

Doctoral Thesis

**Decision-Making Process and Risk Analysis of Agricultural  
Market Economy in Turkey: A Case Study From  
Kalecik Region Wine Producers**

**Rozhodovací Proces a Analýza Risku Zemědělského  
Ekonomického Trhu v Turecku: Studie z Kalecik  
Vinařského Regionu**

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## **ABSTRACT**

Cultivation of vine grapes has always been important in any century among eastern and western civilizations. In spite of a decrease in the vineyard acreage and vine production in the world, there has been an increase in the average productivity. Wine industry in the near past was highly fragmented. There has been a considerable increase in wine production and productivity with the entrance of new world countries to wine industry. The aim of this research is to highlight the importance of wine sector in Turkey and to assess the decision-making process and risk analysis of wine producers in Kalecik Region. The use of multinomial logistic regression constitutes the main methodology of the research. Research results indicate the impacts of social and economic factors over decision-making process and risky behaviors of wine producers.

**Keywords: agriculture, risk analysis, decision-making, Turkish agriculture**

## **OBSAH**

Pěstování vinné révy bylo důležité v každém století napříč východními a západními civilizacemi. Navzdory poklesu plošné výměry vinic, a tím i výroby vína na světě, došlo k nárůstu průměrné produktivity. Vinařský průmysl byl v nedávné minulosti velmi roztráštěný. Se vstupem nových zemí do světového vinařského průmyslu došlo k výraznému nárůstu výroby vína a produktivity. Cílem tohoto výzkumu je upozornit na význam vinařského odvětví v Turecku a posoudit rozhodovací proces společně s analýzou rizik výrobců vína v regionu Kalecik. Hlavní metodologii výzkumu představuje mnohočlenná logistická regrese (multinomial logistic regression). Výsledky výzkumu ukazují dopady sociálních a ekonomických faktorů na rozhodovací proces a riskantní jednání výrobců vína.

**Klíčová slova:** zemědělství, analýza riziku, rozhodovací proces, turecké zemědělství

## ROZŠÍŘENÝ OBSAH

Globalizace světového trhu s vínem a nedávný trend globálního nadbytku vína donutilo trh s vínem ke zkoumání nových alternativ pro udržitelný růst a konkurenční výhody. Vinařský průmysl byl v nedávné minulosti velmi roztržštěný. Výrobci vína ve starém světě byli od sebe navzájem izolováni. Kromě toho většina světových konzumentů vína konzumovala vína buď místní nebo dovezená od výrobců v okolí. Nicméně se vstupem nových zemí do vinařského průmyslu se tyto země nového světa začlenily. Tímto způsobem došlo k výraznému nárůstu produkce vína a produktivity. Evropa hraje ústřední roli v globálním trhu s vínem, jako zdroj vinic představuje přibližně 45% světových vinařských oblastí a téměř 60% světové produkce a spotřeby vína. V současné době dosahuje spotřeba v EU-25 téměř 30 litrů na osobu za rok, po prudkém poklesu v průběhu posledních dvaceti let, a to zejména v producentských zemích, kde se snížila o polovinu. V diskusi o regresních modelech se často považuje za spojitou kvantitativní proměnnou reakční proměnná  $Y$ . Nicméně prognostické proměnné jsou také kvalitativní v souladu s cílem a rozsahem výzkumu. Za těchto okolností jsou použity Logistické regresní modely.

Tento výzkum se zaměřuje především na použití *mnohočlenné logistické regrese* a dopady sociálních a ekonomických faktorů na rozhodovací proces výrobců vína. Výsledky výzkumu tedy ukazují statistickou významnost předpokládaného modelu a dopady každé proměnné na tento model.

**Klíčová slova:** zemědělství, analýza rizku, rozhodovací proces, turecké zemědělství

## **EXTENDED ABSTRACT**

The globalization of world wine markets and the recent trend of global wine oversupply, forced wine markets to explore new alternatives for sustainable growth and competitive advantage. Wine industry in the near past was highly fragmented. Wine producers in the old world, were isolated from each other. Moreover, most of the world's wine drinkers consumed either local wines or imports from nearby producers. However, with the entrance of new countries to wine industry, new world countries have been embodied. By this way, there has been a considerable increase in wine production and productivity.

Europe plays a central role in the global wine market, acting as the source of the vineyards account for approximately 45% of the world's vine growing area and almost 60% of the world wine production and consumption. The present per-capita consumption in the EU-25 is almost 30 litres/year, after a sharp fall during the last twenty years, especially in the producer countries, where it has dropped by one half.

Response variable Y has often been regarded as a continuous quantitative variable in the discussion of regression models. However, the predictor variables have also been qualitative according to the aim and the scope of the research. In such circumstances, Logistic Regression Models have been used.

The use of multinomial logistic regression and the impacts of social and economic factors on wine producers' decision-making process has been the main focus of this research. Therefore, research results indicate the statistical significance of the estimated model and the impacts of each variable over the model.

**Keywords: agriculture, risk analysis, decision-making, Turkish agriculture**

To my parents

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# 1. INTRODUCTION

Grape cultivation for wine production is almost as old as civilization. Grapes have been cultivated in Europe and Asia for thousands of years. Therefore, wine as a processed crop has always been an important item both for domestic consumption and for international trade. According to the ancient literature findings it is possible to understand different usage of grape such as dietary, medical, and social purposes. Estreicher (2006) emphasize wine from King Edward VII's point of view as follows:

*"One Not Only Drinks Wine, One Smells It, Observes It, Tastes It, Sips It and One Talks About It"*

On the other hand, the multipurpose utilization of grape pioneered its cultivation as a preferential agricultural and economic item. The most widespread consumption of grape can be explained as follows:

- Dried grape pulp
- Grape molasses,
- Grape sausage
- Semi-solid molasses of boiled juice of grapes
- Table grape
- Raisin

The world wine industry has experienced a dramatic change with the technological developments, modernization of the production process, innovative marketing strategies and adaptation of changing consuming patterns of the customers. The improvement of the sector and the rise of New World countries for wine production and trade have increased competitiveness in the global business environment.

Turkey, due to its geographical position, is located in the center of where grape was first cultivated and processed for wine production. Historical data proves that the roots of the cultivation of vineyards in Anatolia go back 7000 years ago. However, religious constraints have appeared to be an important obstacle over wine production. Therefore, grape has mainly been grown and consumed as table grape. The approximate estimation of grape production in Turkey is consisted of 40% of raisin, 35% of fresh grapes and 3% of wine production and the rest is used for dried grape pulp and grape sausage. Unlike New World countries, Turkey, even though having the advantages of climate and high level of productivity and having the 6<sup>th</sup> rank in the world grape production, has not yet taken place where she deserves.

The advantage of Turkey is having appropriate climatic conditions for wine production. Therefore, wine has been produced for centuries in this region. Grape

as an agricultural product, along with multipurpose usage, has also advantages of being grown in any kind of soil with the low level of necessity for irrigation. However, due to wrong agricultural policies for evaluation of crops in high value added sectors and inefficient marketing strategies, Turkey have not acquired competitiveness among other wine producing countries. Moreover, the lack of producer organizations for price determination and fragmented and small-size land structure are the major issues to be solved for wine sector in Turkey.

The goal of “marketing” can be summarized as to create customer satisfaction by understanding their expectations for price, quality and service to gain market leadership. However, marketing process for agricultural companies for developing countries has distinctive features. Social and cultural structures of agricultural producers such as education, interfamily relations and social status have determinative importance for competitive marketing. In addition to these factors, climatic changes, economic instability, defects on heritage law, have been the most important determinants on agricultural producers’ decision-making process for marketing process in developing countries such as Turkey.

The purpose of this research is to present the relationship between social and cultural structures of agricultural producers on their decision-making process and risky behaviors for 213 wine producers in Kalecik Region-Turkey. Specifying distinctive features of farmers and understanding the underlying factors causing this situation constitute an important framework for this research. In other words, it is intended to figure out different attitudes of farmers according to their social, economic and cultural backgrounds. In this manner, it is aimed in this research to observe and interpret the risky behaviors of Kalecik wine producers. The distinction of farmers according to their answers to survey questions is intended to guide future agricultural projects and innovation activities in the region with specific extension activities for different farmers.

Random sampling method is applied to achieve the number of farmers to be involved in the research. In addition, Multinomial Regression Model is chosen as the main methodology to analyze the decision-making process and risky behaviors and risky behaviors of farmers in the research area.

This research is consisted of 8 main chapters. After introduction, literature review concerning former researches about Kalecik district and decision-making process and risk analysis in general and in agriculture is expressed. In addition, former studies concerning Multinomial Logistic Regression and recent trends in wine research is highlighted.

Third chapter is based on defining the objective of the research and research hypotheses.

Fourth chapter is consisted of giving detailed information about research methodology and timeline during the preparation, data collection and developing

the Multinomial Logit Model and interpretation of the research results and assessing the statistical validity of the research hypotheses. In addition, contribution of this research to scientific knowledge is defined in the scope of this chapter.

Fifth chapter is constructed on the conceptual framework of the research in the context of the determinants of wine and necessary climatic conditions, while expressing the brief history of wine in the world. Subsequently, different country examples regarding the viniculture are given in this chapter.

Sixth chapter is developed on the general structure of wine industry in Turkey and latest advances about wine sector. On the other hand basic indicators about the social and economic milieu of the research area is emphasized in this chapter.

Seventh chapter is the empirical application and discussion section of this research. Sampling method and specifying the sample size are expressed in this chapter. Moreover, defining the research variables, assessing the statistical validity of the model and research hypotheses and interpretation of results are built up on seventh chapter.

Eighth chapter is the conclusion part of the research summarizing the research results, expressing the importance of this research and guiding the future projects for agricultural policy makers and researchers, planning to study in similar topics.

## 2. LITERATURE REVIEW

The aim of this chapter is to highlight former studies concerning Kalecik district, decision-making and risk analysis and the use of Multinomial Logit Model and its application for categorical data. Thus, the originality of this research is intended to be clarified.

### 2.1. Former Studies Concerning Kalecik District

Taşkaya (2002) in her research focused and investigated the economical situation of farming companies and income distribution in Kalecik district in Ankara. Research area was divided into three villages (Yeniçöte, Çandır, Gökdere) by the researcher according to natural factors and agricultural techniques and 63 farming companies. According to research results in the area, average land operated was 151,60 decar and 81,88 % of this was owned land, 11,87 % was tillable land and 9,47 % was rented land. 95,49 % of operated land was tillable land and 4,51 % was horticulture, vegetable, vineyard land and woodland. The Gini ratios, showing the distribution was calculated as 0,425 for owned land and as 0,4448 for operated land. The average net farm income per farm was 3.500.823.043 TL., and the Gini ratio, G, showing the distribution of this income was found as 0,4650. the average family income per farm was 4.230. 188. 123 TL. Gini ratio was found as  $G= 0,4642$  for family income distribution. According to these results, net farm income on farms studied was not it was observed that there was imbalance on the net farm income distribution in the research area.

Haydaroğlu (1999) investigated modern viticultural enterprises in the provinces of Ankara, Kırıkkale and Kırşehir which belong to the Central Northern Agricultural Region having high potential of grape cultivation. The main aim of the research was emphasized as to improve a relevant strategy and technology for development and modernization of the viticulture. Efficiency of the ecological paramaters such as climate and soil, and total area, topography, site and location of the vineyards above 1000 square meter grafted onto the American rootstocks, the source of planting materials, use of financial supports or credits, establishing and growing techniques of those vineyards were observed. Researcher determined that the total area of grafted vineyards were 3137 da in 118 villages of Ayaş, Bala, Beypazarı, Central, Çubuk, Elmadağ, Evren, Gölbaşı, Güdül, Kalecik, Kazan, Kızılcahamam, Nallıhan, Polatlı and Şereflikoçhisar sub-provinces of Ankara; 963 da in 71 villages of Bahşılı, Balışeyh, Çelebi, Delice, Karakeçili, Keskin, Sulakyurt and Yahşihan sub-provinces of Kırıkkale; 574 da in 49 villages of Akçakent, Akpınar, Boztepe, Central, Çiçekdağı, Kaman and Mucur sub-provinces of Kırşehir.

Fidan (1997), apart from other researchers, focused to determine the economic structure and annual financial results of farms producing grape in Kalecik district of Ankara province and to search the possibilities of increasing incomes in subject



to available production inputs in the prevailing market conditions. Researcher divided the farms into two groups according to land size; the farms having 1-100 decares farm land and the farms having bigger than 101 decares farm land. 40 farms were selected in the sampling method to collect the data. The average size of farms investigated was 191,50 decares and all of which were owned land. Researcher also adds that the first group of farmers gave more importance to viniculture. In parallel with other researchers, Fidan (1997) also mentions the imbalanced structure of the capital distribution among the studied farms.

Gündüz (2004) aimed in her study to emphasize the importance of touristic activities with respect to rural and urban population, to evaluate the touristic preferences of the urban population and the socio-economic needs of the rural population within the same context and to discuss agricultural tourism in the Kalecik district of the province of Ankara as a mean of rural development. Researcher focused to identify the preferences of the urban population of Ankara and a survey was conducted to a representative sample. Moreover, identifying the supply potential of agricultural tourism, which is a new subject to both Kalecik and Turkey, a different survey demand-sided survey was conducted in the area of research.

In order to make a physical evaluation and to discuss the physical feasibility of the target area the criteria for appropriate agricultural touristic activities were identified, these criteria were presented to an expert's view within the so-defined Delphi technique. After the evaluations and multi-criteria decision analysis and geographical information system the TNT mips program was used and the areas in the research field appropriate for agricultural activities were identified and possible applicable models for the Kalecik district center were put forward. According to the results, researcher as conclusion mentioned the importance and potential of the agricultural touristic activities with the implementation of medium and long-term planning and management activities. Moreover, she specified the necessity of human resources as well as infrastructure is required for the service industry and in these process public, private and municipal organizations in the District and the academic environment.

## **2.2. Decision-Making and Risk Analysis**

Decision-making among economic units has a vital importance especially for the adoption of new technical innovations to increase productivity and gain global competitiveness. Therefore this research aims to emphasize this process for Turkish agricultural sector and decision-making process of farmers and the structure of risk analysis and its importance. After giving brief information about some researchers' approaches to decision-making process and risk analysis, the situation of Turkish agricultural sector will be explained.

The key factor to be successful according to Simon (1987) in the global competitiveness for manager includes making decisions, communicating them to

others, and monitoring how they are carried out. Managers must know a great deal about the industrial and social environment in which they work and the making process itself to make decisions well. Dean and Sharfman (1996) claim that the decision process involves the collection of information relevant to the decision and the reliance upon analysis of this information in making the choice. It is inevitable that every innovation in any area has a risk not to overcome some expectations. Thus risk analysis is becoming crucial for economic units to understand the level of risk and avoid its destructive impacts.

Sonka (1979) in her article “Risk Management and Risk Preferences in Agriculture: Discussion” stresses a research made by Mapp et al. which evaluates risky alternatives considering both expected income and returns variability using MOTAD programming model. A like Sonka’s method, in scientific researches the most widespread methods against risk analysis can be summarized as qualitative, quantitative and combined.

### **2.3. Risk Analysis in Agriculture**

After Industrial Revolution, the importance of industry and service sector has been increased. However, agriculture, as mentioned by Schleicher-Trappeser and Strati (1999), still maintains its importance for increasing concerns about environmental pollution and sustainable development. In addition, Ellis and Biggs (2001) specify the transformation of small scale farming companies by the increase in agricultural productivity for overall economic development.

Agriculture for Turkey as a developing country and in the integration process into the European Union Common Agricultural Policy has a crucial importance. According to the Turkish Statistical Institute the share of agriculture in the GDP is 11.9. Nonetheless the amount of total population in Turkey according to the census made in the year 2000 is 67,803,927 and the amount of economically active population in agriculture is 12,576,827 and the share of rural population in total population is 35.1%. Therefore, agriculture still maintains its importance in Turkish economy. It is also vital to develop a decision-making process and risk analysis method for individual farming companies to estimate and understand their attitudes. Thus, research questions of this study are specified as follows:

- What are the main characteristics of wine producers?
- How do farmers differ in socio-economic status?
- Is there a difference in farmers’ decisions for trying and implementing agricultural innovations?
- Do leader farmers affect others in decision-making?
- How to categorize farmers’ risk attitudes?

The answers of above mentioned questions are crucial to make farmers aware of agricultural innovations for applying, adopting and sustaining those activities. The

interpretation of research questions in this research are embodied according to Multinomial Logit Model and the statistical significance of the independent variables on dependent variable. Therefore, the social and economic indicators for explaining Kalecik district wine producers' decision-making process are designated for establishing research framework.

## **2.4. Literature Review for Multinomial Logistic Regression**

Multinomial Logistic Regression which constitutes the basic methodology of this research has been used in different research areas. Moreover, this method has been given importance mainly for choice models. The aim of this chapter is to highlight and give brief information about the previous researches applying this method. Therefore, it is intended to clarify the basic differences among previous researches and this research.

Maiti and Bhattacharjee (1999) have mentioned the aim of their study as to assess the risk of injuries to miners, accounting for their individual and workplace characteristics. They have applied the binary and multinomial logit models to measure the risk of injuries to miners working in a group of underground coal mines in India. They have stated the research questions as: *“What mine and miner characteristics do affect the severity of miners' injury and, how do these same characteristics influence the risk of injuries to miners?”*

Another research, conducted by Sentas and Angelis (2006), has focused on “Categorical missing data imputation for software cost estimation by multinomial logistic regression”. They have expressed the purpose of the study as to investigate the possibility of using a method for estimating categorical missing values in software cost databases. Specifically, the method known as multinomial logistic regression (MLR) is suggested for imputation and is applied on projects of the ISBSG multi-organizational software database.

Abramson et al. (2000), apart from other studies, focused on “Parameter Bias from Unobserved Effects in the Multinomial Logit Model of Consumer Choice”. The authors present an extensive simulation study that provides information on the extent of bias resulting from the misspecification of four unobserved effects that receive frequent attention in the literature-choice set effects, heterogeneity in preferences and market response, state dependence, and serial correlation.

Unlike Abramson et al. (2000), this research has focused on choice model and risk analyses of Turkish wine producers rather than consumers.

Yamaguchi (2000), describes the method and application of multinomial logit latent-class regression models in sociological research. Researcher focuses on predictors of three latent classes of gender-role attitudes among Japanese women. These classes are labeled "traditional gender-role supporters," "prowork gender-equality supporters," and "antiwork gender-equality supporters." The aim of the

analysis has been explained as to “illustrate the usefulness of the method by identifying the characteristics of each class compared with the others”.

Cabrera (1994) emphasizes the use of several computer programs to handle logistic regression models. In addition, they imply SPSS as one of the most popular statistical packages. SPSS statistical package is also used in this research to evaluate the data and interpret the validity of the research hypotheses.

When selection is over a large number of exclusive choices, the multinomial logit specification is attractive in applied work, due to its simplicity, at the cost of parametric and (testable) independence assumptions (Bourguignon and Fournier, 2007). One of the important factors for choosing Multinomial Logit model in this research was also its simplicity for qualitative data as Bourguignon and Fournier (2007) explained.

Dow and Endersby (2004), in addition, compare multinomial probit and multinomial logit for choice models for voting research among a few candidates or parties. An important advantage of MNL relative to MNP in electoral studies is that the logit offers more intuitive answers to our theoretical questions. According to researchers, unlike logit, the probit cannot be easily solved by manual calculation or otherwise be easily manipulated.

Hahn (2003) in his article is criticizing the deterministic method to derive priorities, which may be subject to error in the analytic hierarchy process. Researcher stresses the use of weighted hierarchical multinomial logit model to obtain the priorities for multi-criteria decision-making methods.

Moreover, Stratton et al. (2008) use a multinomial logit model to estimate the relation between personal, household, institutional, and economic factors and college stopout and dropout behavior. Researchers found out significant differences between the factors associated with stopout and the factors associated with dropout behavior.

Another important research was made by Sartwelle et al. (1998). Researchers in their article “Producers' Marketing Practices and Decision Making Processes” applied survey in Kansas, Texas, and Iowa agricultural producers and agribusiness to examine the factors affecting their grain and livestock marketing practices. Researchers used Qualitative choice models (multinomial and binomial logit) to determine whether marketers' choices of cash market, forward contract, or futures and options oriented marketing practices were significantly affected by their individual characteristics. They have classified these individual characteristics as years of experience, enterprise specialization, attitudes toward risk, management decisions, local market conditions, and preferences for alternative types of market-related information. Results indicated that years of experience, risk attitude, on-farm storage practices, and preferences for alternative types of futures and cash

market information had significant effects upon respondents' choice of grain marketing practices.

Consequently, as understood from former studies, multinomial logistic regression due to its econometric modeling structure was used as an important method to assess choice and decision-making process for different scientific areas. The originality of this study is to bring about the use of this model in Turkish wine sector as a very popular and booming sector for explaining farmers' attitudes against agricultural innovations. In a detailed way, the relation among the decision-making process of Kalecik Region wine producers' socio-economic features and their risky behaviors have been examined.

## **2.5. Recent Trends in Wine Research**

Wine, as an important and developing item for many countries and producers, has a wide range of research area. Developments in marketing opportunities and online shopping, better advertising facilities, increasing attention on wine tourism, transformation from old world wine producers to new world producers, creating new brands and many more topics have recently attracted the attention of many researchers to investigate these issues in this area. Therefore, this chapter has focused on analyzing the recent trends in wine research and denominates the divergence and scientific contribution of this research among others.

Decision-making for choosing the correct wine by consumers have been affected by different characteristic of the production process such as climatic conditions, geographic location, irrigation style and duration, storage conditions and so on. Therefore, it is possible to highlight the importance of endemic structure for wine production and processing all over the world. This locality of wine has recently exhilarated wine tourism in many countries which brings forward many benefits for wine producers. Howley and van Westering (2008) emphasized the positive effects of wine tourism for wine producing areas. Researchers, in addition, suggested that tourist expenditures with the introduction of wine tourism, would help English vineyards suffering from the general depression in British agriculture and provide additional income. Moreover, researchers presented the results of a study conducted by 2001 which espouses the above mentioned positive impacts of wine tourism in the UK.

Another research conducted by Yuan and Jang (2008) examines the promotional effects of wine festivals as a part of wine tourism, on wine products and wineries and influence customer behavioral intentions. Researchers put forward the results of a structural equation modeling analysis which denominates that the attendee evaluation of festival quality positively influences satisfaction with the festival, and that satisfaction makes a positive and direct influence on awareness of local wines and wineries.

Centonze (2010), highlighted the strengths and weaknesses of the Hudson River Valley wine region which is classified as a transition from an agricultural cluster to a wine cluster, by using Porter's cluster model. This research, apart from Howley and van Westering (2008) and Yuan and Jang (2008) in which wine tourism was the focal point of the researchers, concerned the possibilities for the future development of the research area as an export-based wine region rather than an agritourism region.

Another recent research made by Maguire (2010) examined the liminality of cultural intermediaries through a case study of wine promoters and their role in creating added value for particular wines, and their identities as reflexive producer/consumers.

As it is well known, wine brand plays a critical role on the decision-making process of many wine consumers. Therefore, Miller and Chadee (2008) analyzed the SME sector by investigating the effect of the brand on wine choice. The complications of limited financial resources of SME's for creating a global brand were also highlighted by researchers. Moreover, according to the survey results, applied to a range of wine consumers, researchers found out that the brand was relevant in wine choice and the weighted importance of the brand elements changed across consumption situations.

Preszler and Schmit (2009) have similarly focused on decision-making process on wine purchasing. However, the discrete structure of this research comes up with the concentration on both attributes influencing wine purchase decisions and primary factors affecting the level of New York wines. Research results indicated that a wine's collective regional and varietal reputation influence overall wine purchasing decisions. Another research about choice of wine made by Lowengart (2010) proposed a multiattribute choice modeling approach. Researcher, by this model, aimed to explore the heterogeneity in the saliency of product attributes in the process of wine choice. Consumer's red wine evaluation data was used for demonstration to identify the attributed and to estimate the choice probabilities. Finally, research results indicated that wine consumers tend to utilize several wine attributes in their choice process. Charest (2009) in her thesis developed a model called "Fabricating Authenticity" for the production of Culture Perspective. The aim of the research was explained as exploring the evolving criteria for "real" and authentic Niagara wines. Researcher in this study highlighted the importance of "authenticity" and how it could be affected by global processes. In addition, possible impacts of the strategies to create authenticity on cultural homogeneity and heterogeneity at the local level were analyzed.

Global competition in the wine sector has been escalating with the entrance of new countries to the global market and production. In other words, Old World Wine producers are leaving their places to New World Wine producers. China, entering the wine sector, has made a substantial progress in the wine production

and marketing. Mitry et al. (2009) emphasized the role of China in the global wine industry. Significant growth rates of production and marketing of wines by Chinese-owned wineries have been expressed by the researchers. Moreover, the underlying factors for China to become a progressive wine producer have also been investigated.

Most of the researchers have focused on country examples and case studies with respect to wine production and trade. The local characteristics and geographic features have determined the quality and kind of wine production. Increasing share of wine trade have also created new investment areas for wine producers such as wine tourism. On the other side, researches concerning wine have predominantly focused on wine consumers' preferences and behaviors. Therefore, it is intended in the scope of this research to concentrate on decision-making process of wine producers rather than the tendencies of wine consumers. The research is chosen as Kalecik District which takes place in Ankara-Turkey. The main contribution of this research can be explained as the use of Multinomial Logit model in the decision-making process of Kalecik district wine producers which constitutes an original approach among former researches regarding Turkish wine sector.

### 3. OBJECTIVE OF THE RESEARCH AND RESEARCH HYPOTHESES

The objective of this research is to highlight the basic disparities among Kalecik wine producers through their decision-making process. In other words, the social, cultural and economic background and their impacts on attitudes against agricultural innovations are the main focal point of this research. On the other hand, observing the diversities of farmers according to selected indicators by using Multinomial Logit Model constitutes a base for apprehending the risky behaviors of wine producers in the region according to research results. Finally, the ultimate aim of the research can be exposed as to guide agricultural policy makers by using research results for preparing the background for more efficient future agricultural improvement or rural development projects. Therefore, it is intended to enable developing different strategies for farmers who embrace distinctive attitudes against agricultural innovations.

The main aim of this research as mentioned before is to search and understand the decision-making process of Kalecik district wine producers. Therefore, the relationships between social and economic factors as specified below, constitutes the basis of the research hypotheses stated below.

**H1:** There is a significant positive relationship among age, education, marketing opportunities, agricultural cooperation, immigration and decision-making of farmers.

**H2:** There is no significant positive relationship among cultivated farm area, land ownership, accessibility to agricultural inputs, distance to city center and decision-making of farmers.

SPSS (Statistical Package for Social Sciences) software is used for the statistical tests for the evaluation process during the research.



## 4. RESEARCH METHODOLOGY AND TIMELINE

The research methodology of this research is based on the use of Multinomial Logit Model. The use of categorical data in the scope of this research and the importance of qualitative interpretation are the basic determinants for selecting this methodology.

The logistic regression model can be used when the response variable assumes only two values, generically, 1 for success and 0 for failure, however, as mentioned by Chatterjee and Hadi (2006), it is possible to extend logistic regression model to situations where the response variable assumes more than two values. There is no natural ordering of the categories. The resulting model can be analyzed by using slightly modified methods that were used in analyzing the dichotomous outcomes. This method is called the multinomial (polytomous) logistic regression.

In detailed way, we can explain the multinomial logistic regression model as follows:

We can assume that we have  $n$  independent observation and  $p$  explanatory variables. The qualitative response variable or dependent variable has  $k$  categories. In order to construct the logits in the multinomial case one of the categories is considered as the base level and all the logits are constructed relative to it. It is possible to choose any category as the base level. It is assumed here as an example that category  $k$  is the base level in the method. Due to that fact, that there is no ordering, it is apparent that any category may be labeled  $k$ . On the other hand, we can assume that  $\pi_j$  indicates the multinomial probability of an observation falling in the  $j$ th category. Our aim is to find the relationship between this probability and the  $p$  explanatory variables,  $X_1, X_2, \dots, X_p$ . The multiple logistic regression model finally appears as follows;

$$\log\left(\frac{\pi_j(x_i)}{\pi_k(x_i)}\right) = \beta_0_j + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_p x_{pi} \quad (4.1)$$

where;  $j = 1, 2, \dots, (k - 1)$  and  $i = 1, 2, \dots, n$ .

Since all the  $\pi$ 's add to unity, this reduces to:

$$\log(\pi_j(x_i)) = \frac{\exp(\beta_0_j + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_p x_{pi})}{1 + \sum_{j=1}^{k-1} \exp(\beta_0_j + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_p x_{pi})} \quad (4.2)$$

### 4.1. Theoretical Background of the Research

Theoretical background through the formation of this research has embodied with the idea of focusing the wine sector in Turkey. The increasing importance of wine sector in Turkey has been the major underlying factor for designating the research theme. On the other hand, the lack of former studies concerning the

decision-making process of wine producers in Turkish wine industry has been the impetus for the determination of research topic. Moreover, Kalecik has become an important district with available climatic and environmental structure for viniculture. Nowadays, with the introduction of Kalecik Karası to the world market has attracted the attention of foreign wine consumers.

Finally, the main distinctive feature of this research can be explained with the use of categorical data for assessing the attitudes of Kalecik wine producers against agricultural innovations and selecting Multinomial Logit model as the major methodology of the research in Kalecik Karası wine production and marketing.

The formation of research topic and literature review concerning former researches has been completed during the period of 2007-2008. On the other hand, after completing the literature review and finalizing the research topic and topic and methodology, the next step of the research has been the collecting of necessary data with survey applied to Kalecik wine producers. The time period for collecting the data for the research has been accomplished in three months (May-June-July) on 2008 in Kalecik district after the determination of sampling method and sampling size which is specified on chapter 7.

## **4.2. Contribution of This Study to Scientific Knowledge**

The importance of this research for its contribution to scientific knowledge can be summarized as follows:

- Increasing productivity, investigating the social and economic background of farmers and improving agricultural tourism have been the main research topics of former agricultural researches conducted in Turkey. However, the focal point of this research is to understand the social and economic background of Kalecik district wine producers' and their impacts on decision-making process.
- Another important contribution of this research is to highlight the marketing failures in the region. As a result, the homogeneity of farmers for decision-making process. This research has focused to realize these failures and to put forward solutions to achieve better and fair marketing structures. Therefore, it is intended to transform this unique structure to better reflect the reality for wine producers.
- Quantitative methods were mainly used in the former studies in order to assess the impacts of agricultural assets on farm productivity. Thus, qualitative data and its evaluation were mainly ignored in many researches. One of the important aims of this research is to focus mainly on qualitative data.
- The use of Multinomial Logit model to understand the decision-making process of farmers also constitutes a different structure for this research.

- The lack of studies in Turkey focusing on “risk” for wine sector increase the importance of this research. Thus, definition of risk and developing strategies for avoiding risk, give originality to this research.

Agricultural innovations and their adoption process by different wine producers in Kalecik district have vital importance for the sustainability of wine production for the future generations. According to the research results, factors affecting the sustainability of wine production in the region are observed to help both for agricultural producer organizations and for agricultural policy-makers.

## 5. CONCEPTUAL FRAMEWORK AND GENERAL OVERVIEW OF WINE INDUSTRY

This chapter aims to identify conceptual framework and general overview to wine sector. New World and Old World wine producing countries and their differentiation is also explained by giving country examples. Therefore, after giving the general production and international trade (export and import) values in the overall world wine industry, European Union (EU), United States of America (USA), Australia and Chile are examined in the historical and marketing perspective.

### 5.1. Determinants of Wine

There have been plenty of determinants for wine selection either for producing or consuming. This chapter aims to express the basic determinants and definitions of wine which mostly affects the price and quality of in the global wine trade among consumers.

**Bouquet:** A tasting term used to describe the smell of the wine as it matures in the bottle

**Marc:** The matter of difference in every year wine due to disparities of global climate.

**Maceration:** The period of time the grapes spend in contact with their skins longer contact brings out at times more subtle or even more robust flavors; more color; more aromas; more tannins; etc

**Oxidation:** A chemical reaction and imperfection in wine resulting from over exposure to oxygen.

**Primeur:** Special process of wine production and bottling without displacing the primary aroma. These kind of wine have to be consumed without any delays.

**Varietal:** A wine that uses the name of the dominant grape from which it's made, such as Cabernet Sauvignon, Chardonnay and Riesling.

**Acidity:** All wines naturally contain acids, which should be in proper balance with fruit and other components. Sufficient acidity gives liveliness and crispness and is critical for wines to age. This is a key element to a wine's longevity and a leading determinant of its balance.

### 5.2. Climatic Conditions for Wine Production

Wine cultivation when observed among major producer countries in the world acquires specific climatic and geographical conditions. Therefore, it is clear that wine cultivation has not been possible in every country and climate.

Bulal (2005) in her research, figures out the main characteristics of wine cultivation. We can briefly point out these as "Generally, the most available belt

for wine cultivation takes place among 34°- 49° north and south latitudes. In details, this land appears in 20°-52° latitudes in northern hemisphere and 20°-40° latitudes in southern hemisphere. Temperature in is the major obstacle on the extension of wine cultivation when moved to north.” On the other hand, Jones et al. (2005) emphasize the effects of other factors such as solar radiation, heat accumulation, temperature extremes, precipitation, wind, and extreme weather events. Researchers, in addition, refer the significant roles climate change and global warming in the quality variations of viticulture. Researcher has observed the period among 1950 and 1999 and has reached statistically significant results proving the impacts of this change on wine cultivation in specific regions.

### **5.3. Brief History of Wine**

Wine as one of the most favorite alcoholic beverages in the world has a long history either for its usage or processing. Grapes have been cultivated in Europe and Asia for thousands of years. Grape cultivation for wine production is almost as old as civilization. As McGovern et al. (1997) highlight, wine’s positive attributes and uses have been commented by many writers as early as the 3<sup>rd</sup> millennium B.C. Researchers, in addition, mention the importance of extensive discussions about dietary, medical, and social roles of wines in all kinds of ancient literature. Moreover, the dichotomy of wine has been also stressed: “praised when consumed in moderation, condemned when consumed in excess.”

Many writers and researchers observed that wines produced from *Vitis vinifera* have been glorified and praised. Moreover, positive attributes and uses of wine have been commented by writers as early as the 3<sup>rd</sup> millennium B.C. In addition to usage of wine for dietary, it was also used for medical and social purposes in the ancient civilizations.

Nowak and Wichman (2005), apart from McGovern et al. (1997), emphasize imbibing history of people since at least 4000 B.C. They mention the birthplace of winemaking Mesopotamia (Persia), near present day Iran, and Egypt-the end-points of the Fertile Crescent as far back as 6000 B.C. They also add that recent discoveries point to winemaking in China during the same period. Stevens (1861), additionally puts forward the information of wine in ancient history as follows:

*“From Palestine or Asia Minor into the Greek islands the transition was natural, and from thence along the shores of the Mediterranean to the Straits of Hercules the progress was easy. It was cultivated in France before the time of the Caesars-first, it is believed, at Marseilles,-and was introduced into Germany at a later period.”*

Due to the location of Turkey (Anatolia) being partly involved in Mesopotamia region, the evidences from as far back as 2300 B.C. have shown that, Anatolia was one of the major producers among other winemaking civilizations as expressed by TARIŞ (2010) (Figs, Raisins, Cotton and Oil Seeds Agricultural Sales

Cooperatives Union). During Anatolian Civilizations wine was important for the survival of the people as an economic activity and as an important tool for trade. On the other hand, the domestic consumption of wine in Anatolian Civilizations was in low levels.

#### **5.4. Wine Industry in the World**

Today, as Bulal (2005) emphasized, wine production occurs throughout the world, and wine is increasingly entering international markets. 90% of the world's current wine species occurs as *Vitis Vinifera* L. In addition, Schnepf (2003) specified that the value of international wine trade has risen from under \$1 billion in 1977 to over \$3 billion by 1989, and to over \$7 billion in 2001. The European Union has traditionally dominated global wine production and exports.

Table 1 demonstrates the shift in wine production in the world for the period of 1997-2007. There has been an increase in the total wine production by 2004 when compared to other production years. However, the uneven shift in climatic conditions year by year caused instability in the overall production of wine. According to Food and Agricultural Organization (FAO) (2010) data, it is observed a decrease in 2007 (263.514.72 tones) than in 1997 (266.696.78 tones).

Regarding the latest situation of grape production in the world, it is observed that, there has been a decrease in the vine acreage for Italy, Spain, France and Germany which were well known as "Old World" countries. One of the major reasons of this decrease as Bulal (2005) mentioned, is the modernization program of European Union for the old vineyards. It is also emphasized that, the reconstruction process against the threat occurred by the increasing effectiveness of "New World" countries such as Australia, New Zealand, South Africa and the United States.

In addition, Remaud and Couderc (2006) highlight a decrease in the traditional wine producing countries especially in domestic consumption and the opening of wine markets of non-producing countries and the development of their domestic consumption. According to Table 2, it is clear that the average wine consumption has the highest level during 1981-1985 period with 280,718,000 (hl). In addition, there has been an increase starting from 1991 until 2005.

Table 1. Wine Production (as processed crop) in the World

<b>Years</b>	<b>World</b>
1997	266.696.78
1998	264.692.59
1999	285.230.68
2000	283.267.34
2001	270.055.50
2002	259.937.20
2003	268.661.65
2004	307.709.19
2005	285.216.47
2006	284.837.21
2007	263.514.72

Source: Food and Agricultural Organization of the United Nations (FAO), Statistical data for the Production of wine as processed crop in 2007, 22 Jan.2011, (<http://faostat.fao.org/site/636/DesktopDefault.aspx?PageID=636#ancor>)

Table 2. World Wine Consumption (in hl)

<b>Period then year</b>	<b>Consumption</b>
1981-1985	280 718 000
1986-1990	240 244 000
1991-1995	223 877 000
1996-2000	224 253 000
2000	224 791 000
2001	226 870 000
2002	228 614 000
2003	235 886 000
2004	237 393 000
2005	237 674 000

Source: Wine Institute, The Voice for California Wine, Situation Report for the World Vitivincultural Sector in 2005, 22 July 2008, (<http://www.oiv.int/uk/accueil/index.php>)

#### **5.4.1. Wine Industry in the European Union**

It is well known that, Europe has a vital role in the global alcohol market, acting as the source of a quarter of the world's alcohol and over half of the world's wine production. Alcohol trade, as Anderson and Baumberg (2006) highlighted, is even more centered on Europe, with 70% of alcohol exports and just under half of the world's imports involving the European Union, with the majority of this trade being between Union countries. Yilmaz (2006) emphasized that European Union

countries, having the export capacity for fresh grape to 74 countries, have also the import from 40 countries excluding EU countries. On the other hand regulatory constraints and lack of dynamism in the marketing strategies in EU have contributed to a large loss of market share for EU wines relative to competing wines, both in the domestic and export markets.

The EU Commission agreed in December 2007 on a profound reform of its common wine market policy in order to catch up with its new-world competitors. The basic aim of the reform can be identified to increase the competitiveness of EU wine producers worldwide. Table 3 shows the wine production of EU for 2001-2008 period.

Table 3. Wine Production of EU (tones)

<b>Years</b>	<b>Production</b>
2001	18548371
2002	17945119
2003	18217588
2004	21110547
2005	18146252
2006	18498062
2007	17176852
2008	17560744

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), wine production of EU for 2001-2008 period, 20 January 2010, (<http://faostat.fao.org/site/636/DesktopDefault.aspx?PageID=636#ancor>)

Table 4 indicates the area of harvested grape in EU for 1997-2007 period. As understood from the table during this period due to agricultural policies and interventions, wine production experienced a decrease. On the other hand as shown in Table 5 that shows top 5 wine exporting countries in 2007. France is the biggest wine exporting country. Following France, Italy as one of the Old World countries appear to be the second biggest wine exporting country. However, with the openness to new markets and other factors, Australia and Chile have raised their wine exports as New World countries. Another important indicator for the comparison of New World and Old World is the unit value of the wine exporters. In other words, Australia with the third rank among wine exporters has higher unit value than Italy having second rank. The basic reasons of the breakdown in Old World wine trade can be expressed as follows:

- The change in the preferences of wine consumers' taste
- Breakdown of marketing strategies for EU



- The rise of the euro against other currencies
- Change in the consumption patterns
- Openness to new markets
- Quality of wine
- Lack of global investing strategies
- The decrease of the prices in favor of lower quality wine

After above given information, it is visible that the New World Countries are better positioned than Old World Countries to capitalize on the opportunities created through industry globalization and its driving forces. Although having the advantage of being traditionally strong in home markets, Old World countries need to better adapt to industry-wide production and marketing changes, economies of scale advantages and the importance of attracting foreign investment.

Table 4. Area of Harvested Grape (ha) in EU

<b>Years</b>	<b>European Union</b>
1997	394.701.9
1998	391.736.7
1999	390.295.6
2000	392.022.0
2001	387.689.8
2002	387.181.2
2003	386.001.6
2004	373.786.9
2005	371.626.4
2006	366.226.1
2007	364.094.4

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), Area of Harvested Grape (ha) in EU, 20 January 2010, (<http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#ancor>)

Over many years France has been leading as the biggest wine exporter among other countries. France, well known as high quality wine producer and exporter, has the second biggest vineyard acreage (2.179.000 acres) after Spain (2.900.000 acres) as shown in Table 5.

Table 5. Top 5 Wine Exporting Countries for 2007

<b>Rank</b>	<b>Area</b>	<b>Quantity (tonnes)</b>	<b>Value 1000 \$</b>	<b>Unit Value (\$/tonne)</b>
1	France	149.293.3	925.418.0	619.9
2	Italy	182.663.5	474.160.9	259.6
3	Australia	781.419	248.846.2	318.5
4	Chile	115.780.8	241.411.9	208.5
5	Spain	143.396.6	239.588.1	167.1

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), Top 5 Wine Exporting Countries, 20 January 2010, (<http://faostat.fao.org/site/342/default.aspx>)

As seen on Table 6, France has the second rank with 217.900.0 acres in world vineyard acreage after Spain with 290.000.0 acres. It is observed that leading wine exporters such as France have adopted the Chateau System on the process of wine production. Tosun (2005) explains this system as the process of wine-making where the vine grows in the surroundings of a chateau or a house. Thus, it is possible to grow the best quality of vine on the borders of each chateau. Finally, at the end of wine process it is observed that the wine is given the name of the chateau where the process begins.

Remaud and Couderc (2006) specifies that “*France, and the “Old World” in general, have historically given primacy to the origin of the grapes, and for centuries, have mainly promoted their “appellations” or specified regions through regional, family-owned businesses.*” Researchers also mention that about 50% of the wine produced in France is issued from one of 700 cooperatives, which have a main objective of maximizing payment to their grape suppliers, who are also their owner.

In addition Castaldi et al. (2006) highlight that French wine makers also face external economic, social and political challenges such as loosing market share in the United States due to informal boycotts in the wake of the Iraq war.

Consequently, the balance of wine sector in the globalized market economy has been changing in favor of New World wine producers. The traditional background of production process, governmental interventions joining with the lack of marketing strategies have triggered the rise of New World countries.

Table 6. World Vineyard Acreage By Country for 2006, (000) Acres

Country	Acres
Spain	2900
France	2179
Italy	2063
Turkey	1410
China	1211
United States	934
Iran	745
Portugal	608
Romania	580
Argentina	543
World Total	19392

Source: TOSUN, M. Development Bank of Turkey, Investigation of Wine Sector, SA-05-04-15, 2005, ANKARA, (quot. 10.01.2010), ([http://www.tkb.com.tr/userfiles/pagefiles/sector-arastirmalari/SA-05-04-15\\_Sarap\\_Sektoru.pdf](http://www.tkb.com.tr/userfiles/pagefiles/sector-arastirmalari/SA-05-04-15_Sarap_Sektoru.pdf))

The main of this research as mentioned in the previous chapters is to highlight the recent situation of wine sector in Turkey while focusing on the evaluation of the survey results obtained from Kalecik district which is one of the important wine regions in Turkey. The marketing structure has also been focused to understand the failures and advantages of the district.

#### **5.4.2. Wine Industry in the United States of America**

The introduction of European grapes to the Eastern colonies of North America by Lord Delaware as Read and Gu (2003) expressed, was in 1619 and to the western shore of the continent even earlier by the conquistadors, with Cortez, then Governor of Mexico, ordering grapes to be planted about 1525. According to United States of America, Department of Commerce, International Trade Administration Department records about U.S. Wine Industry for 2008, There are more than 23,000 farms that grow grapes, of which 90 percent are on plots smaller than 100 acres. In 2007, while total U.S. grape bearing area rose a modest 0.5 percent to 939,250 acres (380,109 hectares), total grape production rose 5.7 percent to 6.73 million tons. About 60 percent of total grape production is wine grape production and that portion rose 3.5 percent to 3.76 million tons. The U.S. Department of Commerce (2008) estimates that California accounted for 61 percent of allwines sold on the U.S. market; imported wines account for 26 percent; and other U.S. state wines account for 13 percent.

In the United States, as Schnepf (2003) denotes, wine, like most alcohol and liquor products was traditionally viewed as a luxury item in the consumer's budget. Researcher, as a result, specifies that the average U.S. wine consumer was

fairly sensitive to price changes, and most expenditures on wine were made by higher-income households with larger shares of discretionary income.

According to the results of MKF Research on The Impact of Wine, Grapes and Grape Products on the American Economy 2007:

- *2.3 million tons of raisins, representing 30% of total grape production, generated \$560 million in retail value in 2005.*
- *95.8 million 19-pound box equivalents of table grapes were shipped out of California with a value of \$3 billion in 2005. Approximately 35% of the crop is shipped to export markets each year. Table grapes, 99% of which commercial crop is grown in California, represent about 11% of total grape production.*
- *615,210 tons of juice grapes produced grape juice and grape juice products with a retail value of more than \$2.8 billion in 2005. Juice grapes represent about 9% of total grape production.*

Goodhue et al. (2007) denotes the importance of California to be accounted for roughly 90% of the value of U.S. wine production in 2006. U.S. per capita wine consumption and the quality of wine consumed continue to rise.

In addition, Brunke et al. (2008) emphasizes that, California had about 4,600 wine grape growers, about 2,300 wineries and produced 650 million gallons on about 470 thousand acres. After this information, researchers highlight the importance of California (the biggest wine producer state in the U.S.A.) to produce about 14 percent as much wine as the EU on about five percent of the area. Moreover, they additionally put forward that, the EU is a major exporter to the United States, shipping about \$2.5 billion worth of wine to the U.S. market in 2007.

The recent international top ten wine exporters acquired from FAOSTAT (2007) as shown in Table 7 exerts the importance and the rise of USA wine trade in the global marketing. As observed from Table 8, USA having (845.234) tones, is the second biggest wine importer following U.K. with (1.178.888) tones.

On the other hand, as seen from Table 7, USA, having 423.118 tones, has the seventh rank among other wine exporting countries in the world while France is having the first place. According to Table 7, it is also important to draw attention to Chile as fourth, South Africa as ninth and New Zealand as tenth wine exporters in the world for 2007.

Table 7. Top 10 Wine Exporters in 2007

Rank	Area	Quantity (tonnes)	Value (1000\$)
1	France	1.492.933	925.418.0
2	Italy	1.826.635	474.160.9
3	Australia	781.419	248.846.2
4	Chile	115.780.8	241.411.9
5	Spain	143.396.6	239.588.1
6	Germany	344.412	990.021
7	USA	423.118	902.852
8	Portugal	341.935	818.494
9	South Africa	499.869	668.629
10	New Zealand	841.71	559.343

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), Top 10 Wine Exporters in 2007, (quot. 10 January 2010), (<http://faostat.fao.org/site/342/default.aspx>)

These countries, as mentioned before, due to their successful marketing policies, well managed foreign investments and well established production process have been increasing their market share in the world wine industry as New World wine producers.

Table 8. Top 10 Wine Importers for 2007

Rank	Area	Quantity (tonnes)	Value (1000\$)
1	United Kingdom	1.178.888	5.010.178
2	USA	845.234	4.623.945
3	Germany	1.418.522	2.697.134
4	Canada	311.784	1.470.082
5	Belgium	311.152	1.425.679
6	Japan	166.664	1.244.057
7	Netherlands	342.598	1.032.887
8	Switzerland	185.869	998.578
9	France	526.227	734.173
10	Denmark	186.760	720.407

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), Top 10 Wine Importers in 2007, (quot. 10 January 2010), (<http://faostat.fao.org/site/342/default.aspx>)

Table 8, in addition, figures out the top ton wine importers of wine in 2007. As observed from Table 8, USA having (845.234) tonnes, is the second biggest wine importer following U.K. with (1.178.888) tonnes. According to data obtained by USDA (2008), California has the largest wine producing state accounted for close to 90 percent of total U.S. wine grape production and the fourth leading wine

producer in the world. Moreover, it is also informed that California grape production rose 3.1 percent to 5.9 percent to 5.9 million tons in 2007.

The important advantages of U.S.A. wine industry can be summarized as:

- Development of marketing and sales through internet
- Well established advertisement strategies
- Implementation of formal sustainable practice programs
- Improving the wine tourism

### **5.4.3. Wine Industry in Australia**

Australia, taking the third place among the wine exporters, can be called as the leading exporter when compared to other New World countries such as South Africa, Chile, USA and New Zealand.

Cusmano et al. (2009) in their citation to (Aylward, 2004) explain that “*The successful experience of Australia has become best practice for adoption by latecomers, in particular South Africa and more recently Chile. The Australian model is rather centralized, with two main actors, the Australian Wine and Brandy Corporation, which is the national sectoral organization, and the Australian Wine Research Institute, which is the national research body, playing a pivotal role, but strongly linked to government action*”

While being accounted for less than 1% of the world wine production in 1960s, Australia produced approximately 4.5% of world wine production (124.478.0 tones) in 2008. According to the information obtained from Australian Wine and Brandy Corporation (2007), Australia has approximately 2,000 wine companies and the sector employs an estimated 31,000 people.

The successful wine policy of Australia can be expressed as follows:

- Developments in the Tax Systems
- Successful Export Policies and Programs
- Better understanding of the structure of Market Demand
- Focusing on the consumption patterns
- Giving importance to wine tourism
- Improving distribution
- Creative brand-building strategies (Morris, 2000)

In parallel with above given factors, Cusmano et al. (2009) defines the impacts of following issues for the success of New World countries:

- Flexibility to the rapidly changing international markets

- Supporting institutions, such as business associations and the research infrastructure
- Institutional innovations
- Building up' wine products to fit with international tastes
- Research & Development strategies with market objectives

Castaldi et al. (2006) emphasize that despite having small populations, Australia and Chile are very well positioned to produce and export wine with their adaptive, large-scale producers and their great lure for foreign investments, providing them with a position of a strong competitive advantage. Researchers also imply that U.S. has the advantage of economies of scale and scope in marketing offer. Besides, Aylward (2003) keynotes the central roles played in Australia by the Grape and Wine Research Development Corporation, the Winemakers Federation of Australia, the Australian Wine Research Institute and the Cooperative Research Centre for Viticulture in coordinating funding, research, information, exports and government lobbying. The impressive success of Australia was interpreted by Aylward and Zanko (2006) as *“It is no coincidence that in terms of core innovation and export measures, small and medium sized enterprises (SMEs) in the South Australian wine cluster perform substantially better than either non-cluster firms or their counterparts in the industry’s less developed clusters”*.

#### **5.4.4. Wine Industry in Chile**

One of the important actors to create the dramatic change in the global wine industry as a New World country is Chile. According to FAOSTAT (2007) data, Chile, in 2007, after France, Italy and Australia has the fourth rank among wine exporters in the world with 1157808 tones of wine production and 2414119 (1000 USD) exporting value.

Bell and Giuliani (2007) identifies Chile to be considered as a shining star among the so-called ‘new world’ producers, for the production and export of wine. Over the past 30 years, apart from a dip in the early 1990s, growth in Chilean production has been dramatic. Exports as a proportion of total production have risen more rapidly than in the other ‘new world’ countries, with nearly half of total production exported. This resulted in an extraordinary transformation in the structure of production and trade. However, the quality of Chilean wine did not improve until the late 1990s.

After a decade Castaldi et al. (2006) draws attention to the growth of Chile’s exports more than six fold to 309 million liters in 2001. In parallel with Castaldi et al. (2006), Crowley (2000) stresses the arrival of first steps of the wine revolution to Chile in 1979. Researcher however, implies that the beginnings of widespread adoption and true impact did not surface until almost a decade later. Since then Chile's wine industry has changed markedly.

One of the basic underlying factors for the dramatic improvement of Chile's wine industry as a New World country can be explained as to constitute the linkage between local firms and multinational joint ventures as Kunc and Bas (2009) explained in their citation to Santarelli and Vivarelli (2007). In order to summarize these positive effects of this corporation can be divided into two:

- Pairing up local firms and multinationals in favor of local markets to use the advantages in the international competitiveness
- Evaluation of local resources with more efficient usage of know-how brought by foreign firms
- Increasing the trenchancy of existing human capital in the industry through diffusion of knowledge

The term "glocalization" perfectly reflects the background of the improvements in the Chilean wine industry. According to Svensson (2001) "*The glocal strategy approach reflects the aspirations of a global strategy approach, while the necessity for local adaptations and tailoring of business activities is simultaneously acknowledged*". Researcher, in addition, emphasizes the difference of the term from the global strategy approach, since it explicitly recognizes the importance of local adaptations and tailoring in the marketplace of business activities. Besides the well established structure of glocalization, Chilean wine industry has also raised its importance for its price-quality relationship, health factors and the agro-climate conditions as expressed by Felzensztein(2002).



## **6. WINE INDUSTRY IN TURKEY**

According to archaeological findings it is recorded that grape and vine production were given critical importance in Anatolia during Hittites. Moreover, according to TARIŞ (2010) data, *“during 1800-1500 B.C. it is also recorded that vine and grape production were very well developed and used in religious ceremonies and served to Gods. Archeological digs have also introduced us the agricultural law to protect vineyard and crops which is compatible to today’s regulations. Another impressive proof of the importance of vine production mainly in Aegean and Marmara Regions (Lapseki, Çanakkale, Bergama, Aliğa and Dikili, Bozcaada, Çeşme, Karaburun and Seferihisar) can be remarked as the paintings about vine and wine glass on the ancient coins.”*

Vine production was also an important economic activity during Ottoman Empire, however, together with the Islamic religion, consumption of wine was restrained. Bulal (2006) explains that period as: *“The restraint for grape juice was not including the process and production of dried fruit pulp, grape molasses, fruit sausage and semi-solid molasses of boiled juice of grapes. Furthermore, the production of table grape and raisin was also important during Ottoman Empire.”* Therefore, wine production has always been given importance in the process of production and trade through Anatolian Civilization’s history.

### **6.1. Latest Advances of Turkey’s Wine Industry**

As mentioned above, vine cultivation and wine production has a very deep history in Turkey. Favorable climatic conditions and availability of soil for cultivation bring about the chance to Turkey for the production of a wide variety of grapes. Moreover, Turkey ranks sixth in the world grape production.

Table 9. World Grape Production (Top 10 Countries)

Rank	Area	Production (Int \$1000)	Production (MT)
1	Italy	395.215.8	739.254.3
2	China	314.852.7	678.689.5
3	USA	296.157.9	638.409.0
4	France	280.422.9	601.905.6
5	Spain	278.122.0	596.470.0
6	Turkey	167.596.9	361.278.1
7	Islamic Republic of Iran	139.170.0	290.000.0 (F)
8	Argentina	134.531.0	290.000.0 (F)
9	Chile	109.016.5	235.000.0 (F)
10	South Africa	841.052	181.300.3

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), World Grape Production (Top 10 Countries) (quot. 10 January 2010), (<http://faostat.fao.org/site/339/default.aspx>)

Table 10. Wine Production (as processed crop) in Turkey (tones)

Years	Tones
1997	336.13
1998	344.63
1999	264.00
2000	247.66
2001	268.29
2002	261.62
2003	225.48
2004	267.24
2005	259.82
2006	252.15
2007	213.02

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), Wine Production as processed Crop in Turkey, (quot. 10 January 2010) <http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#ancor>

Table 9, indicates the rank of Turkey in the overall grape production. According to the table, Italy is having the first rank for grape production. Following Italy, China, USA, France and Spain are having higher grape production levels when compared to Turkey.

The share of Turkey in overall wine production by 2007 occurs as 213.02 tones as indicated in Table 10. In other words, 8.08 % of world's wine production has

been observed in Turkey. Area of harvested grape in Turkey emerges as 484.610 hectares by 2007, which comes up to 13.3 % of European Union (EU) production. Area of harvested grape is also shown in Table 11.

Table 11. Area of Harvested Grape (ha) in Turkey

Years	ha
1997	545.000
1998	541.000
1999	535.000
2000	535.000
2001	525.000
2002	530.000
2003	530.000
2004	520.000
2005	516.000
2006	513.830
2007	484.610

Source: United States Department of Agriculture, Foreign Agricultural Service (FAOSTAT), Area of Harvested Grape in Turkey, (quot. 10 January 2010) (<http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#ancor>)

Turkey has been increasing its importance in wine production with having 4<sup>th</sup> rank in the vineyard acreage in the world by 2006. Despite having the 4<sup>th</sup> rank in the world for vineyard acreage with 1.410.000 acres following Spain, France and Italy, Turkey has been a country with low level of wine production and consumption. Nevertheless, wine sector occurs as one of the most developing sectors in Turkey.

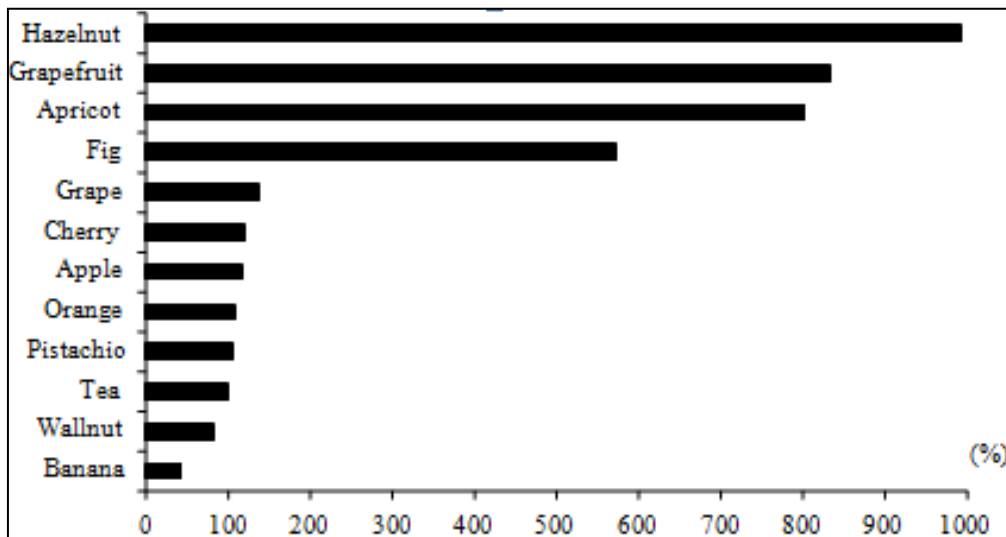


Figure 1. Efficiency Levels of Selected Products for 2000-2006 Period (%)

Source: Turkish Statisticacl Institute, Efficiency Levels of Selected Products for 2000-2006 Period, (quot. 10 January 2010) (<http://tuik.gov.tr/PreHaberBultenleri.do?id=4048>)

According to the data acquired from Turkish Statistical Institute, efficiency levels of basic agricultural products grown in Turkey for 2000-2006 period is shown in Figure 1. Turkey as understood from the table above, has a high variety of products with self-sufficient levels. Excluding banana production, Turkey, due to climatic conditions and geographical location, has the advantage of high levels of production after satisfying the domestic demand. Among above mentioned agricultural items, it is visible that the capacity of grape production is also in high levels, however, the majority of the produced grapes have been used as table grapes instead of wine production. This situation, as explained before, has emanated due to religious background of rural communities and the general agricultural policy failures to approach wine industry as a disregarded sector. On the other hand, it has been experienced in many New World countries that wine industry has the potential to attract joint venture and create job opportunities in conjunction with the creation of high added value when compared to table grape production and trade.

Among major agricultural items Turkey produces, grape as involved in Figure 2, has the first rank with the highest level of consumption in Turkey's domestic market. Therefore, grape consumption takes place as an important agricultural product. However as shown in Table 12, the majority of the consumption of grape in Turkey is consumed as table grape.

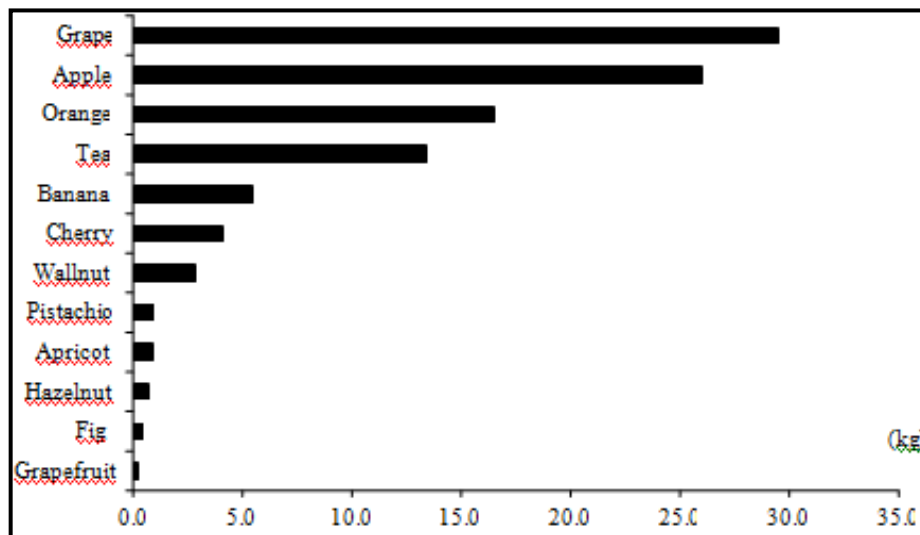


Figure 2. Individual Consumption of Selected Products for 2000-2006 Period

Source: Turkish Statistical Institute, Individual Consumption of Selected Products for 2000-2006 Period (kg), (quot. 10 January 2010) (<http://tuik.gov.tr/PreHaberBultenleri.do?id=4048>)

Table 12. Cultivated Area of Grape in 2006 (%)

<b>Products</b>	<b>Cultivated Area</b>	<b>Production (%)</b>
Table Grape	54,2	50,3
Raisin	31,0	35,5
Wine Grape	14,8	14,2
Total	100,0	100,0

Source: Turkish Statistical Institute, Cultivated Area of Grape in 2006, (quot. 10 January 2010) (<http://tuik.gov.tr/PreHaberBultenleri.do?id=3979>)

Table 12 indicates the amount of cultivated grape area of grape, raisin and wine grape for 2006. As seen from the table, the share of cultivated area for table grape is 54,2%. Following table grape, raisin as the second, has the share of 31% and wine grape is the last with 14,8%.

The fundamental changes in Turkish alcoholic beverages as Gümüş and Gümüş (2007) mentioned can be expressed according to the date it took place as follows:

- *Liberalization of private sector wine imports and privatization of state alcohol monopoly in 2001*
- *Establishment of Tobacco, Tobacco Products and Alcoholic Beverages Market Regulatory Authority (TAPDK) in 2002*

Table 13. Diversity of Grape Production According to Regions in Turkey

<b>Regions</b>	<b>Grape Variety (Black)</b>	<b>Grape Variety (White)</b>
<b>Marmara-Thrace</b>	Pinot Noir-Cinsault Adakarasi-Papazkarasi Semillion-Kuntra Gamay-Karalahana Cabernet Sauvignon-Merlot Syrah-Sangiovese	Clairette-Chardonnay Riesling-Semillion Beylerce-Yapincak Vasilaki-Sauvignon Blanc
<b>Aegean</b>	Carignan-Çal Karasi Merlot-Cabernet Sauvignon Alicante Bouschet	Semillion-Sauvignon Blanc Chardonnay-Bornova Misketi
<b>Black Sea</b>	Öküzgözü-Boğazkere	Narince
<b>Mid-Anatolia</b>	Kalecik Karasi-Papazkarasi	Emir-Hasandere Sungurlu-Akdimrit
<b>Mediterranean</b>	Sergi Karasi-Burdur Dimriti	Kabarcik-Dökülgen
<b>East Anatolia</b>	Öküzgözü-Boğazkere	Narince-Dökülgen
<b>South-east Anatolia</b>	Horoz Karasi-Öküzgözü Boğazkere-Sergi Karasi	Dökülgen-Kabarcik Rumi

Source: AZABAGAOGLU, M. O., AKYOL, A. and OZAY, A. Examining the Turkish Wine Industry : Marketing Effectiveness and Recommendations for Increasing Its Competitive Performance, 2006, New Zealand Journal of Crop and Horticultural Science, ISSN 0114-0671, vol. 34, no.3, p. 257-268, citation from (Çelik, 2002)

Table 14. Wine Producing Companies

<b>Wine Producing Company</b>	<b>City</b>	<b>Capacity (liters)</b>
Mey Alkollü İçkiler San. ve Tic. A.Ş. Tekirdağ Fab.	Tekirdag	21.342.600
Kavaklıdere Şarapları A.S.	Ankara	14.329.715
Doluca Bağcılık ve Sarapçılık A.S.	Tekirdag	12.514.896
Sevilen Şarap San. A.S.	Izmir	7.000.000
Yazgan Şarapçılık San. Tic. A.Ş.	Izmir	4.553.000
Mey Alkollü İçkiler San. ve Tic. A.Ş. Elazığ Fab.	Elazig	4.284.000
Taskobirlik	Nevsehir	3.475.000
Pamukkale Şarapçılık San.ve Tic. A.Ş.	Denizli	2.628.090
Küp ŞarapçılıkFer. Gıda San.ve Tic Ltd. Şti.	Denizli	2.200.000
Turasan Şarapçılık A.Ş.	Nevsehir	2.000.000
Talay Şarap A.S.	Canakkale	1.869.800
Mey Alkollü İçkiler San. ve Tic. A.Ş. Ürgüp Fab	Nevsehir	1.225.777
Atatürk Orman Çiftliği Şarap Fab.	Ankara	1.206.065
Ataol Bağcılık ve Şarapçılık Koll. Şti.	Canakkale	1.117.847
Sarköy Çiftlik Market – Gökhan Küçük	Tekirdag	1.000.000
Others	-	14.886.209
Total	-	95.632.999

Source: TOSUN, M. Development Bank of Turkey, Investigation of Wine Sector, SA-05-04-15, 2005, ANKARA, (quot. 10.01.2010), [http://www.tkb.com.tr/userfiles/pagefiles/sector-arastirmalari/SA-05-04-15\\_Sarap\\_Sektoru.pdf](http://www.tkb.com.tr/userfiles/pagefiles/sector-arastirmalari/SA-05-04-15_Sarap_Sektoru.pdf)

On the other hand, Table 14 indicates the major wine producing companies in Turkey in 2004, including the city of production and the capacity.

As seen on on Table 14, Mey Alkollu Ickiler San. ve Tic. A.S. Tekirdag Fab. with 21.342.600 liters of production capacity, has the first rank among other producers.

Table 15. Wine Production, Consumption and Trade in Turkey (000 hl)

Year	Production	Consumption	Export	Import
1999	257	265	43	1,7
2000	230	263	45	2,2
2001	266	282	37	1,2
2002	260	258	83	1,2
2003	229	242	48	1,2
2004	315	280	41	8,5
2005	292	261	43	13,1
2006	225	234	27	13,2

Source: GUMUS, S. G. and GUMUS, A. H. op. cit. compiled from TUIK and TAPDK data

It is given in the Table 15 that wine export in Turkey is approximately 40-50 thousand hl. however, there has been a dramatic decrease in 2006 to 27 thousand hl. As mentioned before, state restrictions were an important obstacle on Turkey's wine import. Therefore, 2001 can be called as an important milestone for the liberalization of private sector wine imports and privatization of state alcohol monopoly in 2001. Gümüş and Gümüş (2007) highlight that 54 importing firms operate and supply 819 different products in the market in terms of brand and package, but the number of firms increased to 91 at the end of 2006 and the range of the products increased up to 1182; and 3 of these enterprises which have import license were big enterprises who produced wine in Turkey as well. Karabayır (2009) express that the export value of wine was 9.20 million dollars in 2007 which reduced to 7.96 million dollars in 2008. Researcher also implies that, despite gold medals and many other prizes in international competitions, the current export quantity of the Turkish wine sector is not at the level it deserves when compared to grape production. Table 16, in addition, indicates the exports of wine according to volume and quantity for 2004-2008. According to table, 2004 is the year that reaches the highest amount of wine production. Furthermore, it is experienced a dramatic decrease in 2008.



Table 16. Exports of Wine by Years,

<b>2004</b>	Q*	4,063
	V**	7,861
<b>2005</b>	Q	4,374
	V	8,414
<b>2006</b>	Q	6,258
	V	8,535
<b>2007</b>	Q	9,468
	V	9,204
<b>2008</b>	Q	3,53
	V	7,964

\*Q= Quantity; 1,000 liters;

\*\*V= Value; 1,000 US Dollar

Source: KARABAYIR, C. Wine Sector in Turkey, Export Promotion Center of Turkey, 2009, compiled from TUIK data, (quot. 10 January 2010) ([http://www.igeme.org.tr/Assets/sip/tar/Wine\\_09.pdf](http://www.igeme.org.tr/Assets/sip/tar/Wine_09.pdf))

Karabayır (2009) also mentioned that, Belgium, Turkish Republic of Northern Cyprus and Germany are the major destinations (as indicated in Table 17) where Turkish wine is exported. Among these three countries, Belgium has the share of approximately 27% of the total exports. Following Belgium, Turkish Republic of Northern Cyprus has the share of approximately 25% and Germany has 15%.

Table 17. Exports of Wine by Major Countries in 2008

<b>Countries</b>	<b>Value (1,000 USD)</b>
Belgium	2,136
T. R. Northern Cyprus	2,016
Germany	1,178
USA	421
England	347
Japan	214
The Netherlands	137
France	136
<b>TOTAL</b>	<b>7,964</b>

Source: KARABAYIR, C. op. cit.

Turkish wine consumption according to a research conducted by Euromonitor (2003) as figured out in Table 18, indicates that Turkish wine consumers prefer red wine rather than white wine. Main reasons for the preference of red wine can be explained as the useful comments of wine on health mainly for heart diseases in the media.

Demir (2003) emphasized the lower amount of pink wine when compared to red and white wine. Researcher, in addition, indicates that the basic reason for the increase of pink wine is a result of increased tourists came to Turkey during the same period.

Table 18. Wine Selling Indicators in 1997-2003

Period	Wine Selling According to Volume (million liters)						Change in Percentage		
	1997	1998	1999	2000	2001	2002	2001/02	1997/02 CAGR	1997/02 Total
<b>Red</b>	17,9	21,2	24,3	26,6	30,0	35,8	19,1	14,8	99,5
<b>White</b>	8,9	10,6	11,5	12,4	13,6	15,4	13,4	11,6	73,2
<b>Pink</b>	0,8	0,8	0,9	0,9	1,0	1,1	9,4	7,8	45,4
<b>Total Sparkling</b>	1,5	1,6	1,7	1,8	2,1	2,4	14,3	10,2	62,7
<b>Champagne</b>	0,1	0,1	0,1	0,1	0,2	0,2	9,0	8,0	47,2
<b>Others</b>	1,3	1,5	1,6	1,7	1,9	2,2	14,7	10,4	64,1
<b>Alcohol Added and Vermuth</b>	0,2	0,3	0,3	0,3	0,4	0,4	10,4	10,1	61,6
<b>Other wine excluding grape</b>	0	0	0	0	0	0	0	0	0
<b>Total Wine</b>	29,3	34,5	38,7	42,2	47,1	55,0	16,9	13,5	88,0
Period	Wine Selling According to Value(million USD)						Change in Percentage		
	1997	1998	1999	2000	2001	2002	2001/02	1997/-02 CAGR	1997/02 Total
<b>Red</b>	177,8	214,3	246,9	273,	312,	375,	19,8	16,1	111,0
<b>White</b>	60,2	77,4	87,3	95,6	106,	121,6	14,3	15,1	102,1
<b>Pink</b>	4,7	5,1	5,6	6,1	6,7	7,4	10,4	9,5	57,2
<b>Sparkling</b>	36,8	40,8	45,8	52,5	63,1	72,2	14,4	14,4	96,1
<b>Champagne</b>	20,6	22,6	24,7	28,4	34,4	38,2	11,2	13,1	85,1
<b>Others</b>	16,2	18,2	21,1	24,2	28,7	34,0	18,3	16,0	110,2

<b>Alcohol Added and Vermuth</b>	9,9	11,3	12,4	13,7	15,2	17,0	11,6	11,5	72,1
<b>Other wine excluding grape</b>	0	0	0	0	0	0	0	0	0
<b>Total Wine</b>	289,3	348,9	397,9	441,	504,	593,1	17,6	15,4	105,0

Source: Demir, M. O. 2003, Competitiveness Analysis of Turkish wine Sector: A Research on the State Monopoly, Akdeniz University, Social Sciences Institute, Department of Management, Master's Thesis, Antalya, Turkey

As shown in Table 18, the consumption of champagne when compared to others is very low. Demir (2003) explains this situation as a result of higher price of champagne.

## 6.2. General Information About Research Area

This research was conducted in Kalecik District which is located in the Northeast part of Ankara with the geographic coordinates of 40° 06' North latitude and 33° 25' East longitudes. Özdemir(2009) identifies that, Kalecik district encompasses an area of 1353 square kilometers with the average elevation of 725 m. On the other hand, Tüysüz (1997), highlights the fact that, Kalecik area provides a transition between The Central Anatolia Region and Black Sea Region. The distance between center of Kalecik District and Ankara city center is 68 km as expressed by Fidan(1997). The main geographical characteristics of Kalecik area, according to Gündüz (2004), can be expressed as rough due to its mountainous surroundings. Kızılırmak River as the longest river in Turkey flows through Kalecik district within a broad based valley.



Figure 3. Map of Kalecik District with Neighbourhood

Source: Map of Kalecik District with Neighbourhood, (quot. 10 January 2010) (<http://www.resim8.com/resim.php?git=http://aukmy.ankara.edu.tr/UserFiles/Image/kalecik%2520harita.jpg>)

Figure 3 and Figure 4 demonstrate the location of Turkey. Kalecik district as involved in the local administration of Ankara province is shown in Figure 3 with

the neighborhood and surroundings. On the other hand, location of Ankara is also demonstrated in Figure 4.



Figure 4. Location of Central Anatolia on the Map of Turkey

Source: Location of Central Anatolia on the Map of Turkey, (quot. 10 January 2010) ([http://tr.wikipedia.org/wiki/Dosya:Ankara\\_T%C3%BCrkiye\\_mevki\\_haritas%C4%B1.svg](http://tr.wikipedia.org/wiki/Dosya:Ankara_T%C3%BCrkiye_mevki_haritas%C4%B1.svg))

### **6.2.1. Climate**

The geographic location of Kalecik district brings about typical continental climatic conditions to the area. The average temperature during the vegetation period (1th of April – 31th of October) is 17.5<sup>0</sup> C. The annual precipitation is 447.6mm in the district. However, this amount is insufficient for viticulture as Fidan (1997) denotes.

### **6.2.2. Demographical Indicators**

According to Adress Based Population Recording System Data Base (2008) as shown in Table 19, the population in kalecik District is 16.071. The share of Men in overall population is approximately 49.5% while the share of women is approximately 50.5%. One of the most important problems of the district is migration to bigger cities. The lack of young population in the area endangers the sustainability of not only for viticulture but also for other agricultural activities in the district area. The majority of the population is consisted of older generation in the present day.

Table 19. Demographical Data of Kalecik District for 2008

<b>City/District Centers</b>	<b>Total</b>	10.318
	<b>Men</b>	5.152
	<b>Women</b>	5.166
<b>Towns/Villages</b>	<b>Total</b>	5.753
	<b>Men</b>	2.795
	<b>Women</b>	2.958
<b>Total</b>	<b>Total</b>	16.071
	<b>Men</b>	7.947
	<b>Women</b>	8.124

Source: Demographical Data of Kalecik District for 2008, (quot. 10 January 2010) (<http://report.tuik.gov.tr/reports>)

Table 20 indicates the amount and direction of the change in population in Kalecik district for different years. According to the table, since 1955, there is a considerable decrease in village population for Kalecik district except 1965 and 1975. Moreover, between 1950 and 1990 it is observed that city population increased approximately two fold while vilalge population decreased noteworthy in the same period. It is also necessary to emphasize that the majority of the migrants are consisted of young people as Fidan (1997) emphasized. Consequently, the decrease in the village population revealed the problem of sustainable agriculture.

Table 20. Demographic Activity of Kalecik District

<b>Years</b>	<b>City and Village Population</b>			<b>Shares of City and Village Population (%)</b>		
	<b>City</b>	<b>Village</b>	<b>Total</b>	<b>City</b>	<b>Village</b>	<b>Intensity</b>
<b>1950</b>	4.043	33.848	37.941	10.65	89.35	16
<b>1955</b>	4.054	35.653	39.707	11.37	88.63	19
<b>1960</b>	4.112	23.540	27.702	14.84	85.16	21
<b>1965</b>	4.022	24.643	28.665	14.03	85.97	21
<b>1970</b>	4.707	23.164	27.871	16.89	83.11	21
<b>1975</b>	5.804	23.980	29.784	19.49	80.51	21
<b>1980</b>	5.035	23.411	28.446	17.70	82.30	21
<b>1985</b>	5.540	21.804	27.349	20.25	79.75	20
<b>1990</b>	10.051	14.992	25.043	40.13	59.87	20

Source: FİDAN, N. op. cit. TUIK Reports, General Census for Turkey Records

36 villages exist in the local administration of Kalecik district. The scope of this research area covers these villages shown in Table 21.

Another demographic indicator, the marital status of the Kalecik district is shown in Table 22 above. According to the table the majority of the inhabitants in the district are married.

The level and the components of employment is also an important economic instrument for the research area. Table 23 indicates the statistics for employment for Kalecik district. As understood from Table 23, the number of men employed (7.014) is 70% more than the number of women (4.919) employed



Table 21. Villages of Kalecik District

<b>Village</b>	<b>Population for Census2000</b>	<b>Estimated Population Over year</b>	<b>Number of Households</b>	<b>Distance to Ankara</b>	<b>Distance to Center of District</b>
<b>Afşar</b>	81	81	24	86	30
<b>Akkuzulu</b>	187	154	73	87	31
<b>Aktepe</b>	101	39	20	81	25
<b>Alibeyli</b>	392	193	136	86	30
<b>Altıntaş</b>	225	167	85	95	39
<b>Beykavağı</b>	184	140	30	102	46
<b>Çandır</b>	1993	290	95	92	36
<b>Çaykaya</b>	254	237	55	95	39
<b>Dağdemir</b>	107	92	25	71	15
<b>Değirmenk</b>	398	375	120	67	19
<b>Demirtaş</b>	229	149	76	104	48
<b>Elmapınar</b>	122	92	65	91	35
<b>Eskiköy</b>	295	300	45	54	16
<b>Eşmedere</b>	76	54	23	84	38
<b>Gökçeören</b>	190	146	60	82	26
<b>Gökdere</b>	344	281	117	76	10
<b>Gümüşpına</b>	159	125	40	70	5
<b>Hacıköy</b>	398	413	80	80	19
<b>Hanlı</b>	51	77	70	102	46
<b>Karalar</b>	144	74	25	86	20
<b>Karatepe</b>	99	28	30	101	45
<b>Kargın</b>	82	78	22	94	38
<b>Keklicek</b>	71	53	15	68	12

<b>Kılçak</b>	463	315	120	84	23
<b>Kınık</b>	373	235	120	108	52
<b>Koyunbaba</b>	211	183	105	78	30
<b>Kuyucak</b>	78	48	35	74	26
<b>Mahmutlar</b>	352	298	85	105	40
<b>Samanlık</b>	532	478	70	80	14
<b>Satılarköy</b>	317	216	75	99	43
<b>Şemsettink</b>	86	51	20	105	49
<b>Tilkiköy</b>	118	41	23	85	25
<b>Uyurca</b>	76	86	45	97	21
<b>Yeşilöz</b>	122	91	30	71	23
<b>Yurtyenice</b>	236	178	45	97	41
<b>Yüzbeyi</b>	86	57	40	98	42

Source: Kalecik District Governorship, Villages of Kalecik District, 06.06.2009

Table 22. Marital Status of Kalecik District for 2008

<b>Sex</b>	<b>Never Married</b>	<b>Married</b>	<b>Divorced</b>
<b>Total</b>	5.451	12.482	134
<b>Men</b>	3.171	6.510	67
<b>Women</b>	2.280	5.972	67

Source: Demographical Data of Kalecik District for 2008, (quot. 10 January 2010) (<http://report.tuik.gov.tr/reports>)

This situation is very common for rural areas not only in Kalecik district but also for the majority of the villages in Turkey. The main reason for this can be explained according to two basic factors:

- The difficulty of agricultural activities and cultivation, which mainly requires muscular power.
- The conventional structure of Turkish agriculture which gives a role to women mainly as a housewife and being responsible for taking care of children and house work. As a consequence, this situation poses an obstacle to improve women's educational skills.

Table 23. Employment Statistics of Kalecik District for 2008

<b>Sex</b>	<b>Employment</b>	<b>Unemployment</b>	<b>Not-participated in employment</b>
<b>Total</b>	11.933	451	6.749
<b>Men</b>	7.014	348	2.625
<b>Women</b>	4.919	103	4.124

Source: Marital Status of Kalecik District for 2008, (quot. 10 January 2010) (<http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul>)

Table 24 indicates the information about educational background of Kalecik district city center. Apart from the general situation of educational level in rural areas in Turkey, Kalecik district has comparatively higher level of education. One of the most important factors of this consequence can be expressed as the nearliness of the district to Ankara city center which is the capital of Turkey.

Table 24. Educational level in Kalecik District City Center

Illiteracy	700
Literacy	1786
Grammar School Graduation	3028
Primary School Graduation	991
High School Graduation	550
College Graduation	1.512
Higher Education or University Degree	371
Graduate Degree	23
Doctorate Degree	3
Unknown	468

Source: Educational Level in Kalecik District City Center, (quot. 10 January 2010) (<http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul>)

### 6.2.3. Kalecik Karası

“Kalecik Karası” is one of the most well known vines grown in Turkey. Kalecik Karası has the following features as explained by Çelik et al. (1998) as follows:

- *Ruby-violet color*
- *Rich aroma*
- *Low level of tannin*
- *High level of alcohol and acid ratios*
- *Better when consumed younger*

During 1950-1975 period, as Özgün (2003) specifies, due to the immigration of young population to bigger cities, the production of wine was endangered. However, the intervention of Ankara University, Faculty of Agriculture, Department of Garden Plants with the contributions of TUBITAK (The Scientific and Technological Research Council of Turkey), the quality and productivity was considerably increased. In addition, research also emphasizes the increasing importance and production levels of Kalecik Karası since 1995 and 2000 resulting from the project of Ankara University, Faculty of Agriculture, Department of Garden Plants in cooperation with the Ministry of Agricultural and Rural Affairs containing the production of 600.000 vine tree. Table 25 indicates the location and land size of the firms cultivating more than 10 acres of Kalecik Karasi in the district.

Kavaklıdere, which is one of the most well known wine producers not only in Kalecik district but also in other regions of Turkey, has also 400 acres of vineyard for Kalecik Karasi production in the district by 2010. According to the records of Kavaklıdere Anatolian Wines(2010), “contractual farming” was first brought to the district to provide the augmentation and developments of Kalecik Karasi.

Therefore, first implementation was started with 3 farmers given 1 hectare for each in Uyrca village.

Contractual farming compasses to provide vine tree, technical equipments and engineering services in order to produce high quality of wine. Following Kavaklıdere, other firms operating in the district also started to implement this system. Contractual farming also entails monopolistic market conditions mainly for price determination in favor not of farmers but of firms as crop buyers. On the other hand, the imperfection of the producer organizations and the absence of the state institutions in the market as a buyer constitute a disadvantageous situation for farmers in the district.

Table 25. Location and Land Size of the Firms Cultivating More Than 10 acres of Kalecik Karasi in the District in 2007

<b>Name of the Firm</b>	<b>Location</b>	<b>Cultivated Land (ha)</b>
Şato Kalecik Şarapçılık Ltd. Sti. (Isıklar)	Center	75
Vinis Şarapçılık Üretim ve Pazarlama Ltd. Şti.	Center	93
BAK Gıda Sanayi İnş. Koll. Sti. (Kiska)	Gumuspınar	490
KLK Gıda Tarım Ltd. Şti. (Armada)	Center	350
Kalecik Açık Cezaevi ve İşyurdu Müdürlüğü	Center	10
Si-Net San. Ve Tic. Ltd. Şti.	Center	170
Ankara Üniversitesi Ziraat Fak. Bag. Uyg. İstasyonu	Center	25
Kalecik Bağcılık Kooperatifi	Center	300
Total	-	1513 da

Source: Data collected during the Interview with the Head of Kalecik Wine Cooperative on 20.06.2008

## 7. EMPIRICAL APPLICATION

The originality of this research as explained before is the use of Multinomial Logit model for evaluating the decision-making process of Kalecik district wine producers. Thus, this chapter aims to display the methodology of the research while giving detailed information of the model, dependent and independent variables. According to the results it is intended to figure out the validity of the research hypotheses and understand the impacts of social and economic factors on decision-making and risk analysis process of wine producers.

### 7.1. Multinomial Logistic Regression

The basic reasons for deciding the Multinomial Logistic Regression as the main methodology during this research have been expressed in this chapter.

As expressed formerly, the main feature of Logistic Regression can be summarized as “Dependent variable is qualitative with two outcomes”

On the other hand, there may be some situations where the response variable assumes more than two values. Chatterjee and Hadi (2006) for these situations, highlight the introduction of multinomial logistic regression beside binary logistic regression. Researchers imply the use of this method for more diverse situations such as attitude surveys where the response categories are not ordered. They finally express that; *“The resulting model can be analyzed by using slightly modified methods that were used in analyzing the dichotomous outcomes. This method is called the multinomial (polytomous) logistic regression.”*

The *multinomial logit model* (MNLM) is the most frequently used nominal regression model. In this model, the effects of the independent variables are allowed to differ for each outcome, and are similar to the generalized ordered logit model.

Long and Freese (2001) express that: *“In the multinomial logit model, we estimate how individual-specific variables affect the likelihood of observing a given outcome. For example, we considered how individual characteristics such as education and experience affect a person’s occupation.”*

SPSS regression models 16 (<http://web.bgu.ac.il/NR/rdonlyres/E3506B51-0B61-41E7-AE3E-0FB8D83F6CDA/0/SPSSRegressionModels130.pdf>), in addition, specifies the usefulness of Multinomial Logistic Regression for situations in which researcher wants to be able to classify subjects based on values of a set of predictor variables. Moreover, the basic characteristics of the method have been mentioned as follows:

- *A multinomial logit model is fit for the full factorial model or a user-specified model. Parameter estimation is performed through an iterative maximum-likelihood algorithm.*

- *The dependent variable should be categorical. Independent variables can be factors or covariates. In general, factors should be categorical variables and covariates should be continuous variables.*

- *In addition Multinomial Logistic Regression provides the following unique features:*

- *Pearson and deviance chi-square tests for goodness of fit of the model*
- *Specification of subpopulations for grouping of data for goodness-of-fit tests*
- *Listing of counts, predicted counts, and residuals by subpopulations*
- *Correction of variance estimates for over-dispersion*
- *Covariance matrix of the parameter estimates*
- *Tests of linear combinations of parameters*
- *Explicit specification of nested models*

After above given information, due to the necessity to prefer qualitative data, Multinomial Logit model fits for researches for choice models.

## **7.2. Factors Affecting Decision-Making in Agriculture**

Agricultural activities, because of their dependence to natural events can be defined as risky economic activities. Therefore farmers, when trying to decide what to produce, when to produce and how to produce should take into account different factors.

Edwards-Jones (2006) in their article summarizes some factors in farmers' decision-making process as follows:

- *socio-demographics of the farmer,*
- *psychological make up of the farmer,*
- *the characteristics of the farm household,*
- *structure of the farm business,*
- *the wider social milieu and*
- *the characteristics of the innovation to be adopted*

In addition to Edwards-Jones, Gubert and Robilliard (2006) emphasize the importance of the amount of rainfall per year and the unobserved household fixed effect on agricultural income.

After above given examples for decision-making process finally Boussard (1992) in his article stresses The Freund/Markowitz model to explain risk in the micro economy of farmers' decisions.

In this model linear programming was used for the maximization.



$$u = z - A \delta_z^2 \quad (7.1)$$

Where,  $u$  denotes the quantity to be maximized,  $\bar{z}$ ; is the expected value of random income  $z$ ,  $\delta_z^2$ ; the variance of  $z$ :  $\delta_z^2 = E(z - \bar{z})^2$  and  $A$  is a risk aversion coefficient .

Although this function is not linear anymore, researcher could maximize it, and, with reasonable values for  $A$ , he found optimal solutions which were surprisingly similar to those actually made use of by North Carolinian farmers.

### 7.3. Dependent And Independent Variables

Multinomial logit model, after above given information, will constitute the main methodology of this Ph.D thesis. As mentioned before, the aim of this research is to bring out the decision-making process and risk attitudes of Turkish wine producers. Therefore multinomial logit model having the response variable with 3 categories is chosen to be the most appropriate regression model to explain the relationship between response variable and explanatory variables. The 3 different categories of response or dependent variable are as follows:

- I never apply any agricultural innovations
- I apply agricultural innovations only if after other producers apply and explain their satisfaction
- I apply agricultural innovations

As expounded before in the former chapters of this research, it is intended to understand the underlying factors of Kalecik Region wine producers due to their social, cultural and economic heritage. Therefore, the basic aim to divide the response variable into 3 different categories is to conceive the complexity of decision-making process of farmers. In other words, first group points out the farmers having the most conservative structure not only in production and marketing process of Kalecik wine, but also in their family bonds. Thus, this group, when generalized, refuses to apply and implement most of the agricultural innovations and rather sustain their own family farming techniques during production and marketing process. Furthermore, these farmers generally perceive agricultural innovations as a risk to try, apply and implement. As a consequence, they avoid risk by evading these innovations.

The second group of farmers that prefers applying agricultural innovations only if after other producers apply and explain their satisfaction. These farmers appear to be more open for these innovations regarding their means of production and marketing methods. However, on the other side, they are still curious and partly conservative for the possible negative impacts of these innovations. Consequently their way of avoiding the risk or reflecting risk arises as to experience the concrete

outcomes achieved by leading farmers who already applied and experienced the freshly introduced innovations.

The last group of farmers who does not hesitate to try and implement most of the agricultural innovations introduced by either agricultural institutions or ministry of agriculture is also accepted as the leader farmers among others. These farmers mainly are capable of deliberating and predicting the possible positive and negative outcomes of agricultural innovations. This group also emerges as the most open among other 2 groups. Their way of avoiding the risk for the application of new methods and techniques comes up with their self confidence and dividing cultivated area into different parts for both on what new innovations are implemented and on their own techniques are applied.

After explaining the 3 different categories of the dependent or response variable Y, the general view of the Multinomial Logit Model used in this research is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 + \beta_9 \quad (7.2)$$

Y is the dependent or response variable as expressed above. On the other hand, explanatory or independent variables used in the model are mentioned below.

- $X_1$  is the **Age** of the wine producers
- $X_2$  is **Cultivated Land Size** for wine production
- $X_3$  is the **Ownership** of the cultivated land
- $X_4$  is **Educational Level** of wine producers
- $X_5$  is the accessibility of **Agricultural Inputs**
- $X_6$  is the utility from **Agricultural Wine Cooperation**
- $X_7$  is the **Marketing** facilities
- $X_8$  is the **Distance** to city center
- $X_9$  is the **Immigration**

Age of the farmers is one of the important focal points of this research in order to expose the reactions of different age groups of farmers into freshly introduced agricultural innovations concerning the wine production and marketing. In other words, it is aimed to stress the diversification of risky behavior and decision-making process of younger and older generations for agricultural innovations. The value labels of age for 5 different categories are shown below:

- 1,00 = "0-25"
- 2,00 = "26-40"
- 3,00 = "41-55"

- 4,00 = “56-70”
- 5,00 = “70 and more”

Cultivated land size as another explanatory variable is used in the model for addressing the decision-making process of different cultivated wine areas. In plain terms, small land owners and big land owners and figuring out their risky attitudes are the basic aim for embracing this variable in the model. Values of different land sizes and their labels are as follows:

- 1,00 = “does not exist”
- 2,00 = “0–10 decars”
- 3,00 = “11-20 decars”
- 4,00 = “21-30 decars”
- 5,00 = “30 and more decars”

Ownership of the cultivated land and its impacts on wine producers’ risky behaviors also emerge as important issue for conceiving decision-making process. The main purpose for taking this variable into account in the model occurs for revealing the difference in risky behaviors between land owners and renters during cultivation and production process for Kalecik Karasi. In this way, it is intended to emphasize if there is a significant statistical relationship or not. This variable is labeled into 2 as follows:

- 0,00 = not owned (rented)
- 1,00 = owned

Educational level of wine producers, on the other hand, appears noteworthy for evaluating whether farmers having higher education or having less education are more open to agricultural innovations when compared to others. We can convey the widespread opinion relevant to this situation as “the higher education brings about higher risk endurance”. However, cultural and social disparities in developing countries evoke unexpected consequences conversely to general beliefs. Therefore, this research has concentrated on different tendencies and the underlying factors for the outcomes of these tendencies for risk analysis and decision-making process of Kalecik region wine producers. Educational levels of farmers are labeled as follows:

- 1,00 = No education
- 2,00 = Primary School
- 3,00 = Secondary School
- 4,00 = High School
- 5,00 = University

- 6,00 = Higher Education

Accessibility of agricultural inputs is also taken into account for testing the statistical significance as an explanatory variable in the model. The main reason for including this variable into the model is to understand the need of farmers to agricultural inputs and the difficulties to reach those inputs to be used during production and processing of wine. Furthermore, it is also aimed to observe the dependency of farmers against agricultural inputs. Thus, wine producers with higher accessibility and with less accessibility are compared for openness to agricultural innovations in decision-making process and risk analysis. The labeling of this variable is shown beneath:

- 1,00 = does not influence
- 2,00 = very little
- 3,00 = middle
- 4,00 = considerable
- 5,00 = too much

Agricultural wine cooperation is a volunteer farmers' community established in Kalecik with the beginning of Kalecik Karası wine production with the intention of increasing awareness about new agricultural cultivation, processing, production and marketing techniques on farmers in order to increase the productivity as the ultimate goal. Wine cooperation also achieved many successful activities such as coordination with Ankara University Faculty of Agriculture and introducing soil analysis to some producers. However, not too many farmers agreed on being a member of this cooperation and work consistently for better productivity rates and higher income from wine sales. Another aim of this cooperation as declared is to constitute a common ground for collecting the wine and break down the oligopolistic structure for price determination by few big concerns. The reason for taking up this variable into the model is to observe if there is a significant relationship or not between the establishment of this wine cooperation and decision-making process of wine producers on agricultural innovations. In other words, it is intended to examine if there is a contribution of the existence of such an agricultural community on implementation of new agricultural techniques introduced by either ministry of agriculture or private organizations. The labeling of the utility from agricultural cooperation as involved in data entry is as follows:

- 1,00 = no utilization
- 2,00 = very little
- 3,00 = middle
- 4,00 = considerable

- 5,00 = too much

Marketing facilities, in addition to other variables, are believed to play an important role on influencing farmers for the openness for adopting and implementing new agricultural techniques related to wine production and marketing. Therefore, this explanatory variable is included into Multinomial Logit model with below described labels in order to understand whether marketing facilities in the area is accepted by farmers as useful or not on the process of decision-making for agricultural innovations.

- 1,00 = does not influence
- 2,00 = very little
- 3,00 = middle
- 4,00 = considerable
- 5,00 = too much

The statistical relationship between distance to Kalecik District city center from different villages and the response variable is also another significant indicator for comprehending the decision-making process of wine producers and their perception of risk. Kalecik District has a wide area for the villages that are variously located and distance and transportation opportunities among some of them to city center are believed to be one of the determinants on decision-making process. Therefore, farmers are asked whether the distance as kilometers from city center affect their approach for openness to agricultural innovations or not. The labeling of distance to city center from villages is shown as follows:

- 1,00 = does not influence
- 2,00 = very little
- 3,00 = middle
- 4,00 = considerable
- 5,00 = too much

Immigration from rural areas to urban locations is one of the most problematic issues that many developing countries such as Turkey are encountering. There have been many factors triggering this situation such as economic, social, educational and cultural attractions of bigger cities. However, among above mentioned factors, lack of employment potentials, occupational retraining in different areas and different income items mainly arise as the basic factor causing immigration to urban areas. Kalecik District has also experienced the destructive effects of immigration to bigger cities. The consequences of this situation engendered a high rate of average age in the villages in the district. In the course of time the older generation has undertaken the duty for sustaining agricultural

activities not only for wine production but also for other agricultural products that are grown in the region. Finally, day by day, the sustainability of agricultural activities in Kalecik has substantially been jeopardized due to immigration of young population. Therefore, it is intended to accentuate in the scope and aim of this research that the fundamental and complicated problematic situation caused by immigration has become one of the foremost issues. The labels of immigration, whether if it constitutes a problem or not, are indicated as follows:

- 1,00 = does not constitute a problem
- 2,00 = very little
- 3,00 = middle
- 4,00 = considerable
- 5,00 = too much

In addition to above stated explanatory variables, it was also planned to collect data about the amount of monthly income and non-agricultural income instruments. However, as many researchers who conducted a survey in the rural areas have experienced, most of the farmers also in Kalecik District refused to share information about their actual monthly agricultural and non-agricultural income. The main underlying factor for this situation is the belief to avoid paying more taxes by declaring the real amount of income. Despite the fact it was mentioned that this survey was not conducted to gather information for ministry of finance and their names would not be explained, the great majority of the wine producers refused to give information about this item.

#### **7.4. Measuring the Significance of the Model and Coefficients**

After the data entry to SPSS software, the estimation of the model and coefficients are made according to following criterions:

- **Goodness-of-fit:** Chi-Square Value for Pearson and Deviance Measures
- **Model Fitting Information:** Chi-Square for Likelihood Ratio Tests
- **Likelihood Ratio Tests:** 2 Log Likelihood of Reduced Model and Chi-Square
- **Pseudo R-Square:** Cox and Snell, Nagelkerke and McFadden
- **Classification Table:** Number of Observed and Predicted
- **Case Processing Summary:** Number and Marginal Percentage

## 7.5. Sampling Method and Size

The scope of this research is based on the field work applied on Kalecik Region wine producers to understand their decision-making process and risky behaviors. The method to select the size of the sampling is based on the population's features and the aim of this research. Survey and observation have been the main methods while gathering data from wine producers.

Simple random sampling method in which all the producers are having same chance to be involved in the sample, is used to determine the number of producers in the scope of this research.

The formula developed by Yamane (1967) and Cochran (1977) is used to determine the number of wine producers

$$n_0 = \frac{(Z)^2 p \cdot q}{d^2} \quad (7.3)$$

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}} \quad (7.4)$$

where,  $N$  represents the size of the population. The population size in this research is designated as the population of Kalecik region for this research.  $\alpha$ , with the value of 0.05 represents the confidence interval. Therefore,  $Z$  table value appears as  $Z=1.96$ ,  $p$ , with the value of 0.2 represents the possibility of the desired feature to be involved in the population.  $q = 1-p$ , with the value of 0.8 represents the possibility of the desired feature not to be involved in the population.  $n_0$ , represents the size of the sample at the beginning.  $n$ , represents the size of the sample necessary for the research.  $d$ , with the value of 0.05 represents the margin of error.

After above given information, the value of  $n$  which points out the size of sample to be involved in the research is calculated as 212,8. Therefore survey and observation is applied to **213** wine producers in Kalecik district to obtain the necessary data for this research.

## 7.6. Results And Discussion

As explained in the previous chapter, Multinomial logistic Regression has been used as the main methodology in the scope of this research. This chapter aims to figure out the main results of the research. The impacts of social and economic factors of Kalecik Region wine producers have been examined in order to understand the risky behaviors of wine producers.

As mentioned before, survey is chosen to be the major method for gathering the data from the research area. In addition, interview with farmers and firms also serves as an important basis as qualitative data to observe the decision-making process and the risk analysis of the farmers in Kalecik district.

Research findings for the general social and economic situation as a result of the evaluation of the obtained data can be summarized as follows:

- Small land size
- Lack of young population for cultivation process of vine
- Fragmented land structure
- Severity of transportation mainly for mountainous land owners
- Unsatisfied level of productivity (mainly for small size land owners)
- Immigration to big cities
- Shortage and insufficient establishment of producer organizations and agricultural consultancy services
- Oligopolistic price determination against farmers and as a consequence low price for the crops
  - Lack of alternatives for grape production such as grape juice
  - Nonexistence of Sufficient Marketing Opportunities
  - Non-existence of storage facilities for crops
  - Disadvantages of contractual farming

After building our model, it is necessary to determine whether it reasonably approximates the behavior of the selected data. Goodness-of-fit Tests and Model Fitting Information are two important criterions for the determination process. In other words we can describe these as follows:

Goodness-of-fit Tests: The Multinomial Logistic Regression procedure reports Pearson and Deviance goodness-of-fit statistics.

Model Fitting Information: A likelihood ratio test shows whether the model fits the data better than a null model.

In our model these values are shown in Table 26 and Table 27.

Table 26. Goodness-of-Fit

	<b>Chi-Square</b>	<b>df</b>	<b>Sig.</b>
<b>Pearson</b>	201,951	248	,985
<b>Deviance</b>	190,489	248	,997

The Goodness-of-Fit table (Table 26) presents two tests of the null hypothesis that the model adequately fits the data. If the null is true, the Pearson and deviance statistics have chi-square distributions with the displayed degrees of freedom. If



the significance value is small (less than 0.05), then the model does not adequately fit the data. In this case, both Pearson and Deviance values are greater than 0.10. Therefore, we can say that the data are consistent with the model assumptions.

Table 27 indicates a likelihood ratio test of the model (Final) against one in which all the parameter coefficients are 0 (Null). The chi-square statistic is the difference between the -2 log-likelihoods of the Null and Final models. Since the significance level of the test is less than 0.05, we can conclude the Final model is outperforming the Null. In other words, the final model is overcoming our expectations.

After determining the validity of the model as shown in Table 27, the next stage is to check the contribution of each dependent variable's effect to the model as shown in Table 28. In other words, the next stage of the research is to determine the significance levels of selected independent variables in the Multinomial model. By this way validity of the research hypotheses will be tested. The research hypotheses are as follows:

$H_1$ : There is a significant positive relationship among age, education, marketing opportunities, agricultural cooperation, immigration and decision-making of farmers.

$H_2$ : There is no significant positive relationship among cultivated farm area, land ownership, accessibility to agricultural inputs, distance to city center and decision-making of farmers.

For each effect, the 2 log likelihood is used for the reduced model; that is, a model without effect. The chi-square statistic is the difference between the -2 log-likelihoods of the reduced model and the final model reported in the model fitting information table. If the significance of the test is less than 0,05 then the effect contributes to the model. Table 28, indicates that the significance of the test for age, cooperation, distance to city center and immigration are smaller than 0,05. On the other hand, according to the results shown in the table, cultivated farm area, land ownership, education, marketing opportunities and accessibility to agricultural inputs variables are bigger than 0,05. In addition, the coefficients of each variable when observed appear to be positive.

Therefore,  $H_1$  hypothesis is accepted to be valid according to the statistical significance level for age, agricultural cooperation and immigration variables, however,  $H_1$  hypothesis is not accepted to be statistically significant for education and marketing variables. In other words, it is statistically proved that there is a positive significant relationship between decision-making process of Kalecik district wine producers and their educational age, utility from agricultural cooperation and immigration rates.

On the other hand,  $H_2$  hypothesis is accepted to be statistically significant and valid for cultivated farm area, land ownership and accessibility to agricultural

inputs variables. However,  $H_2$  hypothesis is statistically refused or not significant and not accepted for distance to city center from villages. In details, it is statistically accepted that there is a positive statistically significant relationship between decision-making process of Kalecik district wine producers and distance to city center from their village where wine production is carried out. Moreover, cultivated farm area (as decars) has the value of 0,052 which is at close quarters with 0,05. Therefore, it will not be an accurate mistake when this variable may be accepted as statistically significant with positive coefficient value. Under this circumstance, if 0,052 is accepted to be valid, it would be possible to point out that  $H_2$  hypotheses is also refused for this variable which demonstrates that there is a positive statistical significant relationship between decision-making process of farmers' and the size of cultivated farm area however, land ownership and accessibility to agricultural inputs variables are not overcoming the expectations either for statistical value or for coefficient sign.

Table 27. Model Fitting Information

<b>Model</b>	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
<b>Intercept Only</b>	398,580			
<b>Final</b>	200,433	198,147	58	,000

SPSS Regression Models 16 explains the structure of  $R^2$  as follows:

*“The linear regression model, the coefficient of determination,  $R^2$ , summarizes the proportion of variance in the dependent variable associated with the predictor (independent) variables, with larger  $R^2$  values indicating that more of the variation is explained by the model, to a maximum of 1. For regression models with a categorical dependent variable, it is not possible to compute a single  $R^2$  statistic that has all of the characteristics of  $R^2$  in the linear regression model, so these approximations are computed instead. The following methods are used to estimate the coefficient of determination.”*(SPSS Regression Models 16, op. cit.)

Table 28. Likelihood Ratio Tests

Effect	Model Fitting	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-	df	Sig.
<b>Intercept</b>	2,004E2	,000	0	.
<b>Age</b>	218,693	18,259	6	,006
<b>Land</b>	215,809	15,376	8	,052
<b>Ownership</b>	203,301	2,867	2	,238
<b>Education</b>	215,794	15,361	10	,119
<b>Marketing</b>	209,512	9,078	6	,169
<b>Cooperation</b>	214,144	13,711	4	,008
<b>Distance</b>	224,375	23,942	8	,002
<b>Inputs</b>	210,997	10,563	8	,228
<b>Immigration</b>	218,020	17,587	6	,007

Table 29. Pseudo R-Square

<b>Cox and Snell</b>	,606
<b>Nagelkerke</b>	,706
<b>McFadden</b>	,478

The model with the largest  $R^2$  statistic is called as the “best” or most available according to this measure. Following these information, Table 29 explains the validity of our model throughout a perfect model. Cox and Snell with 0,606 value (which is smaller than 1) satisfies the expectations about the model. In addition, Nagelkerke value appeared as 0,706 which is between 0 and 1. Finally, McFadden value with 0,478 also satisfies the expectations which are between 0 and 1. It is possible to say that the model used in this research is accepted as an appropriate model as a whole. Moreover, the results of the above shown statistics and tests indicate that the selection and use of Multinomial model fit the selected dependent and independent variables as a whole.

The classification table (Table 30) shows the practical results of using the multinomial logistic regression model. For each case, the predicted response category is chosen by selecting the category with the highest model-predicted probability.

- Cells on the diagonal are called to be “Correct” predictions.
- Cells off the diagonal are called to be “Incorrect” predictions.

Table 30. Classification

<b>Observed</b>	<b>Predicted</b>			
	<b>Never</b>	<b>After</b>	<b>Apply</b>	<b>Percent</b>
<b>Never apply</b>	21	2	4	77,8%
<b>After others apply</b>	5	55	18	70,5%
<b>Apply</b>	5	17	86	79,6%
<b>Overall Percentage</b>	14,6%	34,7%	50,7%	76,1%

- Of the cases used to create the model, 21 of the 27 people who choose “NEVER APPLY” are classified correctly.
- 55 of the 78 people who choose “AFTER OTHERS APPLY” are classified correctly.
- 86 of the 108 people who choose “APPLY” are classified correctly.

Finally, overall, 76.1% of the cases are classified correctly. This compares favorably to the "null", or intercept-only model, which classifies all cases as the modal category.

According to the case processing summary shown in Table 31, the modal category is “APPLY”, with 49,3% of the cases. Thus, the null model classifies correctly 50,7% of the time. This situation can be explained as the majority of the farmers (50,7%) are supporting agricultural innovations either for introducing or implementing during wine production and processing. In other words, according to these wine producers, the level of potential risk for the application of the agricultural innovations is smaller than the expected outcome. Therefore, the first group of farmers is supporting these innovations during their decision-making process and risk perception.

On the other hand, second group of wine producers with the share of 36,6%, specified their decision as “AFTER OTHERS APPLY”. This group of farmers appears to be more conservative and skeptical against agricultural innovations. Their preferences appear to decide either to apply these methods or not according to other farmers’ opinions rather than their own experiences. Adoption and application of agricultural innovations according to these farmers appear to be risky which is not worth implementing during agricultural production process without having the positive feedback about the outcomes of these innovations applied by other leader farmers. Thus, their decision-making process is identified according to positive and concrete outcomes of other farmers. This kind of decision-making process can be called as risk aversion methodology for skeptical wine producers.

Finally, the third group of wine producers with the share of 12.7% denominates their decision as “NEVER APPLY”. This last group of farmers appears as the most conservative ones when compared to other two groups. In other words, their decision-making process is not affected either by other farmers or agricultural extension services such as private companies or by agricultural faculty members from universities. This group of wine producers espouses conventional wine production as a heritage from previous generations while confronting agricultural innovations. Their decision-making process is built on the idea to trust conventional methods as the most reliable method with lowest risk level rather than any innovations.

Table 31. Case Processing Summary

		N	Marginal Percentage
Decision	Never apply	27	12,7%
	After others apply	78	36,6%
	Apply	108	50,7%
Age	0-25	0	0,0%
	26-40	13	6,1%
	41-55	45	21,1%
	56-70	101	47,4%
	70 and older	54	25,4%
Cultivated Farm Area (decars)	Does not exist	85	39,9%
	0-10	73	34,3%
	11-20	26	12,2%
	21-30	8	3,8%
	30 and more	21	9,9%
Ownership of the Land	Not owned	14	6,6%
	Owned	199	93,4%
Education	No education	2	0,9%
	Primary school	148	69,5%
	Secondary school	35	16,4%
	High school	18	8,5%
	University	8	3,8%
	Higher education	2	0,9%
Marketing Facilities	Does not influence	14	6,6%
	Very little	24	11,3%
	Middle	53	24,9%

	Considerable	0	0,0%
	Too much	122	57,3%
Wine Cooperation Utilization	Does not influence	151	70,9%
	Very little	25	11,7%
	Middle	37	17,4%
	Considerable	0	0,0%
	Too much	0	0,0%
	Distance to Kalecik city center	Does not influence	124
Very little		47	22,1%
Middle		14	6,6%
Considerable		17	8,0%
Too much		11	5,2%
Accessibility to Inputs	Does not influence	113	53,1%
	Very little	55	25,8%
	Middle	36	16,9%
Distance to Kalecik city center	Considerable	4	1,9%
	Too much	5	2,3%
Immigration from Kalecik	Does not constitute a problem	29	13,6%
	Very little	40	18,8%
	Middle	122	57,3%
Distance to Kalecik city center	Considerable	0	0,0%
	Too much	22	10,3%

Table 31 demonstrates the results about wine producers' age, educational levels, size of cultivated farm area (da), land ownership, marketing opportunities, benefits and utilization from agricultural cooperation, distance to city center, accessibility to agricultural inputs and immigration.

As discussed formerly, the lack of older generation due to immigration to bigger cities, the majority (47,4%) of the average age in Kalecik District during this survey appeared within the range of 56 to 70. Following this result, population in the research area is consisted of people older than 70 which corresponds to 25,4% while the youngest group of producers appeared within the range of 26 to 40 having 6,1%. This situation, as stated by some of the wine producers that, the sustainability of not only wine production but also other kinds of agricultural products will be in danger in the near future in case Kalecik district will not be seen as a center of attraction for younger generation.

Another important outstanding issue in Kalecik concurrently experienced in many rural areas within Turkey is the scattered and unbalanced distribution of farm areas. The most prominent factor for this situation can be demonstrated as the defects in the law of decedent's estate. As it is clear from Table 31 that, majority of the survey attendants (39,9%) declared as they do not have their own land for wine production and cultivation. In addition they pointed out that, they either prefer helping the owner of the farm area who is a relative of theirs' or they used to make wine cultivation in the past but no more due to having retirement or having non-agricultural income and age factors. Therefore, this situation is one of the constraints encountered during this research. On the other hand, the skeptical behaviors of farmers hindered to gather information about the kind of non-agricultural economic activity and the amount of monthly income earned.

The ownership of the cultivated wine area emerges as 93,4% owing the property while 6,6% not owing but rather renting the farm area for cultivation and production.

It is observed from the research data that vast majority (69,5%) for the educational background of farmers' occurred as having primary school education. Following this rate, 16,4% of farmers explained their graduation from secondary school and 8,5% from high school. Finally, 2 farmers declared their educational level as having higher education which correspond to 0,9% of overall amount of farmers.

Reaction of farmers' comes into being about marketing opportunities as 57,3% declaring that it constitutes a very big problem. In other words, lack of marketing facilities and just few big buyers turns out an oligopolistic price determination as a consequence of this situation. Only 6,6% of wine producers declared that lack of



marketing opportunities does not constitute a problem for their decision-making process during wine production.

The establishment of agricultural wine cooperation as an independent Non-Governmental Organization and utilization from this cooperation for introduction of agricultural innovations to wine producers in Kalecik expounded as the majority of farmers (70,9%) that this cooperation does not contribute their decision-making process. On the other side, minority of the farmers (25) explained that this cooperation has only a little impact on their decision-making process and guide their risk behaviors.

From place to place the mountainous geographic structure of Kalecik District and different distances from each village to city center entail problems for farmers who live in disadvantageous parts in the region. However, according to survey results shown on Table 31, the distance from villages to Kalecik city center does not constitute a problem for 58,2% of the farmers on their decision-making process against agricultural innovations while 8,0% explained this as a big problem and 5,2% as a very big problem when compared to other farmers.

Another important factor as explained before is the accessibility of agricultural inputs to farmers when necessary without any loss of time when required. It is indicated on Table 31 that more than half of the farmers (53,1%) involved in the survey during this research pointed out that they have not experienced any accessibility problem which could impact their decision-making process. However, 16,9% of the farmers stated that accessibility constitutes a middle level problem while 1,9% emphasized this as a big problem and 2,3% as a very big problem.

Immigration level according to the information gathered from older generation during the survey, has rapidly been increasing due to social, economic and cultural reasons that do not satisfy the expectations of younger generation. 57,3% of the farmers expressed that this situation constitutes a middle level problem and will becoming more destructive if not solved in the near future. Moreover, 10,3% of the farmers declared immigration as a very big problem for the sustainability of agricultural activities. On the other hand, 13,6% of the farmers informed that immigration is not an actual problem when compared to other breakdowns.

So far this research has focused on the Multinomial Logit Model in general and the explanatory power of independent variables on decision-making process of Kalecik District wine producers. However, due to the fact that the dependent variable has 3 categories, Parameter Estimates Table (Table 32) indicates two parts, labeled with the categories of the outcome variable decisions of farmers. These two parts correspond to two equations as shown below:

$$\log\left(\frac{P(\text{decision} = \text{never apply})}{P(\text{decision} = \text{apply})}\right) \quad (7.5)$$

$$= \beta_0 + \beta_1 \text{age} + \beta_2 \text{land} + \beta_3 \text{ownership} \\ + \beta_4 \text{education} + \beta_5 \text{marketing} + \beta_6 \text{cooperation} \\ + \beta_7 \text{distance} + \beta_8 \text{inputs} + \beta_9 \text{immigration}$$

and

$$\log\left(\frac{P(\text{decision} = \text{after others apply})}{P(\text{decision} = \text{apply})}\right) \quad (7.6)$$

$$= \beta_0 + \beta_1 \text{age} + \beta_2 \text{land} + \beta_3 \text{ownership} \\ + \beta_4 \text{education} + \beta_5 \text{marketing} + \beta_6 \text{cooperation} \\ + \beta_7 \text{distance} + \beta_8 \text{inputs} + \beta_9 \text{immigration}$$

In this stage of the research, with the interpretation of Parameter Estimates Table, it is necessary to choose a base category as the comparison group. In this research base group is chosen as “apply”. In other words, “apply” is the reference category.

In order to interpret the results of Parameter Estimates Table, it is necessary to specify the statistically significant independent variables. In this model, if the significance level of Wald statistics of independent variable is less than 0,05( $P < 0,05$ ), this variable is accepted as statistically significant.

Another important interpretation tool is the direction of the regression coefficient specified in the Column B on the Table X whether if it is positive or negative. A positive regression coefficient express that the independent or explanatory variable increases the probability of the outcome. However, a negative coefficient indicates that the variable decreases the probability of that outcome. Coefficients with positive directions, in other words, explain that the possibility of being in the aforementioned group of decision-making (in this research these groups are either “Never Apply” or “After Others Apply” because they are compared to reference category which is specified as “Apply”) are more likely rather than being in the reference category (“Apply”).

On the contrary, coefficients having negative directions represent that, the possibility of being in the aforementioned group of decision-making are less likely rather than being in the reference category. Moreover, the larger coefficient values indicate stronger deterministic power for the aforementioned independent variable in the model while smaller coefficient values indicate weaker deterministic power.

Finally, the last stage of interpreting the independent variables can be stated as the importance of “Exp(B)” column indicated on Table X. After ensuring the statistical significance level of independent variables, it is necessary to denominate the amount of change in percentage of farmers’ decisions to be involved in one of

the above mentioned groups rather than being involved in the reference group is calculated as  $(\text{Exp}(B)-1)$ .

The variables that have a statistically significant relationship to distinguishing farmers' decision-making process for "Never Apply" from "Apply" in the first Multinomial Logit equation were Age=4 (56-70), Distance=1(does not influence), distance=3(middle), cooperation=1(does not influence) and marketing=3 (middle). In details, farmers who were involved in the Age=4, Distance=1, distance=3, cooperation=1 and marketing=3 categories were less likely to be in the group of farmers who declared "Never Apply", rather than the farmers mentioned "Apply".

The possibility of farmers, who are in the age within 56 and 70, are less likely to be involved in the group who declared "Never Apply" rather than "Apply" due to the negative regression coefficient of Age=4, in the parameter estimates table. Moreover, the possibility of farmers, who are in the age within 56 and 70, to be involved in "Never Apply" category, appears to be 92,1%  $(0,079-1= -0,921)$  less than the possibility to be involved in "Apply" category. Moreover, the possibility of farmers, who are in the age within 56 and 70, to be involved in "Never Apply" category, appears to be 92,1%  $(0,079-1= -0,921)$  less than the possibility to be involved in "Apply" category.

The possibility of farmers, who expressed that, distance to city center does not influence their attitude against agricultural innovations, is more likely to be involved in the "Never Apply" group rather than "Apply" group due to the positive regression coefficient of Distance=1. Furthermore, the possibility of farmers to be involved in "Never Apply" category, who declared that distance to city center does not influence their decision-making process, appears to be 12.887,8%  $(129,887-1= 128,887)$  more than the possibility to be involved in "Apply" category.

Similarly, Distance=3 emerges statistically significant  $(P=0,024<0,05)$  according to parameter estimates table. Therefore, we can say that, the possibility of farmers who mentioned that, distance to city center influence their attitude in middle level against agricultural innovations, are more likely to be involved in the "Never Apply" group rather than "Apply" group due to the positive regression coefficient. Besides, the possibility of farmers to be involved in "Never Apply" category, who declared that distance to city center influence their decision-making process in middle level, appears to be 34.480,5%  $(345,805-1= 34480,5)$  more than the possibility to be involved in "Apply" category. It is possible to say that both distance=1 and distance=3 influence the decision-making process in a significant and positive way against reference group ("Apply"). However, we can emphasize the larger effect of distance=3 against distance=1 having higher level of percentage.

The possibility of farmers, stressing that agricultural wine cooperation does not influence their decision-making process, is more likely to be involved in "Never Apply" category rather than "Apply" according to its positive regression

coefficient as seen on parameter estimates table. In addition, the possibility of farmers to be involved in “Never Apply” category, who declared that cooperation does not influence their decision-making process, appears to be 1.160,5% (12,605-1= 11,605) more than the possibility to be involved in “Apply” category.

Lastly, the possibility of farmers, pointing out that marketing opportunities effect their attitude against agricultural innovations in middle level, is more likely to be involved in “Never Apply” category rather than “Apply”. The regression coefficient comes up positive for this variable. On the other hand, farmers in this group appears to be 767,5% (8,675-1= 7,675) more than the possibility to be involved in “Apply” category. Although having significant coefficient in Wald statistics, marketing variable could not be successful for Likelihood Ratio Tests. Therefore, it will not be possible for interpreting this variable when compared to other variables that accomplished both Likelihood Tests and Wald statistics.

Among above mentioned independent variables, which are statistically accepted as significant due their Wald statistics value, we can say that, the deterministic power of variables in turn, is Distance=3, Distance=1, Cooperation=1, Marketing=3 and Age=4. In other words, Distance=1 and Distance=3 in turn have the maximum deterministic power when compared to others. On the other hand, Cooperation=1 and Marketing=3 have less deterministic power while marketing has the least deterministic power in the first equation of “Never Apply” over “Apply” as the reference group shown at parameter estimates table.

On the other hand, the variable that has a statistically significant relationship to distinguishing farmers’ decision-making process “After Others Apply” from “Apply” in the second Multinomial Logit equation is Immigration=2 (very little). In other words, we can say that, the possibility of farmers who mentioned that, immigration influence their attitude in a very little level against agricultural innovations, are more likely to be involved in the “After Others Apply” group rather than “Apply” group due to the positive regression coefficient. In addition, farmers in this group appears to be 7053,4% (71,534-1= 70,534) more than the possibility to be involved in “Apply” category.

Table 32. Parameter Estimates

decision <sup>a</sup>		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
never apply	Intercept	-25,185	1,698E4	,000	1	,999			
	[age=2,00]	2,370	1,452	2,664	1	,103	10,695	,621	184,103
	[age=3,00]	-1,469	1,079	1,852	1	,174	,230	,028	1,909
	[age=4,00]	-2,544	,947	7,207	1	,007	,079	,012	,503
	[age=5,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[inputs=1,00]	,281	1,419E4	,000	1	1,000	1,324	,000	. <sup>c</sup>
	[inputs=2,00]	-,375	1,419E4	,000	1	1,000	,687	,000	. <sup>c</sup>
	[inputs=3,00]	-2,990	1,419E4	,000	1	1,000	,050	,000	. <sup>c</sup>
	[inputs=4,00]	-19,189	1,533E4	,000	1	,999	4,637E-9	,000	. <sup>c</sup>
	[inputs=5,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[distance=1,00]	4,867	2,224	4,787	1	,029	129,887	1,660	10161,964
	[distance=2,00]	,724	2,086	,120	1	,729	2,062	,035	122,961
	[distance=3,00]	5,846	2,582	5,128	1	,024	345,805	2,195	54479,867
	[distance=4,00]	5,417	2,787	3,778	1	,052	225,273	,955	53117,260
	[distance=5,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[cooperation=1,00]	2,534	1,100	5,303	1	,021	12,605	1,458	108,941	

[cooperation=2,00]	-14,924	2169,012	,000	1	,995	3,300E-7	,000	. <sup>c</sup>
[cooperation=3,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[land=1,000]	12,970	2054,908	,000	1	,995	4,295E5	,000	. <sup>c</sup>
[land=2,000]	12,078	2054,908	,000	1	,995	1,759E5	,000	. <sup>c</sup>
[land=3,000]	14,009	2054,908	,000	1	,995	1,213E6	,000	. <sup>c</sup>
[land=4,000]	-3,571	4860,173	,000	1	,999	,028	,000	. <sup>c</sup>
[land=5,000]	0 <sup>b</sup>	.	.	0	.	.	.	.
[ownership=,00]	2,570	1,584	2,632	1	,105	13,069	,586	291,606
[ownership=1,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[education=1,00]	10,007	,000	.	1	.	2,219E4	22185,608	22185,608
[education=2,00]	7,078	9100,877	,000	1	,999	1,185E3	,000	. <sup>c</sup>
[education=3,00]	8,623	9100,877	,000	1	,999	5,557E3	,000	. <sup>c</sup>
[education=4,00]	-7,951	9378,132	,000	1	,999	,000	,000	. <sup>c</sup>
[education=5,00]	-2,357	1,691E4	,000	1	1,000	,095	,000	. <sup>c</sup>
[education=6,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[immigration=1,00]	-14,979	1789,133	,000	1	,993	3,124E-7	,000	. <sup>c</sup>
[immigration=2,00]	-3,768	2,008	3,522	1	,061	,023	,000	1,182
[immigration=3,00]	-1,854	1,231	2,269	1	,132	,157	,014	1,748
[immigration=4,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[marketing=1,00]	1,108	1,356	,668	1	,414	3,029	,212	43,201
[marketing=2,00]	,845	1,186	,507	1	,476	2,328	,228	23,796
[marketing=3,00]	2,160	,920	5,515	1	,019	8,675	1,430	52,636

	[marketing=4,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
after	Intercept	-21,578	7050,887	,000	1	,998			
others	[age=2,00]	1,400	1,148	1,488	1	,223	4,056	,427	38,484
apply	[age=3,00]	,207	,771	,072	1	,789	1,230	,271	5,572
	[age=4,00]	-,012	,677	,000	1	,986	,988	,262	3,726
	[age=5,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[inputs=1,00]	-1,040	2,451	,180	1	,671	,353	,003	43,078
	[inputs=2,00]	-,519	2,538	,042	1	,838	,595	,004	86,156
	[inputs=3,00]	-1,532	2,630	,339	1	,560	,216	,001	37,452
	[inputs=4,00]	-2,033	2,820	,520	1	,471	,131	,001	32,877
	[inputs=5,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[distance=1,00]	-,027	1,983	,000	1	,989	,973	,020	47,414
	[distance=2,00]	-,189	2,030	,009	1	,926	,828	,015	44,208
	[distance=3,00]	,502	2,155	,054	1	,816	1,652	,024	112,732
	[distance=4,00]	-17,804	2253,218	,000	1	,994	1,853E-8	,000	. <sup>c</sup>
	[distance=5,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[cooperation=1,00]	,325	,573	,322	1	,570	1,385	,450	4,259
	[cooperation=2,00]	-1,215	,849	2,050	1	,152	,297	,056	1,566
	[cooperation=3,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[land=1,000]	,110	1,155	,009	1	,924	1,116	,116	10,745
	[land=2,000]	1,428	1,141	1,566	1	,211	4,170	,446	39,036
	[land=3,000]	,830	1,295	,410	1	,522	2,292	,181	29,030

[land=4,000]	-16,801	2972,792	,000	1	,995	5,050E-8	,000	. <sup>c</sup>
[land=5,000]	0 <sup>b</sup>	.	.	0	.	.	.	.
[ownership=,00]	,711	1,225	,337	1	,562	2,037	,184	22,493
[ownership=1,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[education=1,00]	37,603	9812,677	,000	1	,997	2,142E16	,000	. <sup>c</sup>
[education=2,00]	17,367	7050,887	,000	1	,998	3,486E7	,000	. <sup>c</sup>
[education=3,00]	20,114	7050,887	,000	1	,998	5,438E8	,000	. <sup>c</sup>
[education=4,00]	17,820	7050,887	,000	1	,998	5,484E7	,000	. <sup>c</sup>
[education=5,00]	17,577	7050,887	,000	1	,998	4,301E7	,000	. <sup>c</sup>
[education=6,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[immigration=1,00]	2,931	2,349	1,557	1	,212	18,743	,188	1870,896
[immigration=2,00]	4,270	2,149	3,948	1	,047	71,534	1,060	4827,452
[immigration=3,00]	3,677	2,035	3,266	1	,071	39,538	,733	2133,273
[immigration=4,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
[marketing=1,00]	,912	,871	1,097	1	,295	2,490	,452	13,731
[marketing=2,00]	-,642	,777	,683	1	,409	,526	,115	2,413
[marketing=3,00]	,680	,545	1,558	1	,212	1,973	z,679	5,739
[marketing=4,00]	0 <sup>b</sup>	.	.	0	.	.	.	.
a. The reference category is: apply.								



## 8. CONCLUSION

The decision-making process in agricultural activity same as any other economic activity is increasing its importance by the time. Although being affected by many social and economic factors, decision-making process has strongly been influenced by marketing strategies. One of the most dramatic examples for effective marketing can be achieved to introduce new goods and services to customers and attract their attention against these goods and services however, in order to achieve higher levels of sales, it is vital to realize the risk perception of customers in the process of buying a product.

The difficulty to define “risk” engenders an important issue for firms. In other words, risk can occur in discrete circumstances. Breakdowns, occurring in after sales services, spare parts and customer satisfaction are the major and wide spread impacts for risk perception of customers. Therefore, after sales services are as important as introductory advertorials to provide sustainability of a product in the market economy.

The main focus of this research is to explore the decision-making process of wine producers in Kalecik district while examining their risk perception against agricultural innovations. Therefore, it is intended to put forward the social and economic factors during the introduction on agricultural innovations to wine producers. Finally, it is aimed to guide agricultural policy makers such as Ministry of Agriculture and non-governmental organizations for taking into account of social and economic backgrounds of farmers against agricultural innovations.

One of the basic arguments against this Ph.D research could be explained as the simplicity of the independent variables preferred, however, the sophisticated and unpredictable structure of developing countries such as Turkey and mainly rural areas in these countries lead the complexity and drift even for the simplest expected outcomes.

It is observed from the results that, among all wine producers, 50,7% specified to apply any agricultural innovation without hesitating. The perception of risk for this group of farmers can be explained to be acceptable and amenable. On the other hand, 34,7% of farmers expressed the importance and necessity of others farmers’ satisfaction after applying the innovations on their own. According to the positive satisfaction of leading farmers, they accept to apply. The risk perception of these farmers, on contrary, appears not to be accepted without experiencing positive outcomes by others. Finally, 14,6% of farmers refused to apply these innovations. This group of farmers is the most conservative one among others with irremovable thoughts.

According to the results of the model used in this study, it is observed that, age, cooperation, distance to city center and immigration are statistically significant to affect decision-making process of farmers.

It is observed from the results that Age factor appears to be statistically significant on decision-making process of wine producers in Kalecik district. Moreover, it is also seen that focusing on farmers, within the age range of 56-70, will provide a very high possibility for “Apply” rather than “After Others Apply” or “Never Apply” for agricultural innovation activities. Therefore, public or private institutions who are responsible for agricultural extension services might achieve in Kalecik in case of focusing this range of age group for future projects for better results.

Another important indicator for agricultural policy makers is the immigration problem from Kalecik to bigger cities mainly for economic issues. Research results show us that the possibility of farmers who expressed that, immigration influence farmers’ attitude in a very little level against agricultural innovations are more likely to be involved in “After Others Apply”. Additionally, the positive coefficient of “Immigration” variable is statistically significant for this group of farmers. Therefore, for future agricultural activities, it is recommended that focusing on immigration, would positively affect decision-making process of Kalecik wine producers, who say, they will apply the innovations after leader farmers.

Wine cooperative in Kalecik district as an independent variable involved in the Multinomial Logit Model, appeared as statistically insignificant as understood from research results. The main underlying factor causing this result according to research observations in the field can be explained as the relatively new constituted structure of the cooperative and deficiencies about limited activities, mainly due to lack of means of transportation for further villages. Many developing countries, such as Turkey, it has been observed that the conservative structure of agricultural producers in rural areas confront agricultural innovations and activities because of their conservative attitude. On the other side, the role of leader farmers and positive outcomes of their experiences after implementing agricultural innovations result in the adherence of the most of the entire farmers for trying the innovations. Irregular and inequitable distribution of the majority of farming areas in Turkey, mainly due to deficiencies in decedent’s estate law engender small scale production and low level of crop gains as a result. As a consequence, farmers who do not have any other casual income behave skeptical against agricultural innovations in order not to risk their only income from agricultural production. Therefore, supporting the improvements of the efficiency of wine cooperative in Kalecik for expansive activities is believed to attract the attention of farmers’ decision-making process in the course of time.

Statistically insignificant independent variables such as land size, land ownership, education level, marketing and accessibility to agricultural inputs are mainly expected to be explanatory on decision-making process by researchers. Thus, the aim of this research is of vital importance to evaluate the extraordinary and unexpected results on farming activities and farmers’ decisions. In other

words, the disparity of this research arises on highlighting the factors affecting the decision-making process of farmers who live in Kalecik and many other rural regions. Thereby, modernization and recruitment of rural areas in order to improve the wealth of producers in these disadvantageous regions is believed to be better constituted by agricultural policy makers through the results of this research.

On the other hand diversity of farmers having small land size and limited amount of crops who implement subsistence farming activities while the others having bigger land size and implementing market oriented farming entail different approaches through the adoption process of agricultural activities.

Another important issue is the structure of wine sector in Turkey which constitutes a relatively new and developing feature. Therefore, it is vital to anticipate the possible breakdowns in the fragile wine sector in order to minimize the loss of time and financial statement. Thus, it is believed that this situation is one of the important steps to gain competitive advantage of Turkey against Old World and New World wine producing countries. In other words, rationality and productivity principles has to be given priority in Turkish wine production and marketing while competing the other countries that already experienced wine trade for many years.

Wine tourism, arising as a striking sector in many countries, has to be taken into account in Turkey as well as other competing countries. The cultural prosperity and attractive historical assortment provides Turkey a big advantage. On the other side, the lack of imperative infrastructure and feasibility endeavor generates the main deficiency issues. The results of this research might also be useful for comprehending the attitude of farmers against not only production and marketing process, but also for improving infrastructure for wine tourism in the wine regions of Turkey. The different qualifications and reactions of farmers according to their feedbacks for agricultural innovations by using the Multinomial Logit method as applied in this research or by using different methods is believed to be helpful for choosing the most appropriate regions for wine tourism.

Due to three dimension structure of the dependent variable in the model as Apply, After Others Apply and Never Apply, it is believed that the results of this research will shed valuable insight to future rural projects in Turkey. In different terms, the role of leader farmers on other prosecuting farmers for trying and implementing agricultural innovations might be observed in the future research projects. On the other hand, the socio-economic and cultural background of farmers who espoused “Never Apply” for agricultural innovations might be another research topic for future researchers.

Finally, agricultural policy makers’ and governmental organizations’ attempts to provide a better agricultural extension services is believed to be more effective when above mentioned circumstances are taken into account. Therefore, it will be

possible to eliminate the obstacles of farmers' decision-making process and improve the perception against the risk on agricultural innovations.

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