



1<sup>st</sup> Conference, May 2022 (18 - 21)

UTAD, VILA REAL (DOURO), PORTUGAL



# Book of Abstracts

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ISBN: 978-989-704-494-6

**Title**

Book of Abstracts of First Conference of the EuAWE - European Association of Wine Economists

**Editing Committee**

João Rebelo; Alexandre Guedes; Ana Marta-Costa; Leonida Correia; Lina Lourenço-Gomes; Patrícia Martins; Samuel Faria; Sofia Gouveia; Tânia Gonçalves

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Universidade de Trás-os-Montes e Alto Douro (UTAD)

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## Committees

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**Tânia Gonçalves** | *UTAD, CETRAD, Portugal*

# Program

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**MAY 18**

**16:00 – 19:00** Welcome reception and registration (includes wine tasting, local snacks and guided visit to the Palace) | Garden of Palácio de Mateus

**MAY 19**

**08:15 – 08:40** Opening Session | Complexo Laboratorial Building (Room B0.01)

**08:40 – 08:55** Opening session | Complexo laboratorial Building

**09:00 – 10:00** Parallel Sessions | Complexo Laboratorial Building

**Parallel Session I – Covid-19**

Room: **B0.01** | Chair: Sofia Gouveia (CETRAD, UTAD)

***The impact of the COVID-19 on the Hungarian wine industry: The case of the Balaton wine region***

Jeremiás Máté Balogh (Corvinus University of Budapest)

***COVID-19's impact on Italian wine market: Critical issues and opportunities***

Deborah Bentivoglio (Università Politecnica delle Marche), Giulia Chiaraluce (Università Politecnica delle Marche), Giacomo Staffolani (Università Politecnica delle Marche), Francesco Bianchelli (Università Politecnica delle Marche), Adele Finco (Università Politecnica delle Marche)

***Impact of Covid-19 on the performance of Portuguese wineries - A fractional response approach with spatial dependence***

Samuel Faria (CETRAD, UTAD), Alexandre Guedes (CETRAD, UTAD), João Rebelo (CETRAD, UTAD), Sofia Gouveia (CETRAD, UTAD)

***Structural impact of Covid-19 on the profitability of the Portuguese wine industry: a panel data analysis (2014-2020)***

Samuel Faria (CETRAD, UTAD), Sofia Gouveia (CETRAD, UTAD), Alexandre Guedes (CETRAD, UTAD), João Rebelo (CETRAD, UTAD)

**Parallel Session II - History**

Room: **B0.02** | Chair: Paul Nugent (University of Edinburgh)

***Top incomes: Evidence from Bordeaux Fine Wine Prices***

Orley Ashenfelter (Princeton University), Olivier Bargain (Bordeaux University & IUF), Jean-Marie Cardebat (Bordeaux University & INSEEC)

***An economic history of wine appellations in Spain, 1930-2020***

Eva Fernandez (Universidad Carlos III), Francisco Marco-Gracia (Universidad de Zaragoza), Vicente Pinilla (Universidad de Zaragoza), Javier Puche (Universidad de Zaragoza)

***Heritage on the move: how an understanding of the past shapes responses to contemporary challenges in Portugal and South Africa***

Paul Nugent (University of Edinburgh), Lúcia M. Costa Pinto (NIPE, Universidade do Minho), Paulo Ramísio (CTAC, Universidade do Minho)

***Quality wines in Siena: long-term impact of "typical wine" demarcations and GIs on rural development***

Eva Fernández (Universidad Carlos III de Madrid), Giacomo Zanibelli (Università di Napoli Federico II)

**Parallel Session III - Business**Room: **CI.13** | Chair: Giordano Ruggeri (University of Milan)***Keeping up with competitors***

Barbara Richter (Hochschule Geisenheim University), Jon Hanf (Hochschule Geisenheim University)

***Producers, consumers and wine in the making of the Argentine industry, 1885-1915***

Steve Stein (University of Miami)

***Business and economics wine research: a bibliometric analysis<sup>1</sup>***

Giordano Ruggeri (University of Milan), Chiara Mazzocchi (University of Milan), Diego Grazia (University of Milan), Stefano Corsi (University of Milan)

***Shaping blockchain-based innovation strategies in the wine sector: a conceptual framework***

Michael Paul Kramer (Hochschule Geisenheim University), Antonio Galati (University of Palermo), Jon H Hanf (Hochschule Geisenheim University), Maria Crescimanno (University of Palermo)

**10:05 – 11:05 Parallel Sessions | Complexo Laboratorial Building****Parallel Session IV – Management & Covid-19**Room: **B0.01** | Chair: Katrin Simon Elorz (Universidad Pública de Navarra)***Population thresholds models for local alcoholic beverage manufacturing***

Stephan J Goetz (Penn State University), Rebecca Cleary (Colorado State University), Claudia Schmidt (Penn State University), Pan Yuxuan (Penn State University)

***Short - and projected long-term effects of the COVID19 pandemic on wine consumption patterns***

Benoit Faye (HEL), Florine Livat (KEDGE), Philippe Masset (INSEEC), Alexandre Mondoux (Haute Ecole de Changins), Jean-Philippe Weisskopf (INSEEC)

***Economic impact of curative practices on a declining vine plot: Analysis of the winegrower's decision***

Marie Konan (INRAE – BSE), Adeline Alonso-Ugaglia (BSA)

***The performance of wineries: the role of women and the ownership on the board of directors***

Katrin Simon Elorz (Universidad Pública de Navarra), Andrea Olló Lopez (Universidad Pública de Navarra), Maria Elena Aramendia-Muneta (Universidad Pública de Navarra)

**Parallel Session V - Quality**Room: **B0.02** | Chair: Matteo Carzedda (University of Trieste)***Does quality pay off? “Superstar” wines and the uncertain price premium across quality grades<sup>1</sup>***

Stefano Castriota (University of Pise), Stefano Corsi (Università Statale di Milano), Paolo Dyno Frumento (University of Pisa), Giordano Ruggeri (Università Statale di Milano)

***Wine closure types and their role among quality cues for Austrian red wines***

Bettina König (Burgenland University of Applied Sciences), Marcus Wieschoff (Burgenland University of Applied Sciences), Claudia Muschau (Burgenland University of Applied Sciences)

***Wine cooperatives and quality clues: a choice experiment on European consumers***

Francesco Marangon (University of Udine), Stefania Troiano (University of Udine), Federico Nassivera (University of Udine), Matteo Carzedda (University of Trieste)

***In Vivino Veritas? An investigation on consumers' quality perception and wine choice determinants in the digital age***

Enrico Mazzoli (Tuscia University), Luigi Palumbo (Tuscia University)

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<sup>1</sup> Abstract not included according the authors decision.

**Parallel Session VI – Sustainability & Tourism**

Room: C1.13 | Chair: Albert Franz Stöckl (IMC University of Applied Sciences Krems)

***Is there a scope for Eco-labelled wine tourism development? A study the relationship between wine consumption and the frequency of visits to structures operating in the wine tourism sector***

Radu Mihailescu (NHL Stenden University of Applied Sciences), Azzurra Rinaldi (Università degli Studi di Roma Unitelma Sapienza), Daniel Moscovici (Stockton University), Jeff Gow (University of Southern Queensland), Adeline Alonso-Ugaglia (BSA), Lionel Valenzuela (Universidad Tecnica Federico Santa Maria)

***Mobile ethnography approaches for investigating food & beverage tourism experiences***

Albert Franz Stöckl (IMC University of Applied Sciences Krems), Stephanie Tischler (IMC University of Applied Sciences Krems)

***Sustainable wine regions: rural challenges and development drivers***

Ana Trigo (CETRAD, UTAD), Rui Fragoso (CEFAGE, University of Evora), Ana Marta-Costa (CETRAD, UTAD)

***Brewery and Winery By-Product Recycling: Environmental and Economic Benefits***

Jarrett Hart (University of California), Scott Somerville (University of California), Daniel A. Sumner (University of California)

**11:05 – 11:20 Coffee Break | Hallway of Complexo Laboratorial Building****11:25 – 12:25 Parallel Sessions | Complexo Laboratorial Building****Parallel Session VII – Industrial Organization**

Room: B0.01 | Chair: Chiara Mazzocchi (University of Milan)

***Stakeholders' perception of agroecological transition in the wine industry***

Caetano Luiz Beber (University of Bologna), Léa Lecomte (Univ. Bordeaux, Bordeaux Sciences Agro, BSE), Isabel Rodrigo (ISA), Massimo Canali (University of Bologna), Valentina Suprani (University of Bologna), Alexandra Seabra Pinto (INIAV), Eugenio Pomarici (Università di Padova), Eric Giraud-Héraud (Univ. Bordeaux, INRAE, BSE), Giulio Malorgio (University of Bologna)

***Open innovation in the wine industry before and during the Covid-19 pandemic: the role of digitalization***

Ana Pérez-Luno (Universidad Pablo de Olavide), Aída del Cubo Molina (Universidad Pablo de Olavide), Carmen Cabello-Medina (Universidad Pablo de Olavide)

***"I Don't Want to fight with you": Quality, Adaptability and Vertical Integration***

Nicolás Depetris Chauvin (HES-SO Geneva School of Business Administration), Marta Fernandez Olmos (University of Zaragoza), Juan Carlos Hallak (University of Buenos Aires), Santiago Mosquera (University of Buenos Aires)

***Which wine descriptors make a superstar? Evidence from Wine Spectator database<sup>1</sup>***

Chiara Mazzocchi (University of Milan), Giordano Ruggeri (University of Milan), Diego Grazia (University of Milan), Stefano Corsi (University of Milan)

**Parallel Session VIII - Trade**

Room: B0.02 | Chair: Jean-Marie Cardebat (BSE - Université Bordeaux)

***Quality, Collective Reputation and International Trade in Wines***

Philippe Bontems (TSE), Diego Lubian (Università degli Studi di Verona), Angelo Zago (Università degli Studi di Verona)

***Determinants of exports of wine with appellation of origin from southwest Europe, 2001-2018***

Maria-Isabel Ayuda (Universidad Zaragoza), Jean-Marie Cardebat (BSE – INSEEC), Samuel Faria (UTAD), Sofia Gouveia (UTAD), Fransisco Marco-Gracia (Universidad Zaragoza), Vicente Pinilla (Universidad Zaragoza), Raul Serrano (Universidad Zaragoza)

***The Recent Evolution of Argentina's Wine Exports Performance***

Emiliano Villanueva (Eastern Connecticut State University), Gustavo Ferro (Universidad del CEMA and CONICET), J. Sebastián Castillo-Valero (Universidad de Castilla-La Mancha), M. Carmen García-Cortijo (Universidad de Castilla-La Mancha)

***Weather, Trade and Quality: The case of French wine***

Alex Bao (BSE - Université Bordeaux), Jean-Marie Cardebat (BSE - Université Bordeaux), Raphaël Chiappini (BSE - Université Bordeaux)

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<sup>1</sup> Abstract not included according the authors decision.

**Parallel Session IX – Sustainability**Room: **CI.13** | Chair: Pier Paolo Miglietta (University of Salento)***Determinants for the sustainability of viticultural systems in the Douro Demarcated Wine Region***

Ana Marta-Costa (CETRAD, UTAD), Xosé A. Rodríguez (University of Santiago de Compostela), Micael Santos (Menin Wine Company)

***Make sustainable the Prosecco DOC wine chain: the case of Prosecco Sustainability Project***

A. Battistella (Prosecco D.O.C. Consortium), V. Boatto (CIRVE, University of Padua), V. Di Chiara (CIRVE, University of Padua), S. Furlan (Valoritalia srl), L. Giavi (Prosecco D.O.C. Consortium), S. Liggieri (Prosecco D.O.C. Consortium), A. Paiola (Valoritalia srl), E. Pomarici (University of Padua), S. Stefanucci (Equalitas srl)

***Impact of Agro-Environmental Schemes on Hungarian winery's Technical and EcoEfficiency***

Zoltán Bakucs (Centre for Economic and Regional Research), Lajos Baráth (University of Óbuda)

***Perceived benefits from ecosystem services provided within the Primitivo di Manduria PDO area (Italy)***

Andrea Mattia Pacifico (University of Salento), Pier Paolo Miglietta (University of Salento)

**12:30 – 13:30 Parallel Sessions | Complexo Laboratorial Building****Parallel Session X – Policy Regulation**Room: **B0.01** | Chair: Luca Rosseto (University of Padova)***Will Common Agricultural Policy support save farm employment in the wine sector?***

Imre Fertő (Centre for Economic and Regional Studies)

***Do subsidies decrease the income inequality in the Hungarian wine sector?***

Imre Fertő (Centre for Economic and Regional Studies), Arnold Csonka (Hungarian University of Agricultural and Life Sciences)

***The Climatic Reserve: a tool to optimize the commercialization of wine?***

Alexandre Mondoux (Haute Ecole de Changins), Bastien Christinet (Haute Ecole de Changins), Roxane Fenal (Haute Ecole de Changins), Olivier Viret (Etat de Vaud)

***The supply governance of appellations: the case of Prosecco***

Luca Rosseto (University of Padova), Leonardo Cei (University of Padova), Andrea Battistella (Consortium Prosecco Doc, Treviso)

**Parallel Session XI - Trade**Room: **B0.02** | Chair: Francisco J. Velázquez (Universidad Complutense de Madrid)***Google Trends and International Trade in Wine***

Diego Lubian (Università degli Studi di Verona), Umberto Nizza (Università degli Studi di Verona), Angelo Zago (Università degli Studi di Verona)

***A panel data spatial gravity model for international wine trade in the EU (1999-2019)***

Sofia Gouveia (CETRAD, UTAD), Samuel Faria (CETRAD, UTAD), Leonida Correia (CETRAD, UTAD)

***How far apart are the tastes of that far country? Some determinants of the differences in willingness to pay for the different attributes of Spanish wines in different international markets***

Jacobo Núñez (Universidad Complutense de Madrid), David Martín-Barroso (Universidad Complutense de Madrid), Francisco J. Velázquez (Universidad Complutense de Madrid)

***Environmental dynamics in the international trade of Spanish wine denominations of origin***

Juan Sebastián Castillo-Valero (UCLM), Inmaculada Carrasco-Monteagudo (UCLM), Maria Carmen García-Cortijo (UCLM), Marcos Carchano Alcaraz

**Parallel Session XII – Sustainability**Room: **CI.13** | Chair: Adele Finco (Università Politecnica delle Marche)***Consumers willingness to pay for organic wine certification, halo effects and premium for biodiversity claims***

Léa Lecomte (Univ. Bordeaux, Bordeaux Sciences Agro, BSE), Eric Giraud-Héraud (Univ. Bordeaux, INRAE, BSE), Stéphanie Pérès (Univ. Bordeaux, Bordeaux Sciences Agro, BSE), Gilles de Revel (Univ. Bordeaux, INRAE), Adrien Rusch (Univ. Bordeaux, INRAE), Pauline Tolle (Univ. Bordeaux, INRAE)

***The regional impact of climate change and irrigation on grape yields in South Africa. A hedonic approach based on machine learning.***

Britta Niklas (Ruhr University Bochum), Wolfram Rinke (Fachhochschule Burgenland GmbH)

***Geographical Indications as Vectors for Sustainable Viticulture - theoretical and empirical perspectives from South Tyrol and Franconia***

Tilman Reinhardt (University of Bayreuth), Yasmine Ambrogio (University of Bayreuth)

***Sustainable water use management for viticulture through precision agriculture technologies: an Italian case study***

Adele Finco (Università Politecnica delle Marche), Deborah Bentivoglio (Università Politecnica delle Marche), Giulia Chiaraluca (Università Politecnica delle Marche), Giacomo Staffolani (Università Politecnica delle Marche)

**13:30 – 14:45 Lunch | UTAD Panorâmico Restaurant**

**15:00 – 22:00 Technical visit and dinner (Lamego) | Caves (cellars) da Raposeira and Escola de Hotelaria e Turismo**

**MAY 20**

**08:45 – 09:45 Parallel Sessions | Complexo Laboratorial Building**

**Parallel Session XIII – Expert**

**Room: B0.01** | Chair: Gunter Schamel (Faculty of Economics and Management, Free University Bozen-Bolzano – Italy)

***The Information Content of Expert Reviews, Brands and Geographical Indications. Preliminary Experimental from Spain***

Marco Costanigro (Colorado State University), Azucena Gracia Royo (Agrifood Research and Technology Center of Aragon)

***How much do we pay for the quality of the wine? A meta-regression analysis of the influence of quality on the price of wine with different measures of quality***

Jacobo Núñez (Universidad Complutense de Madrid), David Martín-Barroso (Universidad Complutense de Madrid), Francisco J. Velázquez (Universidad Complutense de Madrid),

***The influence of expert scores on wine producers and consumers: Case made, pricing, expert scoring, and bottles of Oregon pinot noirs sold in the US***

Omer Gokcekus (Seton Hall University, USA), Eugell A Gokcekus (Erasmus University of Rotterdam)

***Exploring Online Community Wine Ratings: Are More Popular Wines Rated Higher?***

Gunter Schamel (Faculty of Economics and Management, Free University Bozen-Bolzano – Italy), Giulia Gastaldello (Faculty of Economics and Management, Free University Bozen-Bolzano – Italy)

**Parallel Session XIV - Finance**

**Room: B0.02** | Chair: Jean-Marc Figuet (U. Bordeaux)

***The Application of Non-Fungible Tokens and Blockchain Technology in the Wine Sector***

Michael Paul Kramer (Hochschule Geisenheim University), Jochen Heussner, Jon Hanf (Hochschule Geisenheim University)

***Liquid Assets and Financial Literacy***

Jean-François Outreville (Burgundy School of Business – Université Bourgogne Franche-Comté), Lara Agnoli (Université Bourgogne Franche-Comté), Eric Le Fur (INSEEC)

***The financialization of the bulk wine market: issues, constraints and limits of the introduction of a futures contract***

Jean-Marie Cardebat (U. Bordeaux & INSEEC), Jean-Marc Figuet (U. Bordeaux), Yves Jégourel (CNAM), Catherine Lis-Castiblanco (U. Bordeaux)

***Exploring Relative Inflation Through the Vehicle of Champagne—The Inflation of Experience***

Paul J. Merton (Ethos Wines Group – USA)

**Parallel Session XV – Consumers**

Room: C1.13 | Chair: Lara Agnoli (Burgundy School of Business – Université Bourgogne Franche-Comté)

***Capturing Sources of Preferences Heterogeneity for wine in Discrete Choice Experiments***

Lina Lourenço-Gomes (CETRAD, UTAD), Tânia Gonçalves (CETRAD, UTAD), Lígia M. Costa Pinto (NIPE, University of Minho)

***Have the Wines of the New World and Old World become more difficult to differentiate through time? An initial Sensory Based Exploration***

Philippe Hedger (St. Michael's, UK), Wendy Parr (Lincoln University, New Zealand), Maria Pilar Saenz-Navajas (Institute of Grapevine and Wine Sciences, Logrono), Heber Rodrigues (Plumpton College and Royal Agricultural University, UK),

***Veblen on Wine: Ahead of His Time?***

Robin Goldstein (UC Davis), Daniel Sumner (UC Davis)

***The role of feelings in alcohol consumption. Insights from Italy***

Efi Vasileiou (University of York, Europe Campus), Nikos Georgantzis (Burgundy School of Business – Université Bourgogne Franche-Comté), Lara Agnoli (Burgundy School of Business – Université Bourgogne Franche-Comté)

**09:50 – 10:50 Parallel Sessions | Complexo Laboratorial Building****Parallel Session XVI – Expert**

Room: B0.01 | Chair: Stephen Bazen (Aix-Marseille University)

***Does Excellence Pay Off? Theory and Evidence from the Wine Market***

Stefano Castriota (University of Pise), Alessandro Fedele (University of Bolzano)

***Informational value of peers' and experts' ratings on perceived quality: stated and revealed preference of wine consumers in a non-hypothetical home use test setting***

Magalie Dubois (Burgundy School of Business), Jean-Marie Cardebat (Université de Bordeaux), François Ric (Université de Bordeaux), Michel Visalli (INRAE)

***The role of customer and expert ratings in a hedonic analysis of French red wines prices***

Stephen Bazen (Aix-Marseille University), Jean-Marie Cardebat (Université de Bordeaux, INSEEC), Magalie Dubois (Burgundy School of Business)

***The role of Montefalco Sagrantino PDO for the rural development<sup>1</sup>***

Stefano Corsi (University of Milan), Giordano Ruggeri (University of Milan), Diego Grazia (University of Milan), Chiara Mazzocchi (University of Milan)

**Parallel Session XVII - Perception**

Room: B0.02 | Chair: Lígia M. Costa Pinto (NIPE, University of Minho)

***Perceptions of positive effects of Malvazija istarska moderate wine consumption on human health and psychological functioning - A preliminary study***

Anita Silvana Ilak Peršurić (Institute of Agriculture and Tourism, Croatia), Sara Rossi (Institute of Agriculture and Tourism, Croatia), Ena Bestulić (Institute of Agriculture and Tourism, Croatia), Sanja Radeka (Institute of Agriculture and Tourism, Croatia)

***The weight of the bottle and its effect on perception of quality and willingness to pay for red wine***

Marcus Wieschhoff (University of Applied Sciences Burgenland), Stephanie Andert (University of Applied Sciences Burgenland)

***Consumers' wine knowledge and perceptions of innovative wine labels and packaging***

Cristina Galamba Marreiros (CEFAGE, University of Évora), Catarina Esteves Lopes (Nova IMS, UNL)

***Effect of consumers' risk and knowledge perceptions on the probability of ignoring wine attributes in discrete choice experiments***

Lina Lourenço-Gomes (CETRAD, UTAD), Tânia Gonçalves (CETRAD, UTAD), Lígia M. Costa Pinto (NIPE, University of Minho)

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<sup>1</sup> Abstract not included according the authors decision.

**Parallel Session XVIII – Markets**Room: **CI.13** | Chair: Juan José Juste-Carrión (University of Valladolid)***The Economics of Wine, Beer and Cider***

Jean-François Outreville (Burgundy School of Business – Université Bourgogne Franche-Comté), Lara Agnoli (Université Bourgogne Franche-Comté), Eric Le Fur (INSEEC), L. Martin Cloutier (ESG UQAM)

***An empirical analysis of long-run trends in wine consumption in Scandinavia 1860 to 2020***

Jan Bentzen (Aarhus University), Valdemar Smith (Aarhus University)

***Can we have significant cross-cultural differences within a country? An experiment exploring the impression of Swiss residents of the consumption of wine in cans on different outdoor leisure contexts***

Nicolás Depetris Chauvin (HES-SO Geneva School of Business Administration), Antoine Pinede (HES-SO Geneva School of Business Administration), Heber Rodrigues (Plumpton College, UK)

***Challenges and Responses of Agri-Food Activities under COVID-19 Pandemic: The Case of the Spanish Territories producing Wine and Olive Oil***

Juan José Juste-Carrión (University of Valladolid), Juan Carlos Rodríguez-Cohard (University of Jaén), Antonio Vázquez-Barquero (Autonomous University of Madrid)

**11:00 – 11:25 Coffee Break | Hallway of Complexo Laboratorial Building****11:30 – 13:30 Plenary Session | Aula Magna*****The Portuguese wine industry in a globalised world***

Jean-Marie Cardebat | President of EuAWE - European Association of Wine Economists

Eduardo Rosa | Vice-Rector for Research of UTAD - University of Trás-os-Montes e Alto Douro

Frederico Falcão | President of ViniPortugal – Wines of Portugal

António Filipe | President of AEVP - Association of Porto Wine Companies

**13:30 – 15:00 Lunch | UTAD Panorâmico Restaurant****15:30 – 23:00 Technical visit and conference dinner | Quinta da Pacheca****MAY 21****09:00 – 19:00 Optional visit | Douro tour****09:00 Departure by bus**

Meeting point for bus departure - Miracorgo Hotel: 09:00

**09:30 Short visit of Provezende, a wine and heritage village overlooking Douro River****11:00 Visit to Quinta do Bonfim (including to the oenotourism, with a Porto wine tasting)****13:30 Lunch at Restaurant 1896 (Quinta de Bonfim), by Chef Pedro Lemos****16:00 Boat trip on Douro River****18:00 Back to Vila Real**

## Parallel Sessions I - COVID-19

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# THE IMPACT OF COVID-19 ON THE HUNGARIAN WINE INDUSTRY: THE CASE OF THE BALATON WINE REGION

**Jeremiás Máté Balogh<sup>1</sup>**

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Although many people visit Lake Balaton (located in western Hungary) mainly for summer holidays, the area around the lake also offers many gastronomic options and has a wine region of 32,000 hectares. Winegrowers in the Balaton region (on Lake Balaton) are particularly exposed to wine tourism and related services, as most of them have built their business or marketing strategy there. Wine-related services, such as wine tours, tastings, accommodation, and restaurants account for a significant part of the local wine producers' income. The research analyses the main difficulties caused by the second and third waves of COVID-19 and related lockdowns (November 2020 to May 2021) in the Balaton wine region. Additionally, it investigates the impact of the pandemic on the attitude of regional winemakers toward the use of online marketing in 2020 and 2021. In general, the frequency of wine consumption increases with age (Dula et al. 2012). As age increases, the propensity to buy wine online decreases; more specifically, 22% of consumers under 30 consider online wine shopping feasible, but less than 5% above 65 only (Totth-Szolnoki 2019). Consumers with advanced wine knowledge are from the Baby Boom generation, who are less likely to buy online (Obermayer et al. 2019). The reason behind avoiding buying wine online is the inability to taste the wine (Totth-Szolnoki 2019). In Hungary, wine tourism and festivals are essential marketing tools for winemakers (Gonda et al. 2017). Qualitative research is carried out at Corvinus University of Budapest with an online survey to collect information on the applied practices of local wineries in the Balaton wine region in response to Covid-19. An online questionnaire was sent by e-mail to the wineries. The first part of the survey interviewed the consequences of the pandemic on wineries. The second part surveyed the change in the attitude of winemakers toward online marketing. The last part was devoted to the size and basic features of the wineries. The questionnaire contained 16 questions, including simple choice, interval scaling, and short answer questions. The survey was conducted between 25 March 2021 and 15 April 2021. In total, 120 regional wineries were reached by email during data collection; however, of them, only 30 valid questionnaires were returned. The majority of the respondents worked for small wineries (12 respondents have vineyards below 5 ha, 12 wineries had vineyards between 5--20 ha), 4 medium-sized enterprises (21-40 ha), and 2 large enterprises (more than 40 ha) were also represented. The results showed that Hungarian winemakers, with a few exceptions (including larger wineries), had not paid much attention to online marketing. According to the survey, 43.3% of the respondents assumed that due to COVID-19 the demand for their wines decreased in 2020. In contrast, 26.7% responded that their demand had increased, while 20% said that it had not changed compared to previous years. Furthermore, the significant loss of experiential marketing revenue was the biggest problem for most winemakers (77%). The second most frequently mentioned negative impact, which also affected more than half of wineries (63.3%), was the closure of the HORECA sector. The results show that the COVID-19 outbreak did not have serious consequences on wine production, but the absence of offline sales channels (wine tourism, accommodation, restaurants, and local direct sales) caused by the closures indicated a loss of revenue for winemakers in Balaton. These findings also confirm that the region relied heavily on tourism in the pre-COVID period and needed to recover from this income loss. Many wineries have turned to online marketing

to increase wine sales due to lockdowns. 80% of wineries engaged in e-commerce activities during the lockdowns while 90% of them tried alternative marketing tools and became more active on social media platforms. As a result of the pandemic, online wine marketing has become more popular, and wineries have been more open to using online platforms. E-commerce and online marketing significantly helped winemakers survive during the lockdown but they cannot completely substitute offline channels. This suggests that web shops and online sales could continue to operate and develop to complement face-to-face sales. Experiential shopping is crucial for this region; but there is no substitute for this channel, as it is important for consumers and producers alike. The use of social media platforms can help prepare for seasonal openings and will allow wineries to reach even more potential customers. In the current situation, wineries need to develop an online marketing strategy to survive the restriction period, especially in the early and late summer seasons.

**Keywords:** *online marketing, wine industry, qualitative analysis, COVID-19, Hungary*

#### **Acknowledgements:**

This research is supported by the National Research, Development, and Innovation Office, Hungary, Projects No. 128232 and 134668. The authors appreciate the financial support.

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# COVID-19'S IMPACT ON ITALIAN WINE MARKET: CRITICAL ISSUES AND OPPORTUNITIES

**Bentivoglio, D.<sup>1</sup>; Chiaraluca, G.<sup>1</sup>; Staffolani, G.<sup>1</sup>; Bianchelli, F.<sup>1</sup>; Finco, A.<sup>1</sup>**

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The spread of the Covid-19 pandemic led the Italian food supply chain facing severe difficulties, although its anti-cyclical nature allowed for greater resilience compared to other economic sectors (Barcaccia *et al.*, 2020; Cardebat *et al.*, 2020; Coluccia *et al.*, 2021). As a matter of fact, in 2020 the added value of the agri-food sector decreased by 1.2% at current prices and by 4% in volume compared to the previous year. The worst performance was achieved by agriculture, forestry, and fishing (-6%), while the food and beverage industry held up (+ 1.8% at current prices but -1.8% in volume) (ISTAT, 2020). The economic effects were more important for the sectors with a greater tendency for exportation, in terms of the share of the exported turnover out of the total, including wine (Del Rey and Piccoli, 2020). Wine is one of Italian agriculture's most traditional products and one of the most characterizing products of the Italian culture (Gregori *et al.*, 2017; Pomarici *et al.*, 2021). However, it is undeniable that the pandemic changed the market, the consumption styles and the distribution channels (Dubois *et al.* 2021; Gianneschi, 2021; ISMEA, 2021).

With this clear in mind, the aim of the paper is to investigate the impact of COVID-19 on the Italian wine market. For the analysis, three years were taken into account: before (2019), during (2020), and after (2021) the pandemic. Primarily, a systematic data collection from relevant databases and/or reports was performed. In detail, wine production, export, and consumption, as well as the changes in purchasing habits and distribution channels, were considered. Secondly, a leader winery (central Italy) was selected as a case study, and the analysis was performed through an *ad hoc* questionnaire to assess the situation in the period considered. The survey was made up of six sections, comprising 26 questions. The first section asked about company's general data. The second section analysed company's situation before the spread of Covid-19. This part included questions relating to national and foreign markets in term of sales channels, volumes and types of wine sold. The section three described the impact of Covid-19, taking into account both the change in turnover and the sales dynamics for the various distribution channels and for the products requested. Section four examined the response actions implemented by the company to deal with the emergency. Finally, the last two sections described possible future scenarios and investments to make the company more competitive and resilient in emergency situations.

According to the data analysis (ISTAT, 2022; OIVa, 2021; OIVb, 2022), Italy confirmed its position as leader country in wine production, with 51 mhl in 2021 (+ 4% / 2020), representing 20% of the world production (260 mhl). The last three years show a constant trend in production, with an average of 50 mhl. Among the factors mostly affected by the crisis, exported volumes and values suffered from the limitations established by the governments in 2020. However, it is notable that 2021 is already recognised as the year of the restart, marking a + 7% in volumes and + 13% in values of Italian exported wines (dell'Orefice, 2022). In 2021, Italy exported 22 mhl of wines (almost half of its production), for a total value of more than 7 b€. Even the consumption was affected by the Covid-19, but in positive terms. After a declining trend

registered in the last twenty years, in 2020 the quantities of wine consumed increased (+ 7% / 2019). Italy is the third one consumer in the world for total consumption, but the second in terms of per capita consumption (behind Portugal). In terms of changes in purchasing behaviour, it was observed the increasing attention of the consumer towards sustainability, healthiness, quality, origin, and prices of products. Consumer started to prefer high quality products, locally produced, even with higher prices, giving rise to the *Premiumisation* phenomenon (Dubois *et al.* 2021; ISMEA, 2021; Rebelo *et al.*, 2021). The restrictions and lockdowns led also to modification of the distribution channels, with a notable decline of the mass market retailing in favour of the online platforms (Barbaresco *et al.*, 2021; Gerini *et al.*, 2021).

The survey highlighted two difference scenarios in the period considered. Before the pandemic, the situation of the company was positive, and it was mainly active in export (72% of the total sales). The principal destinations were Switzerland, Japan, Belgium, Canada and the USA, through the monopoly stores and importers. Nevertheless, the advent of the pandemic led to a reduction of turnover (-7%, below the Italian average), with an increase of the internal sale volumes in spite of Ho.Re.Ca., surfing the wave of the *Premiumisation* effect. The winery was able to build and maintain the customer loyalty throughout digital B2B meeting and virtual tasting experiences. Besides that, to overcome and resist over future emergency situations, the winery is currently investing in wine tourism, digital systems and sustainability schemes (i.e. EQUALITAS).

In conclusion, it is possible to state that the wine market is found to be relatively free from the Covid-19 induced shock (Kumar, 2021). However, wine entrepreneurs should be aware of the changes occurred during this period, in particular in terms of changes in the purchasing behaviour of the consumer. The winning strategy to resist over the crisis and become more resilient resides into diversification (for products and sales channels), export, and investments in brand awareness, sustainable solutions and digitalisation (Bentivoglio *et al.*, 2021; Finco *et al.*, 2022). These aspects should be taken into account to target the future agricultural, rural and food policies, at both national and local level.

**Keywords:** wine market; Covid-19; Italy; case study; impact

### **Acknowledgements:**

The authors wish to thank all the partners of the Operational Group (OP) SMART VITIS - Intelligent and Sustainable Viticulture (ID N° 29008) - financed by RDP Marche 2014/2020, sub measure 16.1. "Support for the establishment and management of EIP operational groups on agricultural productivity and sustainability". We also wish to thank the winery Umani Ronchi for providing data and support to the research.

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# IMPACT OF COVID-19 ON THE PERFORMANCE OF PORTUGUESE WINERIES - A FRACTIONAL RESPONSE APPROACH WITH SPATIAL DEPENDENCE

**Samuel Faria<sup>1</sup>, Alexandre Guedes<sup>2</sup> João Rebelo<sup>3</sup> and Sofia Gouveia<sup>4</sup>**

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The COVID-19 outbreak in late 2019 had a globally disruptive effect by degrading trade flow dynamics and exerting an unprecedented exogenous shock on the wine business. However, the impact of the Covid-19 crisis on wine producers varied concerning their market sales focus (Proweine, 2020) and firm structure. Smaller wineries were particularly affected by the pandemic's disruptive impact on the on-trade channel, mostly sustained by the tourism industry. Restraining measures imposed on bars, hotels, and restaurants and travel limitations led to a sharp decline in points of sale and local wine consumption in various wine-growing destinations (OIV, 2021).

Despite the ubiquitous effects of the pandemic, which resulted in a global decline in wine exports, in 2020 the EU27, which represents approximately 48% of the world consumption, consumed 112 mhl<sup>1</sup> (OIV, 2021), a value in line with 2019 figures. Though these results could have been supported by domestic tourists during the summer of 2020 as a result of easing restrictive measures in intra-national mobility in most European countries, the alleged balance level hides dissimilar impacts in the different Member States, such as Portugal, according to the economic dependence on tourism.

Portugal witnessed a decrease in wine consumption (4.6 mhl with -0.6% in comparison with 2019) in 2020 as well as in comparison to its five-year average (OIV, 2021). In Portugal, on-trade sales fell by almost 45% (IVV, 2020). In contrast, the sale of wine through off-trade distribution channels (e.g. supermarkets) rose 5.5%, up to 10 million liters<sup>2</sup>. On average total domestic demand witnessed a decrease of 13.9% in volume and 22.5% in value. These indicators show that the Portuguese wineries were deeply impacted by the effects of COVID-19, highlighting the importance of on-trade channels which suffered most during the pandemic.

Notwithstanding the pervasive effect of the pandemic, which sprawled geographically almost without limitations, it varied between countries, and among companies, according to different lockdown measures, demand elasticities, and reliance on particular sales channels (OIV, 2021). The pandemic had also differentiated regional impacts at the country level as a consequence of both higher production volumes and collective recognition mechanisms (e.g., tradition of high quality), responsible for catalyzing the winery's dependence on trade points of sale which are also conditional on tourism.

As such, it is relevant to investigate how this unique exogenous shock impacted the market performance of wineries in mainland Portugal, which boast distinct levels of dependence on the on-trade distribution channels. Furthermore, the firm's response to the exogenous shock seemingly depends on the internal resources and management skills as well as on the geographic location of wineries, given its structural implications on on-trade distribution channels due to tourism's economic influence on more renowned demarcated regions.

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<sup>1</sup> Million hectoliters of wine

<sup>2</sup> An increase from 191.4 to 201.4 million litres between 2019 and 2020.

Therefore, to a better understanding of external shocks, it seems essential to investigate which factors related to the business (e.g., firm size, experience) influenced the performance of Portuguese wineries, measured by the sales loss in the domestic market during the first year (2020) COVID-19 pandemic impacted wine businesses and if there was any related spatial dependence associated to their geographic location.

More specifically, this study tries to answer the following research questions: (1) Was the impact of COVID-19 homogenous among Portuguese wineries? and (2) Is the level of loss spatially arbitrary or a consequence of a systematic spatial dependence pattern? The answer to these questions provides useful microeconomic and spatial insights to improve management decision-making in a post-pandemic and recovery phase, as well as on potential future outbreaks. To fulfill these objectives this research applies a fractional responses model with spatial dependence.

### **Data and methodology**

Assuming the need for technological firms' homogeneity, the sample only includes firms that produce and sell wines. Data is retrieved from the official fiscal reports of Portuguese firms included in the 11021 NACE<sup>1</sup> for the years 2019 and 2020. Careful screening of the data available for all variables for both years provided a final sample of 290 wineries covering mainland Portugal.

The explained variable is the wineries domestic market loss, measured through the loss between 2020 and 2019 (a fraction between 0 and 1). Based on the resource-based-view approach, as explanatory variables, it includes, in 2019, the number of workers as a proxy for size, the winery's age as a proxy for experience, marketing expenditures, export intensity, wine tourism engagement (dummy variable), the amount of supplies services employed, and the "spatially lagged" dependent variable.

The econometric model relies on a fractional response variable with spatial dependence, filling the condition  $0 \leq y \leq 1$ , whereas a value of  $y = 0$  represents wineries that showed no losses. Given that more than 31% of the total firms analyzed did not report any loss, the sample selection bias ought to be tested and accounted for. To test and eliminate this potential bias, the two-step Heckman selection model was estimated. Additionally, since the two-step Heckman selection model does not account for the fractional nature of the dependent variable, with possible prediction values outside the (0,1) interval, the two-part fractional regression (FRM) arises as a suitable estimation method for this research. The inclusion of a spatial lag variable in the two-part FRM constitutes a novel approach to the model, combining the typical spatial autoregressive model with the FRM.

### **Results and discussion**

Overall, this research provides insights and understanding of which wineries were more resilient to the impact of COVID-19 based on a set of market strategy and firm resources factors, as well as in its spatial dependence. Table 1 includes the econometric results of the three estimated models. These share similar results in terms of signal and significance in the main equation (intensity of losses), which signals the robustness of the results. However, there are differences when the selection equation (propensity of losses) is compared with the main equation. Among these, the size of the firm is deemed a positive determinant of the winery's loss intensity, whereas in the continuous case, this variable has a negative and significant sign.

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<sup>1</sup> Statistical classification of economic activities in the European Community

**Table 1.** Econometric estimations

Variable	Fractional logit	Two-step Heckman	Two-part fractional
<b>Main equation</b>			
Ln(Employees)	0.0726 (0.1280)	-0.0540* (0.0292)	-0.1800* (0.0978)
Age	0.0080** (0.0039)	0.0015** (0.0007)	0.0097*** (0.0033)
Ln(Marketing)	0.1965*** (0.0741)	0.0034 (0.0160)	0.0912 (0.0645)
Export intensity	0.5776 (0.3252)	0.1584** (0.0635)	0.7894*** (0.2941)
Wine Tourism	0.3056* (0.1800)	0.0704** (0.0273)	0.3557** (0.1517)
Ln(SuppliesServices)	-0.5626*** (0.1362)	-0.0275 (0.0332)	-0.3089*** (0.1128)
Spatial Lag (LossW)	2.9551** (1.0751)	0.5575** (0.2824)	2.9411** (1.2854)
<b>Selection equation</b>			
Ln(Employees)	-	0.3285** (0.1345)	0.3285** (0.1345)
Ln(Marketing)	-	0.1806** (0.0707)	0.1806** (0.0707)
Export intensity	-	-0.4310 (0.3845)	-0.4310 (0.3845)
Ln(SuppliesServices)	-	-0.4556*** (0.1374)	-0.4556*** (0.1374)
Dummy Port wine	-	1.2059** (0.5090)	1.2059** (0.5090)
<b>Model statistics</b>			
Log likelihood	-125.7711		-77.2354
Pseudo R <sup>2</sup>	0.0268		0.1046
Wald	29.69***	33.62***	
Lambda		-0.1639	

Note. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively

Results show that: (1) larger firms were more prone to have registered a sales loss during the pandemic crisis; (2) among the firms who did record losses, larger firms were less affected; (3) larger firms are more resilient and capable to adjust to exogenous shocks than their smaller counterparts as would be expected. Furthermore, both “marketing” and “export intensity” variables suggest that most marketing intensive firms (typically the larger ones), showed a stronger propensity to register a sales loss, which could be associated with their greater exposure to a wider market (including international), which entails a more challenging commitment concerning marketing strategies.

Conversely, the results display that export intensity is positively linked with the level of loss in sales (has no significant effect on the probability of having losses) and wine tourism activities are identified as positive drivers of sales loss. The spatial lag parameter’s significance suggests spatial heterogeneity of sales loss, which combined with the significant positive correlation coefficient (Moran’s I) of the dependent variable suggests that wineries with high sales loss rates and/or lower sales loss rates in the dataset are more spatially clustered than would be expected if underlying spatial processes were random.

Therefore, this study contributes to a better understanding of how exogenous shocks impact wineries market performance, allowing us to conclude that both characteristics of the firm and spatial location explain different levels of sales loss.

**Keywords:** Fractional response model; Exogenous shock; Firm performance; Wine.

**Acknowledgements:**

This study has received support from: the FEDER – Interreg SUDOE project SOE3/P2/F0917, VINCI – Wine, Innovation and International Competitiveness, and the FCT – Portuguese Foundation for Science and Technology, project UIDB/SOC/04011/2020.

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# STRUCTURAL IMPACT OF COVID-19 ON PROFITABILITY OF THE PORTUGUESE WINE INDUSTRY: A PANEL DATA ANALYSIS (2014-2020)

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Due to the exogenous shock caused by the Covid-19 pandemic, the year 2020 (and possibly 2021) was one of the most challenging for companies, consumers and the society in general since the great depression of the 1930s. To prevent the spread of the virus through the population, governments across the world adopted drastic social restrictive measures, such as imposed lockdowns, temporary closure of businesses and restrictions to movement of citizens. These restrictions led to an economic contraction, losses of employment and even reduction of available income for households. At the same time, to help firms survive and maintain employment, governments have taken drastic short- and long-term measures, in a different approach from those taken in previous crises.

Among the short-term measures, public programs were deployed to support companies to maintain the jobs (layoff programs) as well as the suspension of credit payments or tax postponements to both firms and families (OECD, 2021). As medium and long-term measures, public programs for structural readjustment of economies were defined, with particularly the “Recovery and Resilience Facility” program of the European Union, aiming to boost economic recovery and support of green and digital transitions.

The losses in revenue caused by the contraction of economic activity posed a threat to the survival of companies, particularly in the case of SMEs, which are typically less robust. Such shock and the existence of mitigation measures led to adaptation of firms, both in their approach to the market (with launch of new products/services as well as working methods, such the focus in digital tools) as well as financial position, with adaptations in investment level, credit management and production abilities (Shen et al., 2020).

The wine industry is a benchmark of an industry that was hit particularly hard by the restrictions caused by mitigation of Covid-19, decimating wineries’ on-premises sales and forcing down the projected industry revenue for 2020 by nearly 14% (Lu, 2020), being expectable that the impacts are varying according to their size, positioning within the market (trade channels) or the even eligibility for government support.

Portugal is illustrative of that scenario, being a traditional producer and one of the leading consumer countries in Europe, with an internationally open industry, characterized by its heterogeneity (prevalence of SMEs and multiple producing regions), suffering and reacting to Covid-19. Based on data from Instituto da Vinha e do Vinho ([www.ivv.gov.pt/np4/estatistica](http://www.ivv.gov.pt/np4/estatistica)), in 2020, comparing to 2019, the exports and domestic market behaved differently. While exports increased by more than 3% in volume and 5.3% in value, the domestic market suffered a drop in value of nearly 22.5%, with losses in volume of 228 million liters.

On the supply side, the question that arises is to know what the true extent of the Covid-19 shock on firms’ profitability. Three hypotheses are formulated: (H1) the Covid-19 caused significant changes in firms’ profitability; and (H2) firm size (and other inherent characteristics) affected the extent of those changes. Finally, (H3) the public support programs mitigated the extent of the impact of Covid-19 losses. The answer

to these hypotheses is based on the analysis of accounting data for Portuguese wineries, using annual data from official reports, covering a period from 2014 to 2020.

Based on the Resource-based view (RBV) and the Institutional-based view (IBV) literature, the firm profitability is considered as a function of internal characteristics, such as size, age, indebtedness, structure of capital and market positioning as RBV variables, and public support programs to mitigate the effects of Covid-19 as a IBV variable.

Econometrically, panel data techniques are used to model profitability, namely through the Generalized Method of Moments, with the assessment of the Covid-19 shock being made with the inclusion of structural break tests as well as correlation tests. Additionally, splitting the sample into firm size groups allowed to understand how firms' financial performance varies according to the size of wineries and respectively, how the exogenous shock hit differently according to size group.

The results suggest that Covid-19 was responsible for a statistically significant change in 2020's profitability of Portuguese wineries, when analyzed as a whole, which confirms H1. When split into groups according to firm size, the results show that there are identifiable differences in how these changes occur, therefore confirming H2. Moreover, the role of public policy programs, in the form of subsidies, is not statistically significant, which does not allow to confirm H3. This means that despite their importance to mitigate job losses and closure of business, they did not have a significant impact to reduce the changes in firms' profitability.

This study provides a thoughtful contribution to the existing knowledge, since it allows, on one hand, to understand firm behavior at the microeconomic level (particularly, what influences firms' performance). On the other hand, it extends the existing knowledge by exploring how exogenous shocks can impact differently firms depending on its structure and conduct, i.e., how firms' inherent characteristics can be a seal against exogenous shocks or what characteristics facilitate losses. Moreover, this article contributes to the understanding of how public support programs impact firms differently and provides policy recommendations for future policy designs, that should be focused on inherent characteristics.

**Keywords:** *Fractional response model; Exogenous shock; Firm performance; Wine.*

### **Acknowledgements:**

This study has received support from: the FEDER – Interreg SUDOE project SOE3/P2/F0917, VINCI – Wine, Innovation and International Competitiveness, and the FCT – Portuguese Foundation for Science and Technology, project UIDB/SOC/04011/2020.

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## Parallel Sessions II - History

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# TOP INCOMES: EVIDENCE FROM BORDEAUX FINE WINE PRICES

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With relatively fixed supply, the evolution of prices of fine wine from Bordeaux must reflect the evolution of relative incomes, i.e. of top incomes who can afford these wines relative to the rest of the income distribution. We use historical data on *Grands Crus* prices to establish this measure as a novel proxy of world inequality (top income shares). It matches relatively well the historical series from the World Inequality Database and provides new evidence for the 19<sup>th</sup> century, a period that is rarely covered in a comprehensive way by traditional data. Results point to a slow rise of inequality in the 19<sup>th</sup> century (consistent with Chancel and Piketty, 2021) and a sharp rise over the past three decades (well documented in the top-income literature). Our approach also allows us to nowcast the evolution of world top incomes in the absence of reliable data for the top incomes in Russia and China.

**Keywords:** *Bordeaux fine wines, top incomes, inequalities*

# AN ECONOMIC HISTORY OF WINE APELLATIONS IN SPAIN, 1930-2020

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Wine production on the European continent has developed following the French model of geographical control of production through the establishment and legal recognition of protected designations of origin (PDO). These emerged with the aim of accrediting quality productions avoiding fraud and competition from wines from other areas or countries that imitated the originals and tried to take advantage of their prestige (Meloni and Swinen, 2018).

Wine protected designations of origin (PDOs) are networks based on the geographical control of production. It was in France that between 1908 and 1911 the first legislation for the protection of wine production in certain geographical areas was developed. In 1919 the first law was passed allowing the creation of appellations of origin through a complex judicial process. The practical problems and conflicts that arose led to the approval of the Capus law in 1927 that established the obligation to define the permitted varieties, delimited area and production methods (Chevet et al., 2018).

In this paper, our objective is to analyze the emergence and expansion of this model of organization and control of wine production in Spain from 1930 to the present. For this purpose, in addition to tracing the origins, development and main milestones of the appellations of origin in Spain, we will study their impact on wine production and the internationalization of the sector.

The French model was quickly imitated in Spain. In a context of falling prices and oversupply, winegrowers in some Spanish regions asked for legal protection for what they considered their local 'natural' wines against competition from others. Thus, in 1930 the legislative framework on appellations of origin was established, which would be integrated into the 1932 Wine Statute (Fernandez, 2016). Spanish legislation delegated the organization and regulations to the regulatory councils, without prohibiting the entry of wines from other areas. Before the civil war, 16 appellations of origin would be approved, although only two (Jerez, and Manzanilla) approved their regulations before 1936. In the decades after the war, new appellations of origin were created, some with some international recognition, as Montilla (1944) or Rioja (1945), and others corresponding to ordinary wine producing regions, such as La Mancha with a vineyard of more than 200,000 hectares in 1964 (Fernández and Pinilla, 2014, 2018).

Changes in the international wine market from the 1960s onwards reinforced the control of appellations of origin, prohibiting the introduction of wine from outside them, establishing stricter rules on production methods and forcing the bottling process to be carried out within their limits. The number of appellations of origin grew to ninety (Fernández and Pinilla, 2014).

It has been explained from a theoretical perspective, that the existence of appellations of origin allows the reduction of information asymmetries between producers and consumers and favors the creation of collective quality marks (Mérel and Sexton, 2012; Shapiro, 1982; Meloni and Swinnen, 2018). Therefore, they reduce market failures and improve efficiency. In the case of wine, the reduction of informational asymmetry is achieved by linking the quality of production to the region from which it originates.

Appellations of origin are governed through collective governing bodies formed by the wineries themselves, which are the regulatory councils. These have the capacity to establish mandatory regulations on production processes, quality standards and the inputs that can be used (only wine originating from the appellation of origin). In this way, they provide more information to the customer and can guarantee a minimum quality standard for all wines produced.

Although the creation of an appellation of origin initially has only these mentioned objectives, it generates a positive dynamic that allows collaboration between wineries, taking advantage of their proximity and specialization in the same type of product. From this point of view, an intense business network arises around the appellation of origin, as companies collaborate and compete with each other. Collaboration can take place in different areas of activity, but the most important ones are related to the guarantee of the quality standards adopted, which creates a double brand, that of the company and that of the appellation of origin; technology transfer; product development; reduction of input purchase costs; and the access to qualified labor. They also develop joint actions in both local and foreign markets, as the development of marketing campaigns, and often exchange knowledge on internationalization possibilities. Therefore, economies of scale and scope are obtained and unit and transaction costs are reduced (Bellefi et al., 2017). Internationalization is also favored by the relationships established around the network.

In short, the appellation of origin is similar to an agro-industrial district, which generates economies external to the individual companies and also internal to the local system, dynamizing the productive process (Beccattini, 2003). The appellation of origin differs from the Marshallian industrial district in that it is institutionally organized and also has the support and supervision of the public administration. This allows for greater cooperation between public-private agents.

**Keywords:** *Appellations of origin, wine history, Spanish wine*

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# HERITAGE ON THE MOVE: HOW AN UNDERSTANDING OF THE PAST SHAPES RESPONSES TO CONTEMPORARY CHALLENGES IN PORTUGAL AND SOUTH AFRICA

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## **Abstract**

At one level, the concept of cultural heritage is premised on human agency and historical change – as is reflected in the sculpted wine landscapes like those of the Douro. And yet, as critics of the UNESCO system point out, the process of recognition entails not just a codification of past practices, but an effort to freeze elements that are considered fundamental. This framing becomes increasingly problematic as climate change alters growing conditions and as the environmental footprint of viticulture comes under closer scrutiny. In this paper, we probe some of these tensions through a comparison of Portugal and South Africa, and pose the question of how far the responses of wine producers to a series of contemporary challenges are informed by readings of past adaptations, both in other locations and closer to home.

The first section of the paper addresses some current trends within the literature. As a first step, we ran a search within Scopus database on the topic of “wine industry” and “challenges”, from 1970 to the present (February 2022). In all, 259 articles were retrieved with a marked increase in the number being published, particularly after 2004. Most originated from the United States and Australia, followed by old wine producing countries: Italy, France, Spain and Portugal. Moreover, the research is clearly multidisciplinary, with only one fifth coming from Agriculture, and the others dispersed through Business, Environmental, Social Sciences, Biochemistry, Economics, Engineering, Immunology, Energy, Chemical Engineering, among others. In order to identify the challenges faced in the past and those predicted in the future, the content of titles and the abstracts of the 259 articles were analyzed and a word cloud was constructed using Nvivo 12. As expected, the most frequent words are *wine*, *industry*, and *challenges*. It is interesting to note the relevance of *regions*, *sustaining*, *quality* and *climate*, denoting the importance of climate (and climate change) for the wine industry, the regional character of the production and the challenges related to quality. It is interesting that the word *water* appears with some significance, but temperature does not, which may signify that climate change effects are expected to be more severe with respect to watering needs, than related with temperature. With regard to sustainability and its dimensions, the word *economics* appears more frequently, followed closely by *environmental* and lastly *social*. Moreover, *market* appears very frequently, translating the importance of trade, as does *internationally* and *global*, due to the internationalization of the sector. Probably associated with the introduction of sustainability parameter in the market for wine, the word *waste* appears with some significance.

The second section of the paper locates this discussion within the recent experiences of Portugal, in particular the Douro valley and South Africa.

In Portugal, the Douro valley assumes particular relevance as it is the most ancient demarcated wine region. Wine production has been central in the region for centuries, constituting the basis of the region's economy and culture. In the past, climate together with soil and topography were amongst the biggest

challenges faced by wine producers. In recent years, climate change effects on the Douro valley show that the mean temperature in the growing season is reaching the upper limit of 21 °C that is conventional for producing fortified wines. Further increase in the growing season temperature will gradually place the region outside this theoretical optimum range. Given the economic and social dependence of the region on vines and wine, this fact represents a particularly serious threat at different levels. Firstly, due to the local economy dependency on vines, wines and related activities. Secondly, the loss of the local identity, since vines and wines constitute the social identity of the region, being present in the vocabulary, the toponymy of the region, cultural demonstrations, land organization, among others. Finally, and due to concomitantly changes in agricultural practices within climate change adaptation measures, the Douro wines could lose their recognizable identity by marketers and consumers.

In South Africa, the challenge facing wine producers has been nothing less than existential, with more than half of farms operating at a loss before the onset of the COVID pandemic made matters immeasurably worse. The challenges have related both to economic and environmental factors. Historically, the industry has struggled to increase its domestic sales, which is part of the legacy of racialized prohibition in the twentieth century. Producers have therefore tended to look to the export market, but have struggled to generate clear and positive images that can invoke appeals to both history and innovation. On the environmental front, rising temperatures are indeed a serious problem, and this has led many producers to abandon the well-known producing areas for cool climate zones, whether along the coastline or at higher altitudes. Moreover, the water deficit has become acute, which raises serious issues because most of the wine is produced within the Cape Floral Kingdom (which has UNESCO recognition) where the authorities are committed to eradicating alien plant species. At the same time, producers are actively experimenting with a long list of southern European cultivars, including those from Portugal, that are believed to be more drought resistant than those that have previously been preferred – thereby drawing consciously on a sense of European viticultural heritage. However, this proliferation of varieties threatens to undermine a clear sense of South Africa's own wine identity.

**Keywords:** *Cultural heritage, Portugal, South Africa, wine history*

# QUALITY WINES IN SIENA: LONG-TERM IMPACT OF “TYPICAL WINE” DEMARCATIONS AND GIS ON RURAL DEVELOPMENT

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This paper contributes to the study of long-term effects of historical wine districts and geographical Indications (GIs) on current development of rural areas by looking at three wine regions in the Tuscan province of Siena: Chianti Classico, Nobile di Montepulciano, Brunello di Montalcino. This study is especially relevant as development of rural areas is one of the main objectives of EU regional policy (€95.5 billion European fund EAFRD for 2021-27).

This paper adopts a quantitative approach to examine the historical evolution of Siena high quality wines, whose success in the international market can be traced back to the second half of the nineteenth century. The analysis will be conducted at a local level using municipal and fattore data for the period between 1830 and 2020. We have collected a newly database from various censuses, such as Indice dei Possidenti della Toscana of 1836, Cadastro Agrario of 1929, Censimento industriale e commerciale of 1937, Cadastro Agrario of 1970, as well as unpublished data from the Archivio di Stato di Siena and the Archivio Consorzio Agrario di Siena. Indicators of today's level of development of rural areas will be collected from more recent census and surveys.

This database will allow us to study whether historical wine districts and historical GIs promote local economic development in rural areas in the long run, a question that have been only explored by Crescenzi al (2021) and Dumangane et al (2021) at a higher aggregated level and for the period after 1950. We also aim at exploring the channels by which historical GIs and wine districts might positively impact on development, including protection of property rights, reduction of information asymmetries (among producers and in the international markets), leverage from product differentiation, premium pricing, market access or land rents (Dumangane et al 2021).

This paper also contributes to the study of the relationship between trade and terroir (Meloni & Swinnen, 2018). Chianti Classico, Nobile di Montepulciano, Brunello di Montalcino were among the first GIs created in Europe. Today, Siena is renowned by the production of high-quality wines, with 12 of the 39 Tuscan *Denominazione di Origina Controllata* (DOC), and all five *Denominazione di Origina Controllata e Garantita* (DOCG) (Mattiacci & Zampi 2004), having a significant importance in the international market for Italian wines (Corsi et al, 2018).

This paper is also especially relevant to study the effects of quality wine districts on rural development because historically Siena has been characterized by a high level of inequality in land distribution and the prevalence of a form of sharecropping, *mezzadria*, before 1950 (Giorgetti 1974; Mocarelli & Vaquero Piñeiro, 2019; Simpson & Carmona, 2021) In the same vein, the historical development of these three Sienese winemaking areas, whose success in the international market can be traced back to the second half of the nineteenth century, are also connected by the role played by wealthy aristocratic families, which significantly contributed to the technological improvement of wine production and the creation of an export industry of wine. The Biondi-Santi family was key in the growth of the Montalcino wine industry in the nineteenth century. Bettino Ricasoli and other noble families, such as the Antinori, also greatly contributed to quality winegrowing (Mocarelli & Vaquero Piñeiro, 2019; Mattiacci & Zampi, 2004). However, Tuscany (and Siene) viticulture has been historically dominated by individual grape-growers. This,

jointly with the prevalence of the *mezzadria*, as well as the association of winegrowers in the Consorzi del Vino, might have a positive impact on income redistribution.

**Keywords:** GIs, local development, Siena, Italy, wine history

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## Parallel Sessions III - Business

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## KEEPING UP WITH COMPETITORS

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In 2020, Germany produced approximately 8.4 million hectolitres (mhl) and imported 14.1 mhl (OIV, 2020). 19.8 mhl were consumed in Germany and 3.4 mhl exported or re-exported in the same year (OIV, 2020). This data shows that German producers have to face strong competition from foreign producers and the German wine market is highly competitive (Richter et al., 2021). Also, on the global level, the wine industry faces an oversupply each year (Loose & Nelgen, 2021; Richter & Hanf, 2020).

In highly competitive markets, flawless product quality has become the standard, and the specific quality attributes do not serve for differentiation. The increasing demand of consumers for “bio”, “vegan”, or “sustainable produced” products, which can be observed in the agri-food business in general, is also reflected in the wine industry. The changing consumer demands put pressure on producers to offer products that fulfil specific characteristics and can be labelled as such. If they cannot offer products with the required attributes to customers and consumers, this might lead to a competitive disadvantage, i.e. parity must be achieved in order to stay competitive.

In the German wine business, there is an increasing tendency towards vertical coordination. Especially well-known producers with a high reputation are cooperating with the German food retail to distribute their brands in larger quantities. The German food retail (discounters and supermarkets) is an important distribution channel for wine producers and accounts for almost 80 % of the total sales volume in the German wine market (Richter et al., 2021). Due to the limited vineyard area, wine producers often enter partnerships with other grape suppliers to secure large amounts of wine at a constant quality level. This means that they enter mid- to long-term contracts with other grape suppliers or firms along the value chain. To meet specific quality attributes, the whole supply chain network must be organized accordingly by the focal firm, which is responsible for this task.

To our knowledge, so far, competitive parity has not been addressed much in the strategic management and the agri-food business management literature. Hence, the aim of this paper is to gain a first overview of the existing literature on competitive parity in strategic management and agri-food business management. In a second step, it should be investigated whether competitive parity is of strategic importance for producers. This question will be examined by using the example of the wine industry. First, a literature overview was conducted and second, an exploratory study was set up, and interviews were held with experts.

The literature overview followed a structured approach, i.e. we searched for articles in leading journals in strategic management and agri-food business management. The search was not limited to a specific period. A set of keywords was used in the selected journals: parity; competitive parity; strategic parity; maintain parity with competitors; parity with competitors. In addition, a meta-search was conducted using the google scholar database. The results of the literature overview were divided into firm-level and network-level results. Both levels are important as there is the focal firm (firm-level) and the whole supply chain network (as mentioned earlier); thus, the network-level was also considered.

The literature on the firm-level reveals that there are hardly any independent contributions on competitive parity. In almost all cases, parity is only taken up as a secondary aspect in texts that primarily deal with competitive advantages in the context of the VRIO concept (resource-based view). However, several

authors stated that it is highly important for firms to have strategies that are a source of competitive parity. Thus, it can be assumed that a long-term approach is necessary to secure parity with competitors in the long run. Literature that was not based on the VRIO concept was in the context of concepts of sequential market entry and business imitation.

Literature on the network-level was even more scarce (e.g. Mentzer et al., 2000). However, literature could be found referring to parity as a relevant aspect in agri-food business chain management. Hanf and Hanf (2007) distinguish between *operative* and *strategic quality management*, which Gagalyuk (2012) refers to as *parity* and *advantage chain management*. *Operative (or parity) chain management* can be used to reach a cost advantage and, at the same time, parity with competitors in terms of quality. For this approach, the operational partnering strategy must be applied. Consumers are not willing to pay for standard products or products that fulfil basic quality requirements. Therefore, the goal must be to maximize efficiency and effectiveness to minimize costs. *Strategic (or advantage) chain management* also needs to fulfil the basic standards on food safety. When additional quality attributes and standards are met, a competitive advantage in terms of quality can be achieved. Consumers will be willing to pay a price premium if they perceive additional value delivered by the product. (Hanf & Hanf, 2007)

In addition to the literature overview, it should be investigated whether competitive parity is of strategic importance for producers in the agri-food business. This should be investigated by using the example of the wine industry. Due to the exploratory character of the research question, a qualitative research approach was considered appropriate. Expert interviews were held with ten managing directors and one industry consultant from Germany, Australia, France and the USA. The interviews have shown that the topic of competitive parity is highly relevant as a component of strategic planning for producers and retailers. While the competitive advantage is usually seen in the brand or reputation of the company, it is difficult to successfully differentiate from competitors in the long term, especially if it comes to individual quality features (e.g. “bio”, “vegan”, ...) or service. Surprising was the statement of several interview partners that, in addition to the quality level, the presence of specific certifications and labels as well as the selection of grape varieties in the assortment, especially the presence in social media and a well-launched online shop play a major role for parity with the competition.

In summary, it can be stated that this topic is a very sensitive issue to discuss with managers, which must be taken into account in future studies.

**Keywords:** *Competitive parity, strategic management, chain management, wine chain, wine business.*

### **Acknowledgements:**

This research is supported by the International Organisation of Vine and Wine (Organisation Internationale de la Vigne et du Vin, OIV).

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# PRODUCERS, CONSUMERS AND WINE IN THE MAKING OF THE ARGENTINE INDUSTRY, 1885-1915

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The goals of wine producers and the expectations of wine consumers are often seen to be in conflict. For example, in the of Argentina's wine industry the era of the 1950s-1970s was an extreme example of a producer-centric model. During these years, decisions were driven largely by government tax incentives and cheap credit that encouraged the production of as much wine as possible. More wine/more credit/more money from the State to pay for everything from new planting, labor, construction, wells, etc. Speculation became the focus. In the words of renowned Argentine enologist Raul de la Mota, "The real decision-makers were not the wine-makers but the accountants." (Interview with the Author August 2003) The result: consumers experienced an enormous decline in wine quality, leading to the near collapse of the industry in the 1980s.

In more recent years, beginning in the mid-1990s, a seismic shift to focus on consumers, for both domestic and international markets. For the first time in its century long history, the Argentine wine er made quality a priority, to bring back domestic consumption and attract for the first time international consumers of Argentine wine. As iconic wine-maker Jose Alberto Zuccardi commented, "Before the 1990s we did not understand the market; we did not understand what people wanted. We never saw the face of the consumers. When we began to see their face, we began to understand what the consumers preferred." (Interview with the author August 2004)

This work focuses on the emergence of the industry 100 years earlier, a period in which producer strategies and consumer preferences coincided. In the last two decades of the 19th century Argentina's wine industry grew exponentially from infancy to adulthood whether measured by: Vineyard growth (from 1,500 hectares in 1873 to 44,700 in 1910; number of wineries (334 in 1884 to 1,394 in 1914; most revealing, production which expanded annually by 11 to 17 percent.

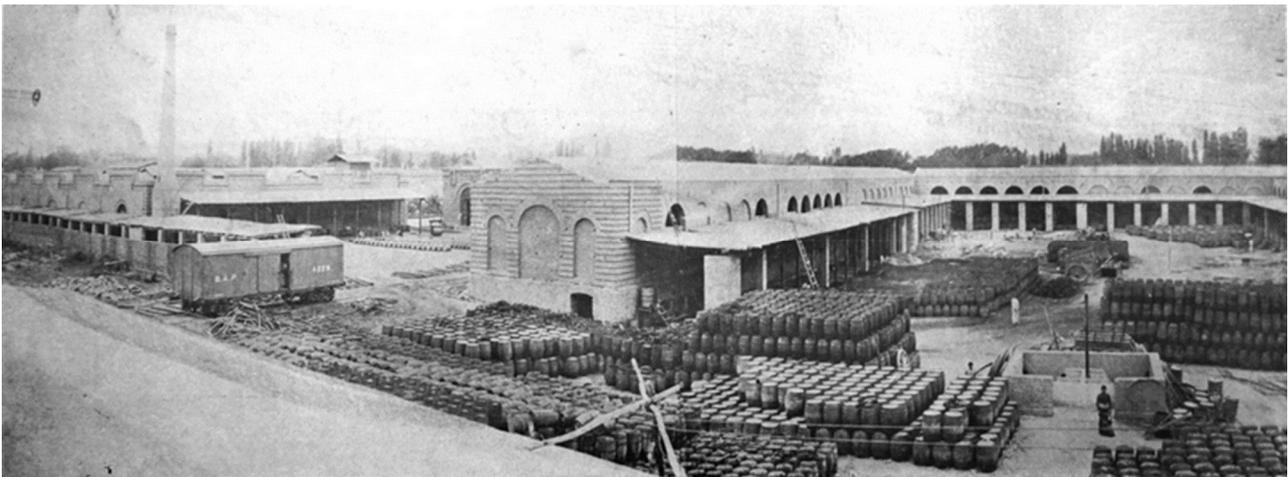
Explosive growth was triggered by both a single event and a long-term process. The event was the completion of a rail link between Mendoza and Buenos Aires. The railroad permitted the rapid shipment of large quantities of wine from the wine the wine lands in the west of the country to the major consumer markets in the east, in particular to the country's capital. The long-term process was massive migration largely from the Mediterranean countries of Italy and Spain which took off in the 1860s and grew substantially in subsequent decades. This flood of people from Southern Europe prompted a nearly 300 percent jump in consumption in the three decades following the birth of the industry. Before the major influx of immigrants beginning in the 1870s, annual per-capita consumption averaged 23 liters. By 1910, it had risen to 62 liters as foreigners grew to 29 percent of Argentina's population. Among the country's wine drinkers, Italians were reported to have consumed 101 liters per year, followed by Spaniards at 90 liters. This made wine Argentina's third most important consumer product after bread and meat, accounting for 8.7 percent of average family food and drink expenditures.

To understand how producer-centric strategies developed in parallel to consumer-centric demands, it is essential to remember who the consumers were. As indicated above, they were almost entirely Southern

European immigrants with a long-standing wine culture that involved concrete expectations for wine that would be central to the form it took in their adopted country. For this group of largely poor men of peasant background, wine was a part of the daily diet, a source of calories and a healthy substitute for the non-potable water of their rural homelands. Quality and taste were not fundamental to the “meanings” of wine. That wine culture quickly became a determining factor in the strategy of the country’s producers.

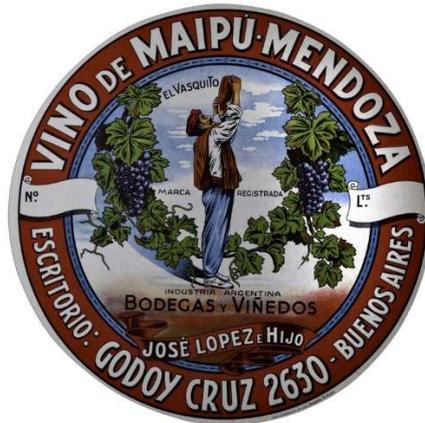
How these expectations for wine influenced producers is made clear in the internal communications of the region’s third largest winery, Bodegas Arizu. For Arizu, the typical consumer was “a person with no taste”, a view shared by the industry at large. As one contemporary critic remarked, the goal was “ordinary wines for the workers....They think about hearty throats, not palates.”<sup>1</sup> And for those palates, typically one liter per day was considered indispensable. In this context, production was clearly driven by a simple calculus: lower price, more produced, more drunk, more profits.

In terms of the wineries, what emerge were some of the world’s first wine factories that on a single day made as much wine as the most important winery of Spain made in a year. One of these factories, Bodega Tomba, became considered the largest winery in the world.



Establecimiento Viti-Vinicola de D. Domingo Tomba circa 1910.  
 Centro Viti-Vinicola Nacional. La viti-vinicultura en 1910 . Buenos Aires: 1911, 38

Besides the drive to meet growing demand, attention to consumers extended to wine marketing and branding. Numerous brands incorporated references to immigrants’ homelands as this 1910 barrel label from Bodegas Lopez. We see a man dressed in Bosque-country regional dress drinking El Vasquito wine from the traditional bota. Equally striking is the fact that he is surrounded by a light-blue circle denoting the color of the Argentine flag. In short, the immigrant consumer could reproduce the wine experience of his homeland in his new environment.



Barrel Label Bodegas Lopez Circa 1910.

But for these consumers, labels were not sufficient. Their wine had to look and at least taste similar to the drink they had left behind. In this regard, producers initially had a problem. Their vineyards were covered by Uva Criolla also known as Uva Pais, the grape varieties that had been brought by Spanish missionaries to be used for mass wine. These grapes produced a largely unpalatable pinkish concoction with aromas compared to pig dung that looked and tasted nothing like the wines of their homelands. The solution: tear up the Uva Criolla and plant European red varieties.

A particularly interesting feature of this conjunction of producer/consumer desires was the emergence of Malbec as the country's most widely planted variety. The choice of Malbec over other options once again demonstrates the coincidence between producers' volume priorities and consumers' wine expectations. One of those options was Cabernet Sauvignon. It is worth reading what a visiting French observer wrote in 1906. "Of all the grape varieties that have been planted in Mendoza, undoubtedly Cabernet has produced the best. Nevertheless, the industry, unable to fully supply the local market, pays scant attention to wines' quality. Cabernet produces little, very little. Undoubtedly, it cannot match the fertility of Malbec and there remains no price difference between the distinct French varieties." Somois, D.S. "Sobre poda del Cabernet Sauvignon," *Boletín del Centro Viti-Vinícola Nacional* (July 31, 1906), 596.

Besides high yield, Malbec, the very grape that has become Argentina's emblem of quality, driving the country's ascendance as a major international actor over the past three decades, played a very different role yet equally significant role a century earlier. While producers did not prioritize essential elements of wine quality, aromas and tastes, they did seek to emphasize one important characteristic: color. And Malbec was the choice, able to stand a greater injection of water than more refined products and still look like wine. So for wineries and commercial distributors, Malbec was winner. With it, wineries could respond to the growing domestic demand by adding water to heavy, alcoholic product that would still look like wine. And the price-driven consumer, whose wine experience defined the drink as a daily staple, could add more water to make it a good fit for a family budget that typically devoted less than 3 percent to its purchase.

In sum, producers and consumers came together. As contemporary observers put it, "Wine drinkers think about hearty throats, not palates." And, "wine-makers want to make lots of wine and above all quickly."<sup>2</sup>

**Keywords:** *Wine History, Argentina, Malbec, Immigrants, Producers, Consumers.*

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# SHAPING BLOCKCHAIN-BASED INNOVATION STRATEGIES IN THE WINE SECTOR: A CONCEPTUAL FRAMEWORK

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## Introduction

The growing demand for transparency along the supply chain, partly related to recent incidents involving food contaminations and food frauds, has led businesses to reinterpret their business models by adopting strategies aimed to ensure an effective traceability system (Antonucci et al., 2019; Giacomarra et al., 2016). Today consumers are expecting information about the origin of the products and/or the production method, which can provide them with greater safety, and which contribute to increasing trust in the product and in the brand itself which is responsible for the coordination of the supply chain (Kramer et al., 2021).

In this scenario, emerging technologies play a decisive role by allowing for constant monitoring of data and information in the various phases of the supply chain (Feng et al., 2020; Kamble et al., 2020). The Blockchain Technology (BCT) represent the more recent digital evolution which can guarantee greater safety for the consumers and for all chain players thanks to a diffused knowledge about “origin, authenticity, custody and integrity” (Montecchi et al., 2019, p. 286). Over recent years, the BCT has found applications in various agro-food sectors, including that of wine. In the latter sector, the adoption of this emerging technology was facilitated, on the one hand, by the marked propensity for innovation of several wineries, and, on the other hand, by the need to guarantee an effective traceability system in response to the consumer demand for transparency and to combat illegal actions (Tardivo et al., 2017). With reference to the latter, recent data of the European Anti-Fraud Office (OLAF) report that 1,7 millions of liters of counterfeit alcoholic beverages, especially wine, were seized across Europe in 2021. In this scenario, BCT could offer important guarantees for all players in the supply chain.

To date, very few studies explored the role and potentiality of adoption of the BCT in the wine industry and the main enabling factors affecting the implementation of this technology. For instance, Tiscini et al. (2020) and Luzzani et al. (2021) found that the adoption of BCT influences the creation of innovative sustainable business models thanks to the collection of data and information that are relevant for monitoring and improving sustainability. Hellier et al. (2020), studying potentialities and barriers, found that the BCT adoption in the wine industry is hampered by the lack of knowledge on how this technology work and the difficulty to exchange data with other systems. More recently, Galati et al. (2021) with the aim of verifying the main factors affecting the adoption of BCT in the world of wine, found that skills of the manager and of the human capital are essential in the process of acquiring external knowledge and the capitalization of the same for the adoption and maintenance of this innovative technology. It is obvious that there are little empirical evidences that are not enough to express a judgment on the opportunities offered by BCT in the world of wine. With this in mind, the aim of this study is to explore and analyze the main opportunities related to the BCT implementation in the wine industry and to identify the most important drivers and barriers of innovation, by using a case study approach.

### **Theoretical Framing**

According to business strategy literature one of the key responsibilities of management is to gather, assimilate, and convert the strategic resource knowledge and capabilities into profitable output of the firm. Innovation strategies are vital to differentiate from and outperform the competition by creating new business models, offering innovative and exciting products and solutions, and potentially developing new markets or even new businesses. As a result, management plays a key role in adopting and utilizing innovations to create competitive advantages. Identifying and selecting knowledge and new capabilities requires a specific form of governance such as markets, authority-based hierarchy, and consensus-based hierarchy (Nickerson and Zenger, 2004). Those differentiate through the course of action they follow to identify the best suitable alternative. In scientific literature this governance is referred to knowledge-based theory. While the resource-based view focusses on assets, the knowledge-based theory analyses through the lens of capabilities. To support the identification of future capabilities, an organization must learn and adopt from others, internal and external to the organization. Being referred to as absorptive capacity of the organization this capability can be described as the competence to identify and analyse novel technologies and processes to convert those into profitable and novel business models (Zahra and George, 2002). Based on the absorptive capacity and knowledge-based theory, we develop a conceptual framework aiming to identify the organizational parameters that shape blockchain-based innovation strategies such as technology leveraging, and business model innovation of firms in the wine industry to provide for sustainable competitive advantages.

In the first step we will use primary and secondary research methods including an exploratory use case and semi-structured interviews with managers from the wine industry. In a subsequent step we will analyse blockchain implementations at wineries in two European markets, namely Italy and Germany, by building on the conceptual framework we developed.

### **Research methodology**

To achieve the purpose of this work and taking into account that the investigated phenomenon is entirely new, the case study approach was used, which is well suited for exploratory investigations (Chetty, 1996; Yin, 1989). Yin (1984, p. 23) defines the case study research method “as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used.”

The case firm in this study, Costaflores organic vineyard, located in in Mendoza, Argentina was selected because it is an innovative actor in the wine industry and boasts a tradition in proposing innovative solutions in this sector. In detail, Costaflores was chosen for this study for several reasons. First, this boutique winery uses blockchain as a platform for transparently sharing data about their business operation on the Internet. Second, they tokenize wine by issuing fungible tokens (FT) at harvest time for each wine bottle produced. The FTs are traded on a decentralized platform using smart contracts and Ether (ETH) as cryptocurrency with the objective to let supply and demand decide on the price of the wine.

### **Expected results**

Today the BCT can offer concrete opportunities for businesses operating in the wine industry linked to the possibility of guaranteeing a greater transparency along the supply chain. The case study of the Costaflores winery highlights the numerous opportunities linked to the adoption of technology in the wine sector in which everything that happens in the vineyard and in the cellar is documented in an open platform and the data are written in the blockchain, data used to ensure an effective traceability system. Results of the case study analysis may have significant managerial implications. Knowing the possibilities of use of BCT in the wine sector (transparency of the supply chain, sustainability of processes, combat illegal actions), the factors that can favor its adoption and the main barriers, can be useful for ensure an effective implementation of this innovation in the sector.

**Keywords:** Technology adoption, absorptive capacity, knowledge-based view, blockchain, wine industry

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# Parallel Sessions IV - Management & COVID-19

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# POPULATION THRESHOLDS MODELS FOR LOCAL ALCOHOLIC BEVERAGE MANUFACTURING

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Local beers, wines and distilled products have drawn the attention of economic development, destination marketing, and related agencies both for their innovation potential and as new sources of income streams, including those derived from visiting tourists. In many communities beer and wine trails have become common, while in more sparsely populated areas mixed trails have been established, consisting of distilleries and cideries in addition to breweries and wineries. Yet this enthusiasm is tempered by the potential for destructive forms of competition between firms, as local supplies exceed market demand.

In this paper we adopt the seminal model of Bresnahan and Reiss (1991) to the case of breweries, wineries and distilleries, all of which are experiencing unprecedented growth across the United States. We start with descriptive statistics, maps, and the distributions of these various firms across the rural-urban county continuum. Following Cleary et al (2019), we then explore the impacts of community-level factors such as income, educational attainment, age groups, ethnic diversity, competing suppliers, social capital, among others, on establishment counts for these different manufacturers of alcoholic beverages. Because we do not observe prices and quantities directly to estimate a firm profit function, we instead infer these from the above fixed and variable factors as they affect firms' profits. In addition to identifying the roles of these different factors in the presence of firms, we are able to provide population thresholds needed to support successive numbers of firms in each of these industries.

Of particular interest is whether a given factor (e.g., social capital, education, metro status) has the same effect across the three sectors. For example, proximity to competitors may be beneficial to wineries and breweries, but not distilleries. Further, given that alcohol consumption is down among millennials but up among boomers, it will be interesting to uncover how this effect is distributed among the location drivers of breweries, wineries, and distilleries.

To operationalize our model, we combine data from several publicly available sources on 3,108 counties across the U.S. We use the number of NAICS 312120 "Breweries," NAICS 312130 "Wineries," and 312140 "Distilleries" in 2016. Total county population from the (to mitigate endogeneity concerns) 2012 U.S. Census Bureau Population Estimates Program (PEP) is used as a proxy for market size. Other variables in our model include those used to assess the economic viability of breweries, wineries, and distilleries. We control for differences in social capital across counties using the 2009 social capital index from the Northeast Regional Center for Rural Development at The Pennsylvania State University (Rupasingha et al. 2006; *with updated data*). We also introduce the number and size of potential intermediaries from the County Business Patterns Database: supermarkets and other grocery stores (NAICS 445110); full-service restaurants (NAICS 722511); mobile food services (NAICS 722330); and number of supercenters and club stores (NAICS 452910). In addition, we consider county demographic information, including income, education, race, percentage of population belonging to various age categories, food assistance program

participation, commercial electricity price, a land price index, rural/urban county status, and regional fixed effects to control for other sources of variation in local demand and supply. We estimate the B&R framework using an ordered probit model.

Preliminary results suggest that there are key similarities and differences across these sectors. Establishing a profitable brewery in a county requires about 80,900 residents and maintaining at least two breweries in a county requires a little less than twice that many individuals. Wineries require about the same population level to establish in a county as breweries: about 81,800. However, wineries require more than twice that to maintain two in the same county. In contrast, distilleries require a much larger population, about 150,000, to support one profitable establishment, but just require about 50% more to support two. This may point to the fact that distilleries are in a declining period in comparison to wineries and breweries (for which the NAICS definition includes manufacture of non-alcoholic versions while distilleries do not).

We find that social capital is positively and significantly linked with all establishment counts. This may point to emphasis on socializing via clubs, associations, etc. encouraged by such establishments. We also find that age has a specific influence on breweries, wineries, and distilleries. For breweries, relatively younger age groups are positively associated with profits. However, for wineries and distilleries, only older age groups have a (marginally) statistically significant relationship with profits, and it is negative. Larger grocery stores, smaller restaurants, and superstores appear to be positively related with brewery profits. Smaller grocery stores and smaller restaurants are positively related with winery profits. Grocery stores regardless of size and superstores appear to have a positive relationship with distillery profits. This pattern may be supported by larger grocery stores offering a selection of beer on their shelves, while other types of grocery stores may just exert location externalities for different types of outlets. We do not find a strong association with per capita income for the profits of any of these establishments.

**Keywords:** *economic development, wineries, breweries, distilleries, count data models*

### **Acknowledgements:**

This research is supported by funding from the U.S. Department of Agriculture, National Institute of Food and Agriculture, and the Agricultural Experiment Station, Penn State University.

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# SHORT- AND PROJECTED LONG-TERM EFFECTS OF THE COVID-19 PANDEMIC ON WINE CONSUMPTION PATTERNS

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*"Penicillin cures, but wine makes people happy." (A. Fleming)*

The COVID-19 outbreak was as unexpected as it was brutal. The existing literature shows that severe and difficult-to-predict events significantly affect consumers through two channels: the "real" crisis and its economic consequences, as well as the "perceived" crisis and its implications on individual (and sometimes even collective) preferences. However, because of its exceptional scope and global nature, the COVID-19 crisis has not only led to an unprecedented decline in overall demand, but also to substantial changes in consumptions and purchase patterns.

Our study aims at contributing to the rapidly expanding body of literature on COVID-19 & consumer behavior by analyzing the impact of the pandemic, and more particularly of the March-April 2020 partial lockdown on Swiss wine consumers. We examine how the consumption, purchase patterns and projected consumer behavior evolved following the pandemic outbreak and control for various factors (cultural background, physical and personal proximity to wine producers, feelings & perceptions, etc.) that may mitigate or reinforce this reaction. The three main elements of this study, the crisis (COVID-19 pandemic), the country (Switzerland) and the good (wine), provide a compelling framework for assessing precisely the relationships between demographic, socio-cultural, and economic variables, on the one side, and consumer behavior, including effective or anticipated shifts in purchase among different goods and over time, on the other side.

Wine provides an ideal subject for such a study. Indeed, its dual antidepressant and addictive nature, for some people in some circumstances, is likely to affect its price and income elasticity. Moreover, wine differs from other consumer goods along several dimensions (see, Storchmann (2012) for a detailed review of the specificities of wine from an economic standpoint). It is a heterogeneous good, ranging from cheap industrial wines of sometimes distant geographical origin to artisanal wines produced locally and/or in an environmentally friendly manner. Some wines are consumed without special attention, often as an accompaniment to a meal. Others have an epicurean appeal and can be savored for themselves in tastings or even become a subject of conversation in their own right. The wine market mirrors this heterogeneity and is segmented with different wines being sold through dedicated distribution channels. Finally, it can be preserved for years and even decades for the best wines. This means that one can purchase a wine without necessarily aiming at drinking it in the near future. The corollary is that one can also consume a wine without having to buy it simultaneously. These specificities render wine particularly well-suited for studying the effect of COVID-19 on actual and projected consumers' behavior, while controlling for differences among wine segments and consumer types.

The virus outbreak in March 2020 has led to an economic recession, whose characteristics differ from country to country. It has also contributed to changes in public opinion and attitudes towards globalization and sustainability. Echoing these considerations, Goffman (2020) advocates for “a new kind of globalization, one predicated not on economic growth but on environmental awareness and economic equity.” At this stage, we can identify four transmission channels between the pandemic and the wine market. First, the crisis disrupted the logistical links of globalized markets and might have led to a reallocation of spending from global to local products. Second, the crisis “de-socialized” people. This raises the question of a possible reallocation between individual and collective consumption. Third, the crisis might have led to transfers between present and future consumption (stockpiling and destocking). Finally, the crisis induced a high level of uncertainty and anxiety. It is therefore likely to have reinforced addictive behaviors and affected savings. The presence and intensity of these effects may depend on factors specific to the individuals considered and their cultural references.

Switzerland provides an excellent laboratory because it is often considered a “Europe in miniature” with several cultures that coexist. Moreover, the spread of the pandemic was much differentiated across the three language parts of the country: the Italian-speaking part (in the South, near the Italian border) was affected very quickly and severely; the French-speaking part (West) followed closely and also experienced a difficult situation; whereas the German-speaking part (North and East) was relatively preserved. This distinct evolution coupled with cultural differences has led to differentiated behaviors in the various parts of the country and a lower rate of compliance to social distancing measures in the German-speaking region. Deopa and Fortunato (2020) refer to this phenomenon as a *Coronagraben* – in analogy to the *Röstigraben* concept that is frequently used to epitomize the impact of cultural differences among Swiss regions on political and economic behaviors. The fact that Switzerland opted for a partial lockdown, which was much less strict than in the rest of Europe, reinforced these differences and should allow for a finer analysis than in countries where freedom was more severely restricted. From an empirical standpoint, focusing on a single country presents notable advantages as it avoids having to deal with potential biases induced by differences in laws, taxes, currency, and alcohol policies in an international context. Moreover, this settings may help to understand why studies on wine consumption during the pandemic arrive at different results in different countries.

Our data comes from a questionnaire that was administered in several European countries. We have included additional questions and response options to the Swiss version of the questionnaire in order to be able to extend the analysis beyond the simple issue of concurrent changes in wine consumption. The survey drew 927 respondents between April 17 and May 10, 2020, using an exponential discriminative chain-referral sampling method via the SurveyMonkey platform. This method was chosen because it allows the data collection to be directed towards people who are more likely to be wine consumers. In addition, it has the advantage of allowing rapid data collection, which in the context of the lockdown was essential. The origin of the respondents reflects the distribution of wine production in Switzerland and the sample appears to be representative of the diversity of wine consumers in this country.

Preliminary results indicate that the consumption of wine increased at the expense of beer and spirits. Those most directly affected by the epidemic have changed their drinking patterns the most. Consumption among friends and colleagues has collapsed, but has not completely disappeared - a consequence of the flexible lockdown approach applied in Switzerland. Nearly a third of the population regularly engaged in remote wine tasting, but few think they will continue to do so in the future. There has also been an increase in “solo” consumption, which points to an increase in the risk of addiction. Nearly  $\frac{3}{4}$  of those surveyed are worried about the economic and non-economic consequences of the crisis. However, the majority of them hope to return to their previous habits once the situation has fully returned to normal. Most of the respondents believe they should buy more local wine: French and Italian speakers are respectively 65% and 70% to agree with this statement, while German speakers are mostly in disagreement (only 26% agree).

**Keywords:** *COVID-19, wine, consumption patterns, projected behaviour, sustainable consumption*

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# ECONOMIC IMPACT OF CURATIVE PRACTICES ON A DECLINING VINE PLOT: ANALYSIS OF THE WINEGROWER'S DECISION

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Vine decline leads to substantial yield losses and higher vine mortality in the vineyards (FranceAgriMer-CNIV-BIPE, 2015). This decline comes from multiple factors and among them, grape trunk diseases (GTDs) represent a real challenge for all the grape regions in the world. An increase in the incidence of GTDs over the last 10–15 years has been reported worldwide (Carter, 1991; Chiarappa, 2000; Graniti et al., 2000; Surico et al., 2000; Reisenzein, 2000; Úrbez-Torres et al., 2009; Sosnowski et al., 2007; Bertsch et al., 2013) and in France (Bruez et al., 2013; Bruez et al., 2021). A national scale study in France in 2015 showed significant increase in vine mortality and yield losses estimated at 4.6 hl/ha/year (BIPE/CNIV, 2015). Approximately 11% of vines became unproductive (BIPE/CNIV, 2015). Jourdes (2015) also showed that a 5% drop of wine quality when vines expressing GTDs symptoms. Quéré & Sermier (2015) estimate GTDs resulted in economic loss for the French wine industry of one billion euros per year. In 2017, 13.2% of French vineyards were declared unproductive, according to the National Observatory of Wood Diseases of the Vine (Doublet & Grosman, 2018). It is also estimated that between 3 and 5 million hl of wine and spirits are lost every year, threatening France's status as the 2nd largest wine producing country in the world (Agreste, 2018).

Esca (*Botryosphaeria sp.*) is one of the main GTDs affecting grapevine wood in France. Because the high likelihood of infection and substantial yield losses from esca, numerous studies were carried out during the last decade to identify the causal fungi and their interactions with the vine in order to develop disease management strategies (Larignon et al., 2009; Bertsch et al., 2013). Despite the threat this disease represents for vineyards, many winegrowers wait to adopt field-tested, preventative (delayed pruning, double pruning, and application of pruning-wound protectants) and curative (curettage and complantation) practices until after symptoms appear in the vineyard around age 8 to 11 years old. The objective of our study is to better evaluate the economic impact of adopting a curative practice (curettage and/or complantation) to control esca in the vineyard. This study is part of the Decidép research program funded by the French National plan for vine decline. This program aims to analyze the technical and economic impact of cultivation practices to limit the impact of vineyard decline in French wine companies. On one hand, curettage is a curative practice to manage esca removing the wood parts attacked by the fungi. According to Cholet et al. (2021), on average, 95% of the cured vines return to typically yields until they are re-infected. Alternatively, complantation involves replacing prematurely dead or diseased vines in the plot with young plants or complants (Prigent, 2004). The objective is to extend the plot lifespan and to improve yield. In the French context where wines are produced within the denomination of origin system (PDO), it is particularly relevant because the probability to reach the rate of missing plants authorized by the regulation is very high if not adopting such practices. The probability to reach the expected yield (maximum authorized) is on the contrary very low.

Our simulations compare the economic impact of different situations using a long-time simulation model. In each situation, we estimate the economic impact of both practices in the long-run and the opportunity cost for a winegrower to invest in these practices and we compare the results to the “normal” situation (no curative practice). To do so we estimate the effect of the adoption on yield and profitability of a vineyard plot affected by esca disease (for different severity levels). The studies undertaken by Kaplan et al. (2016) and Baumgartner et al. (2019) in California for table grapes led to the identification of economic barriers to early adoption of preventative practices. We develop and adapt the model to curative practices. The model takes into account the severity of the disease (low, medium and high), the cost of the practice, the effectiveness of the practice (low and high), the maximum authorized yield (for different PDOs). In order to capture regional heterogeneity (density, prices, yield), we perform the analysis on three different wine regions: Entre-Deux-Mers, Pauillac and the Cognac region. First, we run our simulations by leaving the cost of the practice and the selling price of the wine constant. Then we vary them using a Monte Carlo model. We also analyze the decision of the winegrower to implement or not a curative practice (curettage or complantation) or to do nothing to manage the esca disease according to his behavior toward risk. The aim is to evaluate the influence of the risk behavior of the winegrower on his decision making. For this reason, we use different criteria of decision making from the economics literature.

The results show that for a plot infected with esca, the implementation of the practice of curettage and complantation has a positive impact on yield and on the economic profitability of the plot. This impact is all the more important when the efficiency of the practice is high (better learning and cumulative process) and the severity of the disease at the plot level is high. Furthermore, we show that when the severity of the esca disease is low and the effectiveness of curettage is also low, it is less profitable for the winegrower to implement curettage than doing nothing, because the benefit in relation to the cost incurred is marginal in the long term, or even negative. However, in this case (low severity and low efficiency), it is more interesting for a winegrower to adopt complantation. When the severity is medium or high, it is more profitable, regardless of the effectiveness of the practice and whatever the practice concerned (curettage and complantation), to adopt it. To capture the annual effect of the variation of wine prices, we use a Monte Carlo simulation model. The results show that regardless of the variation of price within our considered interval, the implementation of practices remains profitable.. Finally, if we look at the case of the different wine regions, we observe a higher profitability in the Pauillac region. This could easily be explained by the ranges of wine produced and the reputation of the area, with higher prices for the wines. According to the decision analysis, our simulations showed that the decision of the grapevine growers to implement a practice mostly favors curettage over complantation and doing nothing, and that this decision is dependent on risk preference.

**Keywords:** *Dieback; vineyard; profitability; bio-economic model; decision-making model*

### **Acknowledgements:**

This research is supported by the Project Decidép research program funded by the French National plan for vine decline. This program aims to analyze the technical and economic impact of cultivation practices to limit the impact of vineyard decline in French wine companies.

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# THE PERFORMANCE OF WINERIES: THE ROLE OF WOMEN AND THE OWNERSHIP ON THE BOARD OF DIRECTORS

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Several scholars have reported the impact of women incorporation into companies' management teams and their performance indicators. In the winery sector, this hypothesis has been analysed in homogeneous markets in just a single country and when the presence of women on the board is considered only as ownership (Alazzani et al., 2017; Galbreath, 2015; Gallucci et al., 2015; Pavel, 2012).

The impact on performance measurements is related to the difference in the woman's behaviour in the decision-making process. The debate between risk/return trade-off is a notable issue, since including only performance measures is a biased view of the firm's actions. Thus, in this research, we have included a measure of risk/return, Sharpe Index (Sharpe, 1966). This index is a standard measure of the analysis of the return on investment, given equal risk. In fact, investment funds use this ratio as a selection criterion. We consider it to be an appropriate measure to establish whether the return obtained by companies, whose performance is higher according to their level of risk, and we believe it to be one of the contributions of this study to the debate.

The second issue is connected to Corporate Governance, whose aim is to measure the impact on performance in the absence of separation between ownership and control. Therefore, this measure allows our study to collect data about the presence of owners on the board of directors (Gaitán et al., 2018).

Based on ORBIS data<sup>1</sup> and with empirical purposes, our database consists of 78 wineries of several countries. This worldwide sample analyses the impact of the presence of women and owners on the performance indicators. Some studies state the woman's role with a heightened risk aversion, as well as a positive impact on performance indicators.

The proposed model analyses the impact of several independent variables such as the presence of women on the board of directors, ownership presence and country control variable such as masculinity, as well as other context variables such as age, region, and size of the winery on the Sharpe Index.

The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Its opposite, Femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented (Hofstede, 1980).

The wineries of our database represent a total of USD 130,598.46 million in Total Assets (2020 Year). 45% of wineries corresponds to micro and small enterprises, 22% medium-sized wineries and 33% to larger firms. The average age of the wineries is 48 years. The wineries were organized according to major production regions. The information has been collected from 20 wineries located in Europe, 4 in the United

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<sup>1</sup> <https://www.bvdinfo.com/es-es/nuestros-productos/datos/internacional/orbis>

States, 16 in China, 8 in Australia and New Zealand, 5 in Latin America and the rest (25) corresponding to wineries scattered in different countries, in areas that are not particularly wine producers. 83% of the wineries have women on the Board of Directors.

By estimating the model with the dependent variable Sharpe\_ROI (5years), it is possible to explain the impact that the presence of women on the Board of Directors has on this measure. We can affirm that the impact of the weight of women on the Board of Directors has a better measure of the Sharpe Index. However, it can be observed that this sign becomes negative when women are the general manager, and the owners are on the Board of Directors. However, it remains to be studied whether this sign is a consequence of lower profitability or higher risk aversion.

In terms of context variables, the country's masculinity has a negative impact on risk/return indicators. No statistical differences were found for variables such as age or size.

In terms of the region and taking as a reference the wineries established in Australia and New Zealand, better performance indices are observed in Europe, the United States and China, even though the wineries in these countries have the highest proportion of women on their Board of Directors.

In conclusion, it can be stated that the presence of women on the Board of Directors has a positive impact on the joint effect of risk/return measures such as the Sharpe Index.

**Keywords:** *Wineries-performance, Board of Directors, Sharpe Index, Region*

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## Parallel Sessions V - Quality

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# WINE CLOSURE TYPES AND THEIR ROLE AMONG QUALITY CUES FOR AUSTRIAN RED WINES

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Alternative wine closure types and hereof especially screw caps are on the verge for Austrian wines. This is compliant with the global trend that wines with screw caps already account for 30% of wine sales (Euromonitor, 2016). Counter to the assumption that this holds particularly true for New World wines, this type of wine closures is increasingly embraced by traditional wine producing territories such as France, Germany and Austria. For Austrian winemakers this poses some strategic issues: as alternative wine closures and thereof screw caps become more popular, at which pricing level would their usage be apt to best meet consumers' expectations and what is the role of wine closure types amongst a set of other attributes to assess the quality of wine? This paper addresses those issues and examines perceptions on natural cork in comparison to bottle closures types such as screw caps, glass cork and synthetic cork as the two commonly used closure types for Austrian wines.

Bleibaum (2005) investigates buying intentions for US customers for wines with different closure types. Results suggest that end consumers do prefer cork closures for higher priced wines. These findings are supported by several more recent studies, where wines with cork closures are mostly associated with higher quality and higher prices. Following the study of Martin et al (2007), we hypothesize that red wines with natural cork closures are being perceived to be of higher quality as opposed to such with a screw cap or other closure types. Namely, high-involved consumers with a sound knowledge of the particular features of the different types of wine closures are expected to rate Austrian wines with cork to be of better quality, while low involvement consumers purchasing wines in supermarkets and not consuming wines on a regular basis would not do so. We further shed some light on the price expectations for red wines with different bottle closure types. In line with the results of Bleibaum (2005) it is assumed that Austrian consumers would be willing to pay a higher price for wines with a cork closure.

Answers to a web-based questionnaire were obtained from 501 participants during April 2020. The sample consisted of 53.1% low-involved and 46.9% high-involved Austrian wines consumers. The study was limited to red wines originating from Burgenland, a region known among consumers in Austria for the production of red wines. For the survey, a list of stimuli was created, which was expanded by additional characteristics to serve as the basis for an Adaptive Choice-Based Conjoint Analysis. In the method of conjoint analysis, consumer preferences are estimated by accessing their judgement on products or services via a selection of stimuli. For example, as in the present study, consumers are shown products with different combinations of attributes and asked to make a judgement. The following intrinsic and extrinsic quality cues are used in the survey: grape variety, region of origin (Burgenland wine-growing regions), price, vintage (2015 and 2017) and closure (natural cork, screw cap, glass cork and synthetic cork). Price categories were defined as follows: up to € 5.99; € 6.00 to € 9.99; € 10.00 to € 14.99; € 15.00 to € 24.99 and over € 25.00.

The main findings are threefold: First, results illustrate that price is the most important attribute to judge the quality of an Austrian red wine, followed by closure, grape variety, region of origin and vintage. In the run-up to the study, it was expected that Austrian end consumers would rate the grape variety as being more important than the closure when it comes to choosing an Austrian red wine. This hypothesis is confirmed; price and closure type are rated as clearly more important. Second, it was assumed that consumers expect a natural cork for Austrian red wines with a high price, whereas they prefer a screw cap

for Austrian red wines with a low price. This assumption is confirmed as well. Natural cork is preferred by 54.49% of the participants in all price segments. In second place is the screw cap (26.15%) followed by glass cork (14.57%) and synthetic cork (4.79%). For red wines, consumers are willing to pay EUR 15 if closed with cork, whereas they are not willing to pay more than EUR 10 if closed with a screw cap. Consequently, Austrian red wines do have the potential to achieve even higher prices if they are equipped with cork closures. However, this does not hold true from the perspective of involvement: Thus, high wine knowledge does not automatically mean a preference for natural cork.

Third, the origin of a wine does not have an influence on the preference of a closure type. Furthermore, the vintage of a wine is also not decisive for the preferred type of wine closure. Only in the case of screw caps a slight, but not significant, preference for the younger vintage can be observed.

Since the study was conducted in Austria, a market that is still in the process of establishing geographical designations of origin and single vineyards (Rieden), the aim was to check the importance of the grape variety as a wine characteristic within the selected intrinsic and extrinsic characteristics. Results show, that price and type of closure are considered more important than grape variety, region of origin and vintage. Also, the assumption that consumers prefer Austrian red wines with a specific designation of origin with natural cork over Austrian red wines with a generalist designation of origin with screw cap is not supported by our findings. Here, too, natural cork is clearly preferred for all regions of origin. This is of particular interest for a market in which the grape variety took precedence over the geographical origin for decades.

Our research comes with limitations, which are duly noted, like the absence of sensorial differences. The design of our study is based exclusively on the description of wines and certain quality indicators and does not involve the actual tasting of wines.

**Keywords:** *Wine Closure, Cork, Price, Quality Cues*

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# WINE COOPERATIVES AND QUALITY CLUES: A CHOICE EXPERIMENT ON EUROPEAN CONSUMERS

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Wine cooperatives, and agricultural cooperatives in general, have long been negatively judged by consumers, practitioners and researchers (Elster, 1989). Multiple drawbacks of the cooperative models have been investigated, such as agent and incentive problems (Hakelius and Hansson, 2016, Valette et al., 2018), limited ability to scale up (Tortia et al., 2013), slow adaptation to changes in market conditions (Nilsson, 1997). In addition to these structural issues, the assumption of lower quality, reflected by lower price point, has resulted in the poor reputation of wine cooperatives (Schamel, 2015). Furthermore, Garrido (2022) affirms that the low-quality standards conventionally associated to wine cooperatives are a direct consequence of their inability to avoid opportunistic behaviors of their members. Nevertheless, cooperatives still exist, and a growing number of scholars has been highlighting strengths and advantages of this organizational model (Fahlbeck, 2007; Figueredo and Franco, 2018; Valentinov, 2007).

In spite of the positive reinterpretation of the cooperative model by scholars, there is no clear consensus over consumers' judgement of wine cooperatives and their products, and the literature on this topic is fairly limited. On the one hand, some studies confirm that negative prejudice towards wine cooperatives still exists, in particular among European consumers (Pennerstorfer and Weiss, 2012; Sáenz-Navajas et al., 2013). Wine cooperatives are recurrently cited as unable to pursue branding and differentiation strategies (Bonroy et al., 2019; Grashuis, 2018) and catch-up consumers' growing demand for high quality and variety (Carbone, 2021): this may explain why a non negligible share of consumers negatively judge the cooperative wine label for all the price segments (Rebelo et al., 2019). On the other hand, some scholars point out a trend reversal. European consumers are apparently shifting towards more positive opinions on cooperatives and the wines they produce, as confirmed by quantitative studies performed in Germany (Dreyer, 2019) and Italy (Schamel, 2014). Furthermore, according to recent literature, the adoption of optimal communication and branding strategies is beneficial for the image of wine cooperatives (Bernal-Jurado et al., 2021; Di Vita et al., 2019; Raza and Thomas, 2018).

To the best of our knowledge, while the literature provides multiple examples of Choice Experiments (CE) to study preferences for various attributes and quality clues of wine, only one study has used this methodology to investigate interest in wine from cooperatives among French consumers (Sáenz-Navajas et al., 2013). To fulfill this gap and better understand the opinion on wine cooperatives among Europeans, we developed a CE and used a multi-country longitudinal design to analyze consumers' preferences for wine labels and specific quality clues. A Computer Assisted Web Interviewing (CAWI) survey and the CE were forwarded to a non-probability sample of 3600 wine consumers in Italy, Germany, France, Spain, Slovenia and the UK, stratified by age, gender and geographical origin. The survey was organized in three sections: conventional demographic questions to classify the respondents, a set of questions on wine preferences and consumption habits, and a CE. In a CE, participants are presented with hypothetical but realistic choice situations. The CE methodology lies on the solid theoretical grounds of the Lancasterian consumer theory

(Lancaster, 1966) and random utility models (Block, 1974; McFadden, 1976). Table 1 provides the attributes and corresponding levels used to describe the hypothetical wine bottles in our CE.

**Table 1. Choice experiment attributes and levels**

Attribute	Levels
Price (€/0,75 l bottle)	4; 8; 12
Origin	Friuli Venezia Giulia; other Italian Regions; other European countries
Winescape	YES/NO
Cooperative	YES/NO
Quality certification	generic wine; PDO; organic

Other than the cooperative label attribute, our CE included collateral quality clues, in detail: the price for a 0.75 l bottle (€ 4,00; € 8,00; € 12,00); geographical origin of grapes and wine (Friuli Venezia Giulia (FVG) region, in the Northeastern Italy; other Italian regions; other European country); association (or lack of it) of the wine with a pleasant winescape; presence or absence of a specific quality designation (generic wine, PDO, organic certification). To efficiently elicit respondents' preferences for the attributes, a fractional factorial orthogonal design was used to vary all attributes among the scenarios. Interviewers had to face six choice sets with three treatment combinations each, plus the opt-out alternative ("None of these"), which was present for those respondents who were not interested to ensure that this survey was as realistic and practical as an investment opportunity in the real world. The choice sets were shown in color pictures to the respondents, who were asked to choose among three alternative wine bottles.

A latent class model was then estimated using NLogit 6<sup>®</sup> to highlight the presence of heterogeneity among respondents' preferences for the attributes considered. The model presents adequate ability to interpret the phenomenon in question since the McFadden pseudo r-squared is reasonably good for this kind of model (0.26). All parameter estimates are significant at a 95% confidence level. As expected, the price coefficient is negative. The attributes that seem to have a greater impact on the propensity to choose a bottle of wine are its origin from FVG and the presence of PDO and Organic certification labels. In detail, the positive value of the parameter estimate for FVG origin is higher than the utility derived by a bottle of wine with organic or PDO label. Cooperative production is able to increase respondents' utility. The opt-out option is negative and statistically significant, indicating that the "no buy" option is associated with a utility loss.

Coming to the analysis of latent classes, the number of segments was defined exogenously. The three-class model was selected by comparing some statistical information (LL function, AIC and BIC) for different numbers of classes. The opportunity to better describe groups was also taken into consideration to decide the number of classes. The three class LCM model showed that the sample had heterogeneous preferences and respondents could be divided into different classes, respectively representing 74%, 13%, and 13% of them:

1. Class 1 – Cooperative wine supporters. The coefficients for this class are all significant ( $p > 0.05$ ). The members of this class highly value quality certifications and FVG origin of the wine. In addition, they prefer cooperative wine.
2. Class 2 – Environmentally friendly consumers. Members of this class are mostly interested in the presence of organic certification and the price of the bottle.
3. Class 3 – FVG wine lovers. The last class includes respondents who largely prefer wines from FVG. Furthermore, members of this class show negative preferences towards all remaining characteristics.

Participants belonging to Class 2 and 3 did not appreciate the cooperative attribute. All the groups preferred wine produced in FVG, which is renowned for its high-quality wines. Considering the landscape externalities of production attribute, Class 2 and 3 appear to be indifferent, while members of Class 1 have a negative preference, hence they would not be willing to pay a price premium for this feature. *OPTOUT* was significant ( $p < 0.05$ ) for all classes but negative for Class 1 and 2, which implies that preference for the 'none' option could not be explained by the variables contained in the model. For Class 3, *OPTOUT* was positive.

As highlighted by our results, while negative prejudice towards wine cooperatives and their products still persists, more and more consumers embrace the idea that cooperatives might compete not only on price but also on quality. In this sense, communication based on adequate use of labelling and adoption of quality certifications might strengthen the image of wine cooperatives which focus on quality. As wine consumers evolve and become more demanding on intrinsic quality as well as the wine and the winemakers' identity, history and connection with the territory, cooperatives could further stress their uniqueness: their wines are not only the result of the interaction between man and nature, but also the best expression of a whole local community, embedded and rooted in its territory.

**Keywords:** wine cooperatives; consumers; choice experiment; wine quality.

### Acknowledgements:

This research is supported by the Department of Economics and Statistics of the University of Udine.

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# IN VIVINO VERITAS? AN INVESTIGATION ON CONSUMERS' QUALITY PERCEPTION AND WINE CHOICE DETERMINANTS IN THE DIGITAL AGE

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To wine amateurs, choosing which wine to buy can be a daunting and stressful experience, especially when prompted by a last-minute invitation to a dinner party. In everyone's mind, the ideal result would be to select a wine that pairs well with the food to be served, that all attendees appreciate and something we bought without spending a fortune. A less ideal outcome would be to discover that the party host is a wine guru, that s/he realised how little you have spent on the purchase, and that all attendees experience how bad your Albariño pairs with gigot d'agneau fumé. Luckily, these days, much of the drama above can be averted with technology supporting undecided (and unaware) wine consumers.

Vivino is one of the most known smartphone apps fit for that purpose. It provides customers and community members with information and consumer feedback on practically any wine on the market. Users can photo-scan a wine and quickly learn wine characteristics, origin, average price, grape varieties and how much peers have liked it—thus reducing information asymmetry.

Information asymmetry has been long debated in economics since the early contribution of Akerlof (1970) on adverse selection. Asymmetry of information happens when traders do not have access to the same complete and homogeneous information in a transaction. We often find the concept in market transactions and first time buying of experience goods. Like most agri-food products, wines are experience goods, meaning consumers can only learn their quality, intrinsic property, and flavour after purchasing and tasting them. Therefore, consumers buying such goods for the first time face an information asymmetry instead of producers, who follow each step of the production process (Castrionta et al., 2013). To reduce such asymmetry, consumers adopt a variety of coping strategies, including, among others, collection of information before the purchase through word-of-mouth (peers' judgements), consultation of experts' guides, and use of apps like Vivino. This shows that buyers gather several cues before making their final decision.

Several studies have tried to identify those factors behind consumers' choices and untangle the effect each cue plays on the decision to buy (Hall & Lockshin, 2000; Kim et al., 2013; Reinstein & Snyder, 2005; Robertson et al., 2018). The perceived quality of a product is one of those — together with price, expert reviews and peers' evaluations. In their research, Horowitz and Lockshin (2002) investigated the indicators of wine quality from the consumers' point of view. They concluded that a reasonable amount of the variance in wine evaluations could be explained by extrinsic factors - those that can be known to the consumer before buying the bottle of wine (e.g. price). Nevertheless, the discussion on perceived wine quality cannot be based only on extrinsic variables like price. Other intrinsic (i.e. grapes, acidity, colour, taste) and institutional variables (origin, reputation of winery, denomination, certification) influence customers' valuations. Wine products may see variables such as price and quality be connected by a two-way correlation, where quality levels determine prices or where prices influence quality perception (ibid.).

This paper investigates consumers' cues contributing to wine quality perception. We develop a regression model to predict wine ratings based on intrinsic and extrinsic variables. Our dataset comprises 16,000 observations and 136 variables. We set out a series of regressions where the dependent variable – the average quality rating of wines – is regressed on several independent explanatory variables. Our contribution to the literature is that we use quality rating as the dependent variable instead of the more often used price. We do so to identify those cues that correlate most strongly with the definition of quality – as perceived by customers.

Our analysis found that the perception of wine quality – measured through users' ratings– appears to be strongly correlated to wine prices. In other words, a more costly wine, *ceteris paribus*, tends to be rated more favourably by consumers. We also tried to identify how other extrinsic and intrinsic wine variables affect quality perception on Vivino. We found that popularity – measured by the number of wine reviews received by a single wine - is positively correlated to wine quality reviews. A more popular wine tends to be graded higher on the five-star marking system of Vivino. At the same time, we analysed the effect that places of origin and wine designations (i.e. protected designation of origin and protected geographical designation) have on quality scores. We found that wine origin may influence the final score, but its effect differs widely depending on the wine region.

**Keywords:** *information asymmetry, quality, wine selection, digital application, web scraping.*

#### **Acknowledgements:**

This research received no external funding.

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# Parallel Sessions VI - Sustainability & Tourism

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# IS THERE A SCOPE FOR ECO-LABELLED WINE TOURISM DEVELOPMENT? A STUDY THE RELATIONSHIP BETWEEN WINE CONSUMPTION AND THE FREQUENCY OF VISITS TO STRUCTURES OPERATING IN THE WINE TOURISM SECTOR

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The wine industry, which initially focused on wine production, has now begun to incorporate and expand through the integration the tourism industry (Williams, 2001). The original rationale for the development of wine routes and wine tourism was that of further stimulating the wine industry by creating a direct contact between the consumer and the producer. This importance of the wine tourism sector linked to the fact that there is a relationship between wine producers, the product (wine) and wine consumers that has been demonstrated in many studies ( Getz & Brown, 2006; Sparks, 2007).

The growing popularity of wine tourism has created positive externalities for other related industries such as: accommodation, restauration and festival and events.

Wine tourism is widely described in the literature. Mitchell and Hall ( 2003) list seven main themes that have been studied in this field: the wine tourism product, the wine tourism and regional development, the quantification of the winery visitation, the segmentation of the winery visitation market, the behavior of winery visitors, the nature of the winery visit and the link between biosecurity and wine tourism. Others identify five major topics related to wine tourism: culture and heritage, business, marketing, tourists and systems ( Carlsen & Charters, 2006) . Finally, in other researches, the following themes are analyzed: regional destinations, national and local policies, environmental sustainability, and related activities for the wine tourism consumers (Carlsen, 2004; Mihailescu, 2018).

The data from the respondents were collected by posting. The research has been carried on in seven countries: Australia, Chile, France, Italy, Netherlands, South Africa, United States by posting an online web survey using the Qualtrics survey platform. The research group has been made of several academics coming from the following Universities: University of Southern Queensland, Universidad Tecnica Federico Santamaria, Bourdeaux University, University of Rome Unitelma Sapienza, NHL-Stenden University, Stockton University. Data was collected in the time period going from April 24th 2018 to April 24th 2019.

The data were analysed separately for each country using a different methodology. The focus of this research was that of analyzing the relationship between wine consumption and the frequency of visits to structures operating in the wine tourism sector for the different countries. The questionnaire consisted of three sections: Demographic data: country of residence, gender, age and education. Background data on habits of wine consumptions and perspectives and opinions on the eco wine certifications.

The data set was pre-processed and cleaned by removing the outliers. In particular, the variables “Number of bottles purchased per month” and “N

umber of times visiting a winery” were cleaned by using the rule of thumb that potential outliers are those values out of the range  $[Q1 - 1.5 \times IQR; Q3 + 1.5 \times IQR]$ , where IQR is the interquartile range, Q1 and Q3 are the first and third quartile respectively.

The dataset was analyzed, by considering the multilevel regression and average linkage hierarchical clustering methods. Two the random intercept models were considered:

### Model 1

$$\begin{aligned}
 \text{N. Bottles purchased}_{ij} = & \beta_{0j} + \beta_{10}\text{Winery} + \beta_{20}\text{Gender} + \beta_{30}\text{Single} + \beta_{40}\text{Age 25-34} + \beta_{50}\text{Age 35-44} \\
 & + \beta_{60}\text{Age 45-54} + \beta_{70}\text{Age 55-64} + \beta_{80}\text{Age 65-74} + \beta_{90}\text{Age 75+} \\
 & + \beta_{100}\text{Sustain. cert. food} + \beta_{110}\text{Lower-middle income} + \beta_{120}\text{Upper-middle income} \\
 & + \beta_{130}\text{High income} + \epsilon_{ij}, \tag{1}
 \end{aligned}$$

In Model (1),  $i$  represents the subscript for individuals and  $j$  for countries. Starting from model (1), a predictor was added: Eco-certification.

### Model 2

$$\begin{aligned}
 \text{N. Bottles purchased}_{ij} = & \beta_{0j} + \beta_{10}\text{Winery} + \beta_{20}\text{Gender} + \beta_{30}\text{Single} + \beta_{40}\text{Age 25-34} + \beta_{50}\text{Age 35-44} \\
 & + \beta_{60}\text{Age 45-54} + \beta_{70}\text{Age 55-64} + \beta_{80}\text{Age 65-74} + \beta_{90}\text{Age 70} + \\
 & + \beta_{100}\text{Sustain. cert. food} + \beta_{110}\text{Lower-middle income} + \beta_{120}\text{Upper-middle income} \\
 & + \beta_{130}\text{High income} + \beta_{140}\text{Eco-certification} + \epsilon_{ij}. \tag{2}
 \end{aligned}$$

The results from the first model can be seen in Table 1. The results of the first model show a positive correlation between tourism in wineries and wine consumption, and also a positive correlation with male consumers. At the same time, a negative relation with single people can also be seen. Wine consumers are mostly aged 35 years on, while less statistical significant is the relation of respondents aged 75 and older.

TABLE 1: Results of regression Model 1

Fixed effects:					
	Estimate	Std. Error	df	t value	Pr(> t )
(Intercept)	2.39072	0.44478	52.01123	5.375	1.83e-06 ***
Winery	0.44438	0.04201	2009.56016	10.577	< 2e-16 ***
GenderMale	0.32794	0.15089	2001.74810	2.173	0.029873 *
Single	-0.47325	0.19332	2009.05482	-2.448	0.014448 *
Age25-34 years old	0.48179	0.32696	1958.58874	1.474	0.140757
Age35-44 years old	1.20983	0.35322	1898.59320	3.425	0.000628 ***
Age45-54 years old	1.42355	0.36876	1971.41607	3.860	0.000117 ***
Age55-64 years old	1.90257	0.39004	1998.42428	4.878	1.16e-06 ***
Age65-74 years old	2.70811	0.45028	1998.69474	6.014	2.14e-09 ***
Age75 years or older	3.13713	1.18059	2010.02022	2.657	0.007941 **
'Sustainable cert. food'Yes	0.39250	0.20053	2011.60837	1.957	0.050451 .
Income.newLower-Middle	-0.13751	0.24453	2011.44692	-0.562	0.573937
Income.newUpper-Middle	0.16513	0.26395	2011.96904	0.626	0.531633
Income.newHigh	0.73708	0.26732	1967.71662	2.757	0.005882 **

---  
 Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

In the second model ( Table 2), the relations found in the first model are confirmed. The main difference is that the introduction of the food certification and the wine certification show a positive relation with the number of purchased bottles of wine. However this relation is significant only when the two certifications are considered together.

TABLE 2: Results of regression Model 2

```

Fixed effects:
              Estimate Std. Error   df t value Pr(>|t|)
(Intercept)    1.48408    0.52754 121.40061   2.813 0.005723 **
Winery         0.44365    0.04191 2008.07315  10.585 < 2e-16 ***
GenderMale     0.30093    0.15075 1996.76177   1.996 0.046043 *
Single        -0.47148    0.19290 2009.44339  -2.444 0.014604 *
Age25-34 years old 0.49363    0.32606 1940.62691   1.514 0.130215
Age35-44 years old 1.22189    0.35217 1865.00219   3.470 0.000533 ***
Age45-54 years old 1.45371    0.36790 1957.36131   3.951 8.05e-05 ***
Age55-64 years old 1.94265    0.38930 1992.49943   4.990 6.56e-07 ***
Age65-74 years old 2.72243    0.44917 1993.13211   6.061 1.61e-09 ***
Age75 years or older 3.15134    1.17801 2010.38600   2.675 0.007530 **
'Sustainable cert. food'Yes 0.47466    0.20197 2010.83797   2.350 0.018860 *
Income.newLower-Middle -0.10621    0.24418 2011.56488  -0.435 0.663636
Income.newUpper-Middle 0.16983    0.26334 2011.73149   0.645 0.519071
Income.newHigh  0.70214    0.26681 1954.75645   2.632 0.008566 **
as.numeric('Eco-certification') 0.17144    0.05610 1995.79870   3.056 0.002272 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
    
```

This results indicate that there is a strong case to be made for the development of Eco – labelling wine tourism which in turn can have positive effects on the wine market. They represent signals for the development of wine tourism destinations that could target specific groups of visitors based on age, income or eco-labelled consumption patterns. From a wine producers perspective, the results have important implications in terms of production patterns and resource allocation towards certain types of wines.

In this context local and national policies could be developed in order to foster the wine tourism industry and to develop new wine routes and destination that could attract the growing visitors interested in eco-labelled wine production and consumption.

**Keywords:** wine consumption, tourism, eco-labelling, development

# MOBILE ETHNOGRAPHY APPROACHES FOR INVESTIGATING FOOD & BEVERAGE TOURISM EXPERIENCES

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**Purpose** – Both tools, *experience.fellow*<sup>®</sup> and the *Participatory Photo Analysis* method are *Mobile Ethnography* research tools which combine smartphone snapshots taken by tourists during a visit with their statements and ratings. Pictures and the provided feedback by tourists are used to assess their impressions and level of satisfaction. The purpose of this study is to introduce *Mobile Ethnography* methods in culinary tourism research and present six pilot studies of application.

**Design/methodology/approach** – Two cases where *Mobile Ethnography* was used are presented: the first staged in a popular wine town in the wine region “Weinviertel” of Austria called Poysdorf; the second in a wine-bar & restaurant located in the medieval center of Krems, Austria. The mobile application used is called *experience.fellow*<sup>®</sup> (for IOS and Android). Four sample applications of *Participatory Photo Analysis* are presented: one analyzing customer experiences in local area wine shops and tasting rooms; one focusing on wine shops, international visitors and store atmospherics; one focusing on winery visitations of young wine enthusiasts; and, finally, one concentrating on customer-employee interaction between young customers and one on sales personnel / tasting room staff.

**Findings** – Together, the six presented empirical studies provide evidence for the suitability of both presented methods to gauge visitor impressions and assess their satisfaction with experiences in a food & wine tourism context. The pilot cases corroborate the belief that a combination of photo tools and (text) statements together with ratings provide a deeper insight into consumers’ feelings and notions than conducting interviews or carry out “traditional” questionnaire-surveys that feature scales, item-batteries and rankings.

**Research limitations/implications** – The study contributes to a better understanding of techniques and tools to gauge customer impressions, feelings and emotions as they happen. It appears that the real-time application of the survey tool – both *Mobile Ethnography* and *Participatory Photo Analysis* are used during the actual visits and experiences – is more efficient and more effective than surveys or interviews, which both either interrupt the visitor experience or happen post-visit.

**Practical implications** – Companies invest in places to elicit positive feelings, assuming that they most importantly need to create a global positive effect with visitors. This study highlights how different touchpoints along the customer journey can be assessed in order to create holistic, satisfactory experiences.

**Originality/value** – Researchers try to assess customer satisfaction mostly by using post service surveys. This research study is among the first to examine the usability of *Participatory Photo Analysis* – which is widely used in other scientific fields such psychological studies with children – in a tourism context. What is more, it is a first attempt to prove the utilizability of mobile apps to capture snapshots of people’s impressions in food and wine consuming and experiencing situations.

**Keywords** – Food and Beverage Tourism, Mobile Ethnography, Customer Experiences, Satisfaction

# SUSTAINABLE WINE REGIONS: RURAL CHALLENGES AND DEVELOPMENT DRIVERS

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In the context of climate change impacts, the Mediterranean region will get warmer, dryer and with more heat stress events (Fraga et al., 2015; Jones, 2012). Such estimations have the potential to affect the Portuguese wine industry remarkably, providing additional challenges for all wine growers, but mostly to surrounding rural communities as these are often the main service and skilled workforce provider.

Even though the wine industry is finally recognising the benefits of embracing a more sustainable approach (Flores, 2018), there is still a great demand of more and better information, quality data and improved methodologies to assess its performance (Ferrara & Feo, 2018; Vázquez-Rowe, Rugani, & Benetto, 2013).

Considering this knowledge-gap of relevant information at a wider scale and the fact sustainability perception can be very subjective for being generally embedded in personal beliefs, cultural backgrounds or political views (Santiago-Brown, Metcalfe, Jerram, & Collins, 2015), this study was based on a grounded theory approach with several leading wine specialists from Portugal being interviewed. The aim is to develop theory from data by comparing different analytic discourse classes as these emerge from content analysis (Dunne, 2011). By scrutinising possible patterns associated to a particular culture or territory, it is intended to understand on a comprehensive way the sustainability awareness level of upper echelon individuals while presenting helpful insights for the design of proper policies and guidelines towards sustainable regional development.

Due to COVID-19 restrictions, all in-depth interviews were carried out online via Teams (version 1.4.00.16575) until a saturation level was achieved. The research sample covered nine of the 14 different wine regions of Portugal with 13 women and 23 men being interviewed. Afterwards, all the collected information was transcribed and coded in order to perform an inductive qualitative-content analysis using IRAMUTEQ software. Hence, as empirical textual analysis generated different statistics and clustering results with classes of lexicon being created, we shifted our focus from the individuals to the way discourses were organised and interacting within each other.

Six distinct groups of similar lexicon (clusters) organised in four macro ramifications were generated. As this study was focused on the contextual dimension, dialogues were in the overall focused on socio-economic and cultural affairs such as population growth and productivity growth. Results revealed major concerns and particularities associated to a specific territory, and inherent challenges linked to rural sustainability issues. Impressions on future trends and potential strategies to enhance regional development were also gathered.

When all six clusters were displayed in a Cartesian plane after the factorial correspondence analysis, it was clear that not only all clusters showed some kind of connection between them, but results also revealed that one of them was playing a key role as the central connector link. After analysing this central cluster to better understand its cardinal position and gluing character, it was perceived that such grouped mostly descriptions on leading characteristics of vineyards and wine businesses' structure in the region, including physical and economic farm size. Its pivotal position in the Cartesian plane might be justified for enterprise' structure being often pointed as fundamental for business' performance, when deciding on rural territory

development strategies, mitigation and adaptation initiatives or how it frames the region and its local economic weaknesses. All these are themes approached and gathered by the other clusters.

To close, it can be assumed that population loss was clearly an important topic among participants, as rural areas that are not attracting people and continue to lose population are more likely to see their local economy decline (Avelar, Silva-Oliveira, & Pereira, 2019; Faria, Lourenço-Gomes, Gouveia, & Rebelo, 2020). This will not only bring consequences to local businesses but is correlated to the shrinking of workforce which translates into a challenge to find seasonal workers to work in the vineyards. Other pivotal issue pointed out regarding such matter was related to the level of the community vitality, living standards and smallholder viticulture not being profitable and attractive enough to retain people in general. This explains some of the participants defending the importance to rise the average unit value of wine grapes payed in the region in order to increase the living standards of grape growers and to encourage future generations to continue with the family business and thus remain in the area.

Other value-adding strategies for local economy recovery were also collected, such as adding value to the wine bottle by promoting quality. The development of sustainable wine tourism initiatives in the region was also mentioned, along with the necessity to develop sustainability frameworks or even certification schemes to support wine grower to achieve higher sustainability credentials and respond to export market pressures.

In summary, wine regions in Portugal struggle from burdens associated to climate change impacts, workforce shortage, rural areas socio-economic weaknesses and low profitability for local growers. However, this study shows that the critical point that needs to be addressed first and considered when designing rural policies or strategic plans to deal with sustainable development goals, is somehow related to the farm businesses' structures in that particular area. The needs and desires of residents can then be properly identified allowing to create value for the territory as a whole and work towards sustainable wine regions.

Bottom line, rural policies should be held along sustainability principles and framed accordingly to the region's farm enterprises structures in order to promote sustainable development. Any initiative to sustain regional development in wine regions must be in the position to support farmers, managers and frontrunners and put sustainability goals squarely at the heart of the wine industry.

This study has scientific significance and is a novel contribution to knowledge as it scrutinises sustainability awareness on a comprehensive way not often seen in research of this nature, where there is a considerable lack of relevant information and quality data of this kind. Through this work a wider view of the Portuguese wine sector was built and reported findings can serve as a reference to wine managers and policy-makers pursuing sustainability goals as it navigates through real time perceptions, conflicts and tensions.

**Keywords:** *Contextual dimension; discourse analysis; grounded theory approach; Portuguese wine sector.*

### **Acknowledgements:**

This work was supported by FCT - Fundação para a Ciência e Tecnologia [grant number UI/BD/151305/2021]; under the projects UIDP/04011/2020; UIDB/04011/2020; UIDB/04007/2020; and by the 2019 I&D Research Award from Fundação Maria Rosa.

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# BREWERY AND WINERY BY-PRODUCT RECYCLING: ENVIRONMENTAL AND ECONOMIC BENEFITS

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## **Abstract**

Spent grains and grape pomace, by-products of beer and wine production, are wastes that, where economically feasible are commonly used as animal feed. In California, dairies are a local, high-value market for spent grains and pomace. We quantify the substantial resource and environmental consequences of recycling these by-products for use as feed for dairy cattle. Breweries and wineries can also market by-product use as a sustainable recycling effort that avoids waste. We develop and apply stochastic models of beer and wine supply and demand to simulate the economics effects of labeling products with recycled by-products as sustainably produced.

## **Methodology**

Access to by-product feeds can be locally important to the economics of dairy farms, breweries, and wineries. Not only is there a mutual economic benefit for dairies and breweries from by-product use, there are also opportunities for the brewing, winery, and dairy industries to market a positive environmental and resource contributions from the relationship.

We develop a stochastic model to simulate effects on beer and wine demand and prices, caused by a positive impact on sustainability reputation, from expanding and marketing efforts to recycle these by-products for use as feed. A model of a by-product supplying industry allows us to simulate the effects of an increase in consumers' willingness-to-pay resulting from a positive change to firms' sustainability reputations. A positive change to reputation could occur if California-produced beer and wine were labeled to advertise their efforts to recycle spent grains.

We calibrate our simulations using data from breweries, wineries, and dairy farms in California, where all three industries are important in the Central Valley. In California, dairy farms are the largest market for spent grains and grape pomace. We compare the nutritional contribution of the by-products to replacement feeds, estimate the resources needed to produce these alternative feeds, and quantify the emissions from by-products that would otherwise be diverted to landfills.

We consider a general a system of demand and supply equations which we adopt separately for two beverages, beer and wine. Relevant expositions of this modeling approach include Alston and James (2002) and Wohlgenant (2011). This paper provides the first estimate of the environmental implications of spent grains and grape pomace used as feed, as well as the economic implications from advertising these sustainability efforts.

Spent grains and grape pomace diverted to landfills are significant sources of greenhouse gas emissions; we determine the amount of landfill emissions avoided by recycling these by-products for use as feed. We

apply estimates of net emissions for food waste landfilling from the USDA EPA. Net emissions for food waste landfilling consider emissions from transportation to the landfill, methane (CH<sub>4</sub>) emissions at the landfill, avoided carbon dioxide (CO<sub>2</sub>) emissions from energy recovery at the landfill, and carbon storage at the landfill.

## Results

We first focus on resources required to replace spent grains and grape pomace in dairy feed rations. If all spent grains were replaced with alfalfa hay, 167 thousand tons of alfalfa hay would be needed, requiring 23.6 thousand acres and 94.3 thousand acre-feet of irrigation water for production. In 2019, there were 580 thousand acres of alfalfa hay harvested in California, therefore a 4% increase in acreage of alfalfa hay would be needed to replace spent grains.

If all grape pomace were replaced with alfalfa hay, 843 thousand tons of corn silage would be needed, requiring 31.3 thousand acres and 115 thousand acre-feet of irrigation water. In 2019, there were 415 thousand acres of corn silage harvest in California, therefore an 7.5% increase in acreage of corn silage would be needed to replace grape pomace.

In our mean simulation estimating implications from advertising sustainability efforts, California quantity demanded for sustainably produced beer increases by 1.9%, and quantity demanded for other beer increases by 0.57%. The price of sustainable beer increases by 1.2%, the price of other beer increases by 0.1%, and the revenue from sustainable beer sold in California increases by 3.1%. Compared to beer, the quantity effects for wine are smaller, and the price effects are larger. U.S. quantity demanded for sustainable wine from California increases by 5.8%, and quantity demanded for other wine decreases by 0.1%. The price of sustainable wine from California increases by 3.9%, the price of other wine decreases by 0.1%, and the revenue from sales of California produced sustainable wine increases by 9.9%.

We find that recycling spent grains avoids 397 thousand metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E); recycling grape pomace avoids 1979 thousand MTCO<sub>2</sub>E. This combined total of 2376 MTCO<sub>2</sub>E is equivalent to the annual emissions of 517 passenger vehicles.

## Discussion

Spent grains and grape pomace are locally available feed sources for dairies in California that replace local forage that would be grown otherwise, thereby saving land and water for other industries. This low-cost practice is an especially important consideration in areas such as the Central Valley in California where agricultural land and water is scarce. For some breweries and wineries there is no cost—it is often more cost effect to recycle by-products than to discard them. By doing so they avoid the costs of hauling tons of waste to landfills, and typically they generate revenue by selling the by-products. Furthermore, the greenhouse gas emissions avoided by the practice are globally meaningful.

Although some California breweries and wineries publish their sustainability efforts, they do not promote these efforts on product labels. Doing so would positively affect the price and overall demand for sustainable beer and wine produced in California.

**Keywords:** sustainability, dairy feed rations, by-product feeds, grape pomace

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# Parallel Sessions VII - Industrial Organization

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# STAKEHOLDERS' PERCEPTION OF AGROECOLOGICAL TRANSITION IN THE WINE INDUSTRY

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## 1 Introduction

Previous research has shown that the cultivation of wine grapes and the production of wine are associated with a large number of environmental problems and these concerns include the use of chemicals, in particular the use of pesticides (European Commission, 2020). This has been associated with a growing attention of consumers to environmental protection and sustainable development, which has created new awareness and opportunities. However divergences on how to best address this subject within the sector might lead to confuse consumers and delay adaptation measures (Christ and Burritt, 2013; Hauck and Szolnoki, 2020; Mariani and Vastola, 2015; Teschner and Orenstein, 2021; Varia et al., 2021). This study investigates this issue by analyzing the perception of stakeholders towards the current agroecological transition and in particular on the use of pesticides in the wine sector and possible strategies to overcome the problem. The focus is placed into two different strategies, namely organic production and resistant grape varieties. To this end, a questionnaire was conducted addressed to the main stakeholders in the sector of three main worldwide wine producing countries. They were asked how important the environmental issue was for their business. The objective is to highlight the beliefs of stakeholders about sustainable innovation in wine industry. Accordingly, it intends to answer to the following Research Questions: What influences stakeholder perceptions for an agroecological transition in the wine sector? Which strategy is considered most viable in the long term by wine sector stakeholders? What role of resistant varieties?

## 2 Methods and data

A survey was sent to 1014 stakeholders in the viticulture sector: Professionals; Institutions; Research sector. Consumers and citizens are not targeted. It has been applied in 3 countries: Portugal, Italy and France. The questionnaire survey consisted of three parts i.e. questions related to: A) the stakeholders' importance accorded to environmental issues among other issues, in special the challenges the wine sector will face; B) the levers identified by the stakeholders in order to make possible the agroecological transition; C) the stakeholders' perception about innovations related to organic certification and resistant grape varieties. Responses were collected in a format of a Likert scale varying from 1 = strongly disagree to

5 = strongly agree. In total, the questionnaire included 68 variables. After screening for completeness, 877 (86%) questionnaires were retained for this analysis. The 12 questions of the part B of the questionnaire were used to create the dependent variables, and the remaining parts A and C were included in the models as explanatory characteristics, together with sociodemographic characteristics, such as the country, gender (1=female, 0=otherwise) and age of participants; the sector of the institution which the respondent represents and the size of the institution (in number of employees). Before the regressions were carried out, the number of variables was reduced by principal component analyses (PCA): for perceptions about the agroecological transition, for importance accorded to environmental issues, for perceptions related to organic certifications and perceptions related to resistant grape varieties.

To conduct the multivariate analysis we followed the steps described by Meuwissen et al., (2001); Alvarez et al., (2014) and Hair et al., (2017). The selected variables were submitted to the Kaiser-Maier-Olkin (KMO) measure of sampling adequacy and Bartlett test of sphericity (Hair et al., 2017). Only variables that presented an individual KMO  $\geq 0.5$  were maintained for analysis (Hair et al., 2017). The suitability of the analysis was confirmed by applying the Bartlett test, which presented  $p = 0.000$  for all subsamples, confirming that the data set was suitable to PCA. The number of factors retained in the PCA was based on the Kaiser criterion (i.e., eigenvalues  $> 1$ ) (Hair et al., 2017).

### 3 Results

#### 1.1. Perceptions of agroecological transition

12 statements were used in order to get insights about their perceptions related to which levers can make possible the agroecological transition. These were reduced to only four components with eigenvalues greater than 1 using PCA accounting for 58% of the total variance. According to the component loadings, the components 1 to 4 can be best described as “[y1] technology and financial incentives” (q.3, 5, 9), “[y2] producers’ information and awareness” (q.4, 8, 10), “[y3] society and consumers’ pressure” (q1., 2) and “[y4] standards and regulations” (q.7, 11, 12). We reached an overall KMO value score of 0.76. These four components can be assumed as how stakeholders perceive the agroecological transition and will subsequently serve as the dependent variables in the regression models.

#### 1.2. Perceptions of environmental issues and challenges to the sector

22 statements were used in order to get insights about their perceptions related to their importance accorded to environmental, in special the challenges the wine sector will face. These were reduced to only six components with eigenvalues greater than 1 using PCA accounting for 53% of the total variance. According to the component loadings, the components 1 to 6 can be best described as “[a1] preserve territory and culture” (q.8, 19), “[a2] reducing chemicals” (q.4, 7, 16), “[a3] consumers and retailer’s needs” (q.9, 17, 20), “[a4] European regulation” (q.13, 14, 15), “[a5] decline of vineyards and yields” (q.3) “[a6] investments in new production areas” (q. 20, 22). We reached an overall KMO value score of 0.81.

#### 1.3. Perceptions of organic certification

18 statements were used in order to get insights about their perceptions about innovations related to organic certification. These were reduced to only four components with eigenvalues greater than 1 using PCA accounting for 48% of the total variance. According to the component loadings, the components 1 to 4 can be best described as “[b1] wine incompatibility with BIO production” (q.-2, -7, 15), “[b2] BIO a solution with challenges” (q.10, 13, 17), “[b3] BIO a widespread label with quality alternatives” (q.1, 5, 12) and “[b4] Better natural alternatives to BIO” (q.3, 4, 18). We reached an overall KMO value score of 0.88. The component [b2] groups the stakeholders’ perceptions that identify organic production as a viable strategy in the long run to reduce pesticides in wine production.

#### 1.4. Perceptions of resistant grape varieties

11 statements were used in order to get insights about their perceptions about innovations related to resistant grape varieties. These were reduced to only four components with eigenvalues greater than 1 using PCA accounting for 50% of the total variance. According to the component loadings, the components 1 to 2 can be best described as “[c1] resistant varies reputation and consumers’ acceptability” (q.2, 3, 5, 9), “[c2] resistant varieties as driver of pesticide reduction” (q.1, 8, 10). We reached an overall KMO value score of 0.88. The component [c2] groups the stakeholders’ perceptions that identify resistant varieties of Viti as a viable strategy in the long run to reduce pesticides in wine production.

Subsequently, we used multiple regression in order to assess the relationships between the perceptions of agroecological transitions (variables y1 to y4), and the components of perceptions related to the challenges for the sector, organic labels and resistance varieties (variables a1 to c2) as well as on sociodemographic variables. For each independent variable, the table 1 shows the partial regression coefficient *B*.

*Table 1 Results of multivariate regressions for perceptions of agroecological transition*

x	Variable names	Technology and financial incentives	Producers’ information and awareness	Society and consumers’ pressure	Standards and regulations
a1	Preserve territory and culture	0.18***	0.21***	0.03	-0.05
a2	Reducing chemicals	0.05	0.26***	0.26***	0.30***
a3	Consumers and retailer’s needs	0.08*	-0.03	0.14***	0.01
a4	European regulation	0.03	0.00	0.07*	0.11***
a5	Decline of vineyards and yields	0.04	0.05	-0.02	-0.04
a6	Investments in new production areas	0.18***	0.12***	-0.02	0.10**
b1	Wine incompatibility with organic production	-0.09***	-0.07**	-0.10***	-0.13***
b2	BIO a solution with challenges	0.27***	0.03	0.06	0.01
b3	BIO a widespread label with quality alternatives	-0.08	0.00	0.05	0.06
b4	Better natural alternatives to BIO	0.09*	0.12***	0.04	0.06
c1	RV reputation and consumers’ acceptability	0.00	0.03	-0.03	0.06*
c2	RV as driver of pesticide reduction	0.03	0.01	0.02	0.10**
	Italy	0.22	0.11	-0.36**	0.56***
	France	0.00	0.00	0.00	0.00
	Portugal	0.04	-0.15	-0.14	0.32*
	Age	-0.07	0.03	0.04	-0.12**
	Gender	0.04	0.15	-0.07	0.03
	Public administration	-0.01	-0.17	0.34	0.32
	Producers	-0.14	-0.21	-0.02	0.05
	Associations	0.00	0.00	0.00	0.00
	Suppliers	0.04	-0.10	-0.17	-0.01
	Research institutes	-0.06	-0.12	-0.15	0.31
	Others	-0.22	-0.14	-0.11	0.37*
	Constant	0.19	-0.02	0.14	-0.14
	R-sqr	0.266	0.284	0.247	0.293
	DF	843	843	843	843

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Stakeholders that believe the agroecological transition will be possible with the development of further technological innovations and higher financial incentives (model 1), perceive that the main challenges are

linked to the preservation of landscapes, cultural character and territorial heritage of wine. Further challenges are also related to investments in new production areas and increase the surface area of farms. They also see difficulties in achieving large scale in organic production.

Stakeholders that believe the agroecological transition will be possible with improved access to information and awareness of producers (model 2) on how to change their production practices, agree that the main challenges are related to the preservation of landscapes, cultural character and territorial heritage of wine. Furthermore, information on how to reduce the use of chemicals in both production and processing of wines will be a key challenge. Investments in new production areas will be an important challenge and they perceive the BIO label/certification as expensive and risking to be outdated by other labels.

Stakeholders that believe the agroecological transition will be achieved through society and consumers' pressure (model 3), believe that the main challenges lie in the adaptation of the sector in order to meet the consumers' and retailers' needs, especially in the reduction of chemicals (pesticides and oenological inputs).

Finally, those that believe the agroecological transition will be achieved with more strict environmental regulations, controls and standards (model 4), also believe the main challenges are the reduction in chemicals and the adaptation to the European regulations. They believe the development of more resistant varieties for the vineyards can be a major driver of pesticide reduction, but there might be problems for the reputation of wines and the overall acceptability of consumers. Italians, followed by the Portuguese were the main supporters of these perspectives.

Those that perceive organic production as a viable strategy in the long run to reduce pesticides in wine production, believe that the agroecological transition will be possible through better access to technology, innovations and financial incentives to farmers. For those, the perceived challenges lay on the preservation of landscapes, cultural character and territorial heritage of wine, to explore new production areas and increase farms surface area.

For the stakeholders that see the resistant grape varieties as the best strategy to reduce pesticides in the long run, the agroecological transition will be feasible via more strict public environmental regulations and control and the development of further private market downstream standards. They see the main challenges for this transition in the adaptation to the European regulations and in the reduction of chemicals in both production and processing.

**Keywords:** *Wine economics; wine sustainable innovations; stakeholders perception; agroecological transition.*

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# OPEN INNOVATION IN THE WINE INDUSTRY BEFORE AND DURING THE COVID-19 PANDEMIC: THE ROLE OF DIGITALIZACION

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**Objectives:** This paper has two aims. First, it analyzes if firms in a traditional industry (wine industry) have changed their Open Innovation (OI) strategy, as a way to counter the effects of the Covid-19 pandemic. Second, it tests the contingent role played by the negative economic impact of the pandemic and digitalization on the SMEs' OI strategy in times of Covid-19 pandemic.

**Theoretical framework:** From the emergence of Open Innovation (OI) as a topic (Chesbrough, 2003), it has had a significant impact on research and business practice (West et al., 2014). In the traditional closed innovation approach, firms organize their innovation activities under the umbrella of their internal R&D structure, trying to protect their knowledge from imitation by competitors. In contrast, the OI approach emphasizes the opportunities coming from external R&D, as well as the potential benefits from commercializing the intellectual property. OI has been used to explain how companies generate emerging ways of creating value, by seeking outside their boundaries new ideas and knowledge to be combined with their internal R&D knowledge. From this view, firms deliberately import and export knowledge to improve their innovation (Chesbrough, 2003). The more the firm interacts with other entities, the more ideas, skills, knowledge, technologies and other external intangible assets are accessible, increasing in this way its innovative potential (Greco et al., 2016). As Piperopoulos and Mcadam (2013, p. 241) state, "the firm should seek to engage with a diverse range of actors in the market and business environment, rather than relying on its own internal walls and its R&D department, as in the 'closed innovation' paradigm".

The environment in which companies operate has changed because of the global Covid-19 pandemic. From an OI perspective, this research focuses on studying how Spanish small and medium wineries have changed their OI strategies in order to adapt to the new circumstances and succeed. To do so, we consider the economic impact of the Covid-19 pandemic and small and medium wineries' digitalisation strategies.

Our research focuses on the wine industry, recognized as low-tech industry. This is one of the most representative economic activities in many countries, and in Spain in particular, in terms of employment and income of companies (Bigliardi and Galati, 2013; Vrontis et al., 2016; Pérez-Luño et al., 2019). According to 2020 data from the Ministry of Agriculture, Fisheries and Food, Spanish wineries account for more than 2.37 billion euros per year in Gross Value Added (GVA), equivalent to 2.2% of the national GVA. In addition, this sector can be considered very multifaceted, encompassing primary, secondary and tertiary activities (Somogyi et al., 2010), with multiple challenges faced by winery owners, especially for small and medium wineries, where a single person usually plays the role of the entrepreneur-manager-owner (Dominici et al., 2019).

**Methodology:** We test our predictions in a longitudinal study of 110 Spanish small and medium wineries with two measurement points (during 2016 and during the Covid-19 pandemic in 2021). We measure OI before and during the crisis to assess the wineries' changes in their OI strategies. We also test whether the economic impact of the pandemic as well as digitalization strategies during Covid-19 times, together with OI strategies before the pandemic, have an impact on the current OI strategies of such small and medium wineries.

Findings/implications: This study has addressed how SMEs in traditional industries, as wineries are, have tried to counter the effects of Covid-19 by intensifying their OI approach. It is also analyzed how a strategy of more openness may be dependent on the economic impact suffered by those firms as well as their degree of digitalization.

This study seeks to contribute to the research on OI, by adopting a dynamic perspective of the topic. From this view, firms are expected to reshape their strategies of OI, as a response to external conditions (as a pandemic). Besides, our study falls under the contingency view of OI, by including variables that can influence how firms manage their degree of openness.

Analyzing a sample of 110 wineries at two different points in time, the results show that Spanish SMEs from a traditional industry (the wine industry) have reinforced their OI strategy during turbulent times as those caused by the Covid-10 pandemic. In addition, we identify a repeated behavior: companies increase diversity, by interacting with a greater number of agents, although they do so with less intensity (fewer purposes). Perhaps, this is because the nascent relationships are not strong enough, and there is a lack of trust between the parties, for there to be a greater commitment between them (Dressler and Paunovic, 2020). This is in contrast to the result reached by Doloreux (2015), in which in the same sector but in another country, companies focus their efforts on more "closed innovation". The different finding could be related to the specific context in which this research has been carried out. That is, may be, under such a turbulent environment, companies have been able to relate to more actors, but they have not had the resources or enough time to deepen those relationships. That is and following Dressler and Paunovic (2020) it may be a matter of time to gain the needed trust for deeper relationships.

Digitalization has appeared as a good strategy to deal with the negative impact of the Covid-19 pandemic. The Spanish wineries that were more digitalized have been able to overcome the obstacles caused by the covid restrictions through online communication, sales, purchases, etc. Therefore, thanks to digitalization, not only they have maintained their OI without physical contact, but they have reinforced it.

**Keywords:** *Open Innovation; Digitalization; Covid-19; SMEs; wine industry*

### **Acknowledgements:**

This activity has been financed by the European Regional Development Fund (ERDF) and by the Ministry of Economy, Knowledge, Business and University, of the Andalusian Government, within the framework of the Andalusian FEDER 2014-2020 operational program. Specific objective 1.2.3. «Promotion and generation of frontier knowledge and knowledge oriented to the challenges of society, development of emerging technologies») within the framework of the reference research project (UPO-1258353). ERDF co-financing percentage 80%.

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# “I DON’T WANT TO FIGHT WITH YOU”: QUALITY, ADAPTABILITY AND VERTICAL INTEGRATION

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Competition in global markets increasingly focuses on differentiation. Global demand for agri-food products, in general, has been concentrating on higher quality and healthier goods. For this reason, companies seek to produce higher quality goods to distinguish themselves from other firms<sup>1</sup> and to compete internationally<sup>2</sup>. In turn, producing high-end goods requires quality inputs<sup>3</sup>. So, the question of how to obtain these inputs is central: what organizational structure do firms adopt to meet this challenge?

In this paper, we explore why vertical integration may facilitate the achievement of quality inputs. Some papers have postulated that firms do indeed integrate to achieve quality (Hennessy, 1996; Martinez, 2002; Vetter & Karantininis, 2003; Fernández Olmos et al, 2009; Hansman et al, 2020). A branch of literature has also emerged highlighting the recent trend towards concentration in the agri-food world, following the proliferation of public-private regulations on food standards at the international level (e.g., Reardon et al., 1999; Henson & Reardon, 2005; Reardon et al., 2009; Swinnen, 2014).

However, these papers emphasize that the underlying mechanism behind the relationship between quality and vertical integration is problems in measuring or observing food quality and safety. For example, Hansman et al (2020) find that the mechanism behind vertical integration in the Peruvian fishmeal industry is the impossibility of adequately verifying the quality of the fish (in their case, the protein content) at the time of the transaction between supplier and demander.

In this article, we propose an alternative mechanism: the need to adapt to contingencies (particularly climatic ones). When agreeing on the production process of a given good in an environment with high uncertainty, it is difficult to write a contract that contemplates what to do in each possible contingency. Therefore, the probability of having to adapt the original design after nature reveals itself is higher than in more stable environments. In the context of the make-or-buy problem, if the parties involved are tied to each other, in a sort of bilateral monopoly —what Tadelis (2002) calls temporary lock-in—, the need to adapt ex-post may imply high renegotiation costs. Thus, vertical integration serves to preserve "flexibility", avoiding such renegotiation costs (see Bajari & Tadelis, 2001; Januszewski Forbes & Lederman, 2009).

To test this mechanism, we conducted a survey of 688 Spanish wineries, distributed representatively among the 70 appellations of origin that exist in Spain. Our work is divided into two parts. The first is to verify that the relationship between vertical integration and quality holds in our sample. To do so, we use the percentage of wine production that comes from own-grown grapes as a measure of vertical integration. In addition, we need a variable that captures the winery's pursuit of quality. In this paper, we focus on a

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<sup>1</sup> Kugler y Verhoogen (2012), Hallak & Sivadasan (2013), Manova & Zu (2014) Eckel *et al* (2015), Atkin et al (2017).

<sup>2</sup> Hallak (2006), Verhoogen (2008), Atkin et al (2017).

<sup>3</sup> Kugler & Verhoogen (2012), Halpern et al. (2015), Atkin et al (2017), Amodio & Martinez-Carrasco (2018), Bastos et al (2018), Bas & Strauss-Kahn (2014).

definition based on the organoleptic attributes of the wine (such as aroma, color, taste, etc.). We will use those practices, both in the vineyard and in the winery, which, according to our interviews, lead unfailingly to higher quality from a vertical point of view. We will call this variable “quality index”.

The quality index is composed of 5 practices, in the winery and in the vineyard, which are dummies and weighted equally: fruit thinning, which is the practice of discarding grapes before they ripen to favor the polyphenolic concentration of the wine; sorting the grapes before fermentation begins, which allows dismissing damaged and diseased grapes and thus avoid mixing bad flavored grapes; using French oak barrels to age the wine, given that they are the least invasive and the ones that most highlight the particularities of each terroir; the use of natural cork, because it allows oxygenation of the wine so that it evolves optimally in the medium to long term, and; having an average grape density (in kg/m<sup>2</sup>) below the median of the sample, since, again, reducing the number of grapes allows the remaining grapes to concentrate more polyphenols and, therefore, enhance the sensory characteristics of the wine. Consequently, the quality index can take values between 0 and 5.

We begin by showing that the positive correlation between vertical integration and quality is verified: Pearson's correlation coefficient is 0.09. We then standardize the quality index to interpret the coefficients as one standard deviation increases in the quality variable. We run by ordinary least squares the following regression:

$$\text{Vert.Int}_i = \alpha + \beta \text{Quality}_i + \gamma \mathbf{X}_i + \text{AO}_i + \epsilon_i \quad (1)$$

Here,  $\beta > 0$  has the interpretation that an increase of one standard deviation in the search for quality implies an increase of  $\beta$  percentage points over the percentage of own grapes used in total wine production. AO variable is an appellation of origin fixed effect,  $\mathbf{X}$  is a set of control variables and  $\epsilon_i$  is the error term.

The first column of Table 1 shows the base regression. As can be seen, the positive correlation between the quality index and vertical integration is verified. Specifically, once all controls are added, the coefficient becomes significant at 1%. If there is nothing in the error that affects both vertical integration and the quality index, the empirical model tells us that a one standard deviation increase in the quality index is associated with 4.2 p.p. in vertical integration, which is equivalent to a 5.2% increase at the sample mean. The result is robust to defining the index considering only winery practices, and to using a quality variable self-reported by wineries.

Table 1

	<i>Dependent variable:</i>					
	Vertical Integration					
	(1)	(2)	(3)	(4)	(5)	(6)
Quality Index	2.6** (1.1)	2.7** (1.1)	3.5*** (1.2)	4.4*** (1.1)	4.0*** (1.1)	4.2*** (1.1)
Log (number of employees)		-6.8*** (1.1)	-7.3*** (1.3)	-6.5*** (1.5)	-6.3*** (1.5)	-6.2*** (1.6)
Log (years in the market)					-2.4* (1.3)	-2.4* (1.3)
N of vinified varieties					0.4 (0.5)	0.3 (0.5)
% of revenue from other activities					0.01 (1.1)	-0.01 (1.1)
Organic Production						2.9 (2.6)
Biodynamic Production						6.4 (7.8)
Conventional Production						-3.2 (2.4)
Constant	80.4*** (1.1)	89.4*** (1.6)	109.6*** (12.2)	118.6*** (13.2)	124.3*** (15.0)	125.5*** (13.4)
Wine Type	No	No	Yes	Yes	Yes	Yes
Region Dummies	No	No	Yes	Yes	Yes	Yes
Firm Type	No	No	No	Yes	Yes	Yes
Observations	646	646	646	646	646	646
R <sup>2</sup>	0.01	0.1	0.2	0.3	0.3	0.3

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The second part is to explore the mechanism behind this relationship. The wine industry is ideal for studying the relationship between vertical integration and quality and possible alternative mechanisms, as the problem of observability of input quality is relatively less important. There are two main reasons to support this claim. First, quality parameters are easily observable or measurable. Second, the interaction between wineries and growers takes place all year, and not only at the time of transaction.

The organization of the industry revolves around long-term relationships<sup>1</sup>. Spot markets for sourcing tend to be small and volatile, so winemakers usually agree on the transaction with independent producers ex-ante, based on quality and quantity parameters. Long-term relationships, then, provide certainty and predictability, ensuring a future flow of income for the producer and the availability of the input for the winemaker. The value lies in mitigating potential hold-up problems (see Macchiavello & Miquel-Florensa, 2017).

<sup>1</sup> See MacLeod (2007).

To produce quality grapes, the vine requires a great capacity for reaction on the part of the farmer. As the vine is a living organism, its development is subject to the vagaries of the climate throughout the year<sup>1</sup>. Since the wineries seek to differentiate horizontally their highest quality wines (i.e., to vary the different organoleptic parameters) to stand out from the rest, once this differentiation is achieved, wineries usually try to maintain what distinguishes each wine from one vintage to the next (i.e., they try to maintain the typicity of each wine). To achieve this, different combinations of climatic variables make it necessary to readjust viticultural practices to always obtain the same (or very similar) wine.

The organizational structure —whether vertically integrated or not— affects the ability to make decisions flexibly. In this case, as wineries are usually immersed in a bilateral relationship with an independent producer -in which there is a temporary lock-in (Tadelis, 2002)-, to adapt to contingencies, it is necessary to renegotiate the previous agreement. This renegotiation, as we said, can be difficult because the actions involved in reacting appropriately usually imply an increase in costs.

To test this mechanism, we need to find variability in the firms' need for adaptation. To do so, we focus on one of the most feared events in the wine world: hail (Wilson, 1998; Cagnetti et al., 2013). Following Januszewski Forbes & Lederman (2009), we obtain a 20-year historical series with the number of hail days for each month in different meteorological stations in Spain. Subsequently, we average the number of hail days in each weather station during the flowering period of the grapevine, which is the time when grape quality can be most strongly affected by a climatic disaster such as hail. Then, using geo-referenced data, we assign to each winery a weighted average of the data from the nearest stations. The identifying assumption is that areas with more average hail days have a greater need for adaptation.

We run the following regression:

$$Vert. Int_i = \alpha + \beta_1 Quality_i + \beta_2 Hail_i + \beta_3 (Quality_i \times Hail_i) + \gamma X_i + AO_i + \epsilon_i \quad (2)$$

where the specification is the same as (1), but the number of days of average hail in the flowering period of the vine is added as an interacted term with quality. This will be the variable of interest. The interpretation is as follows: a positive coefficient implies that in those areas where there are more average hail days, the relationship between the quality index and vertical integration is stronger. If our assumption is correct, this means that in those areas where there is greater uncertainty —and, therefore, a greater probability of having to adapt to the state of nature— the average vertical integration of those wineries that make higher quality wines tends to be higher.

Table 2 shows the results. As can be seen, once the controls are included, the coefficient of the interaction term is positive and significant at 5%. This is consistent with the hypothesis that the need for adaptation encourages vertical integration. The result is robust to defining the quality index with winery practices only, but not to using the self-reported quality variable. This may be because this variable involves other dimensions independent of the need for adaptation.

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<sup>1</sup> See Tonietto & Carbonneau (1999), Vaudour (2002), Sommers (2008).

Table 2

	<i>Dependent variable:</i>					
	Vertical Integration					
	(1)	(2)	(3)	(4)	(5)	(6)
Quality Index	1.0 (1.6)	1.2 (1.6)	0.4 (1.7)	1.5 (1.6)	1.2 (1.6)	1.5 (1.6)
Avg Hail	3.5 (6.0)	6.3 (6.1)	7.9 (8.1)	-2.3 (7.0)	-2.7 (7.1)	-4.0 (7.2)
Quality Index * Avg Hail	8.3 (6.2)	7.9 (6.6)	17.3** (7.1)	15.1** (6.3)	15.0** (6.4)	13.9** (6.5)
Log(number of employees)		-6.8*** (1.1)	-7.2*** (1.3)	-6.4*** (1.5)	-6.3*** (1.5)	-6.2*** (1.6)
Log (years on the market)					-2.3* (1.3)	-2.3* (1.3)
N of vinified varieties					0.4 (0.5)	0.4 (0.5)
% of revenue from other activities					0.02 (1.1)	0.01 (1.1)
Organic Production						2.7 (2.6)
Biodynamic Production						5.5 (8.0)
Conventional Production						-3.1 (2.4)
Constant	79.7*** (1.6)	88.2*** (1.9)	108.1*** (12.1)	117.5*** (13.0)	122.9*** (14.8)	124.1*** (13.3)
Wine Type	No	No	Yes	Yes	Yes	Yes
Region Dummies	No	No	Yes	Yes	Yes	Yes
Firm Type	No	No	No	Yes	Yes	Yes
Observations	646	646	646	646	646	646
R <sup>2</sup>	0.01	0.1	0.2	0.3	0.3	0.3

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Our article contributes to the state of the art of economics in two ways. On the one hand, it reinforces the idea that the quest for quality can be a motive for integration. On the other hand, to the best of our knowledge, we are the first to show that there is a possible mechanism other than that identified by the more recent literature (Hennessy, 1996; Reardon et al., 1999; Henson & Reardon, 2005; Reardon et al., 2009; Swinnen, 2014; Hansman et al., 2020). By showing that the need for adaptation plays a role in achieving quality, we present an alternative explanation to the observability and monitoring problems exhibited by that literature. There are at least two policy implications that follow from our paper. On the one hand, the need to reduce potential sources of uncertainty. On the other hand, given that vertical integration can be prohibitively costly for firms, the potential benefits of lowering entry costs<sup>1</sup>, which could mitigate the phenomena of economic concentration and its adverse effects.

**Keywords:** *vertical integration, quality differentiation, wine industry, Spain.*

<sup>1</sup> For example, through the facilitation of financing. See Acemoglu, Johnson & Mitton (2009) and Machiavello (2012).

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## Parallel Sessions VIII - Trade

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# QUALITY, COLLECTIVE REPUTATION AND INTERNATIONAL TRADE IN WINES

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Recently, the European Courts of Auditors (ECA) has criticized the EU policy of subsidizing promotion activities aimed at increasing EU wine consumption in third countries. Member States spent euro 522 million in EU funds under the promotion measure between 2009 and 2013. For 2014-2018, there has been a large increase in funds allocated to the Member States for this measure (1.16 billion euro to the EU-27) (ECA, 2014). However, although wine exports to third countries have significantly increased in absolute terms, the audit revealed that EU wines have lost market shares in the main third countries targeted by promotion actions, with exports of EU wines not eligible for support increasing more significantly (ECA, 2012).

A natural question then is whether the policy is targeting the wrong firms or the wrong destination countries. In effect, “the promotion actions are often used for consolidating markets, rather than winning new markets’. Large wine companies have also benefited from funding, which was intended only for small-to-medium businesses” (Mercer, 2014). It is thus not surprising that the Courts is concerned that, “given the difficulties experienced by the Member States in spending the 2009- 2013 budget initially earmarked for promotion actions, there is a risk that the 2014-2018 budget is set too high, endangering the application of sound financial management principles” (ECA, 2014).

In this project we plan to investigate these issues, extending the existing literature on heterogeneous firms to consider product quality and collective reputation more explicitly and developing an empirical strategy to test the models’ predictions.

In Melitz (*Econometrica*, 2003), most productive (and bigger) firms are those able to serve different foreign markets. If quality is endogenous, however, things may differ. We have extended this literature by making quality endogenous and considering collective reputation, as is the case of wines and of many other manufacturing sectors of developed countries, e.g., Swiss Made. Crozet et al. (2012) is an important contribution proposing a quality-sorting version of Melitz (2003) and testing it with firm level data. First, they argue that revenue-based productivity measures - such as value-added per worker or sales in the home market - could be driven by “primitives other than physical output per unit of input”. Indeed, it is not clear whether productivity is high because a worker produces a lot or because she produces a product with high price. Second, they recall that Melitz (2003) points out that “productivity” can be thought of as either a cost shifter, or a demand-shifting quality variable. They thus propose (probably) the first empirical attempt to test the quality interpretation of Melitz (2003), combining firm-level data that directly measures quality (from Juhlin, a Champagne Wines guidebook) and trade (from export data).

In this project we start the empirical analysis by looking at the evolution of intensive and extensive margins of trade. The ‘intensive margin’ refers to the flow of exports for each firm. The ‘extensive margin’, on the other hand, refers to the number of firms that export (and/or the number of foreign markets that they serve). Mayer and Ottaviano (2008), for instance, notice that the pattern of aggregate exports for EU firms is driven both by the intensive and the extensive margins. Since they consider the extensive margin much more important, they suggest that economic policies should increase the number of exporters and nurture the superstars of the future, without “wasting time helping the incumbent superstars”. However, they do

not take into consideration product quality, which is instead critical for many manufacturing sectors (see, e.g., Fontagné et al, 2008).

We thus consider the role of quality, by constructing a set of quality indicators based on the major wine guides associated to firms. Then we replicate the econometric analysis of Crozet et al., 2012, which is based on cross-sectional data, extending it to a panel setting. We thus check whether quality can explain the intensive and extensive margin of trade for the firms under consideration. We use data on wine firms located in the Verona province, an interesting setting per se, since it has both red and white wines. In addition, for red wines in particular, it has experienced a significant increase in worldwide reputation (especially for Amarone wines) and demand.

In the econometric analysis we take special care to control for endogeneity. Crozet et al. (2012) model the measure of wine quality inferred by the wine-guide and this measure is considered exogenous (from an econometric point of view). However, a potential issue with quality ratings is the reverse causation problem, that is when “ratings are influenced by how successful a wine has been in export markets [..]. In that case, exports would cause high-quality ratings” rather than quality making export more successful (Crozet et al., 2012: p. 625).

To take into account this potential endogeneity problem we pursue the following strategy. We use data on quality reviews from different guides, distinguishing those targeting mostly the Italian consumers from those targeting more specifically foreign markets, thus to some extent controlling for the reverse-causation problem mentioned by Crozet et al. Investigating the robustness of results to alternative ratings, more or less likely to suffer from reverse causality, gives an idea about the negative or positive bias due to endogeneity (Crozet et al., 2012). We also use data – both for quality ratings and trade - from different years, thus exploiting the panel nature of the data.

To conclude, notice that in our theoretical contribution we add collective reputation into a model with endogenous quality showing that quality incentives depend on the degree of expertise of consumers in the destination markets. Therefore, among other things, the distribution of ‘active’ firms in the export markets, that is the type of quality-leaders – either small or larger firms – depend, ceteris paribus, on the degree of expertise in the foreign markets and so we need to take this latter into account. The difficulty may lie in obtaining a proxy of consumer expertise in each destination market. For this purpose, we use Google searches in different countries by retrieving data from Google Trends. Therefore, we estimate a ‘standard’ gravity equation where - among other explanatory variables such as distance, GDP, population, measures of trade costs, etc. - we have a proxy for the degree of consumers’ expertise in the destination markets.

**Keywords:** *wine quality; international trade; collective reputation; promotion policies.*

## DETERMINANTS OF EXPORTS OF WINE WITH APPELLATION OF ORIGIN FROM SOUTHWEST EUROPE, 2001-2018

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France, Portugal and Spain account for a very high percentage of world wine exports. In 2010-16 they accounted for 46% of the global value of wine exports (Anderson et al., 2017). Of these, those from their appellations of origin are by far the most important. The wine from these is usually the one with the highest price and quality. Appellations of origin were established in France before the Second World War and have subsequently been the predominant model for controlling the quality of production in most of the countries of the Old World.

In recent decades, the world wine market has changed substantially. Traditional exporters, such as those from southwest Europe, have faced increasing competition from New World countries. Thus, countries such as Australia, Argentina, Chile or South Africa have strongly increased their share of world wine exports.

In this context, this paper aims to analyze the main factors that have determined the evolution of wine exports from the appellations of origin of France, Portugal and Spain during the last two decades.

The model specification is based on the gravity theory of trade, according to which, trade between two countries is determined by the size of both of their markets and their transport costs. In our research, the dependent variable is the exports in value of 199 appellations of origin from France, Portugal and Spain to 119 importing countries. We use an expanded gravity model in which, the independent variables are the wine production of each of these appellations in the previous year, the GDP of the importers, the geographical distance as a proxy for transport costs, the wine tariffs of the importing countries, the existence of regional trade agreements between the EU and the importing country, and a number of several other variables to control for other costs of trade between countries.

In addition, we introduce multilateral trade resistance terms using fixed effects of the exporting appellation of origin, importing country, and year. The first two parameters reflect all of the specific features of the exporting AOC and importing countries that can affect trade. They are invariant over time and are not captured by the rest of the variables. On the other hand, the time fixed effects capture all of the forms of heterogeneity that change over time and which are shared between the pairs of partners, the time trend in trade, and any macroeconomic shock that affects the trade flows in a specific year. We have used the Pseudo-Poisson Maximum Likelihood estimation method (PPML), following the recommendations of Santos Silva and Tenreyro (2006), due to its advantages compared to others methods. We have conducted a robust estimation of the standard errors clustered by partner pair in order to take into account a possible spatial correlation.

Our preliminary results show that exports of wine from appellations of origin in Southwest European countries are determined by supply, demand and the costs associated with trade. Thus, the production of the appellations themselves and the demand from importers are the most important factors explaining these exports. In addition, these have been negatively affected by the distance to the destination countries, by the variability of the exchange rate and by the financial distance between the exporting and importing country. We have also found that exports are higher the higher the per capita wine consumption in the destination countries. Finally, we have detected the existence of a home bias, since exports decrease when wine production in the importing country grows or is high.

In addition to the general model, we have segmented exports according to wine quality. To determine this, we have used the unit values of exports (price per liter). We have established three groups of wine: wine over €80 per liter, wine between €5 and €80, and wine under €5.

The models, differentiating exports by quality, offer some interesting additional results. Thus, transport costs (distance), as we might expect (Alchian–Allen effect, see Hallack, 2006), affect exports of lower quality wine more, which however are not affected by financial distance, wine consumption per capita in the importing country or Exchange rate variability. The existence of a trade agreement between the exporting and importing country only boosts exports of the highest quality wine. In general, exports of the latter are more sensitive to trade costs, except for transport (distance).

**Keywords:** Wine trade, Appellations of origin, Gravity model

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## THE RECENT EVOLUTION OF ARGENTINA'S WINE EXPORTS PERFORMANCE

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Argentine exports of bottled wines have reached a historical record in 2021; Malbec wines represent more than half of wines exported, and varietal wines (including Malbec) total 90 percent. Is the recent development of Argentine wine exports a sustainable and growing phenomenon? Is this boom entirely limited to Malbec wine exports? To answer these questions, the article firstly presents a statistical examination of the morphology of wine export development in Argentina, showing that even when volume exports have somehow stabilized, relative prices have increased, and the industry exports performance happened despite unstable national macroeconomics. Secondly, a set of econometric models, focusing in Malbec and No-Malbec wine exports and Varietal and No-Varietal wine exports, is presented to assess for the determinants of the demand of Argentine wine. Results show that Argentine wine exports are conditioned by price, the level of income of the importer countries' consumers, and the quality of the wine.

**Keywords:** *wine, exports, Argentina, Malbec.*

# WEATHER, TRADE AND QUALITY: THE CASE OF FRENCH WINE

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Recently, weather issues appear as a new concern of the international trade literature. In this article, we analyze varying weather conditions as another determinant of French wine exports, where we consider geographical differentiation according to wine producing areas. Hence, we examine the impact of combined weather indicators on both export volumes and prices by implementing various estimations from a gravity model, respectively focusing on both intensive and extensive margins, and unit values as a proxy of quality. We exploit a dataset of French wine shipments collected from 1998 to 2020 and gathering 145 PDO (Protected Denomination of Origin), and we deal with daily weather data provided by Météo-France to compute both standard and extreme weather indicators. We infer weather conditions tend to affect more French wine exports through the extensive margin rather than the intensive one, hence the total number of products exported to a given country seems to be sensitive to changing weather. Moreover, quality referring to unit values are also concerned by several outcomes from varying weather, where extreme weather conditions lead to a certain decrease of quality while varying conditions captured by standard indicators entail diverse repercussions on wine prices.

**Keywords:** *Weather, French wine, Gravity model, Quality.*

## **Acknowledgements:**

This research is supported by the European Union – Interreg Sudoe VINCI.

## Parallel Sessions IX - Sustainability

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# DETERMINANTS FOR THE SUSTAINABILITY OF VITICULTURAL SYSTEMS IN THE DOURO DEMARCATED WINE REGION

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Viticulture contributes to and interferes in many levels of European and world life. Portugal is the 11th wine producer and the 10th exporter in value and volume in a global context (OIV, 2021). In its Demarcated Douro Region, the viticultural systems show a high heterogeneity, with diverse problems that affect their sustainability and that of their surroundings, where the distinct actors of the wine production chains are included (Santos et al., 2020). Being an activity with fundamental importance in the maintenance and construction of the landscape, its impacts extend to other economic activities, also influencing social and environmental parameters of the territories where they are located (Santos et al., 2019).

The adoption of a sustainable approach has been recognised as a competitive and resilience factor for the sector (Flores, 2018; Keichinger & Thiollot-Scholtus, 2017). The Triple Bottom Line (TBL) theory, created by Elkington (1994), is often regarded as the most well-known and comprehensive theoretical model used in addressing sustainable development or agricultural sustainability (Hayati, 2017; United Nations World Summit, 2005). Such theory argues that People, Planet and Profit are imperative principles of sustainability and promotes the idea that sustainable development occurs when organisations demonstrate responsibility towards environmental health, social equity and economic viability (Graça et al., 2017; Hayati, 2017; Santiago-Brown et al., 2014). Beyond these basic definitions, there are other recognised approaches to sustainability, but the perception of what it means to be sustainable has changed over the years and continues to gradually evolve (Hayati, 2017; Herath & Rathnayake, 2019; Ramos, 2019). In his recent work, Elkington (2018) mentions how the TBL has been used (and abused) over the years and tries to update the concept to a more holistic system approach rather than a simple accounting tool.

The application of appropriate sustainability assessment methodologies are also considered for taking measures to transition towards sustainability (Ramos, 2019). They allow to strategically follow production processes to increase efficiency and/or optimise environmental performance (Costa et al., 2020; Merli et al., 2018), and efficient use of inputs is also crucial to reduce costs and dependence on government subsidies and free resources for investments in expansion and maintenance (Shirley & Ménard, 2002), with effects on the local community, society, consumers, workers and value chain actors (Luzzani et al., 2020). However, there are still several concerns and limitations regarding the deficit of sustainability-oriented knowledge and methodologies to assess sustainability in the agri-food sector (Hayati, 2017; Kamali et al., 2017). The prevailing shortcomings are focused particularly on the evidenced imbalance of sustainability dimensions that are incorporated in these processes. Environmental issues dominate, while other categories remain under-represented - such as social, economic, institutional, political and ethical (Bockstaller et al., 2008; Olde et al., 2016). Add to this the complexity of agri-food chain systems that encompass biological, economic, social, health and political variables at different scales (e.g. farm, local, regional, national and global), which implies that achieving their sustainability is also complex (Bryceson & Ross, 2020; FAO, 2014).

In this perspective, this work aims to evaluate the variables explaining the sustainability of the viticultural systems practiced in the Douro Demarcated Region, in Portugal, in a dimensional and global perspective of

sustainability. It is intended that the results of this work assist the development of methodologies more adapted to the factors that explain sustainability and that help the agents of the sector to improve the sustainability performance of the production systems and anticipate responses to the contemporary constraints of viticulture related to environmental, social and economic issues (Costa et al., 2016; Flores, 2018; Keichinger & Thiollet-Scholtus, 2017; Matias et al., 2021).

The realized procedure was based on three main steps: (i) adjustment of the matrix of 27 sustainability indicators for the Douro viticultural systems, presented by Marta-Costa et al. (in press), in order to eliminate the economic, environmental and social indicators that overlapped with the efficiency estimations present in Santos et al. (2020); (ii) the previous adjustment allowed a matrix of 24 indicators, structured by the three dimensions of sustainability (8 indicators per each), and to include the efficiency obtained according to Santos et al. (2020) as a possible determinant of sustainability; (iii) analysis of the three dimensions of sustainability (according to a model of 9 and 8 indicators per dimension) and the global index of sustainability (according to 27 and 24 indicators) considering different typologies or groups of determinants: training system, vineyard landscaping, geographic determinants, destination of the grape, type of used work and other determinants, through estimation by the Ordinary Least Squares method using the Huber-White option to consider the possible presence of heteroscedasticity.

The findings from the six models that use the indicators calculated from 27 and 24 indicators are quite similar (9+9+9 and 8+8+8) given that the degree of correlation between them is very high (97%). The most important divergences in the results take place between the estimates of the models developed through the global sustainability index (GLOBAL27 and GLOBAL24) and the estimates of the indices disaggregated by dimension. The results of the global models tend to collect intermediate values from their respective disaggregated models. This leads to the conclusion that further analysis of the determinants is best carried out in a disaggregated analysis. From the disaggregated analysis, the models with the highest explanatory capacity are the economic dimension of sustainability, which provides an R-squared around 80% (slightly higher in the adjusted index).

Significant factors to explain economic sustainability are efficiency, the destination of the grape, the type of labour and other determinants such as the exclusive dedication of the producer to the vineyard and the practice of simplified accounting, associated with small holdings. For environmental sustainability only some determinants of the geographic context were significant. In the case of social sustainability, in addition to geographical factors, vineyard landscaping and the destination of the grape were significant factors.

In conclusion, this study provides new evidence on the advantages of a disaggregated analysis of the sustainability and the findings show that improvements in production efficiency are not being used to improve the environmental and social dimensions of the Douro region's production systems.

**Keywords:** *explanatory variables; economic; environmental; social; indicators, sustainability index.*

### **Acknowledgements:**

This research is supported by national funds through the FCT (Portuguese Foundation for Science and Technology) under the projects UIDB/04011/2020.

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# MAKE SUSTAINABLE THE PROSECCO DOC WINE CHAIN: THE CASE OF PROSECCO SUSTAINABILITY PROJECT

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## **Background and objectives**

Sustainability has been the focus of international institutions and most national governments, although not always with the same emphasis, since at least 1987 when the WCED (Brundtland Commission) published the Report "Our Common Future". Now the concern for the sustainability issues of wine production is shared also by retailers, consumers, and local communities in producing areas and has become a priority also for politics: the new CAP, for example, has introduced various forms of payment to encourage the transition towards sustainable vitiviculture (Pomarici and Sardone, 2020).

As consequence many different sustainable winegrowing programmes were developed through collaborative efforts driven by national institutions and producer associations in all wine producing countries. In this process, as overtime the importance of considering the social and economic aspect is increasingly emerging, appeared different ways to address the challenge of sustainability (Devuyt, 2000; Flores, 2018; Pomarici and Vecchio, 2019).

Despite the general attention to sustainability, the rate of association to wine sustainability programmes or schemes is very different among wine producing countries, mainly due to the uncertainty about the economic impact of the compliance with the sustainability protocols. As a matter of fact, the consequences of participation of cooperatives or wineries in common sustainability projects on their viability are largely understudied and they would deserve to be studied in depth. In principle, positive result should come from the association to sustainability schemes, for the possibility of selling the product at a higher price for the use of more efficient and effective techniques, but the experience of managers and professionals suggest that it exist a wide array of situation, largely depending from eco-physiological condition of vineyards, farm/firm structure and available skills. This is confirmed by two research projects (Pomarici et al., 2015; Jourjon et al., 2016) that show that when specific capabilities are available in managing obligations related to the sustainability schemes their adoption does not have a negative impact on cost and profitability. A key issue in the enlargement of participation to sustainability programmes looks therefore the possibility to share in wine communities the skills and knowledges necessary to manage the transition from a

conventional organisation of production to a sustainable one in a context where the relevant problems are mostly “place related”.

Anyway, in the wine market, many interbranch organisation in charge for the governance of the supply of PDO wines are committed to improve the sustainability of all associated producers; their objective is that all relevant stakeholder could recognise the concerned PDO community as sustainable.

The objective of the proposed paper in to present, as case study, the activity centred on the Consorzio di Tutela Prosecco DOC (from here on: Consorzio) - the interbranch organisation in charge to govern the production of the PDO Prosecco wine in North-east Italy - set up to improve the average level of sustainability of all Prosecco producers, implementing a collaborative action involving research centres, professionals and a selected group of wine companies representing the different firm types operating in the Prosecco DOC production system.

### **Data and methods**

The case study analyses and discuss the process carried out by the Consorzio to implement an innovative sustainability management system of wine production in the Prosecco DOC territory, called Prosecco Sustainability Project. For this purpose, the Consorzio intends to apply sustainability requirements to the entire chain through the monitoring of indicators of sustainability and the assessment of the impact of new techniques and procedures.

To support this process, the Consorzio has promoted the establishment of an operational group in the framework of the European Innovation Partnership (EIP) for agricultural productivity and sustainability, according art. 35 of the reg. 1305/2013.

The Prosecco Sustainability Project has chosen as sustainability benchmark the Equalitas® standard (<https://www.equalitas.it/en/>), which contains severe environmental, economic and social sustainability requirements, and basically aims to design the process able to support the Prosecco producing community as a whole to comply with such standard and to establish a network, coordinated by the Consorzio, useful to exchange experiences and information and collect data to boost continual improvement processes.

The Prosecco Sustainability Project is structured in five phases of action:

- 1- Coordination of the participants to the project (wineries, research institutions, sector experts and the Consorzio), whom must cooperate to find the most suitable solutions and response methods for different situations. Output of this phase was the definition of a work plan and the drafting of audit reports relating to the application of good vineyard and cellar practices according to the Equalitas® standard in the selected wineries;
- 2- Structuring of the coordination system, including the development of the IT platform and the initial survey of indicators (baseline), in order to verify the degree of companies’ organisation and adoption of good practices in the vineyard and in the cellar;
- 3- Development of support strategies and tools for the implementation of the three pillars of sustainability in the Prosecco DOC, which branches off into several sub-phases:
  - a) the verification of any critical issues that may arise in complying the standard requirements analysing the situation of the selected wineries;
  - b) the drafting of a "standard manual" that allows the assessment of the entire supply chain, the verification of the requirements and the specific responses for the three pillars of sustainability, optimized for the characteristics of the territory concerned;
  - c) the test in the selected wineries of specific software for recording data of operations in the vineyard (use of pesticides, fertilization), in the cellar (sparkling wine, must values, etc.), in

administration (water consumption, energy expenditure etc.) to keep the whole supply chain under control.

- 4- Development of a control system based on the consortium, which acquires and processes information from companies and wineries, to constitute a collective knowledge ground for the attainment of a common sustainability standard.
- 5- Training activity to share in the Prosecco community the results of the project in order to stimulate a general adoption of the sustainable practices and the implementation of the desired coordination system.

The case study is developed through analysis of the reports and documents produced by the activity of the operational group and with ad hoc interview to the different actors involved.

### **Results**

The case study presented, although the research is not completed, shows that the collaborative approach adopted by the operational group appears to be effective in achieving the objective of leading a large and diverse community of wine producers towards a high level of sustainability, overcoming the difficulties of the territory in a meaningful way in terms of efficiency and effectiveness. The case study shows also that the approach of the operational group of the EIP could effectively support innovative processes creating synergies among different actors and competencies.

### **Discussion and conclusions**

In detail, it should be noted that the collection of the information needed to monitor environmental sustainability is also relevant to the analytical cost control; in fact, by providing a considerable amount of non-accounting data, it allows to feed an analytical cost accounting and facilitates the development of synergies in the pursuit of economic and environmental sustainability. In this perspective, the opportunities of Information and communication technologies clearly emerge, which can also be enhanced by implementing automatic or semi-automatic systems of data collection on the management of operations in the vineyard and in the winery.

Moreover, it is worth to be highlighted that the activities already carried out show how the centralization at the Consortium of information on the cultivation activities of the consortium members, their processing and use through DSS (Decision Support System), opens up new prospects for continual improvement of the sustainability of the concerned production. The final result will be the quantification and increase in the sustainability of the Prosecco Designation, the consequent amelioration in the perception of wine production among the community, consumers and, therefore, the enhancement in competitiveness.

**Keywords:** *sustainability, wine, certification, territory, Prosecco, competitiveness*

### **Acknowledgements:**

We thank the Prosecco DOC Consortium for providing access to the data and for their willingness to collaborate.

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# IMPACT OF AGRO-ENVIRONMENTAL SCHEMES ON HUNGARIAN WINERY'S TECHNICAL AND ECO-EFFICIENCY

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In the past three decades it has been recognised, that increasing production efficiency of European farmers generates increasing pressures on the environment. Thus, the common Agricultural Policy (CAP) is continuously amended to – at least partly – compensate for the negative effects of increasing agri-food production intensity. Moreover, the amounts dedicated for this purpose show an increasing trend for the past 20 years. Within the CAP, several tools have been implemented to achieve this goal, most important being the Agri-Environmental Contract Schemes (AES), which is designed to provide additional financial support for participating farmers, that voluntarily embrace and implement environmentally friendly farming practices (European Commission 2019). The problem is that the outcomes of the AES, more specifically the expected positive impact on the environment, water management and biodiversity are rather difficult to evaluate and empirical evidence on the productivity effect of agri-environmental payments is mixed (Garrone et al., 2020).

On one hand, agri-environmental measures are traditionally assumed to have a negative effect on productivity as they impose constraints on input use (such as fertilizers, pesticides, and land). On the other hand, positive relationship between firm performance and involvement in environmental activities has long been suspected (Porter and Van der Linde, 1995; Reinhardt, 1999); however, previous results do not indicate the direction of causality, nor the strength of the relationship (Masini and Manichetti, 2012).

The small amount of literature focusing on AES impact evaluation (e.g. water quality, see Poole et al. 2013; Ekholm et al. 2015; Jones et al. 2017) concluded limited or no impact at all. Recently, the impact assessment of environmental payments, has been increasingly replaced by the analysis of eco-efficiency. This combines the traditional production efficiency analysis with measuring the damage caused to the environment, i.e. how the same amount of agricultural products may be produced by minimizing input use and thus environmental damage.

In this paper, we use very recent Hungarian micro data (FADN dataset), that contains AES payments between 2005 and 2019. In addition we merge the FADN dataset to farm holding specific meteorological and soil quality data. This is important since the Carpathian Basin is expected to be one of the most affected European Regions by climate change. Hungarian Meteorological Service report an increase in the number of heat days, and a decrease in the number of days with sub-zero temperature. Winegrape production is one of the most sensitive types agricultural production with respect to climate change.

We first estimate both the Technical Efficiency and Eco-Efficiency of holdings that produce grapes for wine. Second, using Differences in Differences (DiD) estimator with Propensity Score Matching, we evaluate whether there are differences in Technical Efficiency scores of matched farms (between those receiving and those not receiving AES payments). Covariates used for matching include variables measuring the size of holdings (output, land, labour input), share of paid and unpaid labour, personal characteristics of farm owner/managers, location specific dummies etc. Third, similarly to TE, we match farms with respect to their ecoefficiency scores and whether they did or did not receive AES payments. Besides covariates use in the case of TE DiD here, we include climate specific variables as well.

In the light of increasing global temperatures, and, because the Carpathian basin and within Hungary are predicted to be specially affected, we pay special emphasis on water management. Preliminary results deliver disappointing conclusions. Whilst in the light of literature it is expected that AES participant farms to have lower TE, preliminary results show that they are also less eco-efficient, that is participation of Hungarian farmers does not seem to mean lower eco-efficiency scores than those for non-participating farmers. We discuss in detail possible reasons of why lower technical efficiency seems to go hand-in-hand with lower eco-efficiency as well. The paper is closed with several policy recommendations.

**Keywords:** *Technical Efficiency, Eco-Efficiency, Difference in Differences, Hungarian Winegrape farms*

# PERCEIVED BENEFITS FROM ECOSYSTEM SERVICES PROVIDED WITHIN THE PRIMITIVO DI MANDURIA PDO AREA (ITALY)

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## 1. Introduction

Economic prosperity and the well-being of economic actors and citizens depends on the good state of natural capital, including ecosystems that provide essential goods and services: fertile soils, productive seas, clean water, clean air, pollination, flood prevention and the regulation of climate. The deterioration of natural capital and the consequent loss of biodiversity can weaken an ecosystem, compromising the provision of ecosystem services (ESs), the restoration of which is often costly and, sometimes, irreversible. Therefore, it is undisputed that the landscape is a key element of individual and social well-being and that its protection, management and planning entail rights and responsibilities for all (Council of Europe, 2000).

The Millennium Ecosystem Assessment found that around 60% of global ecosystem services are in decline (MEA, 2005). Since the wine industry depends on ecosystem services, exploring approaches, which include them in a holistic perspective, is needed to achieve the competitive advantage and to identify new opportunities to improve the supply chain practices. In addition, adopting this perspective helps to achieve a more resilient wine industry, able to address the loss of biodiversity and natural resource deterioration, while minimizing the climate change impacts and other environmental issues (Marques, 2018). The preservation of ecosystem services is also fundamental for the wine industry because the latter mainly includes land-based firms which depend on services provided by healthy functional ecosystems. The vulnerability of wine industry to environmental changes is evident and, for this reason, specific monitoring strategies and policies are needed to mitigate it.

The aim of this study is to identify, classify and measure the perception of benefits from ecosystem services provided within the Primitivo di Manduria PDO area.

## 2. Materials and methods

### 2.1 Case study area description

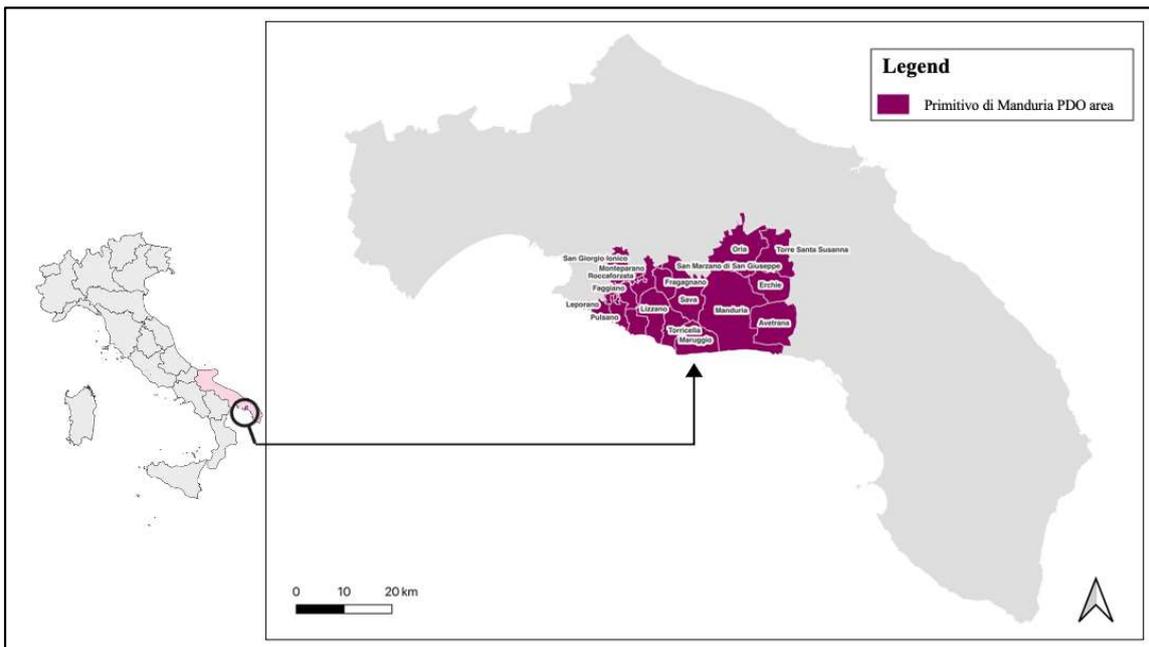
The Primitivo di Manduria PDO area falls within the provinces of Taranto and Brindisi, according to production regulations (MIPAF, 2014): in the province of Taranto, it includes the territories of the municipalities of Manduria, Carosino, Monteparano, Leporano, Pulsano, Faggiano, Roccaforzata, San Giorgio Jonico, San Marzano di San Giuseppe, Fragagnano, Lizzano, Sava, Torricella, Maruggio, Avetrana, and the township of Talsano, while in the province of Brindisi it includes the territories of the municipalities of Erchie, Oria and Torre S. Susanna (Figure 1).

The Primitivo di Manduria PDO area is essentially characterized by two types of landscape, mainly plains: the Ionian Arch, near the coast, where the climate is Mediterranean with fairly mild winters and hot summers; and the Salento peninsula, in the inner area, which is characterized by a more humid climate than the rest of Apulia. This peculiarity determines a more marked alteration of the perceived temperature: the summer season, especially in the southernmost areas, is particularly sultry, while the winter season,

albeit very mild and abundantly above zero even in the coldest periods, taking into consideration the wind chill factor, it can seem colder than it is.

A more detailed analysis of the soils reveals that in the western part of the production area, deep loam-clay soils predominate, which become sandy and thin as they descend along the coastal area, thus only allowing a limited deepening of the roots. Proceeding west, we notice an alternation of thin and deep soils, mostly of sandy clay with medium texture and good drainage.

**Figure 1.** Primitivo di Manduria PDO area



## 2.2. Pilot study

In order to conduct this study, to identify the parameters to be analyzed, a survey that involved 15 stakeholders, i.e., representatives of associations for agriculture and tourism, local authorities and researchers was developed. The group discussed and analyzed the general characteristics of the area, the morphology of the territory, general socio-economic and environmental issues, the role of agriculture and agricultural landscapes in the economy and the main aspects linked to sustainable development in the use of soil.

Based on the scientific literature and on the relevant topics that emerged from the focus group, the stakeholders identified ecosystem services and divided them into the three macro-categories of economics, socio-cultural and environmental aspects, in accordance with the sustainable development pillars (Figure 2).

**Figure 2.** Correlation matrix between ecosystem services and sustainability pillars

ECOSYSTEM SERVICES \ SUSTAINABILITY PILLARS	PROVISIONING		CULTURAL			REGULATING		
ECONOMIC	PRICE-QUALITY RATIO OF TOURIST SERVICES 	 INCOME AND VALUE ADDED				 TRANSPORT	 INFRASTRUCTURE	 SERVICES
ENVIRONMENTAL	 WATER SUPPLY					 MAINTENANCE OF BIODIVERSITY	 WATER PURIFICATION	 PRESERVATION OF A TYPICAL LANDSCAPE
SOCIAL	 LAND USE		 NETWORKING AMONG LOCAL OPERATORS	 CULTURAL IDENTITY	 EXPERIENCE AND INSPIRATION FOR ARTS			

### 2.3. Questionnaire and Survey method

To investigate the perception of ESs, an on-line questionnaire was performed to evaluate the benefit level of belonging to the Primitivo di Manduria PDO area. The questionnaire was addressed to residents, wine operators and tourists and it was divided in in three specific sections for each category.

The first part of the questionnaire included sociodemographic variables (i.e., gender, age, municipality of residence, profession) because the target of respondents can influence the perception of ESs. The second part of the questionnaire was about respondents’ subjective evaluation of perception. Questions were structured basing on the studied parameters. The rating scale was divided into ten levels, from “Strongly disagree” to “Strongly agree”.

### 3. Preliminary results

A representative sample is currently available and reveals contrasting perceptions of ecosystem services provided by the Primitivo di Manduria PDO area. Preliminary findings are based on two questionnaire items.

Figures 3 and 4 show the residents’, tourists’ and wine operators’ perceptions of the benefits from services provided within the Primitivo di Manduria PDO area.

The perception scale was divided into three levels: low, average and high. The low level included scores ranging from 1/10 to 3/10; the average level included scores ranging from 4/10 to 7/10; the high level included scores ranging from 8/10 to 10/10.

As shown in Figure 3, residents consider positively the benefits deriving from the services provided by the PDO area to the state of conservation of rural buildings. However, a higher percentage of wine operators (36,4%) is more critical and expressed a low score. This suggests that throughout the years the area’s recognizability has attracted enough investment and the actions taken to safeguard and to improve the condition of rural buildings have been appreciated by the inhabitants. However, wine operators ask for more actions aimed at rural heritage.

Tourists’ perception is not positive because they have a wider perspective than operators and residents, therefore they can compare the specific context to other similar realities, bringing out the untapped potential. Their negative perception underlines that the Primitivo di Manduria PDO area is not among the most virtuous, in terms of rural building preservation and conservation.

**Figure 3.** Do the ecosystem services provided within the Primitivo di Manduria PDO area have contributed to improving the conservation state of rural buildings?

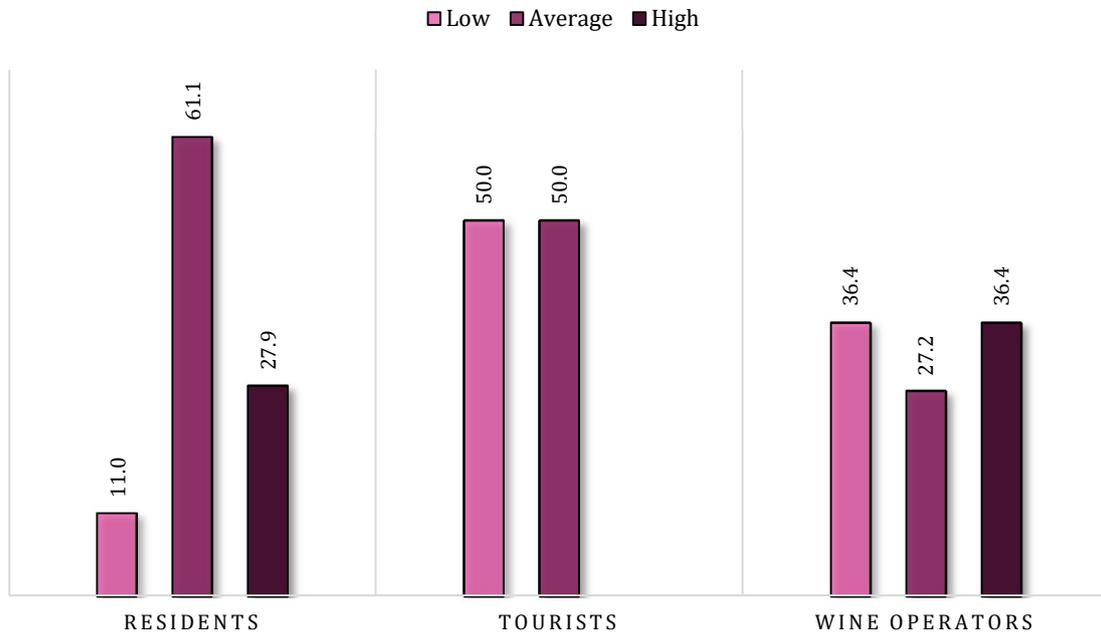
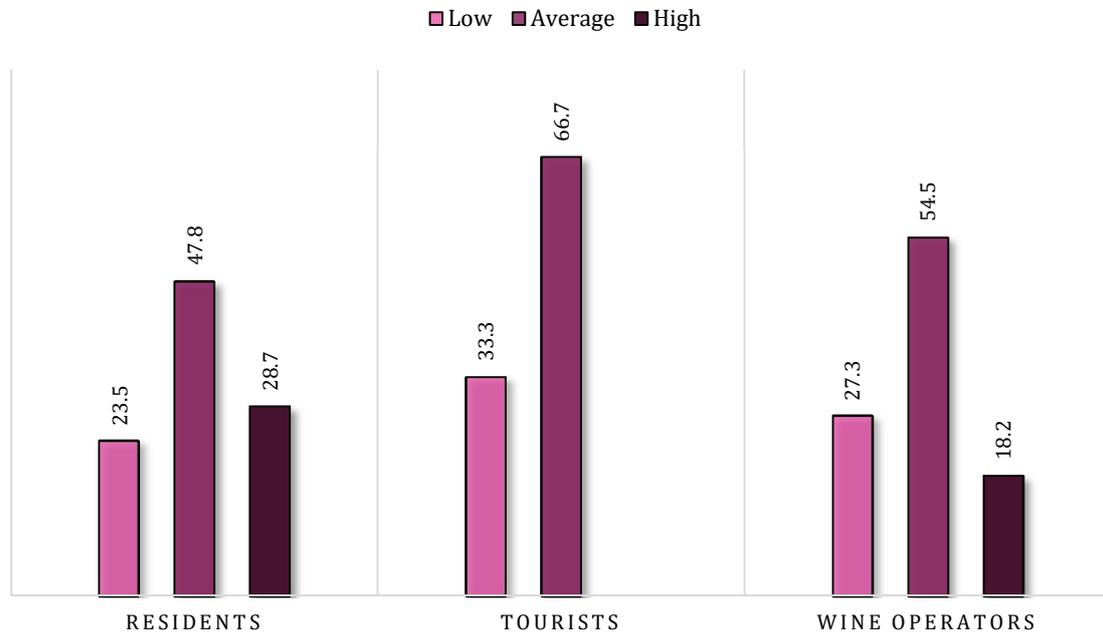


Figure 4 shows that for the absolute majority of residents, tourists and wine operators the Primitivo di Manduria PDO area does not fully enhance the opportunities derived from its reputation to encourage wine tourism. In this case, no tourists expressed a high positive perception.

It should be noted that synergies may not have developed to create a high-quality wine experience because the cultural attitude and mentality of residents and operators within the area is more focused on production rather than on the market approach. Determinants for wine tourism must include attractions, services, prepared hospitality system, infrastructures, an organizational development, and a marketing plan that develops these combinations to the best.

**Figure 4.** Have the opportunities derived from Primitivo di Manduria PDO area been exploited to promote wine tourism?



**Keywords:** *Ecosystem services, land use, wine, natural capital.*

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# Parallel Sessions X - Policy Regulation

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# WILL COMMON AGRICULTURAL POLICY SUPPORT SAVE FARM EMPLOYMENT IN THE WINE SECTOR?

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The creation and maintenance of jobs in agriculture and in rural areas has been a traditional Common Agricultural Policy (CAP) target, as well as an objective restated and emphasized in several European Union (EU) (EC, 2013, 2019) and European Parliament (2016a, 2016b) official documents. Food security in developing and poor countries depends on farm labor and agricultural policy (Kuiper et al., 2020) but less so in developed countries. With economic growth and a higher level of economic development, agriculture's share in employment decreases and government support for agriculture increases (Anderson et al., 2013). While agricultural subsidies have been targeted at achieving different objectives over time, they have affected agri-food value chain markets and allocation in rural and agricultural factor markets – and among the latter, labor allocation in agriculture, and farm labor demand (Garrone et al., 2019). Whether CAP can promote rural jobs, and how, has already been addressed in the literature (Matthews, 2017; Garrone et al., 2019). Our specific research question is whether CAP subsidies can contribute to job creation and prevent out-migration from farms and rural areas (Serra et al., 2005; Alasia et al., 2009). This became a relevant research and policy area following two recent global crises: first, the economic slowdown that followed the global economic crisis, and second, the ongoing global pandemic-related health crisis which has caused an economic recession and reinforced the need to understand the importance of local land use and food production, which might also contribute to job creation on farms and in rural areas. The wine sector is a good example to investigate the impacts of CAP on farm labor. The wine sector is usually also suffered from the lack of farm labor; thus, it is important to know whether policy can prevent the outmigration from this sector. The wine sector has a long history in Hungary, and the country can describe as a wine drinking nation.

Therefore, this study contributes to the literature on agricultural employment and job creation on farms in relation to different types of subsidies or policy instruments available under the CAP. The effectiveness of different types of subsidies in maintaining the labor force in the agricultural sector and job creation on farms is unclear, with mixed findings in the literature, while the empirical evidence is still largely inconclusive. The magnitude of economic effects may also be quite moderate and heterogeneous across CAP instruments. More specifically, the contribution of the study may be found in the following areas. First, we investigate the employment effects on farms of the entire portfolio of CAP measures. Total farm subsidies are decomposed into the individual effects of Pillar I subsidies and different Pillar II, rural development (RD) subsidies, including agri-environmental (AE) subsidies, less favored area (LFA) subsidies, other rural development (RDo) subsidies, and investment subsidies. Second, the farm employment effect is studied in relation to control variables for regional labor market characteristics, which may be important for maintaining local rural and farm labor markets. The study combines farm level data with control regional level labor market indicators at the Nomenclature of Territorial Units for Statistics (NUTS3). Third, in terms of farm employment a distinction is made between the employment of family farm labor and the employment of paid labor. Econometric models are estimated at farm-level for total farm employment and separately for the employment of family farm labor and the employment of paid labor.

This paper investigates the impact of Common Agricultural Policy subsidies on farm employment in Hungarian wine sector. Following previous studies, we set the following three main hypotheses:

**H1:** Pillar I subsidies promote or maintain different segments of farm employment.

**H2:** Pillar II subsidies have heterogenous impact on different segments of farm employment.

**H3:** Investment subsidies promote or maintain different segments of farm employment.

The farm-level employment effects of the entire portfolio of farm-level CAP measures, including Pillar I and Pillar II subsidies, and investment subsidies, were investigated using the Hungarian Farm Accountancy Data Network (FADN) datasets for the period 2007-2015. In addition, agricultural GVA per worker, non-agricultural GVA per worker, agricultural employment, non-agricultural employment, unemployment rate, and population density in NUTS3 regions and price deflators expressed by harmonized indices of consumer prices using a constant base year were obtained from Hungarian Statistical Office.

We estimate the following model:

$$m_{i,t} = \beta_0 + \beta_1 s_{i,t} + \beta_2 X_{ij,t} + \chi_r + \gamma_t + \varepsilon_{i,t}, \quad (1)$$

where  $m_{i,t}$  is the level of labor on farm  $i$  for the year under analysis  $t$ ,  $s_{i,t}$  is the agricultural subsidy for farm  $i$  at the year under analysis  $t$ , and the  $\beta$ 's are the regression parameters to be estimated.  $X_{ij,t}$  is a vector for control regional labor market variables including relative income (agricultural gross-value added (GVA) per worker /Non-Agricultural GVA per worker), relative employment (agricultural employment /Non-Agricultural employment), unemployment rate, and population density. These four-control regional labor market characteristics variables are for the location  $j$  (at the NUTS3 level) where farm  $i$  exists in the year under analysis  $t$ . Finally, we add regional-level- ( $\chi_r$ ) and time- ( $\gamma_t$ ) fixed effects to the model.  $\varepsilon_{i,t}$  is the error term to control farm-level heterogeneity. Unlike to some previous studies, the fixed effects are specified at the farm-level and not at the regional-level when this is the relevant spatial variation.

Econometric models were estimated separately for total farm labor, family labor, and hired labor. We find that total subsidies and, within these, Pillar I subsidies, have positive effect on farm employment, irrespective of the type of employment. Mixed results are found for Pillar II and investment subsidies. Less favored area and other rural development payments are particularly important for the family farm labor, but not for the paid labor, neither the total farm labor. The impact of control regional labor market variables is mixed between the employment of family farm and paid labor.

**Keywords:** *Farm employment, Family labor, Paid labor, Common Agricultural Policy subsidies, Regional labor market characteristics, wine sector*

# DO SUBSIDIES DECREASE THE INCOME INEQUALITY IN THE HUNGARIAN WINE SECTOR?

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Reduction in income inequalities for farmers is one of the policy challenges. The available financial resources, the restructuring of expenditure patterns generate additional issues to be resolved. Outside the European Union, attempts have been made to address the situation by amending the law and strengthening market orientations, meanwhile, the goal is to eliminate income inequality between farmers (Mirsha et al, 2009). The impact of the measures applied may vary depending on whether the payments are decoupled. (Espinosa et al., 2021), on the share of market income and direct payments within the total farm income (Nitta, 2020) as well as the size of farms and their market positions. (Moreddu, 2011). The effect of market income remains significant while its share in total income decreases Allanson (2005). In addition to subsidies, agricultural income inequalities social factors lead to an increase in farm income of farmers (Gardner, 1969) Due to regulations, the concentration of direct payments is observed in several countries. Small number of farms receive most of the direct payments while a large number of small farms share the remaining part of subsidies (Witzke & Noleppa, 2007; Beluhova-Uzunova, 2017, 2020). Regional differences in economic and environmental conditions and the regional needs also influence the effects of reducing income inequality by direct payments (El Benni & Finger, 2013, Tantari et al, 2019). The level and distribution of incomes and their potential inequality have been topics of the highest political and economic importance (e.g. Aristei & Perugini, 2010; Fragoso et al., 2011).

Earlier literature has developed and empirically applied the concept and the context of the decomposition of the Gini Coefficient to the structure and evolution of farm income and agricultural household income (Keeney, 2000; Mishra et al., 2009; El Benni & Finger, 2013; Severini & Tantari, 2013a, 2013b, 2015). These papers focus on the impact of CAP reform on farm income and farm household income inequality. While there may be heterogeneity in results across EU member states and their regions, most studies report that subsidies have reduced income concentration and thus also farm household income inequality. While the effects of agricultural policy on farm income inequality is well documented for the Western European countries and for other developed countries there have been limited similar studies for Central and Eastern European countries. In addition, there is no study on the impacts of CAP subsidies in wine sectors.

The chosen method is based on the approaches employed in earlier literature (Keeney, 2000; Mishra et al., 2009; El Benni et al., 2012; El Benni & Finger, 2013; Severini & Tantari, 2013a, 2013b, 2015), in which income is generated by  $k$  components, and the decomposition of the Gini ( $G$ ) coefficients by income source is undertaken in the following way:

$$G = \sum_{k=1}^K R_k + G_k + S_k \quad (1)$$

where  $R_k$  is the 'Gini correlation' between income component  $k$  and the rank of total income,  $G_k$  is the Gini coefficient for the  $k$ th income component, and  $S_k$  is income share of the  $k$ th income source.

The concentration of coefficients of the  $k$ th income source ( $C_k$ ) is defined as:

$$C_k = R_k * G_k \quad (2)$$

The 'proportional contribution to inequality' of the  $k$ th income source ( $P_k$ ) is defined as:

$$P_k = R_k * G_k * S_k / G \quad (3)$$

and the Gini coefficient rate of change with respect to the mean of the kth income component is defined as:

$$\frac{dG}{d\mu_k} = \frac{1}{\mu} * (C_k - G) \quad (4)$$

The Hungarian Farm Accountancy Data Network (FADN) for the period 2007-2015 is used as a data source to evaluate the impact of CAP reform on wine farm income in Hungary. In addition, price indices as deflators obtained from the Hungarian Statistical Office are used to transform current forint values into constant forint values using 2010 as the base-year. Total farm income is comprised of two potential components: 1) income components, which can contain market income and off-farm income, and; 2) subsidy components, which can contain subsidies from Pillars 1 and 2. Pillar 2 support includes subsidies related to agri-environmental measures, LFAs and other rural development measures.

Our calculation shows that total farm income tends to increase but undergoes considerable cyclical oscillation and a rapid decline in 2009 largely due to the considerable decline in market income. Due to this drop in market income, which is determined by farm output sales and output prices, its relative importance in total farm household income also declined. Off-farm income remained rather stable both in terms of value and in the structure of total farm income. Subsidies from Pillar 1 remained more important than subsidies from Pillar 2. The share of subsidies from Pillars 1 and 2 in total farm household incomes tends to increase over time.

We find that off-farm income has a lesser and rather stable impact on farm household income inequality, while the major change involves an increase in the importance of subsidies from Pillar 2 which is consistent with a policy of targeting farms in less favoured areas. Subsidies from Pillar 1 reduced, while market income increased farm household income inequality.

**Keywords:** *Farm employment, Family labor, Paid labor, Common Agricultural Policy subsidies, Regional labor market characteristics, wine sector*

## THE CLIMATIC RESERVE: A TOOL TO OPTIMIZE THE COMMERCIALIZATION OF WINE?

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Wine supply regulations exist in various countries. Their aim is to ensure the stability and quality of supply to face climatic hazards, changes in consumption patterns, and market variations. In France, several regions have set up a system of Interprofessional reserve (Abellan, 2020) which is similar to the Climatic Reserve. The objective of the Interprofessional reserve is to improve and stabilize the wine market by smoothing out the volumes yearly commercialized to avoid excessive variations (INAO, 2018).

In Switzerland, climatic shocks that affect viticulture are becoming more and more recurrent. For the canton of Vaud, hail (2013), drought (2015), frost (2017), or phytosanitary problems, like *Drosophila suzukii* in 2014, or downy mildew in 2016 and 2021 are recurrent problems affecting grape yields. In 2021, frost, downy mildew, and hail were combined, reducing the global achievement rate (produced quantity in comparison to the maximum authorized) of over 30% compared to the decennial average in the canton of Vaud. The only regulation tool of wine production is the yearly fixed quotas. These maximal limits of production were introduced initially to improve wine quality since quantity and quality are negatively correlated. The quotas are set at the level of the cantons within the regulatory federal maximal amount of grape depending on the wine category produced (AOC, country, and table wines). The instrument of quotas has an influence only on grape production. This influence is relative since the achievement rates for the most planted cultivar Chasselas in the canton of Vaud vary between 60% and 95% (from 2000 to 2018) depending on the climatic conditions of the year. Beyond the wine quotas, Vaud wines, and more generally Swiss wines, do not have a system for regulating the supply of wine. When wine production falls (due to climatic hazards, for example), this has a negative impact on the share of Swiss wines. In fact, from a statistical point of view, the variation of the level of the harvest explains 37% of the variation of the market share of Swiss wines (Mondoux et al. 2021; OFAG, 2021).

The introduction of a Climatic Reserve for AOC wines implies the possibility of harvesting a quantity of grapes whose commercialization in wine would be delayed until it is approved by the relevant authority (Interprofessional organization, for example). Regarding the functioning of this reserve, the total quantities placed in the Climatic Reserve should not exceed a certain amount (for example, the cumulated Climatic Reserve should not exceed 0.4kg/m<sup>2</sup> for the grape variety Chasselas). The reserve would function on the principle of rolling stock; each year the climatic reserved quantity would be replaced by an identical quantity of the new vintage. Therefore, the Climatic Reserve could be stored as AOC non-immediately marketable wine. The responsibility of the reserve's storage would lie with the first wine producer who cellared it at the harvest.

By taking the data from 2000 to 2018 (production, stocks, consumption, prices) and simulating the introduction of a Climatic Reserve, it has been possible to simulate its effect on the global market of the cultivar Chasselas in the canton of Vaud, the second-largest viticulture area of Switzerland (3'780 ha among them 2250 ha of *V. vinifera* cv. Chasselas).

The simulation is divided into four steps. Depending on the yield and of the level of the stocked wines, it is determined if in the different years analyzed the constitution or the liberation of the reserved wines occur.

In a second step, the vector autoregressive (VAR) is used to estimate the influence of the previous consumptions and productions on the current consumption (Mondoux, 2018). The Ordinary Least Square method (OLS) between the consumption at the time “t”, the past consumptions (t-1; t-2; etc.) and the past productions (t-1; t-2; etc.) shows the link between these two variables and its following retroactive values. The third step aims to link consumption and final prices. The econometric model representing a linear regression (OLS method) on time series data (observation of a variable over time) allows estimating the price elasticity with data from the retail market (Mondoux, 2018). At last, the turnover is calculated to give a clear overview of the impact of the Climatic Reserve on the market.

According to simulations carried out at the level of the canton of Vaud in Switzerland (2000–2018), the increase in consumption linked to the release of the Climatic Reserve would be between 2 and 10 million liters per analyzed region. Over the period analyzed, it is possible to observe a turnover increase for the AOC Vaud wine regions between 1.2% and 3.3% for the grape variety Chasselas.

The Climatic Reserve could be complementary to the existing (production) quotas system, which does not have a significant influence on the quantities sold. This tool could make it possible to avoid exceptional and costly federal market regulation measures such as wine downgrading (2013 and 2020), to overcome supply variations due to climatic hazards, pests, and diseases.

Two specific particular characteristics of the Swiss wine market can lead to difficulties in integrating a regulation process of the wine offer to smooth the impact of climatic hazards on the market. The first is the monopolistic competition characteristic of the Swiss wine market which reduces the impact of a global solution since the products are highly differentiated. The second is the fragmentation of the Swiss wine market with six wine regions, 63 different AOCs wines over 15'000 ha, a confederation of 26 politically independent cantons, and a highly differentiated production in terms of grape varieties. This fragmentation makes it difficult for Swiss wines to have a clear identity on the market compared to foreign wines. This identity is also weakened by the possibility of blending to ensure a sufficient amount of similar wines on the market.

**Keywords:** *Wine economics, wine market, econometric simulation, supply management*

### **Acknowledgements:**

This research is supported by the Etat de Vaud through the Direction générale de l'agriculture, de la viticulture et des affaires vétérinaires (DGAV).

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# THE SUPPLY GOVERNANCE OF APPELLATIONS: THE CASE OF PROSECCO

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The wine market is highly regulated, especially in European Union (EU). Wine regulations include a wine set of measures aimed at controlling consumption (excise duties), production (planting rights, distillation, minimum price, storage subsidies), trade (import tariffs), wine quality (restrictions on vine varieties, production area/terroir, vine density, vine practices, grape harvesting, yields, enological practices, additives, ageing, etc.) and on labelling (Meloni et. al., 2019).

The Eu wine quality regulations are centered on the "*appellation*" system, firstly introduced in France in 1935, and recognized by EU in 2008 as the geographical indications (GIs) linking wines to their terroir (Alston and Gaeta, 2021; Meloni et. al., 2019). Since 1970, the history of wine regulations in UE has been drawn by the (Common Market Organization (CMO) of wine. The wine CMO has been reformed (1976, 1987, 1999, 2008) over time according to the policy priorities such as containing the excess supply or to a change in the thinking of policy makers about the performance of some regulations (eg. distillation) or as a response of market wine evolution.

The appellation system is older than CMO regulations. Originally, an appellation established standards in the vineyard and wine processing to enhance the collective reputation of wine-growers of their terroir. The core of appellation system is a set of regulations fixed in the "book of production rules" (*chaier des charge* in France, *disciplinare di produzione* in Italy).

The EU appellations were studied through different approaches. First, the economics of GIs has been investigated as the quality level provided to consumers overcoming information asymmetry or the "lemons" market failure as a result of regulating production (Moschini et al., 2008; Meloni et al., 2019; Alston and Gaeta, 2021). However, positive consumer welfare effects generated by the appellation are reached when enhanced demand effects (better quality) are greater than reduced consumer surplus (high prices) produced by supply restrictions (Mérel and Sexton, 2011). Second, the size of appellation which affects the social welfare. The social optimal appellation size is complex to be defined as it is a balance between consumer effects such as having a greater output but a lower quality and effects accruing to producers (existing and new ones) and overall Gi's costs (eg. monitoring or marketing costs) as well (Deconinck and Swinnen, 2014; Meloni et al., 2019). The political appellation size may not match the social optimal size because of lobbying forces strongly driven by producers (Landi and Stefani, 2015). The proliferation of appellations is topic of interest. Broader appellations are associated with low price wines while narrower (sub)appellations signal high price wines. However, the increase of appellations or (sub)appellations may lead to the "overfishing" problem as reported by Livat et al. 2018, where the appellation does not serve as a signal for quality.

Italy reports 526 appellations (Italian wine quality system: 76 "*Denominazione di Origine Controllata e Garantita, Docg*", 332 "*Denominazione di Origine Controllata, Doc*" and 118 "*Indicazione Geografica Tipica, Igt*"). These appellations cover 72% of viticulture area and generate 82% of the value. The management of appellations is complex task because of wide management activities and interactions among overlapping

appellations. In Italy, the appellations are managed by Consortia, an inter-branch organization of wine-growers, winemakers and bottlers, acknowledged by EU as interprofessional organization. Consortia having high representativeness (as producers and volumes) are entrusted to manage the appellation and to exert the so called "*erga omnes*" (producers' contribution to the Consortium expenses are mandatory, regardless their membership to the Consortium). The Italian regulation over wine sector (law n. 238, 12 December 2016) reinforces the power of Consortia on the supply governance by: i) creating grape harvest surplus (blocage/déblocage); ii) reducing yields or downgrading the wine quality; iii) acting on the viticultural land register (stop in expanding appellation area, temporary/permanent enlargement of the appellation surface); iv) creating a wine stock or reserve (blocage/déblocage).

The short term activities on supply governance such as ones in i), ii) and iv) are aimed at increasing or decreasing the supply according to the vintage (yields variability) and demand forecasts. The actions iii) on the appellation area produce long term supply effects then affect new plantings.

Our case study is the Prosecco appellation which is managed by three Consortia: Conegliano-Valdobbiadene Prosecco Superiore Docg, Asolo Prosecco Superiore Docg and Prosecco Doc. The Prosecco Docg is produced in hilly areas (higher quality) while Prosecco Doc is mainly cultivated in valleys. The Prosecco Doc appellation area is around 24.500 hectares encompassing the area of both Prosecco Docg (around 9.200 hectares). Approximately, the Prosecco Doc Consortium manages 11.600 wine-growers, 1.100 wineries and 340 sparkling companies. Since its establishment in 2009, the Prosecco Doc Consortium has worked actively on the supply governance because the demand, especially the foreign one, has strongly increased over time. However, this task was non easy because the magnitude of production (around 620 millions bottles in 2021) and positive or negative effects coming from the management of the Docg appellations.

The aim of this paper is twofold. First, we want to evaluate the social effects of measures adopted by Prosecco Doc Consortium on the supply to maintain the market equilibrium as change in consumer surplus and producers profits. Second, to assess how interactions among the Prosecco Consortia can affect the supply management.

Methodologically, the effect of supply restriction are investigated both theoretically and empirically by building a system dynamics model which parameters such as elasticities are estimated through a preliminary analysis on supply and consumption in Italy and main importing countries (United States, Great Britain, Germany and France).

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## Parallel Sessions XI - Trade

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# GOOGLE TRENDS AND INTERNATIONAL TRADE IN WINE

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## Abstract

In this project we investigate the use of Google Trends (GT) as a tool to empirically investigate and forecast international trade. We use data on international trade in wine to estimate different gravity equations 'augmented' with GT data to check its predictive power.

## Literature

GT is a Google tool, free to use, that reports the most popular terms searched in the recent past (data collection for GT started in 2004). Indeed, "it provides access to a sample of actual search requests made to Google, allowing one to look into the interest in a particular topic from around the globe or down to city-level geography" (Medeiros and Pires, 2021: 2).

After the early seminal papers on "forecasting the present or 'nowcasting'" (see, e.g., Choi and Varian, 2012, which reports probably the most elaborate and cited discussion of GT predictive qualities), several studies from different research areas have used GT to improve forecast accuracy. Thompson Reuters Web of Science and PubMed jointly recorded about 900 papers that used Google Trends or discussed its use in science since 2010 (Puhr and Mullner, 2021). The diversity of disciplines using GT is remarkable as well. The majority of papers and the earliest applications are in the field of public health, in particularly epidemiology, where GT has been used to study patient behavior/symptoms and to track the spread of viral pandemics, such as Covid-19, Ebola, and Flu (see, e.g., Nuti, Wayda, Ranasinghe, Wang, Dreyer, Chen, & Murugiah, 2014).

Later, economists joined as well and started to use search volume data to predict macro-economic variables, such as private consumption (Vosen & Schmidt, 2011), trade (Ma & Fang, 2021), unemployment, inflation, exchange rates, macroeconomic uncertainty (Castenuovo and Tran, 2017). Economists use GT to analyze also micro-economic phenomena, such as stock prices and their volatilities (see, e.g., 2020, Petropoulos, Siakoulis, Stavroulakis, Lazaris, & Vlachogiannakis, 2021) and trading behavior (Preis, Moat, & Stanley, 2013). Recently, Cziraki, Mondria, and Wu (2021) have used data from Google Trends as a measure of stock market investor attention. In these settings GT has proven valuable as a forward-looking market side measure of expectations with high predictive quality.

Other research applies GT to traditional social science topics like environmental awareness, gender attitudes (Corbi & Picchetti, 2020), religiosity, sexual behavior, suicide, or crime. In tourism, GT is used to predict travel activity (see, e.g., Law, Li, Fong, & Han, 2019). In political science, scholars use GT for polling (Mavragani & Tsagarakis, 2016) and to measure issue salience (Mellon, 2013) and public opinion (Gruszczynski, 2019). Moreover, GT is used to create indices of socio-economic uncertainty (Bontempi, Frigeri, Golinelli, & Squadrani, 2021). In sports research (and practice) GT is used to measure player/team performance/value (see, e.g., Gift, 2020) and in meteorology to study extreme weather phenomena (see, e.g., Kam, Stowers, & Kim, 2019).

While business scholars have employed GT to study technology adoption (Jun, Yeom, & Son, 2014) or advertising (Du, Hu, & Damangir, 2015, Hu, Du, & Damangir, 2014), few social scientists have used it to study firms' internationalization or the like. To the best of our knowledge, the first application of GT data in

the fields of strategy or international business is a recent working paper (Puhr and Mullner, 2021), which uses GT data to study the moderating effect of internationalization on the sensitivity of stock prices during the Covid-19 pandemic. According to the authors, “the results of the study highlight that Google Trends measures of firm internationalization yield similar results as traditional internationalization measures used in International Business” (Puhr and Mullner, 2021: p. 4)

In international trade, to the best of our knowledge only two studies have used GT. Böhme, Gröger and Stöhr (J. Dev. Econ., 2020) show how geo-referenced online search data can be used to measure migration intentions in origin countries and to predict bilateral migration flows. Their approach provides strong additional predictive power for international migration flows when compared to reference models from the migration and trade literature. Moreover, their measures outperform any of the established predictors of migration flows in terms of predictive power.

Ma and Fang (Appl. Econ., 2021) analyze how online search, proxied by GT data, affects international trade in an otherwise classic gravity model. Their results show that online search intensity between two countries can significantly promote international trade. The analysis of possible mechanisms shows that online search is likely to increase trade by overcoming unfamiliarity and reducing trade risks. Since the role of online search is similar to that of traditional networks, they conduct extended analysis and find that online search is likely to substitute, rather than complement, migration networks in international trade.

### **Methods and wine application**

As explained in Castelnovo and Tran (2017), Puhr and Mullner (2021), and Berger et al. (2021), GT provides the frequency in which a particular term is searched for in several languages from various regions of the world. Google normalizes the search data to make comparisons between terms easier. This means that search results are normalized to the time and location of a query by the following process. First, each data point is divided by the total searches of the location and time range chosen by the user. Then, the resulting numbers are scaled from 0 to 100 based on the topic's proportion to all searches on all topics. By doing so, Google Trends data represent the relative popularity. This feature avoids the situation where places with the most search volume would always be ranked the highest. All these Google Trends features described above are widely known by most of its users.

The idea we investigate in this paper is whether a certain set of words associated to a specific wine can be used to show consumption intentions by consumers in different countries. If searches are indeed correlated to consumption, then those same terms may be used to forecast trade of those wines in the countries investigated. We thus propose and investigate several measures for wines searches in different countries. Therefore, we estimate a ‘standard’ gravity equation where - among other explanatory variables such as distance, GDP, population, measures of trade costs, etc. - we have a proxy for the degree of consumers’ interest in specific wines in the destination markets. We thus show to what extent these Google Trends measures can be used as a supplement to corroborate results from traditional gravity estimations. To conclude, and as a significant application, we use our methodology to explain the Prosecco success in international markets.

**Keywords:** *Google Trends; international trade; gravity equations; wines.*

## A PANEL DATA SPATIAL GRAVITY MODEL FOR INTERNATIONAL WINE TRADE IN THE EU (1999-2019)

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In recent years, globalization and integration processes enhanced interdependence relations between countries, with emphasis on competitiveness in the international markets. Particularly, competitive advantages have been exploited by countries and international trade flows have become crucial. The evolution and the determinants of international trade have been extensively studied in the economic literature, mainly with the development and application of the gravity model, originally introduced by Tinbergen (1962). Generically, in this model, the trade flows between two partners are positively dependent on its market size (mass) and negatively dependent on its physical distance. Further extensions of the model allowed to the inclusion of additional explanatory variables, such as population, resource allocation, trade agreements, common language sharing, exchange rate, non-tariff barriers, common border sharing, among others (Anderson & van Wincoop, 2004; McCallum, 1995; Silva & Tenreyro, 2006).

The removal of barriers to international trade improves geographical, economical, and political closeness between member-states, providing greater opportunities for spatial spillovers between member-states. Spatial spillovers are tied to the externalities of closeness between trade partners and can influence and determine how international trade evolves (Fujita et al., 1999). Thus, spatial econometrics methods have gained popularity, with the development of spatial autoregressive models that includes spatial lag variables of the neighborhood effects (LeSage & Pace, 2008).

Wine is a product with strong specialization and openness to international trade. The European Union (EU) is simultaneously the largest producer and exporter region in the world. According to the Eurostat, in 2019, the production within the EU generated 7.1 billion liters of wine. Additionally, the majority of exports of wine of the member-states (57%) is exported to intra-EU countries. Apart from the volume and relevance for the EU trade, wine is also a good example of a good which is particularly dependent on location, being the region of origin one of the most prominent determinants of competitiveness of wine. Altogether, these characteristics make wine a good case-study for international trade flows in the EU.

Therefore, the main goal of this paper is to assess the existence of spatial spillovers in international wine trade flows and its determinants in the EU. Particularly, this research focuses on the evolution of international wine trade flows and the relation of proximity between trade partners. Thus, two main research questions arise: (1) what are the main determinants of wine trade flows in the free-market of the EU; and (2) does proximity between trade partners generate spatial spillovers?

To analyze international wine trade flows, this research extends the traditional panel data gravity model for international trade with the inclusion of spatial lag variables typically used in spatial econometrics (LeSage, 2018). These variables are computed taking into account the value of trade flows and the physical distance between partners. The presence of spatial dependence is then assessed through the significance of spatially related parameters in the model. As pointed by LeSage and Pace (2008), spatial dependence may occur in the origin (proximity to the exporter country), in the destination (proximity to importer countries), or in a combined form (both cases simultaneously). In this research, we study these forms of spatial dependence, to evaluate how spatial spillovers occur to its full extent.

This paper uses annual data for all the EU countries, from 1999 to 2019, which was the longest time period with available data. Annual wine exports for each country-pair is the dependent variable, whereas as explanatory variables, the full model includes GDP per capita of the importer, to proxy the purchasing power of the buyer partner; the distance (in kilometers) weighted by the trade openness; the cost of transportation *per* unit (i.e., per bottle); the existence of common borders between the pair of trade partners; the existence of a common language; the year of entrance in the EU (annual dummies for 2004, 2007 and 2013); a dummy variable for the presence in the Euro (common currency dummy) and two spatial lag variables measuring the proximity effects to the exporter and the importer.

Generically, the panel data spatial gravity model for international wine trade may be defined as follows:

$$\ln T_{ijt} = \beta_0 + \rho W_{ij} T_{ijt} + \beta_1 \ln Y_{jt} + \beta_2 \ln D_{ij} + \beta_4 \ln X_{ijt} + u_{ijt} \quad (1)$$

where  $T_{ijt}$  is the wine trade exports from the country  $i$  to the country  $j$  in the year  $t$ ,  $\rho W_{ij}$  denotes the spatial lag variables and the associated parameters (whose significance determines the existence of spatial dependence between the pair of countries),  $Y_{jt}$  is the GDP *per capita* of the importer,  $D_{ij}$  refers to the distance between the trade partners and  $X_{ijt}$  denotes the other bilateral variables previously explained.

The results of the econometric estimation suggest (as expected in a gravity model) that GDP *per capita*, the existence of common factors such as common border or common currency positively impact the trade flow between the pair of countries. Conversely, the distance is impacting negatively the wine trade flows. Entering in the EU promotes the wine exports of a country, thus revealing positive effects of economic integration. Spatial dependence is also identified in this research. The spatial lag variables of proximity to the exporter and proximity to the importer denote statistically significant results. However, their signals (and interpretations) are quite different. On one hand, the proximity to the exporter is identified as positive driver of wine trade flows. This means that trade between neighbor countries is facilitated by proximity reasons and it there are spillovers caused by the proximity between the partners. However, these spillovers do not occur in importer countries since the proximity to importer has a negative sign. This is to say that a wine trade flow from  $i$  to  $j$  does not generate spillovers to other countries neighboring  $j$ .

Overall, the findings highlight the main determinants of international wine trade. It is shown that wine is a good example of an international competitive good, and its international trade is ruled by the typical factors of international trade (size, distance and common factors). Finally, this research reveals evidence for existing spatial spillovers in both the origin and the destination. This is to say that proximity to the country of origin enhances the flow between a pair of partners, and conversely, proximity to the country of destination hinders trade flows to the neighbor countries.

**Keywords:** *Wine trade; Spillover effects; Spatial gravity model; European Union.*

### Acknowledgements:

This research is supported by FEDER – Interreg SUDOE project SOE3/P2/F0917, VINCI – Wine, Innovation and International Competitiveness, and the FCT – Portuguese Foundation for Science and Technology, project UIDB/SOC/04011/2020.

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# HOW FAR APART ARE THE TASTES OF THAT FAR COUNTRY? SOME DETERMINANTS OF THE DIFFERENCES IN WILLINGNESS TO PAY FOR THE DIFFERENT ATTRIBUTES OF SPANISH WINES IN DIFFERENT INTERNATIONAL MARKETS

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Spain is the first wine exporting country in the world, although it mostly exports bulk table wine. However, in the last twenty years, quality Spanish wines (protected wines) have been gaining importance and international prestige. The purpose of this paper is to determine to what extent the attributes of protected Spanish wines are valued differently in different international markets and identify the possible explanatory reasons behind it.

With this aim in mind, we have estimated hedonic price functions for 26 countries (including Spain) incorporating 17 groups of attributes —wine features; evaluation of wines, wineries and appellations by international critics; and economic environment—. The usual multicollinearity problems are solved by implementing a procedure where all the possible combinations of the 17 groups of identified attributes are alternately included in the price function, which leads to the estimation of more than 130,000 specifications for each of the markets. This allows the identification of the parameters using an internal meta-regression methodology that, in this first stage, is applied independently for each country.

Once the corrected average values are obtained through the meta-regression analysis for each of the considered countries, it is possible to identify behaviour patterns among the 26 selected markets. Three groups of countries are determined by the similarity in their tastes in relation to Spanish wines, derived from a grouping procedure that combines the cluster and the optimal scaling methodologies.

Next, using the results of all the estimates and all the markets together, it is possible to introduce differential aspects between countries with the aim of explaining the observed differences in the propensities to pay previously obtained. Among the candidates are three types of distances: physical distance, cultural distance and that related to the world of wine.

Therefore, alternative measures are used to approximate physical distance: the weighted physical distance obtained from CEPII, a measure of transportation cost obtained from all the UPS transportation rates.

To calculate the cultural distance, we use the joint database of the World Values Survey and the European Values Study for the period 2017-2020. Finally, we include a distance indicator based on production and consumption patterns between each of these markets and Spain.

The results obtained in this second part of the analysis show the importance of physical and cultural distances, especially those that refer to similar lifestyles. The specific distance in terms of production and consumption of wine also shows a relevant effect, perhaps of less intensity than previous ones.

**Keywords:** *Hedonic price functions, Willingness to pay in different markets, grouping countries, Spanish wine.*

# ENVIRONMENTAL DYNAMICS IN THE INTERNATIONAL TRADE OF SPANISH WINE DENOMINATIONS OF ORIGIN

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## Introduction

The international wine market is characterized by presenting very pronounced competitiveness, being in constant growth and evolution, where each producing country designs strategies to position itself in foreign markets; and all of this combining in an attempt to achieve a sustainable balance, in a context increasingly committed to the environment and where more demanding consumers penalizes those products that do not show environmental awareness. Thus, the wine sector, in Spain, has been taking measures to adapt and/or mitigate the environmental effects of this trade on nature, and one of those measures is the calculation of the carbon footprint. The objective of reducing the carbon footprint in viticulture and transport is not only part of the fight against climate change and the reduction of greenhouse gases, but it also represents an opportunity for the added value that entails a policy of cost savings and energy earnings; in addition to allowing wineries to gain market share and differentiate themselves from their competition.

In Spain, although, the calculation of the footprint is voluntary, it is more and more frequent the development of market environmentally responsible wines, so as not to see their presence in markets limited by not complying with their environmental standards, and finally to be co-responsible in the fight against climate change that concerns us all. In addition, the position and characterization of Spanish wine in international markets make sustainability of transcendental importance. Spain, in 2021, led the global growth in volume and consolidated itself as the world's leading exporter of wine, with 2,342.7 million liters; representing 36% of the in bulk wine exported in the world, becoming the world's second-largest supplier of bag-in-box wine, and in terms of packaged wine, it grew above the French and Italian wines in volume (OEMV, 2022).

Based on all the above, the objective of this research is to study whether the measures adopted by the appellations of origin in their fight against climate change are reflected in the reduction of the carbon footprint derived from exports, analyzed from the destinations, formats, segmentation and the effect of the differential elasticities they present.

## Methodology

To achieve this objective, an econometric model of Autoregressive Vectors, VAR, will be specified, where the temporary units go from 2008 to 2019 and the transversal ones are seven Denominations of Origin, with a prominent presence in the international trade, which are: Cava, Catalonia, Cariñena, La Mancha, Jumilla, Rioja, and Utiel-Requena. The VAR will measure the environmental feedback mechanisms between export price elasticity and carbon footprint; to establish dynamic relationships in the period 2008-2019. Its mathematical formulation is:

$$Y_t = A_1 Y_{t-1} + \dots + A_p Y_{t-p} + B_t x_t + e_t$$

where  $Y_t$  is a vector of  $k$  endogenous variables, carbon footprint, and export price elasticity,  $x_t$  is a vector of exogenous variables where specificities of origin and destination of wine will be considered,  $A$  and  $B$  are the matrices of the coefficients to be estimated and  $e_t$  is a vector of innovation. The study will be completed by

estimating the dynamic characteristics of the model through the impulse response functions and the decomposition of the variance of the error to identify, the sign of the relationship between both variables.

The results of the preliminary estimate (Table 1) show that exports are correlated with a decrease in the carbon footprint. This is indicative of the wine sector's commitment to the environment; however, the evolution of the footprint does not significantly mark the dynamics of exports. Finally, the most elastic exported wines contribute more to the reduction of the footprint, probably because they face a market with many competitors, where the environmental vector makes its way as a differential element in competitiveness.

Table 1. Var Estimate (1)

VAR system, delay order 1					
Log-likelihood = 10.308217					
Determinant of the covariance matrix = 0.0018694335					
AIC = -0.2534					
BIC = 0.0159					
HQC = -0.1616					
Portmanteau Contrast: LB(8) = 79.8643, gl = 28 [0.0000]					
Equation 1: Nfootprint					
	<i>Coefficient</i>	<i>Stand.Dev.</i>	<i>Statistic t</i>	<i>P value</i>	
const	0.448681	0.148981	3.012	0.0051	***
Nfootprint_1	-0.416468	0.163228	-2.551	0.0159	**
NElasticity_1	-0.165439	0.435269	-2.3801	0.0065	**
Mean of dep. vble.	0.282641	D.T. of dep. vble.		0.366119	
Sum of squared of residues	3.647907	D.T. of regression		0.343037	
R-squared	0.175318	R-squared corrected		0.122113	
F(2, 31)	3.295133	P value (of F)		0.050401	
rho	-0.300463	Durbin-Watson		2.579276	
Zero-constraint F contrasts:					
All Nfootprint delays F(1, 31) = 6.5099 [0.0159]					
All NElasticity_1 delays F(1, 31) = 0.14446 [0.7065]					
Equation 2: NElasticity					
	<i>Coefficient</i>	<i>Stand.Dev.</i>	<i>Statistic t</i>	<i>P value</i>	
const	0.270416	0.0601196	4.498	<0.0001	***
Nfootprint_1	0.0862226	0.0658689	1.309	0.2002	
NElasticity_1	-0.000894552	0.175648	-0.005093	0.9960	
Mean of dep. vble.	0.294527	D.T. of dep. vble.		0.137833	
Sum of squared of residues	0.594037	D.T. of regression		0.138429	
R-squared	0.052466	R-squared corrected		-0.008666	
F(2, 31)	0.858245	P value (of F)		0.433733	
rho	-0.005419	Durbin-Watson		2.010497	
Zero-constraint F contrasts:					
All Nfootprint delays F(1, 31) = 1.7135 [0.2002]					
All NElasticity_1 delays F(1, 31) = 2.5937e-005 [0.9960]					

**Keywords:** *carbon footprint, export elasticity, appellations of origin*

This research is carried out within the framework of the financing of the ERDF-SUDOE Project "VINCI" (SOE/P2/F0917).

## Parallel Sessions XII - Sustainability

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# CONSUMERS WILLINGNESS TO PAY FOR ORGANIC WINE CERTIFICATION, HALO EFFECTS AND PREMIUM FOR BIODIVERSITY CLAIMS

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## Introduction

Enhancing biodiversity is often cited as a positive externality of organic certification in agriculture. This demonstrated by numerous studies in the agronomic literature (see Karimi et al., 2020, for a recent meta-analysis), although this criterion is not explicitly included in the specifications of organic farming. Nevertheless, some strategic farm decisions or cultivation methods (see for instance Bruggisser et al., 2010, or Winter et al., 2018) can lead to the reversal of these positive trends. It is not uncommon for certified organic products do not meet societal expectations. At the market level, this inconvenience could then lead to a questioning of certification, which would result in a loss of consumer willingness to pay. In contrast, a biodiversity performance claim (through appropriate labelling) could reinforce the consumer desirability for certified products.

Based on an experiment carried out in the wine sector, this article proposes an analysis of the valorization of biodiversity on the markets, and of the implicit link with organic certification. We confirm that wine consumers value the respect for biodiversity and demonstrate the extent to which this evaluation is inherent in certification. The results of our experiment show in particular how a lack of biodiversity performance might offset the gains obtained with the organic claim. We show how this type of result cannot be dissociated from the 'primary' valuation of the product, which is often based solely on its organoleptic attributes.

## Methodology

From a methodological point of view, the originality of our experimental design is that it is based on a pluridisciplinary research team that combines work in ecology, oenology and experimental economics. In the field of ecology, we have been able to use a unique system to categorise winegrowing enterprises in the Bordeaux vineyards, obtaining precise measurements of biodiversity performance, namely at the level of the soil, flora, birds and pollinators. On these four compartments, Simpson's indicator (1949) could be measured on the selected vineyards, which allowed us to construct a global indicator that we call "Biodiv-Score", and whose results could reasonably and easily be understood by consumers. Four wines from the same wine-growing micro-region were then selected and proposed to a panel of more than three hundred consumers. Three of them were organic, but with very different performances in terms of biodiversity,

comparable to the conventional wine selected or, on the contrary, far below (from the perspective of the Biodiv-Score level). An 'expert' assessment also allowed us to propose a hedonic score indicating the organoleptic quality of each wine, as well as a description of its organoleptic characteristics. Consumers were then asked to evaluate these wines according to an experimental economics protocol with increasing information (for example, according to Pérès et al., 2020; Tempere et al., 2019), consisting in obtaining the revelation of the willingness to pay (WTP) for each wine. Starting from a simple hedonic assessment (WTP revealed only from knowledge of the production region and the hedonic score of each wine), consumers were invited to revise this initial assessment, in the knowledge of the results of the Biodiv-Score and the organic certification when the latter is effective.

## Results

The influence of the Biodiv-Score and the organic certification on the WTP allowed us to confirm the results stated above. According to our experiment, an excellent Biodiv-Score increases the value of a wine by 12% of the entire population, and by 53% of the most demanding ones. This also allowed us to measure the halo effects of organic certification which, to our knowledge, in the literature (Apaolaza et al., 2017; Mollá-Bauzá et al., 2005; Stolz & Schmid, 2008), have been exclusively considered in the light of the qualitative aspects of the products (we imagine that organic wine tastes better) or sanitary aspects (organic wine is considered healthier than a conventional wine). Biodiversity does not seem to have been the subject of any studies on the subject, whereas, according to a survey conducted before our experimental market, more than 80% of the consumers recruited considered that the BIO-Biodiversity correlation was self-evident! This result is also confirmed here in terms of WTP. On the one hand, consumers value a wine in the same way if they know it is organic with an excellent Biodiv-Score, or if they only know about the organic certification. On the other hand, a low Biodiv-Score for an organic wine is severely punished by the market. This effect is particularly strong when the wine is initially better valued from a sensory point of view, as if a 'good wine' was not forgiven for not being good in all aspects.

We conclude this article by discussing the risks of market disengagement if the halo effects on biodiversity are not assumed by organic certification. We conclude more generally on the need to integrate purely environmental performance if we want to ensure the development of this certification on a large scale.

**Keywords:** *Willingness-to-Pay (WTP), halo effect, organic wine, biodiversity*

## Acknowledgements:

The authors acknowledge the support of the French National Research Agency (ANR) under the grant 20-PCPA-0010 (PPR Vitae).

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# THE REGIONAL IMPACT OF CLIMATE CHANGE AND IRRIGATION ON GRAPE YIELDS IN SOUTH AFRICA. A HEDONIC APPROACH BASED ON MACHINE LEARNING.

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## **Context: Climate Change and Yields in the South African Wine Industry**

South Africa has been identified as being one of the vulnerable regions with low capacity to respond to climate change (Benhin, 2006), which has a particular importance for agricultural production. For South African vineyards climate change is said to lead to warmer and drier conditions by 2050 and to heat wave periods which can have an important impact on the quantity and quality of grapes and the styles of wine (Ashenfelter, 2008; Conradie et al., 2002; Bonnardot et al., 2005; White et al., 2006; Deloire et al., 2009, 2010; Vink et al, 2012). But not only climate change, but as well vintage-to-vintage variations of weather can impact on grape and wine production (Jones, 2007), so that the tremendous weather differences between coastal and inland mountain wine areas in South Africa (Midgley et al., 2015) are supposed to have respective advantages and disadvantages for the growing of certain grape varieties with irrigation, being an important instrument to influence grape yields.

## **Research Question:**

We want to analyze to what extent the growing of specific grapes and wine production in South Africa is threatened by changing weather conditions and how this translates into grape yields.

We develop a climate model which allows to predict the impact of several weather variables, such as a long-run increase in temperature or decreasing precipitation, on grape yields and assume, that grape varieties cope differently with specific weather conditions and that weather changes affect each region (growing certain grape varieties) differently as well based on respective weather preconditions.

We as well ask for the effect of irrigation on the quantity of yields of different grape varieties in different regions, as irrigation is a key instrument to compensate water deficits.

## **Literature Review**

There are only a few studies dealing with the impact of climate on crop yields (quantities) including grapes. These studies directly estimate the effects of weather variables on different crop yields and add a trend variable to capture changing management practices or technologies, and mostly apply a hedonic approach. The results of these studies are contradictory. While Adams, Wu, and Houston (2003), applying daily maximum temperatures and rainfall over the growing season, suggest an increase in grape yields, Lobell et al. (2006) including additionally minimum night temperatures, suggest a decrease in yields. Both studies assume non-linear effects of temperature on crop yields and focus on California. Niklas (2017), as well applying a hedonic approach, finds, that rising average temperatures increase total output and output shares of wine in higher German quality categories.

Jones et al. (2005) and Schultz (2000) stress, that the increase in the frequency and intensity of weather extremes will lead to higher inter-annual variability of yields.

There is hardly any quantitative analysis on the impact of climate change or weather changes on South African wine production, even if Midgley et al. (2005) found significant warming trends for minimum and maximum temperatures at 12 weather stations for the period 1967-2000 and Bonnardot and Carey found (2008) a significant increase in annual temperatures for the period 1942-2006 for South African wine regions. Vink et al. (2012) suggest that climate change has an impact on the diversity of the South African wine industry and Conradie et al. (2002); Bonnardot et al. (2005); White et al. (2006); and Deloire et al. (2009, 2010) as well suggest changing wine styles, but there is no focus on specific regions or grape varieties.

Regarding the impact of irrigation, there are hardly any economic studies, but more enological studies, which focus on grape quality and suggest, that the effect of irrigation differs depending on for example irrigation type, soil, or the age of vines (Acevedo-Opazo et al., 2010; Keller, 2010).

### **Theoretical approach**

According to the production function approach, grape output in region  $i$  and year  $t$  ( $y_{it}$ ) for each grape variety is produced, combining labor ( $L$ ), physical capital ( $K$ ) and land ( $G$ ) based on a given technology ( $A$ ).

The level of technology is assumed to be similar for all grape producers and the capital stock ( $K$ ) and the amount of labor ( $L$ ) per ha is assumed not to vary among grape producers for the different grape varieties and regions. Only the factor land ( $G$ ) is exposed to different weather conditions and the access to water and irrigation facilities varies and the age of the vines differs.

Hence we apply an hedonic approach to analyze the effect of changing weather and irrigation on grape yields. We use a parameter representing the percentage of irrigated land (%\_irrigation), different weather variables including temperature variables, precipitation and radiation in the winter, growing and harvest season, we take the different age of vines into account and include a trend variable to capture technology changes ( $A$ ) over time (equal for all producers) and leave out all other variables usually applied in a production function ( $K$ ,  $L$ ) for the reasons mentioned above.

### **Data**

For developing the model, we use daily weather data, taken from local weather stations covering the South African wine regions Breedekloof, LittleKaroo, Malmesbury, Olifants River, Orange River, Paarl, Robertson, Stellenbosch and Worcester and offered by the Agricultural Research Council.<sup>1</sup> Data on irrigation, including different kind of irrigation schemes, comes from VinPro.<sup>2</sup>

The data on yields and other control variables-comes from SA Wine Industry Information & Systems (SAWIS (2002-2018)). We focus on ten different grape varieties (five white and five red respectively) which are Chenin Blanc, Colombard, Sauvignon Blanc, Chardonnay, Semillon, Cabernet Sauvignon, Pinotage, Merlot, Shiraz and Ruby Cabernet and we cover the years 2001-2018.

### **Methodology/Data Analysis**

We apply artificial neural networks (Hornik, Stichcombe, 1990) to develop models for the selected grape varieties. A non-linear regression model is built, which uses a classic feed forward artificial neural network (ANN) algorithm (Witten, 2017; Hornik, 1990; Rumelhart, 1986) to generate the functional model between weather and irrigation variables, a trend variable and the age of the grapevine in relation to logarithmic yields.

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<sup>1</sup> The data came from the Agricultural Research Council, but not for free and it is not publicly available.

<sup>2</sup> VinPro is the association of wine producers, a non-profit company which represents 2 500 South African wine producers, cellars and industry stakeholders. Data is not for free and not publicly available.

An artificial neural network is a mathematical simulation of the biological nervous cell system and consists of many regression units, which are typically non-linear. These units are also known as perceptrons (Rosenblatt, 1958), neurons, or nodes in the literature and are organized in layers (Witten, 2017; Hornik, 1990; Rumelhart, 1986). Each layer is stacked on top of the other and all nodes of the underlying layer have a direct weighted link to each unit in the following layer. Several kinds of architecture exist, where the layers can be skipped or where there are feedback loops between previous layers (Witten, 2017). Feed forward networks, those without any feedback loops or recursions, typically have three kinds of layer types. The input layer type that takes the values of the independent variables as input, the hidden layer type that is responsible for the non-linear functional regression, and the output layer type that does the final transformation to the dependent variables. The equation (1) below describes the general form of the network architecture:

$$\ln(Y_i) = f_o \left( \sum_{k \rightarrow h} w_{kh} f_h \left( \sum_{j \rightarrow k} w_{jk} f_i \left( \sum_{i \rightarrow j} w_{ij} x_i \right) \right) \right), \quad (1)$$

where  $x_i$  is an independent variable,  $w$  is a weight for each connection between one node of a current layer and a node of a previous layer and is determined by the training algorithm. And  $f_i$  is the transfer function on the input layer,  $f_h$  is the transfer function of the hidden layer and  $f_o$  is the transfer function of the output layer. The transfer function in this case is the logistic sigmoidal function as described in (2).

$$f(x) = (1 + e^{-x})^{-1} \quad (2)$$

This results in ten different non-linear models, one for each grape variety. Each model consists of an input layer with ten independent variables (nodes), one hidden layer with two nodes and an output layer with one node, representing the dependent variable  $\log(\text{yield})$ .

Then we apply a sensitivity analysis on these models (Hashem, 1992; Rinke, 2015) to calculate the effect of an increase of an independent variable on the yield of each grape variety for each region (to cover regional fixed effects like soil type). The dependency matrix (Rinke, 2015) for the previously generated ANN model is calculated and derived from a sensitivity analyses of the ANN model originally presented by Hashem (1992) and further investigated by Yeh and Cheng (2010). It represents a normalized, accumulated Jacobi matrix (Rudin, 1976) over the observed data samples and expresses the relative importance of an independent variable with respect to the dependent variable of the ANN model. The dependency factor (Rinke, 2015) for each independent variable of the model with respect to the dependent variable is calculated separately by equation (3). Cheng (2010) calls this dependency factor the average linear importance factor.

$$DF(y(x)) = \sqrt{\frac{1}{n} \sum \left( \frac{\partial y}{\partial x} \right)^2} \quad (3)$$

where  $\frac{\partial y}{\partial x}$  represents the partial derivative of the function  $y(x)$ , and “n” the number of samples.

In addition to the dependency factors, the semi-elasticity  $\varepsilon$  of  $y(x)$  (Owen, 2012) is examined. As a log-linear specification between the log-price and an independent variable  $x$  is used, a change of one unit of  $x$  results in a change of  $y$  by  $100 \times (\exp(\varepsilon) - 1)$  percent. For small values, however,  $\varepsilon$  can be interpreted as semi-elasticity, meaning that a one-unit change in  $x$  results in a  $\varepsilon \times 100$  percent change in  $y$ .<sup>1</sup> The semi-elasticity following equation (4) and the average semi-elasticity following equations (5) are calculated.

$$\varepsilon_{y,x} = \frac{\partial y}{\partial x} \frac{x}{y} \quad (4)$$

$$\overline{\varepsilon_{y,x}} = \frac{1}{n} \sum_{i=1..n} \varepsilon_{y,x_i}, \quad (5)$$

for  $n$  observations

<sup>1</sup> See Greene (2008) for a more detailed discussion.

Finally the average semi-elasticity for each independent variable of the model with respect to the dependent variable is calculated separately for each region and grape variety.

## Results

Our results suggest, that advantageous weather conditions differ for white and red grape varieties in general, but as well for each single grape variety, so that matching of these advantageous weather conditions with South African growing regions shows, that each region has a comparative advantage of growing certain grape varieties.

The share of irrigated land shows a generally strong effect on yields for all grape varieties. The average yield/ha increases between 0.28% (for Shiraz) up to even 5.02% (for Semillon) with rising shares of irrigated land. When examining the impact of irrigation on the yields of specific grape varieties, interesting regional differences can be observed for some grape varieties. As an example, while the effect of irrigation for Shiraz (+0.28%) or Pinotage (+4.63%) is almost the same for all regions, the effect of increasing irrigation of Colombard is much higher in Stellenbosch (+10.64%) than in Breedekloof. (+1.82%) or the effect of increasing irrigation of Sauvignon Blanc is even negative in Paarl (-0.49%), but positive for Little Karoo (+3.11%).

Rising temperatures in the growing season only have on average a positive effect on Shiraz, a slightly positive effect on Pinotage and Colombard, but a negative or close to zero effect on all other grape varieties. The same holds for rising harvest temperatures, with a slightly positive effect only on Chardonnay. This is in line with the literature, which sees a challenging effect of rising temperatures and heat waves, which emphasizes the importance of irrigation for the South African Wine industry and a targeted use of scarce water resources.

**Keywords:** *Wine production, Grape yields, South Africa, Climate Change, Irrigation, Machine Learning*

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# GEOGRAPHICAL INDICATIONS AS VECTORS FOR SUSTAINABLE VITICULTURE - THEORETICAL AND EMPIRICAL PERSPECTIVES FROM SOUTH TYROL AND FRANCONIA

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Wine production poses numerous sustainability challenges such as high pesticide use and GHG emissions (Mailly et al. 2017; Ponstein, Meyer-Aurich, and Prochnow 2018). The OIV General Principles of Sustainable Vitiviculture (Resolution CST 518-2016) represent a significant milestone for tackling these challenges at the international level. In the EU, the Farm-to-Fork Strategy of 2020 puts the sustainability of the entire food system in the spotlight, setting ambitious targets, such as a 50 % reduction of chemical and hazardous pesticides by 2030 and full climate neutrality by 2050.

Reaching these targets requires innovation on all levels, including wine production, marketing, and regulation: Many sustainable innovations are available, such as fungi-resistant grape varieties, precision viticulture or sustainable packaging. Sustainability standards, such as the EU organic framework or private labels, are becoming popular amongst producers and consumers. Many countries and regions have started to implement sustainability frameworks (Flores 2018). However, for various reasons, the mainstreaming of sustainable viticulture remains a big challenge: high implementation cost (Bandinelli et al. 2020), regulatory inconsistencies (cf. the debate on potassium phosphonate in organic viticulture, Bleyer et al. 2020), technology “neophobia” amongst producers and consumers as well as marketing conventions and a questionable willingness to pay (Rabadán and Bernabéu 2021). Indeed, many quality wines do not explicitly sell sustainability claims, and empirical studies show a clear price effect of labels only for some market segments (Schäufele and Hamm 2020).

In the EU, the backbone of wine regulation and marketing is the system of Geographical Indications, which is mandatory in all member states and promoted worldwide through bilateral and international agreements (Huysmans 2020). Given this importance, the European Commission, in its recent reform proposal from 31st of March 2022, COM(2022) 134, explicitly encourages “producers of GIs [...] to adhere to sustainability standards that are more stringent than the mandatory ones and go beyond good practice”. Art. 12 of the proposed regulation sets a new legal frame for “sustainability undertakings” in GI product specifications.

Given the predominant importance of GIs for the European wine economy, our contribution assesses the potentials and challenges of GIs to promote sustainable viticulture.

From the outset, many aspects seem to favour GIs as vectors for sustainable practices: GIs cannot be delocalized. All production, including GI wines, has to become sustainable. As producers themselves define the product specification of a GI, locally adapted measures might be prioritized in a “bottom-up” way that integrates local knowledge, corresponds to existing capacities and thus creates “ownership”. Ensuring the sustainability of GIs should also be in the producers’ best interest, as the “collective reputation” (Cagriota and Delmastro 2015) of a GI can be tainted by negative publicity. In a holistic vision, the entire GI system could be seen as a policy instrument for sustainability (Crescenzi et al. 2021). This system would be strengthened if GIs reliably guarantee for the local implementation of sustainable practices.

Consequently, policymakers on all levels are trying to integrate sustainability into the GI system: OriGIn and FAO are cooperating on a sustainability strategy for GIs (Vandecandelaere et al. 2021). The recent impact assessment of GI regulations by the European Council (SWD(2021) 428 final) considers integrating sustainability aspects more “systematically” in future EU policies. In France, the Institut national de l’Origine et de la Qualité has started an initiative in 2016 to integrate agroecological targets into all official signs of quality and origin, including wine indications (Gautier 2016). Accordingly, the product specification for Champagne, for example, is now banning all pre-emergent herbicides (OJ 2020/C 432/08).

However, there might also be challenges: Empirical evidence suggests that GIs favour certain sustainability dimensions more than others (Milano and Cazella 2021; Flinzberger et al. 2022). Private sustainability standards might be more flexible and attractive for some producers. Coordinated government programs on the other hand might be more systematic and easier to control. Forcing sustainable practices through GI specifications can also cause practical problems, related to GI governance structures, or even legal challenges (cf. the recent complaint of the Asociación de Elaboradores de Cava de Requena against the mandatory imposition of organic viticulture for “Cava” before the European Court of Justice (OJ 2021/C 369/02). The German Federal Ministry of Justice has expressed general doubts on the admissibility of sustainability considerations into Intellectual Property Law.

Our contribution triangulates theoretical insights from institutional economics and empirical evidence from two case studies to assess how GIs can promote sustainable wine production:

We first analyse the GI system through the analytical lens of the Institutional Analysis and Development (IAD) Framework (Ostrom 2009) and Innovation Systems theory (Bergek et al. 2008). Results are validated empirically for two distinct case studies:

South Tyrol in Italy has an established GI system with wide DOC coverage, international appeal, strong governance structures and a coordinated effort towards sustainability.

Franconia in Germany is less famous internationally and even nationally, and the GI system and its governance structures have been introduced only recently.

For analysing the case studies, we use a mixed-methods approach, combining semi-structured expert interviews with stakeholders and a quantitative survey amongst producers.

Our results suggest a nuanced picture: Whilst GIs offer a powerful regulatory framework that corresponds to many demands of IAD-theory, improves certain functionalities of the Innovation System and therefore present an important element of a sustainable “policy mix” (Kern, Rogge, and Howlett 2019), they do not perform on all aspects and their potential depends on the concrete context. The strength of GI protection must correspond with control possibilities. Internal governance of GIs might need adjustments and the recent reform proposal brings forth new possibilities. We derive tentative conclusions on how regulators and stakeholders could maximize the potential of GIs for sustainability.

**Keywords:** *Geographical Indications, Sustainable Viticulture, New Institutional Economics, EU Wine Regulation*

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# SUSTAINABLE WATER USE MANAGEMENT FOR VITICULTURE THROUGH PRECISION AGRICULTURE TECHNOLOGIES: AN ITALIAN CASE STUDY

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Despite global wine grape production has grown steadily over the past 20 years, climate change has emerged as a driver of transformation in wine regions, resulting in a range of impacts (Fraga, 2020). Climate changes are anticipated to accelerate in the future and present a number of challenges for wine regions (Upton & Nielsen-Pincus, 2021). Three major changes can be identified: varying CO<sub>2</sub> concentrations, an increase in temperature, and a lack of water. Focusing on the last aspect, water is a critical resource for environmental and economic sustainability in wine regions. In fact, water is becoming a critical issue also for the viticulture sector, where generally water was not considered an essential input for quality and quantity. In Europe, irrigation of vineyards is below 10% of the total area, but the tendency towards irrigation is increasing to mitigate the effects of climate change and a more stressful environment (Costa et al., 2016). Irrigation has therefore expanded especially in Mediterranean Regions, including Italy. Until today, different approaches have been used to cope with water use efficiency, such as the use of drought tolerant rootstocks, clones and/or varieties, improved training systems or increased row spaces, and irrigation applications (Dry et al., 1998; Flexas et al., 2010; van Leeuwen et al., 2019). However, for correct water management, in addition to the optimization of irrigation systems, the implementation of precision viticulture technologies and decision support systems are necessary, paying close attention to aspects such as profitability, costs, and sustainability (Ortega et al., 2004; Benedetti et al., 2019; Bucci et al., 2020; Bellvert, et al., 2021). The capability to continuously and precisely monitor the response of plants to water stress, through the use of digital technologies for the assessment of the plant water status, is a key component to quickly react to critical conditions (Finco et al., 2022). This study was developed in the framework of the project SMART VITIS - Intelligent and Sustainable Viticulture - financed by RDP Marche 2014/2020, Sub-measure 16.1 (Support for the establishment and management of EIP operational groups on agricultural productivity and sustainability). The aim of the project is to introduce a digital platform for monitoring the water balance of the vine. In detail, the platform allows the integration of different sources of data, gathered daily and seasonally, through the use of remote and proximal sensors, to generate new aggregated information to support the planning and decision-making of the wine entrepreneurs in order to decide when and how much to irrigate.

The paper proposes, through the analysis of a case study (a winery located in central Italy), to determine the economic impact of producing wine grapes under irrigation regimes. In details, a comparison of yields, costs, and economic indices (water productivity or WP and economic water productivity or EWP) was performed over two years. Thus, vineyards irrigated by supplemental irrigation in 2021 were compared with vines grown without irrigation in 2020. All the data were collected with a questionnaire and evapotranspiration, useful for the calculation of economic indices, derived from remote and proximal sensors connected to the digital platform.

The analysis of production trends shows that irrigated field plots, despite the very drought season, maintained their production levels higher than those of non-irrigated. The costs analysis shows that irrigation costs account for 30% of the total fixed costs and about 12% of the total variable costs. In detail,

the variable costs of irrigation, which are represented by energy, labor and maintenance, are equal to 160 €/ha. On the other hand, the fixed costs were found to have a much larger amount than that of variable costs, for a total of 600 €/ha (200 €/ha for the depreciation of the irrigation system and 400 €/ha for the annual consortium fee). In summary, the total cost of irrigation is equal to 760 euros per hectare. Our results are in line with the literature that highlights total irrigation costs per hectare between € 400 and € 800 (Boatto *et al.*, 2017). In addition, the evaluation of economic indices allows determining the conditions by which irrigation strategies may be economically sustainable, helping the decision-making process. From the analysis emerged that with irrigation the WP decreases. This means that the crop is less stressed. On the other hand, the results show that EWP decreased and became negative when irrigation was included. This means that production costs exceed the benefit of production. In fact, the water costs represent 10% of the total costs.

In conclusion, this study highlight that the estimation of water balance and water stress of vineyard based on precision technologies combined with the economic analysis and sustainable indices can provide support for winemakers to optimization and programming of the use of water. In addition, from the analysis emerged that the incidence of irrigation costs can have significant relevance. However, rational irrigation interventions can justify the increase in costs with an improvement of quality and quantity of production as well as the maintenance of the optimal physiological state of the plant. It is therefore necessary to optimize the irrigation volumes. The efficiency of water use will allow balancing not only the economic issue of the production process but also environmental sustainability. To achieve sustainability, the modern emerging technologies, that include remote and proximal sensors and precision farming approaches, could make a decisive contribution. More sustainable grapevine irrigation with precision viticulture techniques should supply enough water, at the right moment, to guarantee a profitable yield and winemakers' desired grape composition, without compromising vine longevity. Sustainable irrigation means increasing agricultural productivity while maintaining environmental services and ecosystem resilience by ensuring that a sustainable amount of water is used. However, it is also important to consider water governance, which encompasses policy, planning, and management decisions around water resources that influence innovation, adoption, and choice in climate adaptation efforts.

**Keywords:** *Water productivity; Vitis vinifera (L.); Precision viticulture; Italian case study; Economic analysis.*

### **Acknowledgements:**

The authors wish to thank all the partners of the Operational Group (OP) SMART VITIS -Intelligent and Sustainable Viticulture (ID N° 29008) - financed by RDP Marche 2014/2020, submeasure 16.1. "Support for the establishment and management of EIP operational groups on agricultural productivity and sustainability". We also wish to thank the winery Umani Ronchi for providing data and support to the research.

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## Parallel Sessions XIII - Expert

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# THE INFORMATION CONTENT OF EXPERT REVIEWS, BRANDS AND GEOGRAPHICAL INDICATIONS. PRELIMINARY EXPERIMENTAL FROM SPAIN

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## **Introduction and Background**

Reputations play an essential role in markets for experience goods, such as wine, where quality is unknown to consumers until after purchase. Reputations can be modeled as subjective quality expectations (Shapiro 1983) formed by consumers based on past product experiences or word of mouth/advertisement. In the case of wine and many other food products, consumers associate quality expectations to brand names (winery reputation, private), but also to the region of production (collective reputation, shared by many wineries, Costanigro, McCluskey, and Goemans 2010).

Collective reputation mechanisms are key to the EU's objective of protecting regional products from imitations, and promote the creation of wealth and development in rural areas (Josling 2006). The long-standing strategy is based on the development of a system to certify, regulate, and promote geographical indications (GIs). However, the conditions under which GIs serve as effective quality cues are not fully understood. While there is large literature calculating implicit prices of GIs e.g. (Costanigro, McCluskey, and Mittelhammer 2007), hedonic estimates confound the value of an information source with the market premium/discount for high/low quality. Ay (2021) used the term "information content" of a GI to refer to how well a designation of origin captures differences in pedo-climatic conditions, but such differences may not necessarily result into quality differences valued by consumers. In sum, a coherent theory is lacking, and empirical research has provided only incomplete or context-specific answers.

Further complicating matters, technology is changing the ways in which consumers search for information. In addition to reputations, expert reviews provide a source of quality information accessible from printed/online sources (Wine Spectator, Decanter) or mobile apps (e.g. Vivino), and are often displayed at the store alongside with price and other product information. Expert reviews represent a source of quality information alternative to the classical reputation mechanisms, and have been shown to shift demand even in store settings (Villas-Boas, Bonnet, and Hilger 2021; Hilger, Rafert, and Villas-Boas 2010). If a consumer trusts and conforms to the quality criteria of the reviewer, scoring systems can provide extremely specific quality information (up to the vintage of a particular wine from a particular winery). With the ubiquitous spread of mobile phones, the cost of acquiring information via expert reviews has decreased substantially. If, at least for some consumers, expert reviews supersede the usefulness of the GI signal, the effectiveness of the EU marketing strategy may be diminished.

## **Objectives**

We present preliminary results from an experimental study conducted in Spain to analyze how consumer select and value alternative sources of quality information before purchasing a wine. Using a multiple price listing experimental auction, we measure the relative information content of firm reputations, GIs, and expert reviews in serving as quality cues. We also examine the hierarchical structure or level of redundancy of information sources, and whether access to one form (e.g. expert reviews) diminishes the value of

others. Finally, we investigate how wine prices, consumers' beliefs, preferences and wine expertise may moderate these effects, and present a first estimate of the consumer surplus generated by the labels.

## Methods

As pointed out by Klain et al. (2013) the value of information is an ex ante (pre-purchase) concept, and can be measured directly with experimental methods. In a pre-purchase scenario, access to sources of information which enable consumers to better discriminate differences in quality will be more valuable than less informative signals. The perceived value of an information source can be conceptualized as how much a consumer would be willing to spend (or search, which is costly, see (Stigler 1961)) to obtain the information before purchasing a product. The idea is that acquiring a good source of quality information is akin to purchasing an insurance against bad experiences. The value of an information source is linked to its ability to reveal *differences* in quality, rather than the quality of any specific product, and it is therefore an ex ante (pre-purchase) concept measurable with experimental methods (Klain et al. 2013). In a pre-purchase scenario, access to sources of information enabling consumers to better discriminate differences in quality will be more valuable than less informative signals.

During the months of March and April 2022, we will elicit how wine consumers value alternative sources of information by simulating a wine shopping experience in a laboratory setting. In each session, consumers receive a €20 endowment, and are required to purchase one of four wines for sale, all in a similar price range. Participants take home any money they have left at the end of the experiments, and complete a demographic and wine knowledge/shopping behavior questionnaire. At the beginning of each session participants receive information about the four wines for sales, including market prices, grape varieties and vintage. The wines for sale are from different GIs, brands, and have different expert scores, but this information is not revealed at first.

Before choosing which wine to purchase, participants engage in three sequential multiple price listing auctions (Andersen et al. 2006) to purchase additional information Geographical Indications, brand, and expert reviews. When a participant states a willingness to pay higher than the randomized market price, they receive the auctioned information for all four wines on sale.

Two experimental treatments are administered in a between subject design: the order in which the information is auctioned, and the price of the wine for sale (high: 11€-14€ vs. low: 4€-8€), resulting in 12 experimental sessions of 12-15 participants.

**Keywords:** *value of information, designations of origin, wine quality, experimental auction*

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# HOW MUCH DO WE PAY FOR THE QUALITY OF THE WINE? A META-REGRESSION ANALYSIS OF THE INFLUENCE OF QUALITY ON THE PRICE OF WINE WITH DIFFERENT MEASURES OF QUALITY

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A controversial issue in the literature that estimates hedonic price functions in the wine market is the influence of quality. Some previous papers have tried to approach this question, being the meta-regression analysis of Oczkowski and Doucouliagos (2015) the article that has dealt with this question in a more precise and statistically robust way.

However, in this paper we intend to go a step further to delve into this issue. Thus, the present meta-regression analysis is carried out from a database that contains the detailed coding of 223 collected articles —practically all of the articles published in the period 1993-2021— that estimate hedonic price functions in the different wine markets. In total, information is obtained for 1,596 different estimates. Around 60% of the estimates introduce some type of wine quality indicator, either through evaluations by critics, guides or specialised magazines, or other evaluations of a different nature. Various quality measures are also found within the same specification.

An important effort is dedicated to the homogenisation of information, especially due to the existence of different scales in the quality indicators, as well as the use of different functional forms, being the semi-logarithmic the most common one. For these reasons, all the found effects are converted to semi-elasticities, which implies considering the effects of the scales and the transformations necessary to overcome the problems of using different functional forms. This requires obtaining additional information from the original articles on means and deviations of the price and quality variables. In many of these papers, this information is not offered, so a procedure for estimating these values is established if necessary. Around 1,200 semi-elasticities estimated at the mean of each sample are finally available.

With this sample, we use the publication selection model proposed by Egger et al. (1997), Stanley (2005), and Stanley and Doucouliagos (2012, 2017), with some input from Andrew and Kasy (2019) and Ugur et al. (2020). To do this, different specifications of the initial meta-analysis model are contrasted with the aim of finding an average value of the price semi-elasticity to quality that takes into account the precision with which it has been obtained and eliminates publication selection bias.

Specifically, at least eight relevant issues are addressed in this type of analysis: a) treatment of the selection bias introduced by the fact that many studies do not have quality indicators in their estimations; b) heteroskedasticity; c) the risks of bias in the estimation of the average value by the specified linear relationship; d) the hierarchical structure of the data —given that many estimates come from the same article—; e) endogeneity problems in the estimated expression; f) the over-influence of articles that present many estimates; g) corrections to get evidence sufficiently supported; and h) finally the problems of estimation and uncertainty derived from the meta-regression analysis.

Carrying out the last stage, the multivariate meta-regression analysis, seeks to discover the sources of heterogeneity in the originally estimated coefficients (in this case, on the original or equivalent semi-

elasticities for those estimates that do not use a semilogarithmic expression or do not use a 100-points scale). In other words, it is about finding out if the differences found in the values of these semi-elasticities are caused by a) questions related to the sample (e.g. origin of the wines, markets, time period, etc.), b) the nature of the data (e.g. type of data source, type of price, etc.), c) attributes considered in addition to quality in the estimated price hedonic functions, d) decisions about the functional form, e) econometric issues, and f) aspects related to the type of publication where the estimate was found (e.g. article, books, working papers, other types of grey literature). Therefore, all these aspects have had to be adequately coded from the text of the original articles in order to obtain additional bibliometric information that allow the appropriate elaboration of the analysis.

The results show the existence of a positive and statistically significant effect of the quality on price, robust to specifications and to the proposed corrections. In addition, there is evidence of some publication bias. Significance is also found in some of the included meta-regressors that explain the differences in the magnitude of semi-elasticity between studies, which may help to understand future results on this issue.

**Keywords:** *Wine quality ratings, hedonic price functions, meta-analysis, meta-regression analysis.*

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# THE INFLUENCE OF EXPERT SCORES ON WINE PRODUCERS AND CONSUMERS: CASE MADE, PRICING, EXPERT SCORING, AND BOTTLES OF OREGON PINOT NOIRS SOLD IN THE US

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There is extensive literature focusing on the influence of wine experts on wine prices; and consumers' buying decisions, e.g., Jones and Storchmann, 2001; Schamel and Anderson 2003; Ali, Lecocq, and Visser, 2008; Hilger, Rafert and Villas-Boas, 2011; Friberg and Grönqvist, 2012; Gokcekus and Finnegan, 2013; and Chen and McCluskey, 2018.

In this study, we adopt a novel, indirect approach which simultaneously accounts for the influence of expert scores on wine makers and consumers. We theorize that **both wine makers and consumers consider wine experts' scores**. In doing so, we argue that there is a three-step, sequential process in place. In the first step, given its production capacity, weather conditions, and other relevant factors effecting quantity and quality of grapes grown, a winery decides to make a certain number of cases of wine from a particular vintage. Also, given the number of cases of wine it produced, a winery sets a release price. In the second step, they send samples of their wine for tasting and scoring by tasting agents, or the tasting agents acquire wines by spending their money. Tasting agencies publicize their tasting scores with their brief tasting notes. These tasting notes, at least the ones by Wine Spectator, are augmented by the number of cases made as well as release price. In the third step, in the market, consumers purchase wines.

We put forward claims regarding each one of these steps 1) to examine the relationship between cases of wine made, winery recommended release price (both of which are set by wineries before scoring), and expert scores; and 2) to investigate the possible impact of expert scores on sales: Claim (1), release price is negatively correlated with cases made. Claim (2), release price signals the quality of wine and, accordingly, score and release price are positively correlated. Claim (3) because consumers pay attention to expert ratings, Claim (3a), the higher the score, the higher the number of bottles purchased/case made, and (3b), the higher the score, the higher the average market price/release price. These three claims are set to investigate the presence and extent of experts' influence on wine producers and wine buyers.

To empirically check the validity of these claims we utilize categorical data analysis and estimate regression models. In our analyses, we use data from the US wine market. Consumers pay attention to ratings, rankings, and similar statistics provided by experts in order to make better decisions (Ginsburgh, 2003; Lindley, 2006; and Quandt, 2006). This is particularly understandable for American wine consumers because the American wine market is the biggest in the world both in terms of value and volume; in 2020, there was a recorded revenue of \$50 billion and a volume of 33 million hectoliters (Statista). Moreover, wine is an experiential good with a wide array of distinctions regarding grape variety, as well as in style, vintage, region, vineyard, and winery.

Nowadays, there is an inflation of rating agents, but three of them (Wine Spectator, Wine Advocate, and Wine Enthusiast) stand alone as the most recognized in the US. Blind tasting and numerical scoring are common futures of these ratings. Finished wines, reviewed from bottle in blind tastings, are given a single score (on a 100-point scale). **For example, for Wine Spectator: 95-100** - Classic: a great wine; **90-94** -

Outstanding: a wine of superior character and style; **85-89** - Very good: a wine with special qualities; **80-84** - Good: a solid, well-made wine; **75-79** - Mediocre: a drinkable wine that may have minor flaws; and **50-74** - Not recommended." A visit to a local or online wine store in the US clearly demonstrates how widely expert ratings, in particular Wine Spectator's, Wine Advocate, and Wine Enthusiast ratings are made available to buyers to help in making their decisions. It should be noted that, in most cases, only 90+ ratings are advertised. (Gokcekus & Gokcekus, 2019)

We use **423** scores from the Wine Spectator for all of the 2017 pinot noir wines from Oregon, USA. First, we check whether there is empirical evidence to support our three-step process by utilizing a sub-sample of **247** wines of 423 wines with scores for two consecutive vintages, namely vintage 2017 and 2016 to estimate the following three regression models:

$$Case_i = \beta_0 + \beta_1 Case_{i,t-1} + \beta_2 \Delta Score_i + \epsilon_i \quad (1)$$

$$Price_i = \alpha_0 + \alpha_1 Price_{i,t-1} + \alpha_2 \Delta Score_i + \alpha_3 \Delta Case_i + \epsilon_i \quad (2)$$

$$Score_i = \delta_0 + \delta_1 Score_{i,t-1} + \delta_2 Price_{i,t} + e_i \quad (3)$$

Our preliminary regression analyses are supportive of the three-step process: **(a)** Previous year's case made, which we use as a proxy to production capacity, is positively associated ( $\widehat{\beta}_1 = 0.44$ ,  $t = 6.89$ ) with case made; and change in score, which we use as a proxy for quality improvement is negatively associated with case made ( $\widehat{\beta}_2 = -1361.74$ ,  $t = -2.51$ ).

**(b)** Previous year's release price is positively ( $\widehat{\alpha}_1 = 0.87$ ,  $t = 27.15$ ); change in score, a proxy for increase in quality, positively ( $\widehat{\alpha}_2 = 1.69$ ,  $t = 4.06$ ); and change in case made, a proxy for increase in quantity supplied, negatively ( $\widehat{\alpha}_3 = -0.0002$ ,  $t = -4.46$ ) associated with current release price. **(c)** Current score is positively associated with both the previous year's score ( $\widehat{\delta}_1 = 0.39$ ,  $t = 8.13$ ) and release price ( $\widehat{\delta}_2 = 0.03$ ,  $t = 6.09$ ).

Next, to empirically check the relevance of our Claims (1 & 2), we utilize all **423** pinot noir wines from Oregon, vintage = 2017, evaluated by Wine Spectator. Our preliminary categorical data analyses indicate a statistically significant relationship between case made categories and release price categories (Pearson chi-square (4) = 172.67, Cramer's V = 0.45), and between release price categories and score categories (Pearson chi-square (4) = 115.62, Cramer's V = 0.37).

Finally, we check the relevance of our third claim, namely the presence and extent of experts influence on wine buyers. To do so, we augment Wine Spectator's data by acquiring number of bottles purchased for **258** wines from cellarttacker.com; and average US prices from winesearcher.com. We estimate the coefficients of the following regression models:

$$\left( \frac{\text{Bottles purchase}}{\text{Case made}} \right)_i = b_0 + b_1 score_i + u_i \quad (4)$$

$$\left( \frac{\text{Average price}}{\text{Release price}} \right)_i = c_0 + c_1 score_i + v_i \quad (5)$$

Our preliminary regression analyses indicate a statistically significant relationship between expert's score and bottles purchased/case made ( $\widehat{\beta}_1 = 0.08$ ,  $t = 9.14$ ); yet no relationship between expert's score and average price/release price.

**Keywords:** Expert scores, pricing, wine producers; wine consumers

# EXPLORING ONLINE COMMUNITY WINE RATINGS: ARE MORE POPULAR WINES RATED HIGHER?

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There is rich literature on the effects of wine characteristics on prices, particularly evaluating the impact of expert ratings. Oczkowski and Doucouliagos (2015) further review key papers in the literature and show that expert ratings have a moderate influence on wine prices across various sample designs, countries or regions and time periods. Schamel (2014) analyses the impact of winery reputation and expert ratings on retail prices comparing co-ops and private wineries in our study regions Trentino and Alto-Adige/Südtirol.

With the rise of social media platforms, ordinary consumers can rate wines and make their opinion known to others. Popular examples of platforms dedicated to wine ratings are vivino.com and cellartracker.com. The observation that frequently rated, i.e., highly popular, but relatively ordinary wines receive high average ratings initiated this paper.

To date, several authors have explored consumer wine ratings found online. Caldas and Rebelo (2013) use CellarTracker data and expert ratings to assess the consistency of ratings for a small sample of Portuguese wines. Their model shows, minor differences aside, that the different rating systems are reasonably consistent. Oczkowski and Pawsey (2019) assess the relative impact of consumer ratings from vivino.com and expert ratings on Australian wine prices using a hedonic model for wines rated by both consumers and experts. Their analysis lends some credibility to the claim made by vivino.com in the sense that consumer ratings have strong correlations with the ratings of several wine experts. The consumer ratings used in their analysis are transformed to have the same quantiles as the expert ratings by James Halliday to which they are compared to. Differences between expert and consumer ratings for wine have been explained by several factors, including different objectives when evaluating a wine, heterogeneous consumers, and the different contexts in which expert and consumer (community) ratings are assigned. Gokcekus and Nottebaum (2011) also note that consumer ratings tend to be made after expert ratings are available and they are not the result of blind testing. Kotonya et al. (2018) analyzed over one million Vivino.com ratings collected between November 2016 and March 2017. They found that wines are typically assessed within their geographical region of origin and that community comments and ratings express a rich knowledge about the wines being comparable to expert opinions. However, some open research questions remain, particularly related to wines normally not rated by experts but within online communities. We claim that a missing topic in the literature relates to exploring how consumer ratings are affected by the rated wines' characteristics. Moreover, the literature lacks critical review of the reliability of data gathered from these platforms which requires detailed knowledge and checks of the sample wines rated.

Therefore, this exploratory study investigates the extent to which wine ratings assigned by consumers on social media platforms can be explained by the wine's popularity, variety, producer, regional origin, and vintage. Moreover, it provides an initial analysis on data reliability for econometric purposes.

We collect a detailed data set of consumer wine ratings provided by vivino.com platform. To be able to thoroughly check data quality, we restrict our analysis to recent vintage wines from two specific provinces or regions in northern Italy (Trentino and Alto Adige/Südtirol). The original dataset was obtained in 2019 and contains 2534 wine ratings. We only retained wine ratings associated with a specific vintage, dropping

those with an unclear or non-unique vintage. The final data set analysed includes 2354 wines: 83% from Alto-Adige/Südtirol (88 distinct producers) and 17% from Trentino (66 distinct producers). Despite only considering recent vintages, it was difficult to obtain consistent price data as only about 29% of the wines rated were sold directly on the platform. Moreover, we noticed errors in the correct allocation of wines to the appropriate geographical indication (GI). Thus, we chose to omit information on prices and GIs from the quantitative analysis. The dataset includes information on the name of the producer (producer), the vintage (vintage), the average rating from consumers who purchased the wine (rating), the number of ratings received by each vintage (nratings), the province the wine originates (region) and wine variety (variety).

After a thorough descriptive analysis that helped assessing data reliability, we apply binomial logistic regression (LR) to explore factors determining ratings below and above the sample mean (3.82). Precisely, we determine wines rated one standard deviation (or 0.253) above and below the sample mean to create two dummy variables identifying high-ratings and low-ratings. We use these dummies as dependent variables in two LR models. We classify 621 wines as high-ratings and 327 wines as low-ratings. In our LR model, we consider the number of ratings obtained by each wine (*nratings*), *vintage*, *producers*, and *variety* as regressors. The *nratings* variable may be considered a proxy for the wine's popularity on the platform. The original *nratings* variable is continuous, and it is recoded into an ordinal one based on quantiles to handle non-normality. Vintages are represented by 5 dummies coded as follows: (*vintage1*) 2013 or lower, (*vintage2*) 2014, (*vintage3*) 2015, (*vintage4*) 2016, (*vintage5*) 2017. Varieties and producers are also included as dummies.

The two LR models (*low-ratings* and *high-ratings*) have an R<sup>2</sup> of 16% and 17%, respectively. Multicollinearity tests revealed no significant concerns as all VIF values are below the recommended maximum threshold of 10 (Hair et al., 1995). Our preliminary findings suggest that wines rated by a greater number of consumers (*nratings*) are less likely to fall into the low-ratings category. Wines from the 2014 vintage, widely acknowledged as a difficult climate vintage, have higher odds of falling into the low-ratings category. Producers and variety-related significant effects also emerged, all increasing the likelihood of being rated in the low-ratings category. Among the significant producers and varieties analysed, Cantina La-Vis ( $\beta$  4.12;  $p < 0.0001$ ) and Schiava ( $\beta$  2.78;  $p < 0.0001$ ) respectively record the greatest effects on the dependent variable (i.e., *low-ratings*). Müller-Thurgau, Chardonnay and Pinot Noir positively predict low-ratings as well, with remarkable effect sizes (Müller-Thurgau:  $\beta$  2.81;  $p < 0.0001$ ; Chardonnay:  $\beta$  1.28;  $p = 0.036$ ; Pinot Noir:  $\beta$  1.28;  $p = 0.029$ ).

For the *high-ratings* model, Vintages older than 2013 and the 2015 vintage have positive and significant coefficients ( $\beta$  .93;  $p < 0.0001$ , and  $\beta$  .68;  $p = .006$ , respectively). Interestingly, the number of ratings is not a significant predictor for high-ratings. Producers and variety effects emerge as well, but almost all of them decrease the odds of a wine being assigned high-ratings. White blends and the Cabernet-Merlot- Lagrein blend are the only exception, being most likely to receive high-ratings ( $\beta$  .78;  $p = .072$ , and  $\beta$  .85;  $p = .055$ , respectively).

A preliminary indicator for producer reputation on the platform is computed as the product of the total number of ratings received by its wines and its average rating, and further standardized using the z-score (*Prodrepindex\_std*). When *Prodrepindex\_std* is introduced in the model, the effect of *nratings* remains consistent. Moreover, the variable negatively predicts *low-ratings* while increasing the odds of *high-ratings*.

To conclude, results of this study on factors influencing wine ratings in online communities reveal that receiving more ratings (i.e., a higher popularity of the wine on the platform) appears to discourage low-ratings while not encouraging high-ratings. Consumers seem to recognize specific vintages as either higher quality (e.g., 2015) or lower quality (e.g., 2014), demonstrating to possess a specific knowledge of the product in line with Kotonya et al. (2018). Variety and producer effects emerge in both models, but mainly explain assigned to the low-ratings category. Lastly, producers' reputation on the platform seems to positively affect wine ratings.

Regarding data reliability, the Vivino sample analysed does not represent all producers adequately despite including all Trentino Alto Adige wines on the platform. Indeed, some producers have a considerably larger selection of wines than the one sold on Vivino. Hence sample selection does not necessarily represent the actual offer, leading to potentially biased results. Additionally, some producers may have been on the platform for longer than others, with repercussions on their reputation on the community. This is a variable we did not control for in this study. This information and the incorrect assignment of GIs raises some concerns about the reliability of the wine communities' data for econometric applications.

**Keywords:** Consumer ratings, social media platforms, wine, reputation

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## Parallel Sessions XIV - Finance

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# THE APPLICATION OF NON-FUNGIBLE TOKENS AND BLOCKCHAIN TECHNOLOGY IN THE WINE SECTOR

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## **Introduction**

As part of the recent OIV research regarding the digital transformation of the wine sector and the expert interviews conducted in its member countries, blockchain technology (BCT) was voted as the technology to receive the highest level of prioritization. Despite the early stage of adoption, the technology promises a wide range of benefits to the industry such as transparency, traceability, fraud prevention, enhanced marketability and accessibility, transaction security, as well as increased and faster legal compliance with administrative burdens.

While most applications of BCT focus on the use of fungible tokens, several applications for non-fungible tokens (NFTs) especially in digital collectibles have seen a considerable increase in interest lately.

In this paper, we examine through explorative case studies the current situation regarding the application of NFTs in the wine sector as well as providing a comparison of other current applications of BCT. We will also identify and assess opportunities and challenges in the application of the technology.

## **Research methodology**

The research is based on a multiple exploratory case study approach. Semi-structured interviews with stakeholders from the wine industry in different countries with the objective to determine the economic motivation for the application of fungible and non-fungible tokens will be conducted.

The research methodology we selected supports the research objectives of providing an academic guidance to the management on how the choice of a particular FT/NFT application can shape the complex ecosystem of the wine sector.

We further examined the different functions and applications of tokens in the wine industry and given the limited availability of published research at this early stage, we performed a literature overview focusing on collectibles and investment classes, which have experienced higher digital penetration already.

## **Blockchain and asset tokenization**

Blockchain is a distributed ledger technology (DLT), a constantly synchronized data storage distributed across locations and entities. Both, BCT and DLT are oftentimes used as being interchangeable. However, BCT has been designed to set up rules for transactions permitting amongst others the development of applications and smart contracts. One of the key characteristics of blockchain is that it enables the implementation of smart contracts to enter into and execute contractual commitments to safeguard transactions. Smart contracts are software programs that are based on BCT with fixed rules for automatically executed transactions based on a set of predefined conditions that have to be met. They allow the tracking of products along the supply chain, manage ownerships, and authorize automatic payments. They could further replace the trust that has been established by intermediaries so that parties, that have not met and performed trades before, can rely on the integrity of the transaction. Key benefits of smart contracts are the increased transparency and trust in a decentralized system with no single ruling authority (Zhao et al., 2019) and the reduction of ex-ante and ex-post transaction costs (Ciatto et al., 2020).

Smart contracts in BCT can be seen as coordination mechanisms applying an institutional perspective over coordination (Frantz and Nowostawski, 2016). The simplest form of a smart contract is a token. Using the definition established by Valeonti et al. and the work of Bal and Ner, Regner et al. and Leech, a non-fungible token is a cryptographically unique, indivisible, irreplaceable and verifiable token that represents a given asset, be it digital, or physical, on a blockchain (Valeonti et al., 2021; Bal and Ner, 2019; Leech, 2022). Based on these attributes, NFTs other than for the purpose of speculation and investment, serve as an instrument for transparency, authenticity, provenance, traceability, and royalty payments, which are examined in more detail in respect of their functionality and applicability to the wine industry, in particular with regard to wine collecting, wine investment, and fraud and provenance.

### **Main results**

Analysis has shown the potential for the use of NFTs in the wine sector, in particular with regard to the use for wine as a collectible despite a number of challenges that mostly stem where the difference of wine as a tangible object and investment tool, while the adoption as an investment tool follows the same patterns as other classes and as such presents the same benefits and challenges. With regard to transparency, traceability and fraud prevention the adoption of NFTs as an instrument is promising but lacks empiric evidence and will require more research and real-life use cases to determine its capacity for practical use.

### **Discussion**

Despite the many benefits of BCT in general and NFTs in particular as shown in the examination of the various use cases, several challenges for the adoption of NFTs in the Wine Sector need to be contemplated as well.

Depending on the particular use of a NFT, it comes with a number of legal and regulatory aspects that need to be resolved to promote the implementation and adoption: given that the NFT represents in many use case a legal agreement between two parties and is in itself only a digital representation of a legal obligation, it comes with an underlying contractual risk of fulfilment. The same is true in its application for royalty payments as long as those are not automated as well, which is currently as shown not the case. Closely connected is the issue of intellectual property rights in particular in the use as collectible. The adoption as an investment security on the other hand is highly impacted by regulatory concerns and the potential of money laundering using NFTs. With regard to the technological elements such as NFT maintenance, marketplace risk, and the coding of the underlying smart contracts as well as the aspect of cybersecurity and fraudulent activity also need to be considered.

**Keywords:** *non fungible token, wine industry, stakeholder, blockchain*

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## LIQUID ASSETS AND FINANCIAL LITERACY

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The demand for wine could be considered within the context of the consumer's lifetime allocation process (Gourinchas and Parker, 2002). Within this framework, demand is attributed to a person's desire to consume wine at the present period or to invest in wine for future consumption. Many studies have shown how such a life cycle optimization process can be shaped by consumers' subjective discount and preferences (e.g., risk aversion), the economic environment (e.g., real income, inflation rates and risky returns on investments), and the social background (education, financial literacy, wealth), among other features (Lusardi and Mitchell, 2014).

Following this approach, it is therefore not surprising that wine is studied as a consumer good or as an investment and a substitute to traditional financial assets (Outreville and Le Fur, 2017). The focus is therefore on the links between subjective discount factors such as financial literacy, education, risk aversion and the emergence of wine as a financial asset (Masset and Henderson, 2010; Bouri, 2015; Le Fur and Outreville, 2019).

The notion of financial literacy has generated considerable interest in parallel to the development of innovations in the field of financial products (Jappelli and Padula, 2013). The main concepts underlying the notion of financial literacy are classified into three categories: (1) numeracy and capacity to perform calculations related to interest rates and to understand the notion of inflation; (2) knowledge of financial assets and (3) understanding the concepts of risk and risk diversification. Several studies across countries have found that the more educated and financially literate are also more likely to participate in more sophisticated investments (Christelis, Jappelli and Padula, 2010; van Rooij et al., 2011; Arrondel et al., 2015).

A survey was submitted to a large audience by a professional panel provider in France and in the UK, ensuring quota sample per age and gender. The questionnaire requested information on wine consumption behavior, involvement and knowledge. It covered the notion of financial literacy, financial risks attitudes and familiarity with financial issues related to the purchase of fine wines. The preliminary results presented here show the important role of financial education and awareness and financial risk attitudes in the decision to purchase and the willingness to pay for wine for future consumption or investment.

**Keywords:** *Wine economics; Fine wine assets; Financial literacy; Education*

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# THE FINANCIALIZATION OF THE BULK WINE MARKET: ISSUES, CONSTRAINTS AND LIMITS OF THE INTRODUCTION OF A FUTURES CONTRACT

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This article aims to determine to what extent bulk wine can be considered as a commodity and, therefore be subject, like the vast majority of agricultural products, to an organized futures market. Although differentiation by quality, defined by expert ratings and/or “appellations”, is an essential characteristic of the world fine wine market, this is not the case for bulk wine. Three key factors make bulk wine a potential “commodity” and legitimize the question we address in this article: (a) the geographic concentration of its production while its demand is globalized, implying significant international trade flows, both physical and financial; (b) its economic homogeneity leading to the inevitable failure of any quality differentiation strategies, and (c) a high price variability. In the first part of the paper, we clarify these arguments and explain, with reference to the existing literature, the conditions leading to the creation of an agricultural futures market.

We develop an econometric analysis in the second part of this article. We use weekly data between March 2000 and October 2020 on the average price of bulk red and rosé wines without geographical indication (as transmitted to the European Commission) for each of the three countries studied: Italy, France and Spain. Together, these three countries account for nearly half of the world's wine production. If the homogeneity of bulk wine is proven, it must translate into a high degree of substitutability between different origins and thus into geographic arbitrage resulting in a convergence of European bulk wine prices. To test for the existence of a long-run relationship between French, Spanish and Italian bulk wine prices, we rely on different econometric approaches, from linear cointegration tests to vector error correction model (VECM) with structural breaks. We also implement threshold cointegration tests. The same model is used to measure the speed of adjustment to deviations from the equilibrium relationship. We also analyze the causal relationships between these different prices and measure their volatility using traditional GARCH modeling. We then explain why this high volatility and the high degree of convergence between European bulk prices, as indicated by our preliminary results, are a prerequisite for the launch of a futures contract.

The development of a commodity derivative depends on objective factors such as those analyzed in our econometric study, but also on technical characteristics that rely on both the market structure and the way the futures contract is defined (maturity, physical characteristics of the underlying asset, possible delivery conditions – cash settlement vs. physical settlement, delivery locations -, existence of premium/discount mechanisms). We explain this assertion in the third part of this article. Beyond the launch of a futures contract *per se*, the conditions for its success should also be discussed. We suggest that it depends on the needs expressed by the key players in the wine industry or, more subjectively, on the way such financial tools are perceived. These are of two kinds: a desire for greater price transparency within the value chain and a need to manage price risk in a necessarily second-best strategy. We detail this approach in this final part for each industry player: wine producers, brokers and traders. We finally discuss the stakes and constraints that a futures contract on bulk wine could have on the structuring of the French wine industry and notably on the role played by intermediaries. Using the results of our econometric analysis, we

conclude with a certain number of operational recommendations to the public authorities and the actors of the bulk wine sector.

# EXPLORING RELATIVE INFLATION THROUGH THE VEHICLE OF CHAMPAGNE: THE INFLATION OF EXPERIENCE

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The purpose of this research is to show how different income groups are better or worse off today compared to the past by reviewing what happened to the relative price of champagne—a luxury good that has remained stable in terms of product, use, and means of production over the years—to their income.

Are people better off today, or were they better off in the past—how can we tell?

Inflation is measured in various ways, and historically it has always affected different socio-economic groups differently, but there has not been an objective measure of these differences. Consumer Price Index shows us generalities but says nothing about the experience of inflation by different income quintiles.

Using champagne, we are able to measure price inflation on a consistent and precise manner for different income groups over a long period of time by asking how many hours of work each quintile would have to perform to obtain the necessary disposable income to purchase each of the champagne brands and their tiers (entry-level, mid-range, flagship). These are analyzed over time to see how inflation affects each income level. Using the datapoints of champagne prices, this research demonstrates the different experience of inflation by five wage earning groups over the past 75 years.

This may appear to be narrow research, looking at only one thing—champagne—however this is a strategic research site because its character can offer insights and allow one to make observations about the effects of inflation on real lives, irrespective of whether or not champagne was actually purchased by people in these income groups.

The question of who is better off, is relative. What were the fond good old days, and what did that might mean? It may not quite have been the good old days, depending on who you are comparing yourself to. Relative to what? Relative to that year, or relative to the best ever?

How can it be that people think the best days are behind them? As things change, the bar of what is standard continues to be pushed up, so “better” never seems to happen compared to the past. Champagne is a product that hasn’t changed over time, and it has always been considered a luxury item. In that way it makes for a perfect product to use to ascertain relative inflation over time.

## **Strategic Research Site**

Champagne prices were acquired from UC Davis Libraries and the author’s own personal collection of Sherry-Lehmann wines shop catalogs creating a strategic research site. In this way a long-term, self-contained, primary data source maintaining the consistency of relative variables, which permits parallel comparisons across time for three different tiers of champagne (entry-level, mid-range, flagship) was created. Three different brands of champagne are used (Bollinger, Louis Roederer, Moët & Chandon).

**Each catalog functions as a time capsule.** Thus, the strategic data site draws upon more than 350 such time capsules. Each time capsule is published by the same wine store with the same motivation (perspective, interests, goal, purpose). The details and designs of the catalogs have evolved over time, however the primary objective to encourage customers to buy wine remains unchanged.

Using the datapoints from this strategic research site, evaluation is made using the five different income levels to determine how each level is affected by inflation using the number of hours work that must be completed in order to obtain the disposable income necessary to purchase a bottle of champagne from each of the brands' three tiers.

The income data draw on figures provided by the U.S. Census Bureau and are for the entire United States (U.S. Census Bureau, 2022). Five income brackets are distinguished, the lower four quintiles and lower limit of the top 5 percent of families of all races.

### Underlying Value of Research

Concretely, we're talking about champagne prices, but the broader implications of this is what it takes to get into luxury. To purchase champagne, what resources are required, and how difficult is it for someone to obtain them?

From entrée level luxury to flagship level, economic classes experience inflation differently. Surprisingly, what we see is the absolute level of entrée is cheaper for all income quintiles over the seven decades described, as demonstrated by the prices of the entrée level of champagne in each brand. However, going up in luxury level, it has generally become more expensive in real inflation terms.

Comparing different income strata to different tiers of champagne, by determining how many work hours it would take to buy a bottle over time, we can use this concrete measurement of inflation to answer questions that ask when different groups of people were economically better off—based on their economic experience of their financial ability to access this archetypal luxury product, champagne.

In this way, the notion that we were economically “better off in the good old days,” can be objectively evaluated.

**Keywords:** *champagne, relative inflation, stratification, strategic research site, stable consumable goods (SCG)*

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## Parallel Sessions XV - Consumers

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# CAPTURING SOURCES OF PREFERENCES HETEROGENEITY FOR WINE IN DISCRETE CHOICE EXPERIMENTS

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The Discrete Choice Experiments (DCE) technique is a choice modeling technique included in the class of stated preference methods. It has become increasingly popular to assess preferences and economic value for multi-attribute, complex or unfamiliar goods or services in several research areas. In addition to providing information on relative importance of the attributes of a good or service, it also allows the estimation of welfare measures, such as willingness to pay (WTP).

By constructing scenarios or hypothetical markets, DCE attempts to mimic the transactions that individuals make in the real world. Theoretically, the DCE has a Lancasterian nature (Lancaster, 1966) based on the assumption that a good can be described by its attributes and is routed on the random utility theory (McFadden, 1974), which assumes that true utility of an individual's choice is a random variable from the researcher point of view. Therefore, it assumes that the latent utility is formed by an observable and a stochastic component and that the probability that an alternative is chosen, from the set of available alternatives, is the probability that it has the highest utility. This presumes that the individual attends to all information provided by the analyst and makes trade-offs between attributes in a full compensatory way.

By administering a survey to a relevant sample, the DCE asks the respondents to choose their preferred alternative from a set of options (choice set or choice occasion). Each alternative represents a specific combination of the attributes' levels of the good or service. In this process, it assumes that individuals are rational utility maximizers, attend to all information provided by the researcher and make trade-offs between the attributes in a full compensatory way.

In order to analyze econometrically the choices made by the respondents, a number of discrete choice models have been developed. Over the past four decades, a fundamental issue in choice analysis has been the best way to model heterogeneity or the variability of choice behavior across individuals. Its understanding has become an essential research topic in various economic issues, such as the correct assessment of welfare estimates and economic value, optimal pricing policies, choice share predictions or demand elasticities. It is also worthwhile to optimize the development of new products or services, or the redefinition of the existing ones with specific attributes, considering the existence of consumer groups with specific characteristics.

In choice analysis, two sources of heterogeneity are generally considered: the observed (systematic preference) heterogeneity that is measured usually through data collection, and the unobserved heterogeneity that is not measured by the analyst, but as it is relevant to the individual choice should be included to explain the choice behavior. Although the analyst seeks to maximize the amount of observed variability, due to limitations of available data on respondents' characteristics, there is usually a substantial part of the heterogeneity that is unobserved (e.g. Hensher et al., 2015).

Thus, in general, choice modelers have favored models based largely or exclusively on unobserved heterogeneity (Fiebig et al., 2010), giving rise to some extensions of the basic Conditional or Multinomial

Logit model (McFadden, 1974) that assumes homogeneous preferences for alternatives' attributes. The most popular variants are the Random Parameters (or Mixed) Logit (RPL) model and the Latent Class Logit (LC) model to include heterogeneity due to tastes variation (unobserved preference heterogeneity), by allowing the parameters to vary randomly over individuals according to a continuous distribution or a discrete distribution (or set of classes), respectively. Another variant of the MNL model is the Scaled Multinomial Logit (S-MNL) model (Fiebig et al., 2010) that incorporates heterogeneity due to scale variation (unobserved scale heterogeneity), specifically to take into account the evidence found in the literature that the choice behavior may be more random for some individuals than for others and, therefore, the differences in preference structures may be explained by the variability on choice consistency. Nesting the S-MNL and RPL with normal mixing, Fiebig et al. (2010) developed the Generalized Multinomial Logit (G-MNL) model to explicitly account for both preference and scale heterogeneity.

Empirically, there has been a great deal of research comparing alternative models and as found by Keane and Wasi (2013), the preferred model for modeling heterogeneities depends on the dataset. Hence the comparison of several methods for modeling heterogeneity is a major task in any given application.

The goal of this paper is to understand the behavioral implications of considering distinct approaches for modelling individual heterogeneity and the gains in adopting more complex models, including the importance of explicitly accounting for scale heterogeneity. To this end, we estimate and compare a number of models on their overall goodness-of-fit and willingness to pay measures.

Using a dataset collected in 2018 comprising Swiss consumers, preliminary results show, from a behavioral understanding, that the estimated effects from the simplest model to the most complex are relatively consistent. Results coherently suggest the significant influence of Medals, Country of origin (France, Chile, Italy, Portugal), Grape variety (Cabernet Sauvignon and Red Blend) and Price on the utility of choosing a bottle of wine. However, Syrah variety, Landscape and Alcohol content do not exhibit statistically significant influence on the utility of choosing a wine across all models estimated.

Estimation results confirm the presence of a substantial amount of heterogeneity in preferences for most wine attributes and, therefore, differences across WTP estimates are found. Assuming the mean WTP space from G-MNL, we find that Swiss respondents are willing to pay a price premium for the following wine attributes: awarded, Chilean, red blend variety, French, Italian, Portuguese, and cabernet sauvignon variety. Ignoring scale heterogeneity will lead to higher mean WTP estimates and a significant mean WTP for American wine. It can be inferred that the greatest gains in estimating more complex models are obtained at the level of the willingness -to-pay measures.

**Keywords:** *consumers heterogeneity, consumer preferences, wine choice, discrete choice models*

#### **Acknowledgements:**

This work is supported by national funds, through the FCT – Portuguese Foundation for Science and Technology under the project UIDB/04011/2020.

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# HAVE THE WINES OF THE NEW WORLD AND OLD WORLD BECOME MORE DIFFICULT TO DIFFERENTIATE THROUGH TIME? AN INITIAL SENSORY BASED EXPLORATION

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Use of the binary terminology of Old World (OW) and New World (NW) as applied to wine is subject to increasing debate (Rodrigues, et al., 2020; Anderson, 2018). However, there remains support for the assertion that the OW represents Europe and Mediterranean countries, and the NW incorporates all other wine producing regions. For now, that differentiation just holds. There is an established perception amongst many critics and consumers that OW and NW wines are fundamentally different, both organoleptically and stylistically. It follows that they can be distinguished relatively easily, certainly by wine professionals. Even though the basic concept of what Old World and New World constitutes is being examined and challenged through various lenses (Banks, et al., 2010; Li, et al., 2018), the binary description persists. Each of the elemental sensory aspects of New World and Old World wines is often described quite differently. When compared to Old World wines, New World wines are typically expressed and described as: fruity; rich; warm; higher alcohol; more full-bodied; seamless; less acidic; and with smoother, less assertive tannins. Whilst Old World wines are not the antithesis of their New World counterparts, they are often referred to as being leaner in style, more austere, possessing tougher tannins, elegant, savoury and restrained (Huggett, 2006). The latter typify the sensory descriptors more often associated with the Old World style. This widely accepted generalisation extends to the ability to be able to distinguish between a NW and OW wine, again largely premised on these generalisations and preconceptions. This may well have been true in the past. The present work examines whether, over the initial two decades of this century, this ability to easily differentiate wines from these two geographical areas has changed and become more difficult, more nuanced and less certain. Have viticultural and winemaking advances, together with other externalities, combined to mask and blur organoleptic perceptions as to the typicality of OW and NW wines? A variety of disparate and related factors may account for such changes. OW wines may have evolved stylistically due to macro influences such as different and better clones, climate change, viticultural management advances, and/or application of progressive wine making skills and techniques. Similarly, New World wines have been subject to evolving viticultural practices, winemaking philosophies, new generations of winemakers and technological developments. Both OW and NW regions and their wines have benefitted from improved understanding of how to marry cultivars and specific clones with particular soil types and structures. This has been aided by effective research and the resultant development of new clones (Anesi, et al., 2015; White, 2020. Van Leeuwen, et al., 2019). The fundamental objective of the present work is to test the hypothesis that OW and NW wines have become more difficult to differentiate both organoleptically and stylistically. In addition, an attempt is also made to determine what the primary causal factors underlying any perceived convergence may be.

In order to test our hypothesis and achieve our goals, a corpus of wine reviews from the same assemblage of expert wine critics ( $N = 7$ ) for a range of wines from NW (16 wines) and OW (15 wines), spanning a 20-year period (from 1997 until 2018) have been mined and analysed. An attempt was made to make the

wines comparable in terms of the grape varieties. In addition, the published assessments/critiques analysed are from wines at the same stage of their development. Each wine had to be sufficiently well known and contiguously produced during the entire research timeframe so that they attracted the same multiple expert and professional reviews every year. Descriptors for each of the 31 wines were extracted for each year and every review. After a semantic categorisation, a final corpus comprising 126 descriptors was obtained: i.e., a large lexicon that subsumes gustatory, olfactory, structural and hedonic/aesthetic language. A Correspondence Analysis (CA) followed by a Hierarchical Cluster Analysis (HCA) were performed, categorising the descriptors in New World and Old World during the two periods, namely 1997 and 2014. The CA-HCA results showed that Old World and New world wines were described differently during both periods. Old World wines reviewed during Period One were typically described as sweet, having medium body, red fruit, coffee, being tannic, kirsch and fat. The same wines in the latter period were described as being velvety, sensuous, concentrated, pure and intense and having dark fruits, violets, lemon and finesse. During the initial period (i.e., 1997-2001), the wines from the New World were typically described as earthy, mineral, cherry, vanilla, meat, grapefruit, nutty, forest. During the latter period (i.e., 2004-2008), they were described as being powerful, dense, powerful, creamy, floral, blueberry and elegant.

An additional analysis of wine alcohol level over these periods was also undertaken. For this analysis, a two-way ANOVA was applied considering the time period (1997-2001 and 2004-2008) and origin (OW or NW) as fixed factors considering individual effects and their interaction. This demonstrated a significant effect of both variables (origin:  $F=74.3$ ,  $p<0.0001$ ; period:  $F=24.9$ ;  $p<0.0001$ ) on the level of wine alcohol, but no significant interaction ( $F=1.2$ ,  $p=0.2$ ). This indicates that an increase in the alcohol level of wines was observed from Period One to Period Two, regardless of the wine origin. Also, regardless of the period, the alcohol was higher in NW wines than in those of the OW. It was also observed that the alcohol level variability across the wines (measured as standard deviation) was greater amongst the Period Two, OW wines (ranging from 12.0 to 15.8%;  $Sd = 0.8$ ) than amongst Period One wines and for NW wines from both periods.

Further research into the detail of the causal factors behind the present results would be of value to viticulturists, winemakers and the retail sector. Also, an expanded analysis with a focus on white wines would also help to validate the work done so far.

**Keywords:** *Old World; New World; Organoleptic; Sensory.*

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## VEBLÉN ON WINE: AHEAD OF HIS TIME?

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The American economist and popular pundit Thorstein Veblen (1857–1929) is best known for coining the phrase “conspicuous consumption.” Veblen’s fame peaked in 1899, when he published his bestselling book *The Theory of the Leisure Class* and went on the lecture circuit. The central claim in Veblen’s work was that the vast majority of spending and consumption by affluent consumers is motivated by the desire for social status rather than by physical needs. Veblen observed that consumers with extra disposable income tend to seek out scarce or unique goods that are in vogue among upper-class aristocrats whose lifestyle such consumers wanted to emulate.

Veblen argued that when disposable income increases, the behavior of consumers across all classes becomes increasingly motivated by the aspiration to maintain or elevate one’s social status by imitating the upper-class way of life in every respect, which means displaying “conspicuous waste” in one’s lifestyle and conforming to the “canons of taste” in one’s consumer preferences. In Veblen’s work and elsewhere, the taste for and spending on fine wines and rare wines is often cited as a classic example of such “aspirational” consumption.

In recent years, results from a variety of blind wine tasting experiments have suggested that consumer demand for expensive wine may be better explained by packages, labels, and conformity with expert opinion than by the sensory qualities of the wine (Goldstein et al., 2008; Hodgson, 2009; Ashton, 2014). In spite of this apparent dissociation price and sensory preferences, the 21<sup>st</sup>-century wine market has been flooded with thousands of new expensive, small-production wine brands, many of which have succeeded. These results are in line with Veblen’s observations, more than a century earlier, that in a leisure economy where basic consumer needs are satisfied, firms seeking sustained profitability may increasingly compete on what Veblen calls “salesmanship (includes, e.g., needless multiplication of merchants and shops, ..., sales-exhibits, sales-agents, fancy packages and labels).”

In 1950, Veblen’s theories were codified by the economist Harvey Leibenstein in a *QJE* paper entitled “Bandwagon, Snob, and Veblen Effects in the Theory of Consumers’ Demand.” Leibenstein (1950). Leibenstein’s “Veblen Effects” are characterized by upward-sloping demand curves, where an increase in price causes an increase in demand. In introductory economics courses, Leibenstein’s Veblen Effects are commonly cited along with Giffen Goods as the two known exceptions to the economic Law of Demand. In our view, however, although Veblen’s work can be well applied to present-day markets, the demand pattern Leibenstein describes has little to do with the real world and even less to do with Veblen.

Veblen’s prediction was not that an increase in price of a given good would cause an increase in demand for that exact good. Veblen did not predict upward-sloping demand curves, as Leibenstein did. Instead, the basic effect Veblen predicts is that in a market where most consumers’ basic physical needs (food, water, shelter, heat, cooling, etc.) are met, the drive for social status dominates consumer demand.

Let’s say that a consumer buys a Rolls-Royce instead of a Hyundai to impress his neighbors and feel better about himself. This purchase motivation, and the desire to spend a lot more for the Rolls-Royce, does not mean that raising the price of the Rolls-Royce will increase its sales. Nor does it mean that decreasing the price of the Hyundai will decrease its sales. Veblen simply asks why anybody would buy a Rolls-Royce when a Hyundai of equivalent size would serve their practical needs just as well. The choice to spend extra on a

high-priced luxury good is not motivated by practicality: it is motivated by social signaling, by wanting to have the feeling of driving around like you're the Queen of England.

Collectors who buy rare and expensive wines, like collectors who buy rare and expensive cars, tend to pride themselves on *not* merely choosing a product because it's the most expensive. They pride themselves on expressing their own personal taste in their choices. Once they've made a choice of product, luxury consumers are as price-sensitive as anyone, and they might well haggle over price. A wine collector who sets their sights on a bottle of 2010 Château Margaux will seek out the *lowest*, not the highest, price for a case of that wine at auction (as long as it's believed to be genuine).

So the real Veblen effect (as we see it) does not express in an upward-sloping demand curve for an individual good. Rather, what Veblen centrally observes is that with increased disposable income comes a consumer shift from lower-priced to higher-priced goods of similar functionality. It is in their choice of the whole higher price *range* (one encompassing the acceptable group of classy blends reflecting the tastes of the aristocracy) that the desire to spend more just to spend more manifests.

In this paper, we apply our own interpretation of Veblen's original theory—untarnished by Liebenstein's tradition—to the present-day wine market. We observe multi-modality in the frequency distributions of US wine prices (shown with histograms) and a segmentation of the wine market into several premium sub-segments, a phenomenon that is best explained by Veblen's theoretical framework of luxury demand. We also aim to correct some common misconceptions about Veblen's theoretical stance, and to protest the misnaming of Liebenstein's "Veblen effect" in economics.

**Keywords:** *Wine, Luxury Goods, Prices, Conspicuous Consumption, Veblen, Economic History*

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# THE ROLE OF FEELINGS IN ALCOHOL CONSUMPTION. INSIGHTS FROM ITALY

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Scholars analyze alcohol consumption both as a driver and a consequence of positive or negative emotions and feelings (Tartaglia and Bergagna, 2020; Calvo-Porrall et al., 2020). Many research analyse the impact of alcohol consumption on life satisfaction, with contradictory results. Some studies document lower life satisfaction among heavy alcohol consumers than moderate consumers and abstainers (Livingstone, 2009). Other studies reveal an inverse U-shaped relation, with moderate drinkers reporting a higher level of satisfaction than high and low drinkers, or an inverse J-shaped relation, with drinkers at all levels reporting higher life satisfaction than abstainers (Massin and Kopp, 2014). These inconsistencies are explained by different socio-demographic characteristics of consumers, like gender and age, or different consumption motivations (Murphy et al., 2005; Tartaglia and Bergagna, 2020).

Wine consumption is usually associated with positive emotions and connected with symbolic and experiential purposes, linked for example to the concept of enjoyment and to lifestyle-related factors (Charters and Pettigrew, 2008). It is correlated with subjective well-being when associated with food, and research highlights consumer involvement as a key variable in influencing emotions and satisfaction (Calvo-Porrall et al., 2019; Silva et al., 2016).

The purpose of this study is to determine the extent and importance of feelings in affecting consumption of wine, beer and spirits, and the moderator role of socio-demographic characteristics.

The research objectives are reached by analysing data collected in 2017, 2018, 2019 by ISTAT (the Italian National Statistics Institute) as part of the multi-purpose survey “Aspetti della Vita Quotidiana” analysing relevant aspects of the everyday life of Italian families. The sample is composed 115,541 individuals from more than 38,000 families selected on geographical bases in order to be representative of the Italian population. This research project analyses three groups of information included in the big survey conducted by ISTAT: i) socio-demographic characteristics of respondents (age, gender, education level, household, occupation, provenience); ii) feelings, analysed through selected items from the 36-Item Short Form Survey Instrument (SF-36) by Ware and Sherbourne (1992); iii) consumption frequency for wine, beer and spirits.

Our modelling strategy accounts for the interdependence among an individual’s level of drinking habits among wine, beer and spirits and a number of feelings which, in turn, depend on exogenous explanatory variables. This is done using a Generalised Structural Equation Model (GSEM).

Results confirm that feelings are able to affect alcoholic beverages consumption habits. Particularly, feeling calm drives people to drink more wine and beers than spirits, while anxiety results to be negatively related with the consumption of any kind of alcoholic beverage. After controlling for the effect of the socio-demographic, the estimated models reveal that when Italian people have positive feelings, they drink more wine and beer; when they have negative feelings they tend to consume more spirits.

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## Parallel Sessions XVI - Expert

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# DOES EXCELLENCE PAY OFF? THEORY AND EVIDENCE FROM THE WINE MARKET

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We investigate how product quality affects firm profitability in competitive markets with vertical and horizontal differentiation. We first develop a theoretical model and derive the conditions that affect the relation between quality and profitability, the latter defined as the ratio of equilibrium profits to the invested capital. We then provide an empirical analysis of 1,052 Italian wineries over the period 2006-2015. Using different econometric methodologies, we find robust evidence that wineries' reputation for product quality does not affect profitability, measured by the Return on Invested Capital. We conclude by discussing the generality of our findings and their policy implications.

**Keywords:** *product quality; firm profitability; vertical and horizontal differentiation; reputation for product quality; Return on Invested Capital; wine market.*

## **Acknowledgements:**

We thank Orley Ashenfelter, Paolo Bertoletti, Federico Boffa, Giacomo Calzolari, Marco Costanigro, Alessandro Gavazza, Philipp Kircher, Enrico Minelli, Raffaele Miniaci, Steven Stillman, Karl Storchmann, Mirco Tonin, David Yanagizawa-Drott, the seminar participants at the Free University of Bolzano and the University of Brescia, and the participants at the EARIE 2021 (Bergen, online), the ERSA 2021 (Bolzano, online), the AAEA 2018 (Washington), and the 2018 Wine and Hospitality Management Workshop (Lausanne), for helpful discussions and suggestions.

# INFORMATIONAL VALUE OF PEERS' AND EXPERTS' RATINGS ON PERCEIVED QUALITY: STATED AND REVEALED PREFERENCE OF WINE CONSUMERS IN A NON-HYPOTHETICAL HOME USE TEST SETTING

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**Purpose** - Most of the world's wine consumers consider wine buying as a risky activity due to a high level of confusion stemming from the complexity of the market. A solution to cope with this confusion is for consumers to rely on better informed agents when making their decision. These third parties may be either peers or experts offering homogenous information mapped on a single rating scale comparable among wines. The positive or negative word of mouth (PWOM/NWOM) expressed in the form numerical ratings may have an influence on the consumers.

This paper aims to examine the extent to which the perception, evaluation, and willingness to pay for wine of wine consumers are influenced by their exposition to wine quality information in a home use-test setting.

**Design/methodology/approach** - This research design is at the crossroads of psychology, sensory sciences, and experimental economics. As an alternative to laboratory tests, we designed a remote sensory evaluation using a home-use-test (HUT) setting and an experimental online auction. We expose a representative panel of untrained regular consumers of red wine (n=300) from France (n=150) and Spain (n=150) to both positive and negative word-of-mouth (either peers' or experts' ratings) in a home-use test setting.

The participants receive at home four 2cl samples (the equivalent of one swallow) of four red wines selected on the Vivino dataset. All four wines display the same information presentation, vintage 2018, from two famous wine regions: Bordeaux and Rioja. Though this information is not communicated to the participants, all four wines are in a similar price range. The sets of two wines, from similar regions, allow testing for both positive word of mouth (PWOM) and negative word of mouth (NWOM) impact because they received either high or low ratings from peers and experts. The ranking of the wines differs from peers to experts, allowing to tackle the endogeneity problem.

We use a between-subjects experimental design to test the hypotheses. To ensure the correspondence in both countries we proceed to a back-translation of the questionnaire. To avoid wine order bias, the wine order presentation is randomized using a Latin square – Williams design. The participants are randomly assigned to one of three groups to ensure that the baseline participant characteristics are comparable across the groups. The first group is the control group, the second is exposed to both positive and negative expert ratings only, and the third one to both positive and negative peer ratings only.

The participants connect to the Timesens platform and taste the wines while being video recorded online. They also answer a set of questions and participate in a BDM auction for each wine. To unveil the stated

and revealed preferences of the participants, we combine the use of emotion monitoring with Facereader, stated liking, and the use of free comment (FC-AEF – Attack Evolution Finish) for a word-based sensory description of the four red wines. Thus, variables like product category involvement, opinion-seeking behavior, and subjective knowledge are tested on previously validated scales. Thanks to the questionnaire we also reconstruct the purchasing and consumption patterns of the respondents. To determine the impact of the information provided on their willingness to pay, we conduct online a non-hypothetical design, the Becker, De Groot, Marschak (BDM) experimental auction method for each wine. Only one of the four wines is randomly selected for the real auction, ensuring the incentive compatibility of the study. Participants are then re-contacted after one week to confirm the hedonic valence of the terms used in the FC section. The study will be replicated in lab conditions in march 2022 to test for the influence of the environment on the results obtained.

**Findings** - Some results are yet to be developed to determine the informational value of peers' and experts' ratings to wine consumers.

**Practical implications** - Our interdisciplinary study involving experimental economics, sensory sciences, and psychology contributes by presenting the first protocol for conducting a combined HUT, online auction as well as implicit and explicit measures of the sensory and hedonic analysis. It is also the first exploratory study developing a covid-proof experimental design for wine monitoring both stated and revealed preferences as well as willingness to pay.

For the industry, it is valuable to better understand what source of quality information has more value for the consumers.

**Keywords:** *Incentive compatible experiment, willingness to pay, stated and revealed preferences, positive and negative word of mouth, perceived quality*

#### **Acknowledgements:**

This research is supported by Interreg Sudoe – VINCI SOE3/P2/F0917, Chaire Vins & Spiritueux INSEEC U., Burgundy School of Business and ECOR (Université de Bordeaux).

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Available upon request

# THE ROLE OF CUSTOMER AND EXPERT RATINGS IN A HEDONIC ANALYSIS OF FRENCH RED WINE PRICES

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Wine is an experience good whose true quality can only be known by consuming it. This characteristic provides a rationale for expert ratings which deliver information on wine quality and reduce the information asymmetry for the consumer. The market for expertise has developed considerably since the 1980s and the role of experts has become central to the pricing of wines. Numerous econometric studies have demonstrated this, based on hedonic regressions that analyse the price of a wine in terms of its different attributes. The evaluation of one expert in particular (Robert Parker) has been found to have a very strong impact on prices. Parker's withdrawal in 2015 left a significant void in the wine expertise market. The question that has emerged since and remains unanswered is: who will replace Robert Parker?

We hypothesize that consumers' ratings will come to dominate expert ratings in the wine expertise market. Consumers may in the future rely more on the comments and ratings of other consumers or peers, rather than on those of experts (guides, specialized journals, personalities). This hypothesis is based on what has been observed in the hospitality (restaurants, hotels) and cultural (movies, novels, etc.) markets where very popular applications exist and allow information to be collected from peers. A similar type of application for wines, Vivino, has existed for several years and its use is growing exponentially. Created in 2010, this platform has more than 50 million users and contains ratings on tens of thousands of wines from around the world.

The objective of this study is to test our hypothesis in a hedonic regression framework which includes the usual attributes of the wines as well as the ratings from both recognized experts and those of consumers on the Vivino application. We use 37,960 entries in the Vivino database on French red wines with vintages from 2000 onwards. The estimation of a standard hedonic price equation including the average expert score and the average consumer rating shows that peers' ratings have a larger effect on price than experts' scores: a 1% increase in the average consumer rating would increase bottle price by around 9.5% other things being equal (including vintage, wine area and classification by 'cru') compared to 5.5% for an equivalent 1% increase in the average expert score. These initial results are found to be robust to outliers and the general conclusion that peers matter more than experts as far as price is concerned still holds when we exclude the top-end wines. Using a Hausman test we also conclude that consumer ratings do not appear to be affected by the price of the wine.

**Keywords:** *Quality evaluation, Wine prices, Hedonic value, Wine experts, Peer rating*

## Parallel Sessions XVII - Perception

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# PERCEPTIONS OF POSITIVE EFFECTS OF MALVAZIJA ISTARSKA MODERATE WINE CONSUMPTION ON HUMAN HEALTH AND PSYCHOLOGICAL FUNCTIONING - A PRELIMINARY STUDY

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Since the discovery of the so-called ‘French paradox’ by Renaud & de Lorgeril, M. (1992), a diet of high fat and cholesterol intake along with red wine that does not negatively impact health, such as cardiovascular risks, medical surveys found more positive relations of wine and health and more biochemical substances with positive effects on human health (Anekonda 2016; Golderg . The positive effects include blood pressure, cholesterol levels, blood lipids, diabetes, obesity regulation, prevention of atherosclerosis, cardiovascular disease, anti-inflammatory and antitumor effects. In addition to the positive impact on physical health, evidence exist on positive impacts of phenolic compounds (stilbenes, especially resveratrol) on mental health regarding protecting neuronal cells from damage, preventing the development of neurodegenerative diseases, treating depression, improving cognitive function, and increasing memory (Ares et al., 2015; Diener et al., 1999; Guilemin et al., 2016). The positive psychological responses of humans caused by moderate wine consumption respond to a positive sense psychological well-being, fewer or no symptoms of depression, and a higher level of positive affects and lower negative affects.

During the scientific project “Vinum Sanum” several research questions were set and hypothesis upon whom surveys were conducted. The surveys included questions about human behaviour towards wine, medical aspects of wine consumption, comparison of consumers and non-consumers perceptions about health attributes of wine. The study was carried out in accordance with the Declaration of Helsinki developed by the World Medical Association and was approved by the Ethics Committee of the Clinical Hospital Center Rijeka (Croatia). The purpose of the study presented in this article was to show how wine consumers perceive wine and how it affects their psychological state. The main objective of this survey was to provide evidence about moderate wine consumption of Malvazija istarska on human health, the possible positive effects of wine consumption on psychological well-being and to detect positive perceptions towards wine. The objective was achieved by testing participants during a period of six weeks of moderate wine consumption of autochthonous Croatian grapevine variety Malvazija istarska (*Vitis vinifera* L.) produced in Istria county.

The data were collected from wine consumers at two time points (in June and July 2019) before and after wine consumption with a self-completed questionnaire that was administered by trained researchers. Two questionnaires were used, one to measure the psychological response of the influence of moderate wine consumption and one to measure the perception of wine and its health attributes. Variables were measured with the Likert scale (1-5 for wine attributes and 1-10 for psychological affects). For data processing descriptive analysis (M, SD), and factor analysis were used.

Results indicate the awareness of positive health aspects of wine consumption, connected to the positive effects of wine on cardiovascular health (namely, heart, blood vessels health and levels of blood cholesterol). Wine was perceived as a natural and healthy beverage, in a positive sense with its relaxation, hedonistic effects and quality attributes (ageing/vintage, terroir, micro region/vineyards). The psychological

affects/subjective well-being included negative stress affects (being nervous, anxious and under pressure) that were explained by everyday pressures of work and family obligations. The construct of negative affects was separate from the positive affects expressed with feelings of happiness, emotional stability and positive general well-being feelings. The obtained results about positive effects of moderate wine consumption may be useful for other researchers in medical branches who question if moderate wine consumption has positive or negative effects on human health, and may serve in current discussions at the World Health Organization on wine and health.

**Keywords:** *Moderate wine consumption, wine consumers' survey, health, Croatia.*

#### **Acknowledgements:**

This research is supported by the Croatian Science Foundation, project „Influence of different vinification technologies on the qualitative characteristics of wines from Croatian autochthonous varieties: the role of wine in human diet “- VINUM SANUM (IP-2018-01-5049).

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# THE WEIGHT OF THE BOTTLE AND ITS EFFECT ON PERCEPTION OF QUALITY AND WILLINGNESS TO PAY FOR RED WINE

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Multiple research has shown that extrinsic properties of packaging such as colour, shape, texture, sound, smell and weight can have a decisive influence on the quality perception of products (for a detailed review of the empirical evidence see Piqueras-Fiszman & Spence, 2015). Piqueras-Fiszman and Spence (2012) have shown that there is a relationship between the weight of wine bottles and the expected price. However, the 2012 experiment did not assess intrinsic quality attributes. Our study combines existing results on the relationship between extrinsic attributes, quality perception and willingness to pay with the evaluation of intrinsic quality attributes for Austrian consumers.

The aim of this empirical study was to investigate whether the weight of a bottle has an influence on sensory perception of quality and the consumers' willingness to pay. In order to be able to make statements on the gustatory quality perception, an experiment with an experimental group (n=22) and a control group (n=24) with a quantitative survey in the form of two questionnaires was chosen as method. The subjects from a convenience sample were randomly divided into two groups and the weight of the bottle served as an independent variable. One group was given wine in a bottle with a low weight and the other group was given a wine bottle with a high weight. Test persons were then asked to pour themselves a glass from the respective bottle and then to complete the first questionnaire on intrinsic quality attributes and willingness to pay. The questionnaire asked about the quality cues origin, ageing potential, taste and colour, and whether the wine had received awards with high points. Willingness to pay was assessed using the van Westendorp Price Sensitivity Meter (PSM).

Both wine bottles of the Bordeaux type were not labelled, had the same glass colour and differed only in weight, and in barely perceptible differences in dimensions. The weight of the two bottles was 360g and 1200g, representing the outer ends of commercially available bottles. The wine selected was a neutral red wine with a medium level of tannins, which could neither be perceived as a wine that had been aged in small wooden barrels for a long time nor as a wine that had been aged in steel tanks.

After the survey of the intrinsic quality attributes and the willingness to pay, a second questionnaire with demographic information and questions that allow conclusions about the level of involvement of the participants was handed out.

In the run-up to the study, we assumed that consumers judge the quality of a red wine in a wine bottle with a higher weight better than the quality of a red wine in a wine bottle with a lower weight (H1). The results show that there is no significant difference ( $\alpha=0.126$ ) in the quality assessment of the wine depending on the weight of the bottle. In the present experiment, a higher bottle weight does not lead to a higher quality perception.

Furthermore, we hypothesized that consumers are willing to pay a higher price for a wine in a bottle with a higher weight than for a wine in a bottle with a lower weight (H2). Again, no significant difference ( $\alpha=0.122$ ) was found between experimental and control groups. The higher weight of the bottle therefore does not lead to a significantly increased willingness to pay among the test persons.

Although hypothesis 2 has to be rejected due to the result of the t-test, additional information could be derived from the findings of the van Westendorp PSM. It can be said that for all four values (PMC, IPP, OPP and PME) there is a higher willingness to pay for the heavier wine bottle compared to the lighter wine bottle. One of the limitations of the study is that the test persons did not taste the wine in a direct comparison. Since the direct comparison of products with different extrinsic properties corresponds more to the situation at the point of sale, perception is to be surveyed in a further, second study under precisely these conditions. The available results indicate that significant differences in quality perception and willingness to pay for different bottle weights only occur in a direct comparison.

**Keywords:** *Red wine, bottle weight, quality perception, willingness to pay*

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# CONSUMERS' WINE KNOWLEDGE AND PERCEPTIONS OF INNOVATIVE WINE LABELS AND PACKAGING

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The present study intends to understand how consumers with different types of wine knowledge perceive wine labels and packaging.

According to Ellis & Mattison Thompson (2018) wine is a complex and information-intensive product with a multitude of attributes, both intrinsic - the physical-chemical aspects of the wine, which are unique in each product and cannot be modified without changing the product (Boncinelli et al., 2019) - and extrinsic - the external aspect of the product (Ellis & Mattison Thompson, 2018). Due to this complexity, it is crucial to understand which type of wine attributes are best valued by the different groups of consumers in order to target various market segments effectively (Velikova et al., 2015).

Taking into account that consumers are not typically able to taste wine in a retail store, extrinsic attributes such as packaging and labels have an important role on consumers' decision (Lockshin et al., 2006). Although it is possible to find some studies about the influence of wine packaging and labels on consumers' perceptions (e.g. Barber & Almanza, 2006; Henley, Fowler, Yuan, Stout, & Goh, 2011; Sherman & Tuten, 2011; Rocchi & Stefani, 2006;), there seems to exist little research on this field focusing on the perceptions of consumers according to their knowledge about wine. Consumer's knowledge plays a key role on consumer purchase behaviour (Vigar-Ellis et al., 2015); indeed what consumers know about a product affects many aspects of their perceptions and purchase behaviour.

Previous research indicates that consumers with different wine knowledge value the elements of wine packaging differently. When it comes to wine knowledge there is a useful and interesting way to segment the wine market. Vigar-Ellis, Pitt and Berthon (2015) were the first to develop it, although it was the study by Ellis and Caruana (2018) that described each segment in more detail. The segments resulted from the relationship between objective and subjective wine knowledge, and the authors identified four different types of wine knowledge: Neophytes or Novices, Experts, Snobs and the Modest.

In this context, the present study intends to answer the following research questions:

- Do Experts, Snobs, Modest and Neophytes value wine label information differently? If so, which are the main elements on labels valued by each group?
- Do Experts, Snobs, Modest and Neophytes have the same perception and attitudes towards visual elements on wine packaging (design, shape and type of closure)?
- Do Experts, Snobs, Modest and Neophytes have different levels of acceptance of visual elements on wine packaging (design, shape and type of closure)?

In order to answer those questions data was gathered through an online survey conducted with 306 Portuguese wine consumers. The questionnaire was divided into six parts, that enabled the collection of data to measure the variables in analysis. All questions were mandatory with closed answers.

Subjective and objective wine knowledge was measured following the study by Ellis and Caruana (2018). Two different approaches to measure the importance of information on wine labels were used. Firstly, based on the study by Tootelian and Ross, (2000), to measure the overall importance of information on

wine labels, respondents were asked to indicate how important the label information was to them, on a 5-point scale. Secondly, a more specific approach, adapted from Thomas and Pickering, (2003), which measures the importance of each informational item present on wine labels, was introduced.

Label design and the scale to measure label preferences were based on the insights from the study by Sherman and Tuten (2011). The labels were created to represent visually three different design styles: Traditional, Contemporary and Novelty. To prevent possible biased opinions, each label contained the same informational elements: brand name, country, year and variety. Based on Sherman and Tuten (2011) a five-point Stapel Scale was used to measure attitudes and perceptions towards the label designs.

Finally, the choice of different packaging with various shapes, sizes and types of closure was mainly based on the research by Nesselhauf et al. (2017). More specifically, the study included four different packaging options: bottles with corks, screw caps, bag-in-box and StackTek. The packages were illustrated in the survey through images. To explore attitudes towards the different packaging options, the five-point Stapel Scale mentioned above was used once again. The acceptance of wine labels' design and packaging was measured through participants' intention to buy, in one item on a seven-point Likert scale. Once again, labels' design and packaging were illustrated on the survey through images.

In order to answer the research questions, analysis of the results included descriptive statistics and One-way ANOVA and MANOVA

The findings of the study showed that the importance of information on wine labels is significantly higher for Experts than for the Neophyte and Modest groups. Additionally, there were statistically significant differences in the importance of the informational elements on wine labels for the four groups. However, the same could not be concluded about the perceptions and acceptance of the visual elements of wine packaging. In fact, the results showed there were no statistically significant differences among the four groups.

These results provide important insights for those working in the marketing field, especially in the wine sector: Firstly, that consumers value information on the wine label in the purchase process; Secondly, despite the increasing number of innovative packages, consumers still prefer labels with traditional designs and bottles with a cork; Finally, when creating wine labels, marketers should give more attention to the Expert group than to other groups.

**Keywords:** *consumer knowledge; wine; labels; packaging*

**Acknowledgements:** This work is financed by national funds through the FCT – Foundation for Science and Technology, I.P., under the project UIDB/04007/2020

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# EFFECT OF CONSUMERS' RISK AND KNOWLEDGE PERCEPTIONS ON THE PROBABILITY OF IGNORING WINE ATTRIBUTES IN DISCRETE CHOICE EXPERIMENTS

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Knowing the drivers of consumers choice is important to understand its heterogeneous nature, and crucial to attend distinct demands, especially for complex experience goods, such as wine. Wine bottles' labels conveys significant information, on intrinsic (grape variety, region, and wine style) and extrinsic quality cues (brand, price, and others), which influence consumers' quality perception and choice, making wine a complex "experience good" (Mueller et al., 2010). It is hypothesized that wine complexity increases consumers' susceptibility to ignore information when making a choice, such that beyond the attributes and the buying context, consumer attitudes or perceptions may also induce them to choose wine differently, leading to a distinctive choice process.

An issue that seems evident is the level of knowledge (Flynn & Goldsmith, 1999). In fact, Ellis and Mattison Thompson (2018) show that wine knowledge types are significant predictors of purchasing behavior. Another issue is risk, as buying wine is considered a relatively risky decision, being perceived risk widely known as a factor which drives wine purchase behavior (Lockshin, Jarvis, D'Hauteville, & Perrouty, 2006). For wine, Mitchell and Greatorex (1989) state that its purchase typically involves functional risks such as social, financial and physical risks. Financial risk is associated to the price paid; performance (or functional) risk appears to be related to the taste of wine; social risk relates to negative outcomes which result in embarrassment with family or friends. Thus, consumers tend to use heuristics to reduce some risks specially when purchasing a product with visibility to others, as is the case of this study.

In sum, choice structures are not homogeneous, and knowing the sources of differences in consumers preferences becomes a crucial issue. To this end, most studies of consumer choices and preferences employ discrete choice experiments (DCE), a stated preference technique to understand people's preferences and values. In a DCE, an individual is presented with a choice between two or more alternatives described by multiple attributes. It adopts the rational choice model of behavior, where the individual is assumed to have well-formed preferences, full information, and maximizes utility by choosing the alternative that gives the highest utility.

In wine economics, DCE has been applied to understand the choice behavior that underlies the task of choosing wine. DCE applications on wine (e.g., Tang et al., 2015; Platania et al., 2016; Williamson et al., 2016; Annunziata et al, 2019; Ribeiro et al., 2020; Gonçalves et al., 2020) have shown the relative sensitivity of choice to wine origin, grape variety, landscape, awards or medals, brand, and. The majority of the studies assume a full compensatory behavior and do not attend to the fact that some of these attributes are possibly ignored by respondents (Ribeiro et al., 2020). The recognition of the limitations of the rational choice model and efforts to better address the potential for deviations from it have grown over the last two decades: some studies focus the role of complexity on choice behavior (Alemu et al., 2013), while others focus on choice heuristics (e.g., Hensher and Greene, 2010; Hensher, Rose, and Greene, 2005). Regarding

the second strand of literature, attribute non-attendance (ANA) is a particular rule of choice behavior commonly found in DCEs, where some individuals ignore one or more attributes (see Lew and Whitehead (2020) for a review). A specific case occurs when the respondents employ lexicographic decision-making rules, selecting an alternative based solely on the level of the most important attribute. In terms of prevalence, the use of heuristics is related to unfamiliar and complex goods whose choice requires a considerable individual cognitive effort (e.g., Alemu et al., 2013). The product's self-knowledge, as well as personal attitudes and beliefs may influence such choice behavior (e.g., Rosenberger et al., 2003; Yoo and Ready, 2014).

Using a stated choice dataset for wine collected in 2018 in Switzerland, this study aims to analyze information processing heterogeneity, namely a lexicographic choice behavior, in the context of a latent class model (Greene and Hensher, 2003). This model assumes that individuals are classified into a set of  $C$  heterogeneous groups or latent classes (unknown for the researcher), where members of each class share the same preferences, but the classes themselves are distinct from one another. Although homogeneity in preferences is generally assumed within each class, the model allows for the inclusion of interactions with covariates. We explore the inclusion of respondent characteristics (subjective knowledge, perceived risk and education) as determinants of belonging to a specific class of decision rules. Well-established and tested instruments were used: i) Flynn and Goldsmith (1999) self-perceived knowledge scale was used to measure consumers' knowledge perceptions and identify heterogeneous segments of consumers with more or less self-perceived knowledge; ii) Kang and Kim (2013) scale was adapted to collect data on perceived risk for wine with focus on social, financial and performance dimensions.

Preliminary results suggest that, in general, respondents with higher subjective knowledge are more likely to belong to "grape oriented" ANA class, respondents with higher perceived risk are more likely to be price driven, and younger respondents are more likely to belong to ANA class where only medals are considered. The findings suggest that wine knowledge is a significant predictor of grape variety, in line with previous results (Ellis & Mattison Thompson, 2018; Ferreira, Lourenço-Gomes & Pinto, 2022), revealing that wine consumers who think they know a lot about wine, tend to engage in more variety seeking behavior in their wine purchasing. Results also show that perceived risk is significant for choosing wine based solely on the price attribute, which suggest that it may act as a risk reduction strategy (Lockshin et al., 2006; Mueller et al., 2010). In sum, both are significant predictors of purchasing behavior and play an important role on using information processing heuristics (Robertson et al., 2018)

**Keywords:** *subjective knowledge, risk perception, consumer preferences, wine choice.*

### **Acknowledgements:**

This work is supported by national funds, through the FCT – Portuguese Foundation for Science and Technology under the project UIDB/04011/2020.

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## Parallel Sessions XVIII - Markets

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## THE ECONOMICS OF WINE, BEER AND CIDER

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The number of alcoholic beverage types has been increasing over time with lower alcohol content and more variety of flavors and tastes. The supply for “fun” drinks is rising and it is becoming difficult to tell the difference between wine, beer and cider. You can drink cherry wines, co-ferment of beer and blueberry juice that taste like a Lambrusco or rosé crispy ciders with flavors of pears that taste like a Prosecco. The increasing hybridization of wine, beer, and cider makes each beverage increasingly blurred and redefines the competition lines between products and markets.

The demand for wine, beer or other alcoholic beverages has been examined mostly separately in the literature, although wine is the most researched one compared to other beverages. Fogarty (2010) presents a survey of this literature and finds more than 130 papers estimating demand elasticity for beer, wine and spirits. Outreville and Le Fur (2020) identify a list of 117 papers published on wine price determinants over the period 1993-2018.

*Wine economics* has emerged as a growing discipline that analyzes wine-related issues not only within agricultural economics, but in adjacent fields such as finance, trade, growth, and environmental economics. Economists like Adam Smith, David Ricardo, John Stuart Mill or Leon Walras, all wrote, to some extent, about wine (Chaikind, 2012). Although these early writings are related to the value of vineyard land or trade, they refer to wine as an example. Nothing similar can be traced for apples orchards or cider, although cider was known in the Roman Empire and became popular with the Normans, whose conquest of England in the 9th century brought apple orchards and cider production and consumption (Watson, 2013).

A simple Google search in scholarly publications for the last ten years period 2012-2022 and for words such as *wine*, *beer* and *cider* (although Google hits of single words may result in an exaggerated count) results in a tremendous difference in favor of wine. These results are in line with the emergence of a new academic field called *wine economics*. *Cider economics* or *Economics of cider* do not exist yet. However, there are many similarities between cider, beer and wine that need to be explored.

The purpose of this paper is to examine the possible emergence of topics exploring the synergies in academic research between fermented drinks such as wine, beer and cider. Compared to beer, which is popular around the world, wine and cider production is mainly popular in temperate regions, where vines can grow, or apple trees can flourish. The highest wine production is in Europe, with Spain, Italy and France as the largest producers. Cider strictly refers to fermented products and its top three producers are France, Spain and UK.

In the first part of our study, we look at the segregated markets for wine, beer and cider and propose that cultural influences may explain synergies or complementarities in consumer behavior and consumption. In order to explain food and beverage consumption around the world, many studies in the literature identify cultural variables as pivotal (Penz, 2006; Cervellon and Dubé, 2005; Bartels and Reinders, 2010). Cultural influences on consumer behavior impact on purchase behavior, decision making, and responses to pricing

aspects (Craig and Douglas, 2005). Only a few studies have investigated the complementarities of the demand for beverages across cultures.

In the second part we propose to explore purchase behavior, decision making, and responses to pricing aspects. There are two common approaches to estimate consumer valuation for product characteristics. First, the hedonic price analysis commonly used in the wine sector (Outreville and Le Fur, 2020, for a survey). Second, the willingness to pay (WTP) estimation *based* on the maximum price at or below which a consumer will definitely buy one unit of a product. This corresponds to the standard economic view of consumer *reservation price*. A few papers apply this approach to the wine market (Yang et al., 2009; Holmquist et al., 2011; Lecat et al., 2016) and this paper explore the similarities for beer and cider.

In the conclusion, our study highlights possible emergence, developments and topics for academic research in wine, beer and cider economics. This is clearly a path to be followed to analyze synergies and complementarities between wine, beer and cider.

**Keywords:** *wine economics, beer, cider, consumer behavior, price analysis*

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# AN EMPIRICAL ANALYSIS OF LONG-RUN TRENDS IN WINE CONSUMPTION IN SCANDINAVIA 1860 TO 2020

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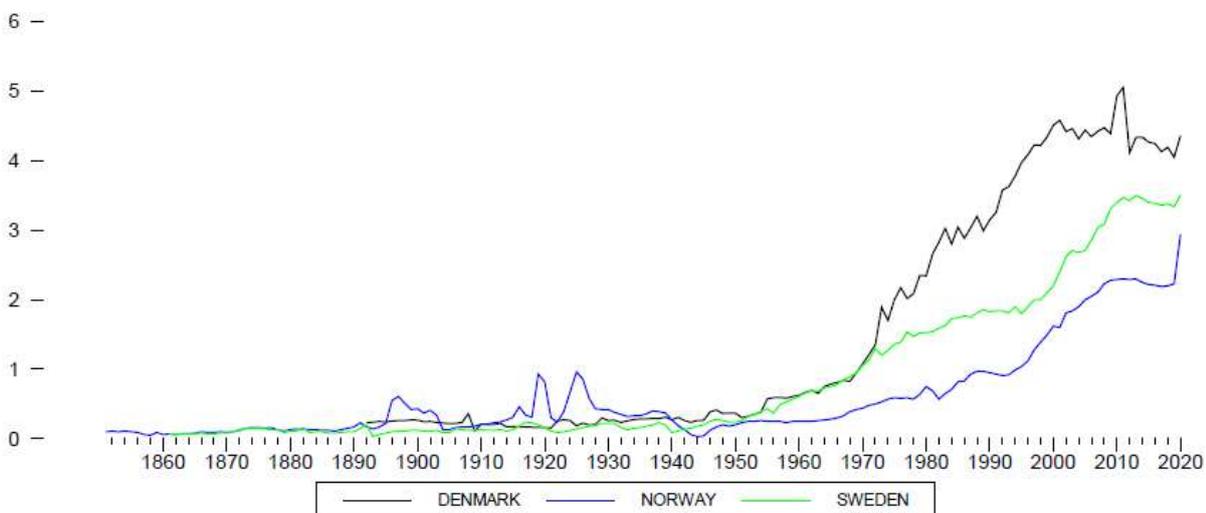
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The Scandinavian countries – Denmark, Norway and Sweden – have a history in the 19th Century of alcohol consumption concentrated on strong spirits, and with a relatively high level of per capita consumption. There has also been a long tradition for beer consumption. Much later – from the 1960s – wine has become a major part of the alcohol consumption culture in Scandinavia. Thus, wine consumption in Scandinavia was more or less absent until the 1960s, but from that period alcohol consumption shifted toward wine - especially in Denmark, where the present level is similar to the wine consumption in many southern European countries. Norway and Sweden are lagging behind the wine consumption level in Denmark, which possibly is caused by the state monopolies in these countries having a strict control of shops selling alcohol as well as a heavy alcohol taxation. The temperance movements have historically been stronger in Norway and Sweden as compared to Denmark and thus making it less socially acceptable to enjoy alcohol.

In addition to the history of wine consumption the analysis also includes a formal test of convergence in wine consumption, where Norway and Sweden seems to partly catch-up with the Danish level of wine consumption – although they still face a less liberal retail sector with regard to the marketing and sales of alcohol. The analysis build on long time series data for alcohol consumption, which are available back in time to the last part of the 19th Century. The existence of the data series is partly due to the high alcohol taxation and thereby the need to measure and collect data for beer, wine and spirits sales. For the present analysis data for per capita consumption (+15 years of age) for all three beverages go back to 1860 for Norway and Sweden and are available for all years up to 2020. For Denmark, the data cover the period 1890 to 2020. Figure 1 depicts these historical data for wine consumption in Scandinavia.

Figure 1. Wine consumption in Scandinavia 1860-2020 (liters of alcohol per capita, aged +15 years).



Normally alcohol consumption is measured as a simple sum of the per capita consumption of different beverages measured in liters of pure alcohol like the data exhibited in Figure 1. Due to the alcohol content

of the various beverages there will be an obvious difference between the total amount in liters or if measured in liters of pure alcohol – where the latter is often the case in empirical studies. However, even when applying measures in liters of pure alcohol, this methodology implicitly assumes that the various types of alcohol are perfect substitutes and can be aggregated via a simple summation. From an economic point of view – or a consumer utility approach – this may not be so simple. Consequently, the present analysis uses an alternative method that includes an analysis of both trends in levels of alcohol consumption as well as structural effects, where the latter is dealt with as the composition of beer, wine and spirits consumption. Basically, total alcohol consumption is represented by a 3-elements vector, which includes the amounts of beer, wine and spirits. The length of this vector in Euclidian space is the alternative measurement of ‘total consumption’ in contrast to a direct summation of the beer, wine and spirits amounts. Furthermore, with only beer, wine and spirits involved this alcohol consumption vector can be exhibited in the 3-dimensional space. Still, the concept can be extended to a  $n$ -dimensional space which is not needed here with only 3 beverages. The question of measuring the structure of alcohol consumption is based on the same vectors, where the length of the vector is interpreted as level. Differences in the angles among the vectors - for the countries involved - will be interpreted as structural deviations in the consumption patterns of beer, wine and spirits.

Although there have been large structural shifts within alcohol consumption in Scandinavia during the last century the differences between the countries have been much smaller. All countries have shifted alcohol consumption patterns from spirits and beer towards wine and these structural shifts have been somewhat parallel in the time dimension, which is reaffirmed in the analysis applying the before-mentioned methodology of quantifying the structural component in alcohol consumption.

**Keywords:** *Historical wine data, Scandinavia, Convergence in wine consumption, Structure of alcohol consumption*

# CAN WE HAVE SIGNIFICANT CROSS-CULTURAL DIFFERENCES WITHIN A COUNTRY? AN EXPERIMENT EXPLORING THE IMPRESSION OF SWISS RESIDENTS OF THE CONSUMPTION OF WINE IN CANS IN DIFFERENT OUTDOOR LEISURE CONTEXTS

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## 1. Introduction

Places associated with outdoor leisure have always included forests, the coast, lakes and rivers, mountains and deserts amongst other spectacular scenery (Bell et al., 2007). Paradisiac islands like those in the Caribbean area; luxury winter destinations such as the Swiss Alps, or deserts like the Sahara or the Arabian desert are historically offering a bunch of outdoor leisure options to visitors, fruit of a well-established-specialised system of hospitality.

During outdoor leisure, people consume a vast amount of food and beverages. In the luxury tourist sector for example, millions of bottles of wine are consumed every year during holidays, accompanying these outdoor leisure activities. The high consumption of wine in glass bottles, increases the level of greenhouse gas emissions and thus, the amount of total carbon footprint emitted. On the other hand, cans are known as being a convenient and trendy alternative to glass bottles. Aluminium cans made from 100% recycled materials are more sustainability efficient, with cans being more widely recycled, as well as being lighter in weight. Besides being more sustainable, they are easier to transport and because of the format, the cans also have potential to reduce over-consumption, as most sizes are 25cl, unlike bottles where the standard size is 75cl, presenting an opportunity for consumers to monitor their intake reasonably. But how the use of cans in outdoor leisure contexts during holidays is perceived by consumers? Which type of attitude do they have concerning the consumption of wine in cans and how these attitudes are grounded in culture?

This experiment has as main objective to examine whether people who consume wine in cans are perceived in terms of their basic personality characteristics, understand the role of cultural background on people perception, and verify the role played by the consumption context on people perception. Our hypothesis is that prejudice and negative attitudes towards wine in cans might exert a negative effect on the evaluation of people who consume canned wines. To evaluate this hypothesis, the consumption of wine in cans will be evoked in four different contexts of use during outdoor leisure activity (beach resort, ski resort, desert safari, and party). In order to examine the effect of culture on subject's response we use participants from Switzerland, a country where three different cultures, associated with three different languages, cohabit. This experiment would be later extended to participants from three different cultures (British, Italian and Swiss). The countries were chosen due to their "distance to the object" (see Dany, Apostolidis & Harabi, 2014 for a review). Switzerland is famous for its winter leisure activities. Italy is a country that encompasses both kind of holidays (winter and summer holidays) and the United Kingdom is a neutral country, depending on the season and the region visited. Three research questions were developed:

- a) Which type of personalities / values are perceived for the person that consume wine in cans?
- b) Do the contexts of consumption evoke different personalities to the given consumer?

c) Do the different personalities / values depend on the culture of origin of the participant?

## 2. Method

### 2.1 Participants

We have chosen Switzerland for its immense cultural diversity (because of geographical location and history). The main languages are: German (62.3%), French (22.8%), Italian (8%), and Romansh (0.5%). Here the language spoken is used as a proxy for culture. We distributed an online survey using a national representative database. A total of 796 answers were collected, representative of the population by age, gender and language (44 answers in English were excluded for the study).

### 2.2 Test Instrument

#### 2.2.1 Construction of scenarios

The scenarios were constructed focusing on different contexts of outdoor leisure activities during holidays: Beach resort, ski resort and desert safari. A neutral scenario (party) was proposed. Scenarios were randomly and equally distributed to the participants:

#### **Scenario (A)**

“Imagine you are on holidays.

You are on a beach and  
you see a person drinking a wine in can”

#### **Scenario (B)**

“Imagine you are on holidays.

You are on a ski station and  
you see a person drinking a wine in can”

#### **Scenario (C)**

“Imagine you are on holidays.

You are on a desert safari and  
you see a person drinking a wine in can”

#### **Scenario (D)**

“Imagine you are in an outdoor party.

you see a person drinking a wine in can”

Each subject was requested to read one of the scenarios described above. They were invited to project their selves into the scenario until they could describe the person who is consuming the canned wine in that occasion. They were instructed that this is a test to see how well they can size up an individual's personality based on very little information. Instructions and scenario were presented in the native language of each subject's nationality (French / German / Italian / English).

Once subjects read the scenarios, they were invited to rate their impressions (see table 1) of the person who consumes the wine in cans on a seven-point scale (from (1) = undisciplined to (7) = disciplined, for example). Then, subjects were redirected into two subsections where we explored more about the context of consumptions. On the quantitative side, we asked the participants to rate on a scale 1 to 5 his/her preference for type of activities (i.e., in order to avoid falling in clichés that Swiss participants go to the mountains) but also direct questions about canned wine, in order to learn more about their description of the product. Finally, a social demographic questionnaire was proposed (age, gender, level of education (as a proxy for income)).

Table 1. List of opposite attributes used to characterise the consumer of canned wines in each scenario.

Attributes	
Undisciplined	Disciplined
Not Health Conscious	Health Conscious
Environmentally Unfriendly	Environmentally Friendly
Unimaginative	Imaginative
Unpopular	Popular
Boring	Interesting
Unemotional	Emotional
Vulgar	Elegant
Ungracious	Gracious
Unsatisfied	Satisfied
Introverted	Extroverted
Unconscious	Conscious
Low Education Level	High Education Level
Poor	Rich
Ugly	Beautiful
Bad	Good

### 3. Results and Discussion

The canned wine drinker is perceived as: Not health conscious, Environmentally unfriendly, Imaginative, Interesting, Emotional, Vulgar, Gracious, Satisfied, Extroverted, Conscious, Low education level, Rich, Beautiful, Good (see table 2).

Table 2. Perceived personal attributes of the drinker (T tests)

GENERAL (n=752)				
	-	Mean	+	
	Undisciplined	3.486702	Disciplined	
***	<b>Not health conscious</b>	3.046543	Health conscious	
***	<b>Environmentally unfriendly</b>	2.901596	Environmentally friendly	
	Unimaginative	3.714096	<b>Imaginative</b>	***
	Unpopular	3.517287	Popular	
	Boring	3.735372	<b>Interesting</b>	***
	Unemotional	3.869681	<b>Emotional</b>	***
***	<b>Vulgar</b>	2.94016	Elegant	
	Ungracious	3.817819	<b>Gracious</b>	***
	Unsatisfied	4.12766	<b>Satisfied</b>	***
	Introverted	4.518617	<b>Extroverted</b>	***
	Unconscious	3.906915	<b>Conscious</b>	***
***	<b>Low Education Level</b>	3.355053	High education level	
	Poor	3.634309	<b>Rich</b>	**
	Ugly	3.80984	<b>Beautiful</b>	***
	Bad	3.801862	<b>Good</b>	***

Figure 1. Perceived personal attributes of the drinker by language of the respondent

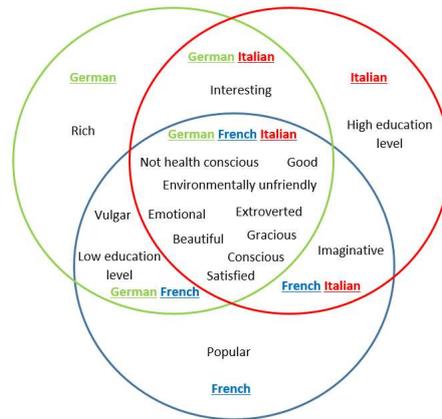


Figure 2. Perceived personal attributes of the drinker by the context of consumption

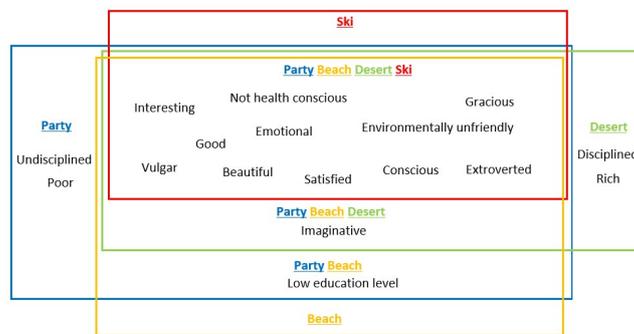


Table 3. Culture VS context (multivariate test)

GENERAL (n=752)		
Attributes	MV test Language	MV test Context
Undisciplined - Disciplined		**
<b>Not health conscious</b> - Health conscious		**
<b>Environmentally unfriendly</b> - Environmentally friendly	**	*
Unimaginative - <b>Imaginative</b>	**	
Unpopular - Popular	*	
Boring - <b>Interesting</b>		
Unemotional - <b>Emotional</b>		
<b>Vulgar</b> - Elegant	***	
Ungracious - <b>Gracious</b>	*	*
Unsatisfied - <b>Satisfied</b>	***	
Introverted - <b>Extroverted</b>	***	
Unconscious - <b>Conscious</b>	***	
<b>Low education level</b> - High education level	***	
Poor - <b>Rich</b>		***
Ugly - <b>Beautiful</b>		
Bad - <b>Good</b>	***	

Table 4. Do you think this person is...

	Across language			Across scenarios			
	German	French	Italian	Beach	Desert	Ski	Party
A man	62,3%	71,6%	60,8%	65,6%	72,3%	63,6%	51,2%
A woman	11,1%	2,2%	2,5%	6,1%	5,5%	5,7%	3,7%
Either of the two	26,6%	26,3%	36,7%	28,2%	22,3%	30,7%	45,1%

Table 5. How old do you think this person is?

	Across language			Across scenarios			
	German	French	Italian	Beach	Desert	Ski	Party
18 to 29	40,8%	30,2%	35,4%	33,7%	18,8%	48,3%	55,8%
30 to 39	22,0%	19,8%	19,0%	25,2%	20,5%	19,9%	21,2%
40 to 49	22,0%	27,7%	22,8%	18,4%	37,0%	19,9%	13,3%
50 to 59	11,9%	19,1%	15,2%	19,0%	18,8%	10,2%	6,7%
60 to 69	2,5%	2,9%	6,3%	3,7%	4,1%	1,1%	1,8%
70 or more	0,8%	0,4%	1,3%	0,0%	0,7%	0,6%	1,2%

There are differences between cultures and there are no significant differences across scenarios. The distance to the object may play an important role, all the attributes of the ski context (close distance) also apply to the other contexts (which differ in distance). There is an opposition of the party (undisciplined & poor) and desert (disciplined & rich) contexts (see figures 1 & 2).

Culture seems more important than context to define the perception of the attributes of the canned wine drinker (see table 3).

The drinker is perceived as being a man, with some contrast across scenarios and culture. The drinker is young, except for the desert safari (middle age) (see tables 4 & 5).

**Keywords:** *Canned Wine, Consumer Perception, Cross-cultural.*

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# CHALLENGES AND RESPONSES OF AGRI-FOOD ACTIVITIES UNDER COVID-19 PANDEMIC: THE CASE OF THE SPANISH TERRITORIES PRODUCING WINE AND OLIVE OIL<sup>1</sup>

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The irruption and rapid global spread of COVID-19 has led the vast majority of countries to face unprecedented challenges in the fields of health and economy. Spain has been one of the most affected countries in the world from both perspectives, with one of the highest mortality rates and with a profound economic impact characterized by a major economic contraction, very high unemployment, and an increasingly worrying situation of public finances.

The COVID-19 crisis has severely hit world food production and trade: international logistics problems and a slump in demand—especially during the confinement—via exports, with a strong impact on prices and incomes; rising rigor in health standards (in products and packaging); nationalist pressures on trade agreements; and the boom in online sales, given the collapse of the hotel, restaurant, and catering channel (HORECA).

These consequences have been added to the trends challenging agri-food activities (AFA) during the course of the 21st century: global population growth, which will require a 50% increase in agricultural production by 2050; climate change and resource scarcity, which call for greater sustainability; the integration of food supply chains in order to minimize costs and risks in terms of control, safety, and traceability in a growing regulatory context; an accelerated digital transformation, ranging from precision irrigation to high-tech greenhouses, GIS, and GPS mapping on farms, with data analysis or DNA labelling; and changes in food demand.

Notwithstanding, increased overall consumption is juxtaposed with higher demands for quality and variety by an increasingly informed consumer.

The pandemic has shown the strategic nature of these activities with regard to food security while at the same time putting a face to the humblest links in the food chain, in their daily, absolutely essential work of production and distribution. Our intention is to show the importance of olive oil and wine activities in Spain from a territorial perspective, demonstrating that local firms adapt their responses in collaboration with public bodies within a territorial institutional framework. The study of olive oil and wine activities is especially interesting because, on the one hand, they tend to generate agglomerative phenomena (clusters) in numerous rural areas, which promote the creation of firms and employment and local development processes involving a symbiosis between product and territory, and on the other hand, because they are two strategic agri-food branches in which Spain is a world leader, with the consequent repercussions on both the local/regional and national economies, as will be demonstrated in the descriptive analysis.

The academic literature has brought about great efforts to study the effects and consequences of the pandemic on different activities of business worldwide. More particularly, some papers have highlighted

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<sup>1</sup> Presentation of the paper published in *Sustainability* **2021**, 13, 13610.

the importance of resilience as a challenging process of responding to the consequences of crisis. Furthermore, regarding agri-food activities, researchers have posited the effects of the COVID-19 pandemic on agricultural value chains from different perspectives, also in the case of the olive oil and wine industries in Spain. However, none of these studies adopted a placebased approach which considers economic growth and structural change a territorial process where institutions condition the process of capital accumulation.

Given the fact that wine and olive oil activities in Spain are of great importance in rural territories as generators of employment and value added, it is worthwhile to ask ourselves, adopting a territorial approach, how the actors involved in the territorial value chains are responding to the challenges of the profound transformations that COVID-19 has brought about. Results will show that cooperation among local actors—who build territorial networks—in innovation processes, as well as product and market diversification, are paramount for making territories more resilient to face current and future challenges.

Therefore, the aim of the paper is, first, to corroborate through fieldwork the consequences of the pandemic in the firms producing wine and olive oil in Spain, and second, to find out the changes implemented in order to face it, the learnings that have been taken in, and the panorama for the future expected by managers and owners.

In order to meet these goals, in Section 2, the paper briefly presents the theoretical background under the territorial approach as well as the description of olive oil and wine activities in Spain. In Section 3, the materials and methods used to gain the strategic information about the firms in their territorial context are reported. Section 4 accounts for the main results of the research. Next, a brief discussion on the theoretical implications of these changes on territorial development is offered. Finally, the paper ends with some final comments for future research.

The research was designed to analyze the responses of Spanish wine and olive oil territories to dealing with the challenges that the COVID-19 pandemic has imposed on their productive and commercial activities. To this end, the study was carried out in different parts of the regions of Andalucía and Castilla y León, where olive oil and wine are the most prominent agri-food activities. Public bodies and local stakeholders took part as key informants and, for the sake of diversity, companies of various types of capital and sizes, and with different economic dynamics and corporate structures, were interviewed. Available quantitative data on sectoral reports were used to assess the relative weight of wine and olive oil activities in the selected regions.

Spanish territories producing wine and olive oil have demonstrated a great resilience during the hardest moments of the pandemic, in line with agri-food activities as a whole. Nevertheless, rural territories face significant challenges for the near future. Although the traditional ones have not been solved, such as the consequences of the lack of competitiveness, deriving from the vicious circle of depopulation, new challenges have also emerged. Among them, the acceleration of the process of digitization in all areas, increasing and diversifying the capabilities needed to manage agri-food business, and the need of planning for a new long term sustainable policy based on collaboration between local actors in order to implement successful actions on the territory.

**Keywords:** *Wine, Olive oil, Territory, Pandemic*

