We develop a hedonic pricing model for the Bulgarian wine market following Schamel and Anderson (2001). We assume that the market is in equilibrium and respectively, consumers make their choices given their knowledge of prices and characteristics of other wines and commodities. According to Freeman (1994), the

¹⁰ For comparative analysis of the empirical findings in most of the studies, see Schamel and Anderson, 2001.

¹¹ We do not discuss hedonic analysis for other food processing industries.

¹² The identification problem arises from the fact that implicit prices may reflect not only consumer preferences but also factors that determines production.

¹³ See Unwin, T., 1999.

equilibrium assumption implies that implicit prices may be specified without modelling the supply side of the market (Schamel, 2000).

In a transition environment, the consumers' knowledge and certainty about sensory quality of a particular wine is limited due to information and economic constraints. Because of this, we hypothesise that a bundle of other quality characteristics also defines the wines sold on the domestic market. We suggest that wine consumers' utility arises not only from the taste of the wines which is reflected in the sensory quality ratings, but also from the psychological effect of purchasing wine from a certain region and brand. Additionally, this effect could be strengthened or weakened by an information effects on the privatisation of certain wine processors in a given regions, although such an unobservable impact is difficult to be captured, especially, when data from a period not lagging far behind the end of privatisation is used. Ownership structure (e.g. wines produced by co-operatives, or foreign owned processors, or processors run by employee managers, or by other corporate structures) could also influence the consumers' decision and willingness to pay for wines.

In a formal way, goods W_i (in our case wines), described by a vector G of l characteristics (attributes) [$G = g_1, g_2, \dots, g_l$], could be presented as follows:

$$W_i = W(g_{i1}, g_{i2}, \dots, g_{il}),$$

where i denotes particular wine of the group of W .

Thus, the market price of the good i of W will be:

$$P_i = P [g_{i1}, g_{i2}, \dots, g_{il}]$$

The vector of attributes G , used in our model, comprises the sensory quality ratings, varietal and regional origin.

$$P_i = P [\text{Quality}_i, \text{Variety}_i, \text{Region}_i]$$

After testing the functional form with a Box-Cox model, we reject the linearity and we use a log-linear model with logarithm of prices being dependent variable. The econometric model to which we find solution is:

$$\ln(\text{Price}_i) = \beta_0 + \beta_1 \ln(\text{Quality}_i) + \sum_{j=1}^8 \beta_j \text{Variety}_{ij} + \sum_{k=1}^{11} \beta_k \text{Region}_{ik} + \beta_i$$

where i denotes a certain wine from the sample, j denotes the number of different varieties, and k denotes the number of regions used in our model.

Price_i is the market price of a given bottle of wine i sold on the Bulgarian market in 2000. Quality_i is a numerical variable that represents the quality of the i -th wine according to the standard 100 point scale. Variety_i is a dummy variable that equals one for the variety of grape of which the i -th wine is made and zero for the other varieties. Region_i is a dummy variable that equals one for the region of origin of the i -th wine, and zero for the rest (see table 10). For not falling into the dummy variable trap and avoiding multicollinearity problems, we exclude from our estimations the region of Svishtov and the variety Cabernet Sauvignon. Thus, in the final version of our model we stay with eight varieties and eleven regions and the estimation results will be comparable to red wine Cabernet Sauvignon produced in the region of Svishtov.

Three of the introduced varieties represent red wines: Merlot, Gamza and Other Red¹⁴; and the rest five represent white wines: Chardonnay, Sauvignon Blanc, Traminer, Misket and Other White¹⁵. The *Region* variable comprises the country divided into 11 sub-regions: three for the North region, three for the East, three for the South, one variable for the whole South-West region, and one variable *Other BG regions* for all other North, East and South regions, not presented with a particular dummy.

Data

We estimate implicit prices for Bulgarian wines produced in the period 1989 - 1999 and sold on the domestic market in 2000. The data for our analysis is derived from the Bulgarian wine trade magazine "*Bacchus*". It consists of information about the sensory quality according to the 100 point scale, the vintage, regional origin, producer, and also

¹⁴ Other Red includes: Shiroka melnishka loza, Mavrud, Cabernet&Merlot, etc.

description of the taste of the wines. The sample consists of 233 wines from vintages 1989 to 1999, with average retail price of BGN 5.98 (3.07 Euro)¹⁶, and average quality rating of 76.09 points (see table 11). From all wines, almost two-thirds are red wines (60.1%), and the rest 39.9% - white ones. The regional distribution of the wines is almost the same for the North (29.6%), South (26.2%) and East region (31.8%), with the South-West region presented with only 2.6% of the total sample, a fact that seems normal given the presence of only one large winery in the region (Vinprom Damjanitza) and its specialization in production of red wines of the brand "Shiroka Melnishka Loza".

From the red varieties, about 30% are Cabernet Sauvignon. Merlot is represented with 18.46%, and Gamza with 2.15%. From the white wines, the largest share belongs to Chardonnay (15.45%), followed by Sauvignon Blanc (5.58%), Traminer (4.29%), and Misket (3.43%). To the group of Other Red belong 10.3% of the wines in the sample, and to the group of Other White - 11.16%. Table 9 shows that about 30% of the wines are young wines - from vintages 1998 - 1999, and the rest - old wines, with a diminishing share in the total sample with increase in the age.

Additionally, for the purpose of our estimations, we divide the sample into two sub-samples taking the year 1997, when the industry restructuring started, as a cut-off point. The first sub-sample includes wines from vintages 1989 - 1996 (120 observations or 51.5% of the total sample). The second sub-sample comprises wines from vintages 1997 - 1999 and represents 48.5% of the total sample (113 observations). However, this almost equal distribution between the two sub-samples, hides different and important information. If we look at the ratio red wines/ white wines, we will see the predominance of the white wines in the first sub-sample, and the dominance of red wines in the second sub-sample. Thus old red wines and young white wines dominate the market. Interestingly, the average sensory quality assessment does not differ considerably for the three groups, and is in the range of 75.5 - 76.7. However, the average retail price for the wines in the first sub-sample is higher with 35% compared to the second one, which could be explained with the age of the wines, and respectively, the higher-value added.

We do not divide wines into premium and non-premium wines due to the transition characteristics of the market. Western price border between premium and non-premium wine appears to be inapplicable when we consider transition wine markets, and more specially Bulgarian wine market. Bulgarian wine market is still depressed, with changes

¹⁵ Other White includes: Riezling, Dimiat, Muskat, etc.

¹⁶ 1 Euro= 1.9558 BGN

being more rapid and extreme than in the western markets. Capital constraints affect wine processors, consumers' purchase power is considerably low (the lowest among the CEEC-10), production costs are also low, and respectively most of the wines' prices stay in the lower price end. Additionally, no attempts for determining the price border between premium and non-premium wines have been made by now.

5. Discussion

Tables 12 and 13 display our results and show how the impact of regional reputation changes significantly and negatively with industry restructuring. As we have discussed in the previous section, we chose Cabernet Sauvignon and Svishtov as a comparative variety and region, and we exclude them from the estimations in order to avoid the dummy variable trap. Thus, all coefficients should be explained as relative to Cabernet Sauvignon produced in Svishtov region.

The results show that for the full sample wine quality has positive and significant impact on market prices. Although the coefficient seems very high, it quite clearly displays to what extent Bulgarian wine market is still ill-developed and how big are the price differences between low and high quality wines. This is not the case with the quality rating in the two sub-samples (table 12), where its impact remains insignificant for both of them, and the coefficient decreases its value with industry restructuring.

Red wines from the variety *Gamza* account for 54% price discounts on average, with a downward trend presented in the coefficient, reflecting changes in the consumers' taste towards red wines made from this local grape variety. These changes in the tastes of the consumers are consistent with the reduced export of red wines from local grape varieties to the Western markets, where their distribution is becoming more difficult due to the unpopularity of the varieties, the specific taste of the wine and the unstable quality of wine production.

The opposite trend is characterising white wines from the local variety *Misket*. The coefficients are negative, but increasing with time and respectively, with decreasing price discount relative to Svishtov's Cabernet Sauvignon. Decreasing discounts, but still higher than 24% are presented also for the other white wines, all other things equal. This to great extent is connected with the fact that usually white wines are with lower prices compared to red wines, and may be, also reflects the fact that young white wines, together with old red wines, are preferred by the customers and thus have higher prices.

The analysis of the regional variables for the '89-99 vintages, shows significant difference compared to Svishtov wines for all regions, with exception of Varna, and wines produced in most of them are sold with more than 50% price discounts on average, all other things equal. On one hand this could be explained with the specialization in production of red wines with high quality in Svishtov region, which became a market strategy of the largest winery in the region (Vinprom Svishtov) after its privatization. On the other hand, other factors influence these price discounts. In the region of Russe (wines are sold with 76% discount) was the largest foreign investment which affected not only the development of Vinprom Russe but also the development of the wineries of smaller scale in the neighbouring area. Moreover, the winery produces mostly red wines. Suhindol wines account for the smallest price discount (24%) due to the specific features of the co-operative system and the social role that it plays in the rural areas, which additionally increases production costs. The highest price discounts are displayed for the regions where wineries were privatised from managerial buy-outs or through mass privatization (Bourgas region, South-West region, Rhodopy region) and where red wines remain the main wine industry output. While in the regions where red and white wines are produced together (Sub-Balkan, Other BG regions) and/or white wines play a dominant role (Shumen, Targovishte), price discounts are with 20% lower, but still with 51-54% below Svishtov wines.

Varna is the only region where price discounts are not presented and the coefficient is not significant. This could be explained with the specialization of the region in growing white wine grapes and respectively, producing white wines. But comparing vintages '89-96 with '89-99 we can see a downward trend of the coefficient and reduction of its significance. On the contrary, for the rest of the regions coefficients are increasing very rapidly, although also losing significance, and as a consequence, for vintages '97-99 regional reputation is reduced considerably and there are no regions with significant coefficients.

Interestingly, it appears that the econometric results for the total sample are driven by the wines from vintages '89-96 (see tables 12 and 13).

However, this empirical results raise several important questions: Why the price discounts for wines produced in regions where red wines are dominant are so high? Why for the regions where white wines dominate, price discounts are less than for the regions where red wines are produced? Why the coefficients of those regions are more or less similar to each other? Why the region of Varna stayed the only region with insignificant reputation? Is there any driving force that causes this?

6. Market segmentation

A closer look at the empirical results displayed in the previous section and at the data analysis, together with the knowledge of certain specialization of given regions and wine processors in production of only red or only white wines, gave us ground to hypothesise and test whether Bulgarian wine market is segmented, i.e. that there exist different market for white wines as distinct from the market of red wines, and respectively, the impact of regional reputation on consumers willingness to pay for red or white wines differs considerably¹⁷.

For the purpose of testing that hypothesis, we divide our sample into two sub-samples: the first one only with red wines (140 observations), and the second one only with white wines (93 observations). We introduce a new variable, *Age*, which represents the age of a certain wine and equals 1 if the wine is from vintage 1999, 2 if the wine is from vintage 1998, etc. unless we reach 11 for the wines from vintage 1989. We regress *regional variables*, *wine quality* and *age* on the wine prices for the full sample and the two sub-samples. For comparison we choose wine produced in the region of Shumen.

As we can see from table 14, the results display very different situation for the two sub-samples and prove our hypothesis of market segmentation.

The first important difference appear to be the age of the wines - while the average age of the white wines is only 2.6 years (with oldest white wine of 6 years), the average age of the red wines is 4.74 (with oldest red wine of vintage 1989). Interestingly, the coefficient of *Age* for white wines is negative, although not significant, while for red wines it has a strong positive and significant impact on the market prices (table 14). Wine quality remains significant and positively related to prices. The average sensory quality rating for red wines is 77.05, while for white wines 74.65. However, regional reputations differ for both red and white wines in terms of significance and sign of the coefficients. First, there are four regions, where white wines are not presented in the sample and in practice, rarely or not produced at all: Svishtov, Haskovo, South-West region, and Rhodopy region. Second, while white wines from Bourgas region account for significant price discounts compared to white wines from Shumen region, the variable has no significant impact on the prices for the red wines. Additionally, the regions of Russe, Svishtov, Targovishte, Haskovo and Rhodopy, together with the intercept, are significant for red wines, while this does not hold for white wines.

¹⁷ We will not consider the case, where consumers are carrying out activities in coalitions according to their preferences For the hedonic modelling of the problem see Dreze and Greenberg (1980).

The reputation of the region of Varna is strongly significant in the sample of the white wines and the coefficient remains positive as in our discussion in section seven. Last, the coefficients of *Russe*, *Suhindol* and *Other BG regions* are negative for the sample of red wines, and positive for the sample of white wines. These results reveal that there is segmentation of the Bulgarian wine market. Hence, when estimating hedonic functions for regional and varietal reputation this segmentation has to be taken into account in order more accurate and precise results to be obtained.

7. Conclusions

With privatization of processing facilities and farm restructuring, Bulgarian wine sector entered an extremely competitive environment. In the globalized world wine markets, the extent to which the price declines (or rises) for a particular group of producers depends very much on the quality upgrading of its product, absolutely and relative to that of other producer groups, as perceived by consumers at home and abroad (Schamel and Anderson, 2001). Additionally, in all developed wine markets (Western Europe, UK, USA, Australia, New Zealand, East Asia) there has been a dramatic substitution of quality for quantity (Anderson et al., 2002). With declining exports of wine, in volume and value, unit value of Bulgarian wine exports increased with 25% since 1995 (table 1 and figure 7). This displays that Bulgaria is becoming part of the globalised wine markets and the substitution effect (quality for quantity) noticed by Anderson et al. (2001) has affected the wine sector and the country is on a way of producing less wine, but of higher quality.

Future positive expectations are connected with creation of appropriate leasing/sales arrangements; with improvements of living standards and hence, the investment decisions of the small-scale grape-growers; with the reorganisation of the quality system and completing of the legislation establishing quality and marketing standards; with the high and increasing wine trade volume¹⁸ and value¹⁹ specialization indices, and considerably high index of comparative advantage in wine²⁰ (table 1); with the consolidation between the wineries and investments in new processing technologies.

¹⁸ 0.96 in 1999 and fourth place in the world ranking (Anderson and Norman, 2001)

¹⁹ 0.97 in 1999 and fourth place in the world ranking (Anderson and Norman, 2001). The last two years for which data is available (1998 and 1999) have the highest two numbers for the transition period.

²⁰ In the period 1990-1994 Bulgaria is second among all wine producing countries, with average index of comparative advantage in wine of 11.41, and third for the period 1994-1999, with average index of comparative advantage in wine of 13.50.

In this paper we analyse the impact of the restructuring on the wine system in Bulgaria and we develop a hedonic pricing model for estimation of wine quality, regional and varietal reputation effects in Bulgarian wine market . We show that wine quality has significant and positive impact on wine prices. Red wines of local varieties, namely Gamza, are with diminishing significance and importance, while white wines from local varieties (in our case Misket) increase their image in consumers' tastes and preferences.

Our results reveal that there is significant regional reputation on the market and wines are sold with significant price discounts compared to Svishtov Cabernet Sauvignon wines. With time, price discounts are rapidly diminishing for white wines and increasing for red wines, and regional reputations are losing significance, with an increase in the coefficients. This is positively related with wine industry restructuring and is a major result from the completed privatisation in the sector.

We show that Bulgarian wine market is segmented and when estimating the impact of regional reputation on wine prices, and respectively on consumers' willingness to pay, the differences in the both segments - red wine market and white wine market - should be taken into account in order more accurately the effect of different factors on retail wine market prices and consumers' behaviour to be captured.

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List of tables and figures

Table 1. Bulgaria: Main trade indicators

	1989	1993	1995	1997	1999
Unit value of wine imports	0.37	0.17	0.21	0.40	0.65
Wine trade value specialization index	0.99	0.92	0.93	0.94	0.97
Unit value of wine exports	1.01	1.10	0.86	0.95	1.11
Index of comparative advantage in wine	4.83	17.13	14.91	12.54	10.51
Index of intra-industry trade in wine	1	8	7	6	3

Source: Anderson and Norman, 2001.

Table 2. Bulgaria: Household consumption of some foods and beverages (average per capita), 1989-1999

<i>Foods and beverages</i>	<i>Unit</i>	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Grapes	kg	5.0	4.5	4.2	5.4	5.3	4.3	3.6	3.8	4.0	2.6	2.3
Wine	l	16.4	14.5	12.2	13.9	12.5	10.2	8.5	8.4	8.6	9.2	6.5
Beer	l	29.7	26.4	17.8	17.5	15.5	16.9	14.7	11.1	5.5	8.9	10.1
Rakia	l	4.2	3.9	3.0	3.2	3.5	3.3	2.7	2.6	2.2	2.7	2.5
Soft drinks	l	32.9	31.2	21.2	26.5	24.8	30.4	28.3	23.4	11.5	20.3	24.6

Source: NSI

Table 3. Bulgaria: Household consumption of main beverages by decile group of income in 1999 (liters)

<i>Foods and beverages</i>	<i>Total</i>	<i>Decile groups</i>									
		<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>	<i>VII</i>	<i>VIII</i>	<i>IX</i>	<i>X</i>
Soft drinks	24.6	9.9	15.6	17.5	21.1	22.8	23.7	26.9	29.9	33.9	44.4
Spirits	19.6	7.1	10.0	12.0	15.5	17.4	19.6	21.9	25.7	28.6	37.9
of which: Wine	6.5	2.4	3.7	3.9	5.1	5.6	6.1	7.2	8.6	9.9	12.3
Beer	10.1	3.4	4.9	6.3	8.1	9.4	10.6	11.4	13.2	14.3	19.6
Rakia	2.5	1.2	1.3	1.6	2.0	2.1	2.5	2.8	3.3	3.6	4.9
Other	0.5	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.8	1.1

Source: NSI

Table 4. Bulgaria: Share of cultivated vineyards by different organization structures per region, %, 2000

Region	Individual farms	Agricultural cooperatives	Other farm structures	Total
North Region	80	14	6	100
East Region	66	32	2	100
South Region	77	20	3	100
South-West Region	99	0	1	100
Total for the country	76	20	4	100

Source: Ministry of Agriculture and Forestry (MAF), Bulgaria.

Table 5. Bulgaria: Distribution of grape growers by regions, %, 2000

Region	Individual farms	Agricultural Co-operatives	Other	Total
North Region	87	3	10	100
East Region	86	7	7	100
South Region	87	6	7	100
South-West Region	94	1	5	100
Total for the country	87	5	8	100

Source: MAF

Table 6. Wine grape varieties in Bulgaria - area per regions, 2000

Variety	North region		East region		South region		South-West region		Total	
	Area (ha)	Share (%)	Area (ha)	Share (%)	Area (ha)	Share (%)	Area (ha)	Share (%)	Area (ha)	Share (%)
<i>Red wine grape varieties</i>										
Pamid	4759	28.4	7600	44.6	12868	35.2	2923	31.6	28150	35.4
Merlot	2112	12.6	1277	7.5	9772	26.7	795	8.6	13956	17.5
Cabernet Sauvignon	2123	12.7	1633	9.6	8771	24.0	458	5.0	12985	16.3
Shiroka melnishka loza	0	0.0	0	0.0	0	0.0	4756	51.4	4756	6.0
Other (14 varieties)	7765	46.3	6528	38.3	5172	14.1	316	3.4	19781	24.8
<i>Total</i>	<i>16759</i>	<i>100.0</i>	<i>17038</i>	<i>100.0</i>	<i>36583</i>	<i>100.0</i>	<i>9248</i>	<i>100.0</i>	<i>79628</i>	<i>100.0</i>
<i>White wine grape varieties</i>										
Rkaziteli	4221	33.5	2852	14.6	4567	32.1	101	46.5	11741	25.2
Dimiat	978	7.8	6124	31.4	2429	17.1	17	7.8	9548	20.5
Misket red	0	0.0	1618	8.3	3072	21.6	0	0.0	4690	10.1
Misket otonel	1128	8.9	1686	8.7	811	5.7	20	9.2	3645	7.8
Shardonnay	884	7.0	1115	5.7	344	2.4	0	0.0	2343	5.0
Uni Blanc	0	0.0	2186	11.2	109	0.8	0	0.0	2295	4.9
Others (19 varieties)	5396	42.8	3892	20.0	2884	20.3	79	36.4	12251	26.3
<i>Total</i>	<i>12607</i>	<i>100.0</i>	<i>19473</i>	<i>100.0</i>	<i>14216</i>	<i>100.0</i>	<i>217</i>	<i>100.0</i>	<i>46513</i>	<i>100.0</i>

Source: MAF and own calculations.

Table 7. Production of wines per region and category in Bulgaria, 2000

Region	Quality wines		Table wines		Home-made wines		Total	
	Production (hl)	Share (%)	Production (hl)	Share (%)	Production (hl)	Share (%)	Production (hl)	Share (%)
<i>Red wines</i>								
North region	81247	20.0	110563	28.4	606167	44.9	797977	37.2
East region	83909	20.7	67379	17.3	273924	20.3	425212	19.8
South region	230408	56.8	201374	51.8	292231	21.6	724013	33.8
South-West region	10246	2.5	9792	2.5	177624	13.2	197662	9.2
<i>Total</i>	<i>405810</i>	<i>100.0</i>	<i>389108</i>	<i>100.0</i>	<i>1349946</i>	<i>100.0</i>	<i>2144864</i>	<i>100.0</i>
<i>White wines</i>								
North region	51415	25.2	90336	34.3	159565	30.0	301316	30.2
East region	134620	66.0	114115	43.3	220973	41.6	469708	47.0
South region	16873	8.3	58680	22.3	138769	26.1	214322	21.5
South-West region	967	0.5	426	0.2	12072	2.3	13465	1.3
<i>Total</i>	<i>203875</i>	<i>100.0</i>	<i>263557</i>	<i>100.0</i>	<i>531379</i>	<i>100.0</i>	<i>998811</i>	<i>100.0</i>
<i>Total for all wines</i>								
North region	132662	21.8	200899	30.8	765732	40.7	1099293	35.0
East region	218529	35.8	181494	27.8	494897	26.3	894920	28.5
South region	247281	40.6	260054	39.8	431000	22.9	938335	29.8
South-West region	11213	1.8	10218	1.6	189696	10.1	211127	6.7
<i>Total</i>	<i>609685</i>	<i>100.0</i>	<i>652665</i>	<i>100.0</i>	<i>1881325</i>	<i>100.0</i>	<i>3143675</i>	<i>100.0</i>

Source: MAF and own calculations.

Table 8. Share of the different categories of wine per regions, %

Region	Quality wines	Table wines	Home-made wines	Total
<i>North region</i>				
red wines	10.2	13.8	76.0	100.0
white wines	17.1	30.0	52.9	100.0
total for all wines	12.1	18.3	69.6	100.0
<i>East region</i>				
red wines	19.7	15.8	64.4	100.0
white wines	28.7	24.3	47.0	100.0
total for all wines	24.4	20.3	55.3	100.0
<i>South region</i>				
red wines	31.8	27.8	40.4	100.0
white wines	7.9	27.4	64.7	100.0
total for all wines	26.4	27.7	45.9	100.0
<i>South-West region</i>				
red wines	5.2	5.0	89.9	100.0
white wines	7.2	3.2	89.7	100.0
total for all wines	5.3	4.8	89.8	100.0
<i>Total for the country</i>				
red wines	18.9	18.1	62.9	100.0
white wines	20.4	26.4	53.2	100.0
total for all wines	19.4	20.8	59.8	100.0

Source: MAF and own calculations

Table 9. Sample distribution, %

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Share	2.58	0.86	1.29	2.15	3.00	11.16	12.45	15.02	21.03	19.31	11.16

Source: Own calculations

Table 10: Definition of variables

<i>Variable</i>	<i>Definition</i>
Log (Price)	Dependent variable
Quality rating	Sensory quality, 100 point scale
Cabernet Sauvignon Merlot Gamza Other Red	Dummy variables for red varieties that equal 1 if the wine is from the same variety or zero otherwise.
Chardonnay Sauvignon Blanc Traminer Misket Other white	Dummy variables for white varieties that equal 1 if the wine is from the same variety or zero otherwise.
Suhindol Russe Svishtov Targovishte	Dummy variables that equal one if wine is originating from one of these North regions, and zero otherwise.
Varna Shumen Bourgas	Dummy variables that equal one if wine is originating from one of these East regions, and zero otherwise.
Sub-Balkan Haskovo Rhodopy	Dummy variables that equal one if wine is originating from one of these South regions, and zero otherwise.
South-West	Dummy variable that equals one if wine is originating from the South-West region, and zero otherwise.
Other BG regions	Dummy variable that equals one if wine is originating from other wine regions in Bulgaria, and zero if originating from regions with own dummies.

Table 11. Summary statistics of the *Bacchus* data set

Variable	Vintages		
	1989 - 1999	1997 - 1999	1989 - 1996
	Total sample	II sub-sample	I sub-sample
Share of total sample	100.00	51.50	48.50
Quality rating	76.09	75.55	76.66
minimum	55	55	57
maximum	86	85	86
Average price (BGN)	5.98	5.12	6.89
minimum (BGN)	2.00	2.00	2.00
maximum (BGN)	20.00	13.50	20.00
Cabernet Sauvignon	29.18	16.67	42.48
Merlot	18.46	12.50	24.78
Gamza	2.15	0.83	3.54
Other Red	10.30	8.33	12.39
<i>Total red varieties</i>	<i>60.09</i>	<i>38.33</i>	<i>83.19</i>
Chardonnay	15.45	22.50	7.96
Sauvignon Blanc	5.58	10.00	0.89
Traminer	4.29	7.50	0.88
Misket	3.43	5.00	1.77
Other white	11.16	16.67	5.31
<i>Total white varieties</i>	<i>39.91</i>	<i>61.67</i>	<i>16.81</i>
<i>Total red and white varieties</i>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>
Suhindol	6.87	1.67	12.39
Russe	11.59	11.67	11.50
Svishtov	3.86	0.83	7.08
Targovishte	7.30	12.50	1.77
<i>North region</i>	<i>29.62</i>	<i>26.67</i>	<i>32.74</i>
Varna	6.87	8.33	5.31
Shumen	18.88	26.67	10.62
Bourgaz	6.01	9.17	2.65
<i>East region</i>	<i>31.76</i>	<i>44.17</i>	<i>18.58</i>
Sub-Balkan	12.88	13.33	12.39
Haskovo	9.01	2.50	15.93
Rhodopy	4.29	0.83	7.97
<i>South region</i>	<i>26.18</i>	<i>16.66</i>	<i>36.29</i>
<i>South-West</i>	<i>2.57</i>	<i>3.33</i>	<i>1.77</i>
<i>Other BG regions</i>	<i>9.87</i>	<i>9.17</i>	<i>10.62</i>
<i>Total</i>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>

Source: Own calculations

Table 12. Regression results, total sample

	Coefficient	P-value
Intercept	-1.245	0.43
Wine quality	0.816**	0.03
Merlot	-0.038	0.68
Gamza	-0.539***	0.01
Other Red	0.207*	0.08
Chardonnay	-0.142	0.12
Sauvignon Blanc	-0.123	0.34
Traminer	-0.024	0.87
Misket	-0.570***	0.00
Other white	-0.277***	0.01
Suhindol	-0.289*	0.10
Russe	-0.759***	0.00
Targovishte	-0.670***	0.00
Varna	0.015	0.93
Shumen	-0.562***	0.00
Bourgas	-0.828***	0.00
Sub-Balkan	-0.589***	0.00
Haskovo	-0.665***	0.00
Rhodopy	-0.727***	0.00
South-West	-0.821***	0.00
Other BG regions	-0.481***	0.01
R-squared	0.3406	
Number of observations	233	

Note: *** indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level.

Table 13. Regression results, sub-samples

	I sub-sample		II sub-sample	
	Coefficient	P-value	Coefficient	P-value
Intercept	-0.527	0.86	-0.450	0.82
Wine quality	0.664	0.33	0.501	0.26
Merlot	0.009	0.95	-0.112	0.39
Gamza	-0.566**	0.04	-0.755*	0.06
Other Red	0.240	0.23	0.075	0.66
Chardonnay	-0.101	0.59	-0.111	0.34
Sauvignon Blanc	-0.340	0.42	-0.040	0.77
Traminer	-0.551	0.31	0.001	0.99
Misket	-0.895***	0.02	-0.474***	0.01
Other white	-0.462**	0.05	-0.237*	0.06
Suhindol	-0.310	0.16	0.180	0.69
Russe	-0.843***	0.00	-0.141	0.70
Targovishte	-0.717*	0.06	-0.138	0.71
Varna	0.463	0.12	0.336	0.37
Shumen	-0.620***	0.01	-0.019	0.96
Bourgas	-0.954***	0.01	-0.269	0.48
Sub-Balkan	-0.539***	0.01	-0.144	0.70
Haskovo	-0.767***	0.00	-0.010	0.98
Rhodopy	-0.780***	0.00	-0.373	0.45
South-West	-1.152***	0.01	0.014	0.97
Other BG regions	-0.476*	0.06	0.007	0.99
R-squared	0.3890		0.3258	
Number of observations	113		120	

Note: *** indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level.

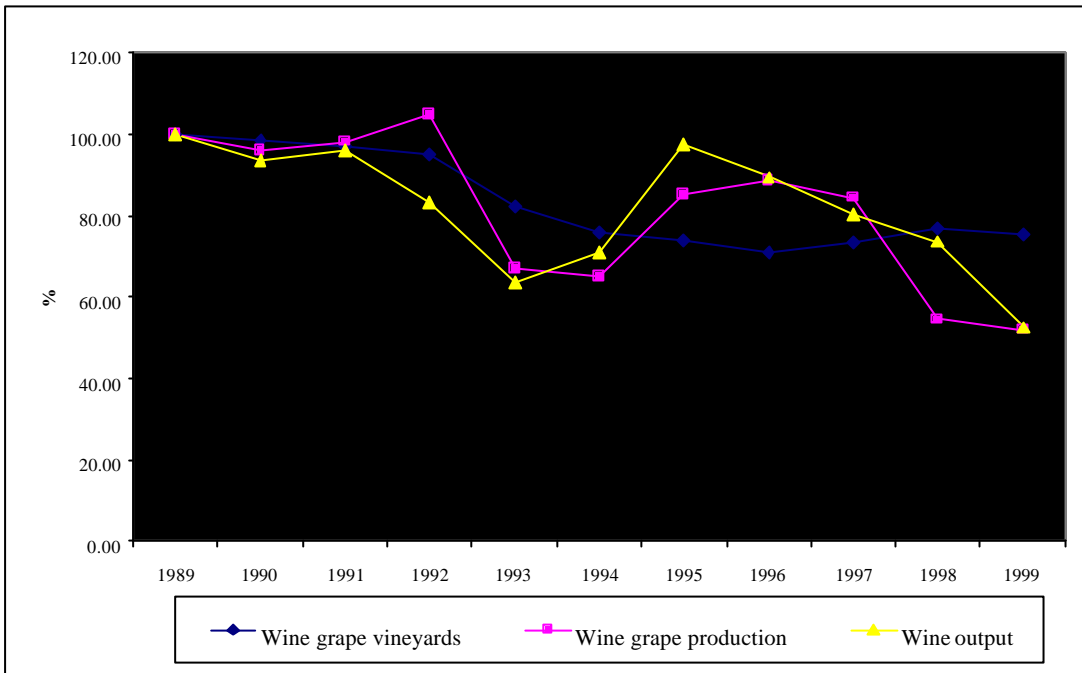
Table 14. Regression results from the samples of only white and only red wines

Variables	White wines		Red wines		Total sample	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Intercept	-2.256	0.28	-5.680**	0.03	-4.332***	0.00
Wine quality	0.874**	0.07	1.688***	0.00	1.340***	0.00
Age	-0.015	0.68	0.061***	0.00	0.051***	0.00
Suhindol	0.297	0.15	-0.133	0.45	0.075	0.57
Russe	0.022	0.88	-0.479***	0.00	-0.196*	0.06
Svishtov	--	--	0.332*	0.07	0.537***	0.00
Targovishte	-0.018	0.90	-0.360*	0.09	-0.101	0.41
Varna	0.590***	0.00	0.373*	0.09	0.538***	0.00
Bourgas	-0.328***	0.02	-0.089	0.74	-0.331***	0.01
Sub-Balkan	-0.097	0.51	-0.199	0.18	-0.065	0.52
Haskovo	--	--	-0.391***	0.01	-0.175	0.14
Rhodopy	--	--	-0.344*	0.06	-0.114	0.46
South-West	--	--	-0.141	0.52	-0.021	0.91
Other BG regions	0.376	0.23	-0.121	0.41	0.108	0.34
R-squared	0.2837		0.3224		0.2939	
Number of observations	93		140		233	

Note: *** indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level.

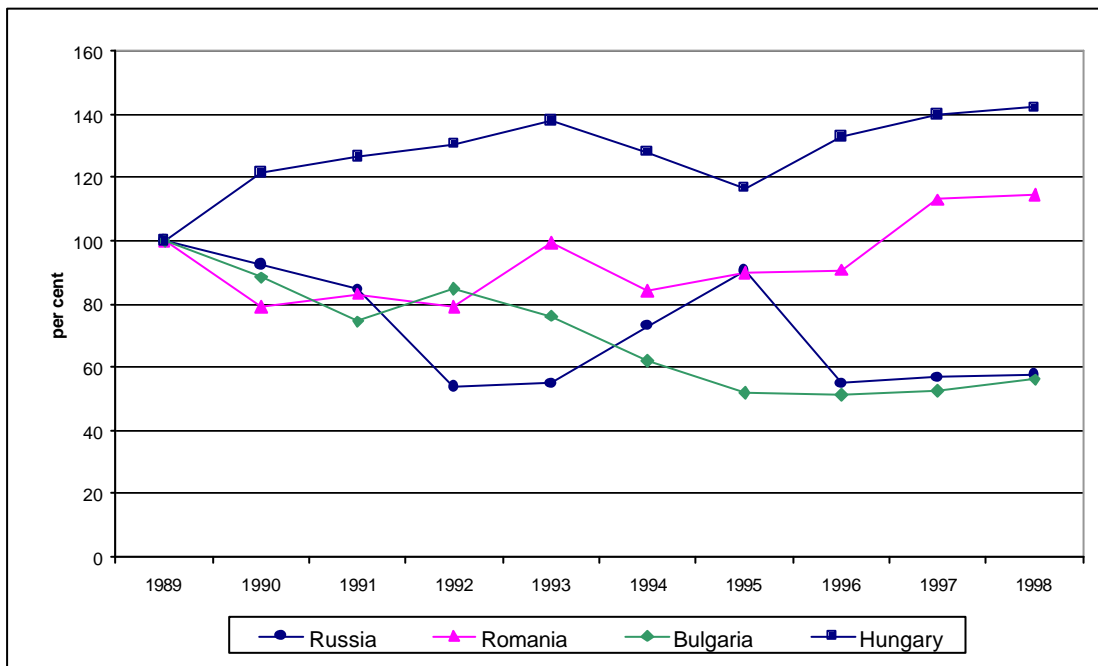
Note: "--" indicates no observations in the sample.

Figure 1. Bulgaria: Changes in main wine indicators, 1989-1999



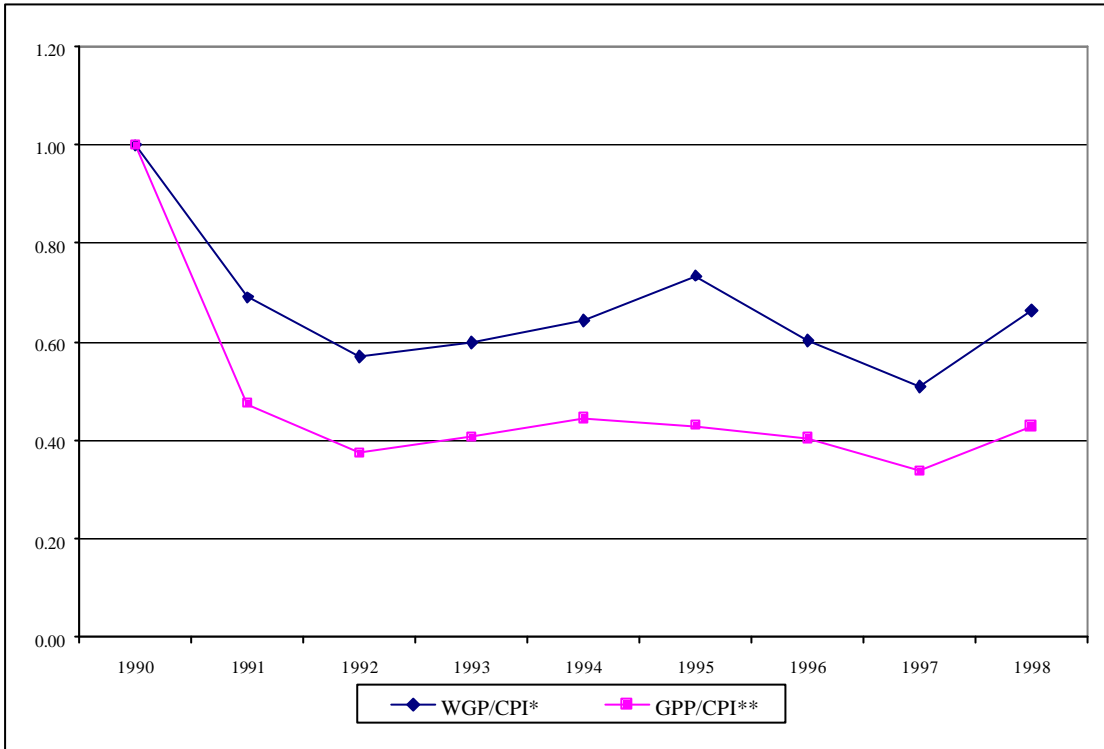
Source: Own calculations

Figure 2. Changes in consumption of wine per capita in some CEECs, 1989-1998



Source: Noev and Swinnen, 2002.

Figure 3. Terms of trade for the Bulgarian wine and grape producers

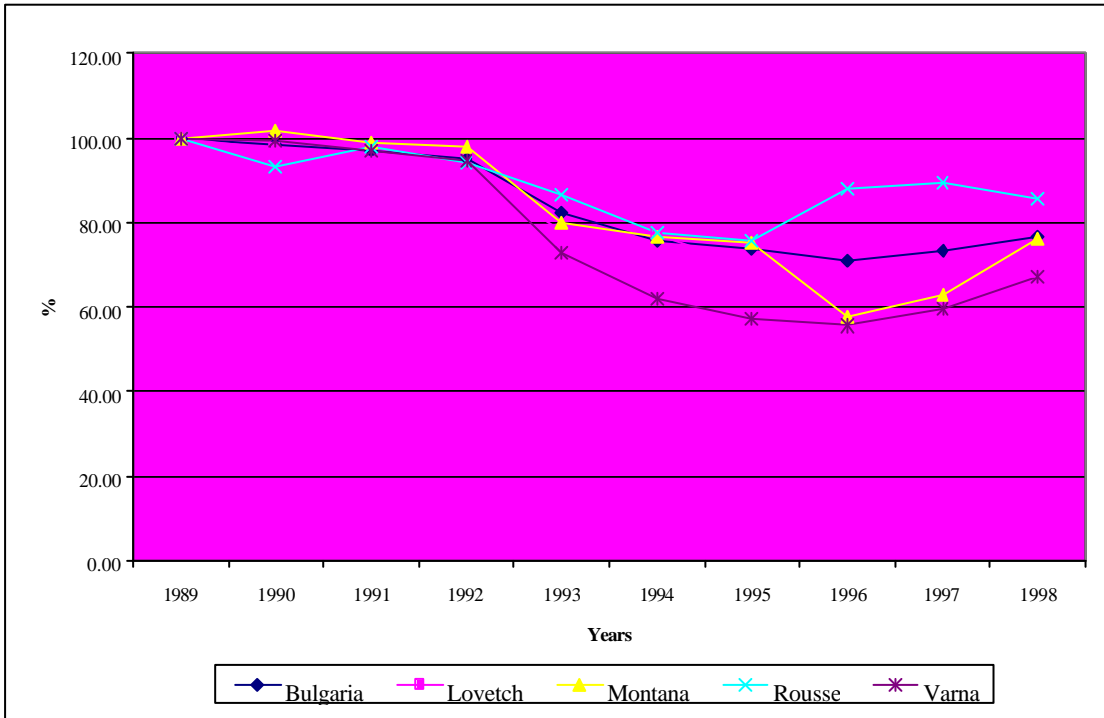


Source: Noev and Swinnen, 2002

*Ratio of wine producer price (WGP) over consumer price index (CPI)

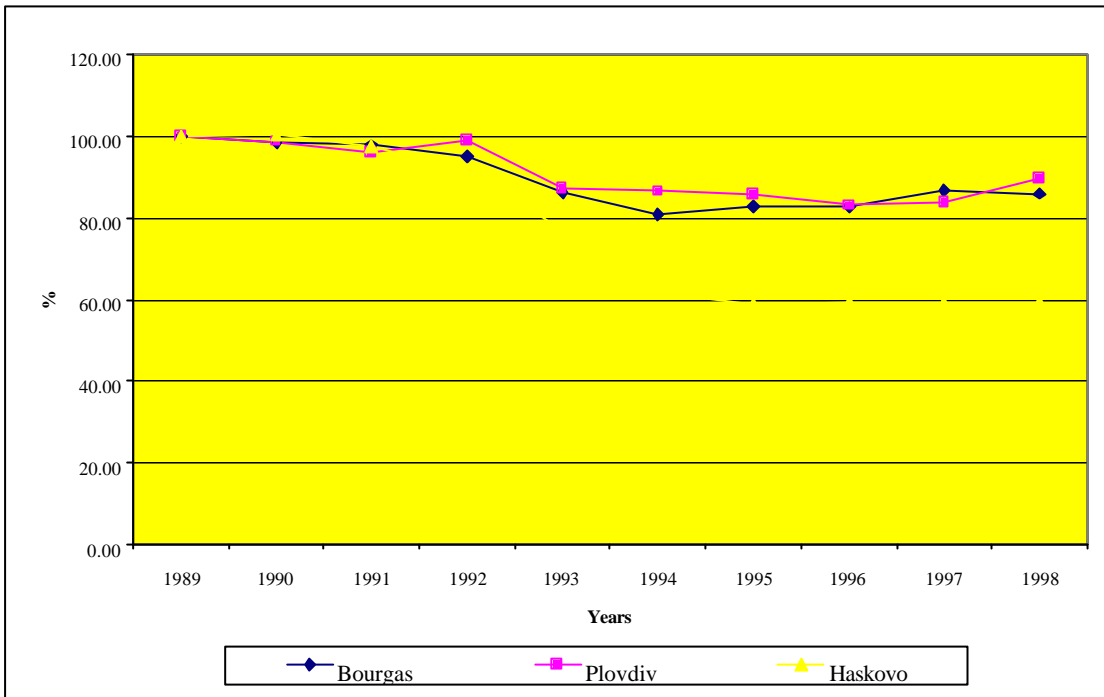
** Ratio of grape producer price (GPP) over consumer price index (CPI)

Figure 4. Bulgaria: Changes in wine vineyards in the north regions, 1989-1998



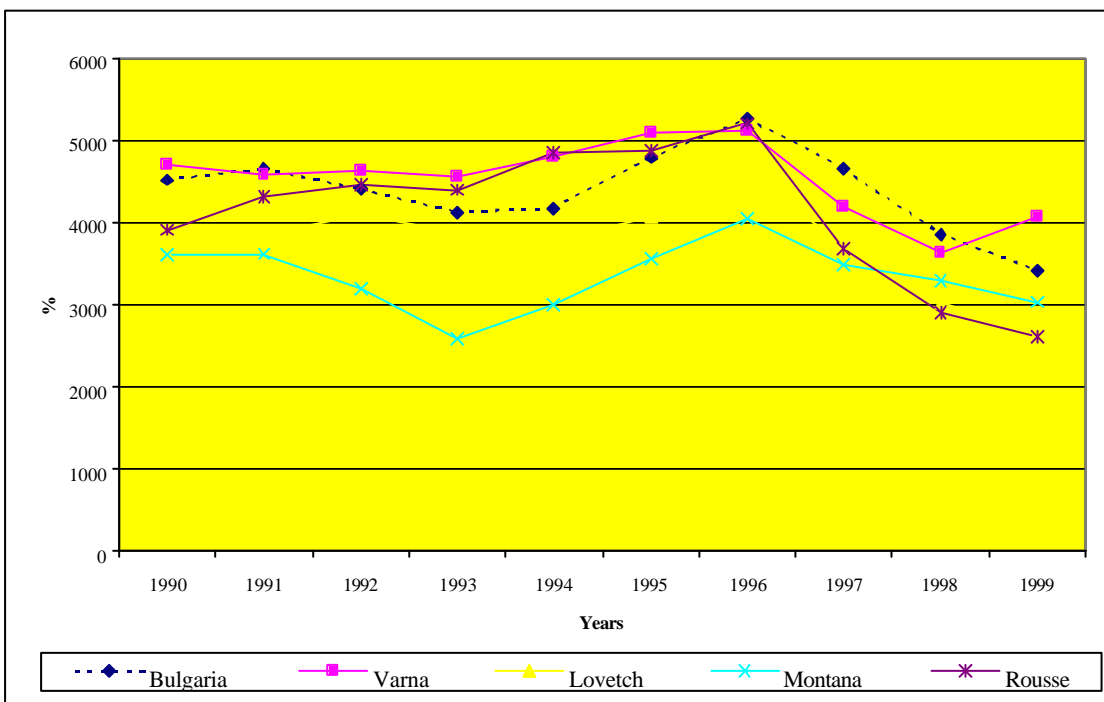
Source: Own calculations

Figure 5. Bulgaria: Changes in the wine vineyards in the south regions, 1989-1998



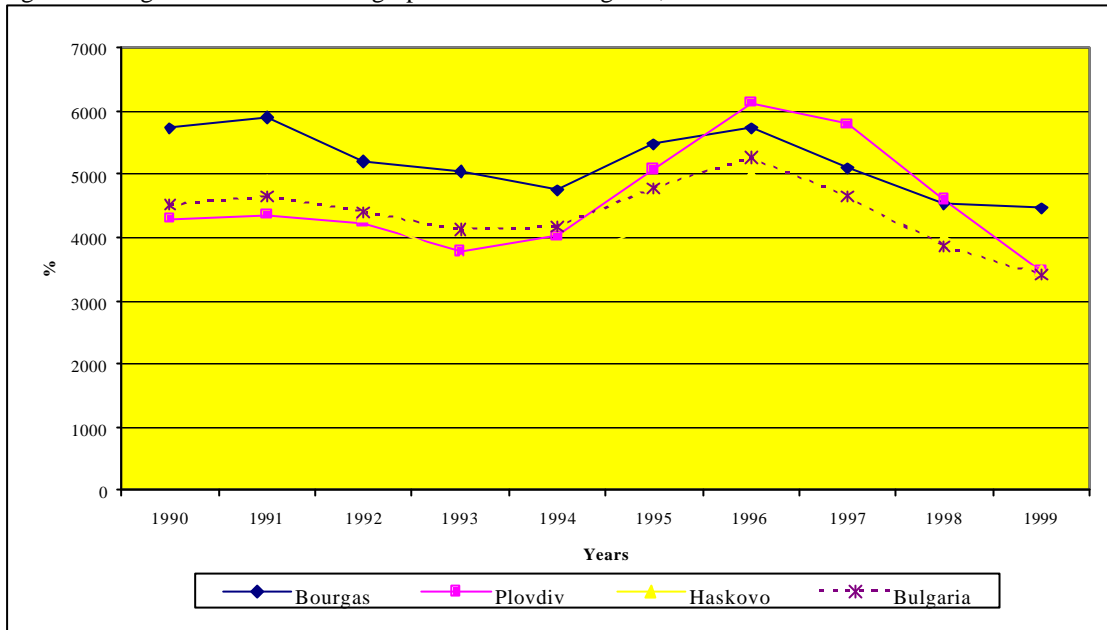
Source: Own calculations

Figure 6. Bulgaria: Yields of wine grapes in the north regions, 1990-1999



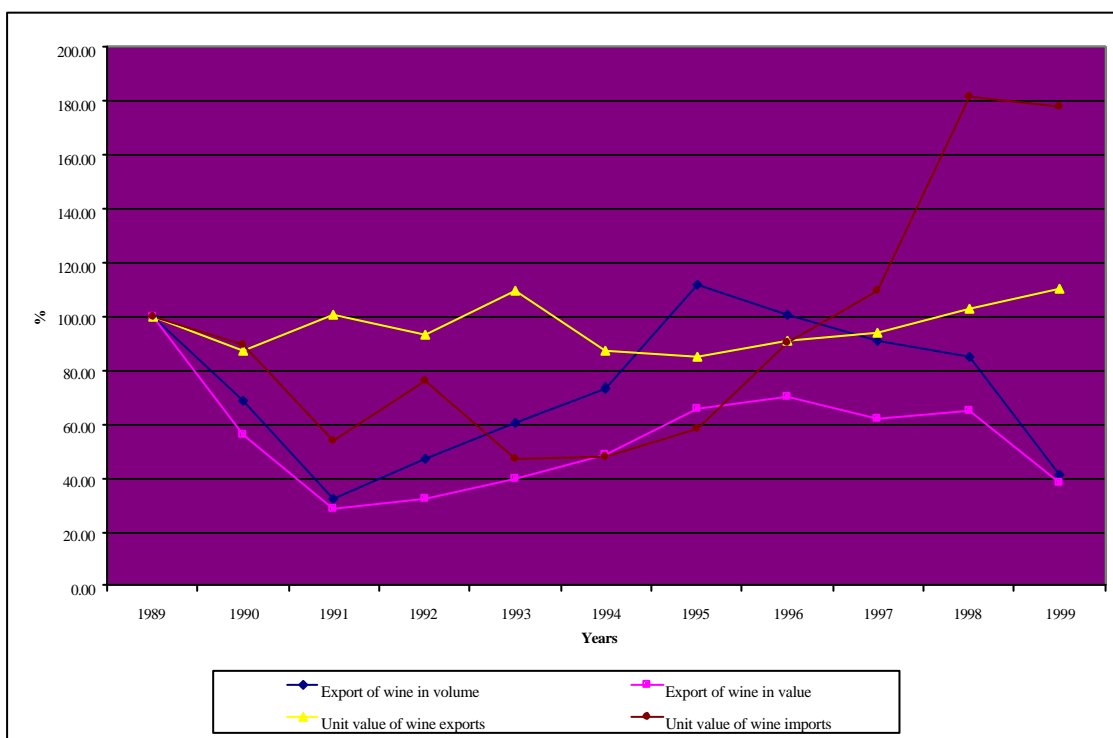
Source: Own calculations

Figure 7. Bulgaria: Yields of wine grapes in the south regions, 1990-1999



Source: Own calculations

Figure 8. Bulgaria: Change in the main wine trade indicators, 1989-1999



Source: Own calculations