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Linking Spanish wine farmers to international markets: Is direct export better than indirect export in improving farm performance?

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ABSTRACT

Selecting an appropriate export channel is one of farmers' most important strategic decisions as it determines farm performance. Although direct and indirect exports are two important channels linking farmers to international markets, little is known about whether direct export is better than indirect export in improving farm performance. This study addresses this research gap by analyzing the impact of export channel choice on wine export farm performance, utilizing data collected from 479 wine-exporting farmers from Spain. An inverse probability-weighted regression adjustment estimator addresses the selection bias issue of export channel choice. The results show that the wine export price received by the direct exporters is significantly lower than that received by the indirect exports. Using domestic intermediaries for exportation (i.e. indirect export) can reduce information asymmetry and transaction costs, which enable indirect wine exporters to sell their products at higher prices. However, there are no significant differences between direct and indirect exporters in export volume, value, diversity, and satisfaction. The findings highlight that direct and indirect exports do not generate differentiated profits, and wine farmers should choose one of them that can facilitate their access to international markets.

1. Introduction

Export channel choice is critical to successful export as modes are the agents of both opportunity identification and market response (Cieřlik et al., 2023; Ishii, 2020; Kalinic and Brouthers, 2022). Direct and indirect exports are two important channels that help link farmers to international markets. Direct export means that farmers sell their products directly to customers and agents in another country, while indirect export means that farmers sell their products to domestic third-party intermediaries who choose to re-sell those products to international markets (Cheng, 2021). Compared to direct export, indirect export involves a lower control power over foreign channels but requires fewer resource commitments. Besides, intermediary agents at the indirect export channel may help reduce information asymmetry between farmers and international buyers and lower transaction costs. Therefore, choosing an appropriate export channel is crucial for farmers seeking profit maximization, especially when farmers cannot easily switch channels once a channel is selected (Aulakh and Kotabe, 1997).

This study aims to improve our understanding of whether direct export is better than indirect export in improving farm performance, using survey data collected from 479 exporting wine farmers in Spain. Spain provides an appealing context to understand the

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relationship between export channel choice and wine farm export performance. Spain is one of the main traditional Old World wine-producing countries, characterized by small vineyards and promotion of their "appellations" or specified regions through regional, family wine growers (Rodrigues et al., 2020). Wine export activities occupy a prominent place in this industry as a whole, both in terms of employment and revenue (Marco-Lajara et al., 2023). The wine sector plays a fundamental role in the economic development of Spain (OIV, 2022). According to data released by the Spanish Wine Federation, Spain is the world's first-largest exporter of wine in volumes (more than 2300 million litres) and the third in export values (more than 2900 million euros) in 2021. In recent decades, domestic wine consumption has been reducing, which drives wine farmers to export wine to international markets and seek profits there (Abella-Garces and Ferrer, 2022).

While studies on transaction costs have provided valuable insights into how farmers select their export channels to seek the expected benefits (He et al., 2013; Manuel and Mauro, 1999), the resource-based view scholars highlight that indirect export may be beneficial for farmers who lack resources and foreign market information (Fernández-Olmos and Díez-Vial, 2014). Kalinic and Brouthers (2022) stated that although efficiency factors (e.g., export frequency and R&D intensity) are essential, farmers' decision-making process (i.e. whether decisions are made collectively or individually) should be considered when making the export channel choice decision. Researchers have also emphasized the need to complement the previous approaches considering the social context, including network theory or institutional theory (Jiang et al., 2018; Kalinic and Brouthers, 2022; Li et al., 2023).

When farmers choose to export, they need to select an export channel that is not only efficient but also allows them to create a competitive advantage in foreign markets to get higher benefits (He et al., 2013). Some studies have explored the factors that influence farmers' decisions to choose export channels and estimated the impact of export channel choice on export performance (Aulakh and Kotabe, 1997; Cheng, 2021; Fernández-Olmos and Díez-Vial, 2015; He et al., 2013; Kalinic and Brouthers, 2022; Li et al., 2023; Okpara, 2009; Rambocas et al., 2015). For example, Aulakh and Kotabe (1997) found that transaction-specific, strategic and organizational capability factors mainly influence people's export channel choices, and the export channel choice does not directly influence export performance. Building on resource-based views and institutional theory, He et al. (2013) concluded that a firm can improve export performance by aligning its export channel with its level of resource-based market orientation. Li et al. (2023) reported that firms selecting export channels that align with product development capabilities have higher export performance. While these studies provide valuable insights about export channel choice and its effect on farmers' export performance, they fail to account for selection bias issues associated with export channel choice. Failure to address the selection bias issue would generate biased estimates.

The present study, therefore, contributes to the literature by employing an inverse probability-weighted regression adjustment (IPWRA) estimator to address the selection bias inherent in export channel choice when investigating how export channel choice affects the export performance of wine farmers in Spain. The most attractive quality of the IPWRA estimator is that it is doubly robust, which assumes that the treatment effects estimates would be consistent and unbiased once either the treatment equation or the outcome equation is correctly specified (Chigusiwa et al., 2023; Zheng and Ma, 2022). As a further contribution, this study captures the wine farm export performance using four objective indicators (export price, export volume, export value, and export diversity) and one subjective indicator (export satisfaction), enriching our understanding of the effects of export channel choice. The findings would provide significant insights regarding how wine farmers should choose an export mode to sell their products at international markets.

The rest of the paper is structured as follows. Section 2 reviews the literature. Section 3 introduces the methodology. Section 4 presents and discusses the empirical results. The final section concludes the paper and discusses policy implications and limitations.

2. Literature review

An important decision that farmers need to make is which export channel they should choose because it is difficult to change the channel once chosen and also because the selected export channel has high costs and performance implications for exporting farmers (He et al., 2013; Li et al., 2017). Following this, Anderson and Coughlan (1987) indicated that one of the first decisions to be made by firms entering a foreign market is whether to distribute via integrated versus independent channels. This is considered an essential make-or-buy decision in management and has been debated in economics literature.

Although the existing research recognizes that the export channel that a farmer chooses is one of the most important strategic decisions (Kalinic and Brouthers, 2022), it is unclear how the export channel impacts export performance. Previous literature implicitly assumes that there is no best-performing export channel because otherwise, all the farmers always choose this channel (Fernández-Olmos and Díez-Vial, 2015). Since the direct and indirect export channels are all appropriate channel choices and each has certain advantages for the farmer, using a given channel will not explain channel performance. Thus, we do not expect a direct linkage between the export channel and exporting farmers' export performance.

There are several dominant perspectives to study the performance implications of export channel choice. Transaction cost economics assumes that farmers choose the most efficient export channel; that is, they will export directly at a lower cost than relying on intermediaries for those exporting activities (Cuypers et al., 2021). In particular, the experience and uncertainty of the exporting activity can be linked to the export channel performance. In a similar vein, Leonidou et al. (2002) demonstrated that the appropriateness of a particular export mode depends on variable foreign market conditions (e.g., economic situation, competitive practices, and distribution structure).

The strategic fit perspective of the resource-based view suggests that aligning export channel choice with farmers' capabilities leads to superior export performance (He et al., 2013). Empirically, Fernández-Olmos and Díez-Vial (2015) discovered that wine farmers choose their export channel based on their internal resources. Drawing on the resource-based view, He et al. (2018) considered the export channel an important moderator that can impact the value of resource-based advantages when expanding internationally. Other studies have evaluated the importance of capabilities complementarities in channel relationships (Chabowski et al., 2018; Griffith and

Dimitrova, 2014). Some of these capabilities in export activities include an exporter's ability to share information, communicate, and develop long-term relationships with distributors (Lages et al., 2005, 2009).

Some studies have examined the performance implications of choosing international entry mode channels. More specifically, they add the resources and mutual benefits incorporated in a relationship between two or more parties, that is, relational capital, to predict firm mode choice and performance (Caroli and Lipparini, 2002; Coviello, 2006). Although the effects of export channel choice on export performance are mixed, Zou and Stan (1998) conceived the channel relationship as a key determinant of export performance. Coherent with this result, other studies have confirmed that one of the benefits of a long-term commitment with the main distributor leads to enhanced export performance (Racela et al., 2007). In particular, Ibeh (2003) established that firm-specific competencies, such as developing channel relationships and networking, appear to influence the firms' export performance. Likewise, greater coordination with the intermediary provides a broader view of the export market, and as a result, it is expected to achieve satisfactory levels of export performance (Beaujanot et al., 2006; Karelakis et al., 2008; Racela et al., 2007).

According to the entrepreneurial theory of the firm, a firm's entrepreneurial orientation influences the export channel choice and export performance (Kalinic and Brouthers, 2022). On balance, whether a systematic relationship between export channel choice and export performance is central to all theoretical perspectives in International Business. Related to this consideration, there have been many empirical models, even analyzing when firms adopt various entry modes in their export activities (Oliveira et al., 2018), but their results have sometimes been contradictory (Kalinic and Brouthers, 2022). We theorize and test the idea that value-generating benefits derived from choosing a channel export mode are contingent on transaction cost, resource, knowledge, network and entrepreneurship considerations and, therefore, export channel choice will vary.

3. Methodology

3.1. Method

The impacts of export channel choice on the wine farm export performance can be estimated by the average treatment effect on the treatment (ATT). ATT is the average difference in outcomes of direct wine exporters with and without direct exporting (Manda et al., 2018; Wossen et al., 2017; Zheng and Ma, 2023). It is specified as follows:

$$ATT = E[Y_{ID} - Y_{IN}|D_i = 1] = E(Y_{ID}|D_i = 1) - E(Y_{IN}|D_i = 1) \quad (1)$$

where $E[\cdot]$ is the expectation operator; Y_{ID} is the outcome variable (export price, export volumes, export value, export diversity, and export satisfaction) of direct wine exporters in an observed context while Y_{IN} is the outcome variable of direct wine exporters in a counterfactual context. D_i is a binary variable that identifies whether a wine farmer is a direct wine exporter or not (1=direct wine exporters and 0=indirect wine exporters). The major issue of estimating Eq. (1) is that it is not possible to observe the counterfactual outcome ($Y_{IN}|D_i = 1$), i.e. the outcome of the direct wine exporters had they not chosen to export directly.

Different econometric models can be used to estimate the impact of export channel choice on wine farm performance in a counterfactual context. These include, for example, the endogenous switching regression (ESR) model (Khosla et al., 2023; Li et al., 2020; Zheng et al., 2021), propensity score matching (PSM) (Ma et al., 2022; Yoshida et al., 2022), and inverse probability weighted regression adjustment (IPWRA) estimator (Danso-Abbeam and Baiyegunhi, 2018; Zheng and Ma, 2023). Although the ESR model helps address selection bias issues originating from both observed and unobserved factors, it requires the inclusion of valid instrumental variables (IVs) in the selection equation. However, it is always challenging to identify valid IVs, especially in the second-hand open-access dataset and in a case with multiple dependent variables (five dependent variables in this study). Both PSM and IPWRA models address only observed selection bias. PSM assumes a consistent estimation when the selection equation is correctly specified, ignoring the correct specification of the outcome equations. Compared with the PSM model, the IPWRA model has a double-robust property, assuming a treatment effect estimation is consistent if the treatment or outcome model is correctly specified. Because we fail to find valid IVs that meet the requirements for five dependent variables, we employ the IPWRA model to estimate the impact of export channel choice on wine farm export performance.

The unbiased ATT estimates of the IPWRA estimator rely on the conditional independence (CI) and the overlap assumptions (Cattaneo, 2010; Linden et al., 2016). The CI assumption requires that the common variables affecting the treatment assignment and treatment-specific outcome are observable. In this way, these variables must remove the potential dependence between treatment and outcome (Celli, 2022). CI assumption is strong and requires that no unobserved factors, such as farmers' motivations to export or local weather conditions, influence a wine grower's decision to choose a particular type of export channel and the export performance. Violation of this assumption will lead to biased estimations. In practice, we include a rich set of control variables to satisfy the CI assumption. The overlap assumption requires that each wine grower has a positive probability of receiving each treatment level conditioning on a rich set of covariates. In practice, after estimating the probabilities that wine farmers choose to export, the samples with a negative probability can be dropped directly before estimating the treatment effects of export channel choice.

Econometrically, the IPWRA estimator estimates three steps to calculate the treatment effects. First, the IPWRA estimator computes the inverse probability weights (IPWs) by estimating the parameters of the treatment equation. We model wine farmers' decisions to choose direct exports as a random utility function to obtain the treatment equation. We assume that wine-exporting farmers are rational, and they decide to sell their products at the international markets to maximize their expected profits. Farmers have two channels to access international markets: direct export and indirect export (via domestic intermediaries). Let's assume that the expected profit from the direct export is U_D^* and the same from the indirect export is U_N^* . A farmer will choose to export his products to the

international markets directly if and only if $U^* = U_D^* - U_N^* > 0$, with U^* denoting the expected profit difference. Although U^* cannot be observed directly, farmers’ decisions to choose to export wine can be modelled by a latent variable function specified as follows:

$$U^* = \gamma X_i + \varepsilon_i, E_i = \begin{cases} 1, & \text{if } U^* > 0 \\ 0, & \text{otherwise} \end{cases} \tag{2}$$

where U^* can be observed by E_i , in which $E_i = 1$ if a farmer chooses to export directly and $E_i = 0$ otherwise. X_i is a vector of factors that influence farmers’ decisions to export wine directly or indirectly. γ is a vector of corresponding parameters to be estimated; ε_i is an error term. A probit model can estimate Eq. (2).

Second, the IPWRA estimator fits weighted regression models of the outcome for each treatment level using the estimated IPWs and obtains the treatment-specific predicted outcomes for each subject. To facilitate our analysis, we assume that the outcome model has the following specification:

$$Y_i = \alpha_i + \beta_i X_i + \mu_i, \text{ with } i = [0 \ 1] \tag{3}$$

where Y_i refers to a vector of outcome variables (export price, export volumes, export value, export diversity, and export satisfaction). α_i is a constant. X_i refers to a vector of factors affecting outcome variables. β_i is a vector of parameters to be estimated and μ_i is an error term.

In Eq. (3), $i=[0 \ 1]$ identifies equations for direct wine exporters ($i = 1$) and indirect wine exporters ($i = 0$). We employ linear regression to estimate (α_0, β_0) and (α_1, β_1) using inverse probability weighted least squares as follows:

$$\min_{\alpha_1, \beta_1} \sum_i^N (Y_i - \alpha_1 - \beta_1 X_i) / P(X_i, \hat{\gamma}) \text{ if } D_i = 1 \tag{4a}$$

$$\min_{\alpha_0, \beta_0} \sum_i^N (Y_i - \alpha_0 - \beta_0 X_i) / 1 - p(X_i, \hat{\gamma}) \text{ if } D_i = 0 \tag{4b}$$

Third, the IPWRA estimator calculates the ATTs by computing the means of the treatment-specific predicted outcomes and restricting the computations of the means of the subset of treated subjects. The ATT is then calculated as the difference between Eqs. (4a) and (4b) as follows:

$$ATT_{IPWRA} = \frac{1}{N_D} \sum_i^{N_M} [(\hat{\alpha}_1 - \hat{\alpha}_0) - (\hat{\beta}_1 - \hat{\beta}_0) X_i] \tag{5}$$

where $\hat{\alpha}_1$ and $\hat{\beta}_1$ are estimated inverse probability-weighted parameters for treated farmers (i.e., direct wine exporters); $\hat{\alpha}_0$ and $\hat{\beta}_0$ are estimated inverse probability-weighted parameters for untreated farmers (i.e., indirect wine exporters); N_D refers to the total number of treated farmers.

3.2. Data source

The data used in this study were collected from Spanish wine farmers. Here, a wine farmer is a term used to describe a grape grower and winemaker belonging to a Designation of Origin in Spain.¹ The data was collected in 2021. As every Regulatory Council keeps an updated file of their wine farmers, the population comprised 3661 wine farmers under the 70 Designations of Origin (DOs) registered until 2021 in Spain. To collect the data, an online questionnaire was emailed with a hyperlink to wine farmers in Regulatory Councils, with follow-up telephone calls. The sample selection was based on the following criterion: the minimum sample size for the wine farmers sample is 10 % of the population in each Designation of Origin (DO), guaranteeing adequate representation of wine farmers belonging to Designations of Origin. Under these considerations and after discarding incomplete samples, the total sample size used for the analysis in the present study comprised 688 wine farmers, corresponding to 68 Designations of Origin (Dos). After data cleaning, the sample used in this study included 479 wine-exporting farmers. Among them, 397 farmers are direct exporters and 82 indirect exporters.

Following previous studies on the wine industry (Chauvin et al., 2023; Fernández-Olmos and Díez-Vial, 2014), the questionnaire was designed and modified to suit the Spanish wine industry with a Designation of Origin. Further, a pre-test of the questionnaire was conducted by a small number of wine farmers in Spain. The final questionnaire was developed based on the feedback collected from the pre-test survey.

3.3. Measurements of key variables

3.3.1. Dependent variables

We consider four dependent variables to capture wine farm exporting performance from the objective perspective: export price,

¹ Cecrv: <https://vinosdo.wine/sala-de-prensa/el-sector-en-cifras/>

export volume, export value, and export diversity.

Specifically, export price is measured as a dummy variable considering data availability in the questionnaire. It equals one if the export retail price exceeds 36 euros per bottle and zero otherwise. Export volume refers to the ratio of exported volume to total production. Export value refers to the ratio of exported value to total value. Export diversity refers to the number of countries a farmer exports wine to.

We also consider one dependent variable to capture wine farm exporting performance from the subjective perspective: export satisfaction. Specifically, export satisfaction is a synthesized variable measured based on six items using the factor analysis approach. The survey questionnaire asked wine farmers, "How satisfied are you with your wine export performance?". Wine farmers were asked to report export performance satisfaction from six aspects: export volume, value per bottle, number of countries exported, number of labels (sku) exported, export logistics, and international brand recognition. Then, respondents were asked to answer the question on a five-point Likert scale, ranging from 1=very unsatisfied to 5=very satisfied. Based on the collected information, we use the principal component analysis to synthesize a variable representing export satisfaction based on the information collected for those six variables. [Diamantopoulos & Kakkos \(2007\)](#) emphasized that measuring wine export performance objectively and subjectively improves our understanding and increases analytical reliability.

3.3.2. Export channel choice variable

Export channel choice is used as the treatment variable. It is measured as a dummy variable, which equals one if a wine farmer chooses direct wine export and 0 otherwise (i.e. indirect export). Our database did not identify farmers who used direct and indirect exports simultaneously. Existing research on export channel choice suggests that the channel type implies different levels of control and resources over exports ([Kalinic and Brouthers, 2022](#); [Li et al., 2023](#)). Although direct export gives farmers the most control over the distribution decisions, it also requires greater resource commitments. Indirect export has the least control power because farmers delegate all the marketing tasks to intermediaries, but these last ones also bear most of the marketing costs abroad.

3.3.3. Selection of the control variables

As discussed earlier, the IPWRA estimator requires the inclusion of a rich set of control variables to satisfy the CI assumption. Following the existing studies ([Chabowski et al., 2018](#); [Cheng, 2021](#); [Fernández-Olmos and Díez-Vial, 2015](#); [Kalinic and Brouthers, 2022](#); [Karelakis et al., 2008](#); [Li et al., 2023](#)), we selected 11 control variables. They include wine differentiation, promotion mode, activity diversification, size, human resources, low exporting experience, high exporting experience, qualified designation of origin, distribution mode, exporting mode network, and individual decision-making.

From the perspective of transaction cost economics, wine characteristics can determine the optimal choice of export channel. In particular, highly differentiated wines that require considerable training and knowledge need direct exporting compared to easy, standardized wines. Transaction costs are high for highly differentiated wines, and the proprietary content of these wines increases monitoring and control costs, encouraging farmers to export them by themselves ([Fernández-Olmos et al., 2009](#); [Khemakhem, 2010](#)). Therefore, we include the variable representing wine differentiation, which measures the percentage of wines at entry level, as a control variable. Another issue of the exported wines is whether sponsors exist in their promotional activities in the foreign market. When farmers lack sponsorships for promoting their wines in international markets, they must make a large amount of promotional effort. In this case, it is expected to rely on independent intermediaries, which might become more effective in promoting the wine of several farmers. Therefore, we include the promotion model variable as a control variable. Specifically, the promotion model variable is measured as a dummy, which equals 1 if a farmer uses sponsorships above average and 0 otherwise.

Suppose some farmers diversify their production of agri-food products (oil olive). If this is the case, they may be able to export additional products through the same channel, and additional economies of scale could be achieved ([Anderson and Coughlan, 1987](#)). Thus, farmers with a greater diversification of production activities are expected to choose the direct export channel. Given this, we follow [Chauvin et al. \(2023\)](#) and include a variable representing activity diversification. The activity diversification variable captures the total number of diversified activities that farmers are engaged in.

From the resource-based view, the resources and capabilities of the farmer influence their ability and willingness to invest resources required to export directly. Based on this, farmers of greater size are expected to engage in direct exporting since resources are needed to absorb the high costs of setting up operations and marketing products and services in foreign countries ([Agarwal and Ramaswami, 1992](#)). It is also generally assumed that farmers with higher intangible resources are more likely to export directly. In particular, [Fernández-Olmos & Díez-Vial \(2014\)](#) found that human resources are the most important factor in their model of exporting mode choice. Based on this, we consider that the greater the importance of human resources, the greater the probability that farmers will choose to export their wine directly. Therefore, we include size and human resources as two of our control variables. Here, the size variable captures the number of temporal employees. The human resource variable is measured as a dummy, which equals 1 if agronomists work on the wine farm and 0 otherwise.

Exporting wines directly to international markets involves risks and uncertainties. Intermediaries can help reduce information asymmetry in wine exportation. Therefore, farmers with low exporting experience may be less likely to choose direct export, while their counterparts with high exporting experience may be more likely to do so. In this study, we include two control variables, low exporting experience and high exporting experience, to capture the relationship between exporting experience and export channel

choice.

The knowledge-based view posits that since exporting farmers are restricted in their experiential capabilities to perform all operations in different markets by themselves, their decisions to export directly are influenced by the resources and capabilities of their international experience (Johanson and Vahlne, 2017). Some wine farmers belong to Designations of Origin² (DOs), which are further qualified (i.e., QDO). These QDOs are associated with higher export values than the rest of the non-qualified DOs. Through the experience and learning acquired by these QDOs³ during their greater international exporting presence than DOs, farmers belonging to them can create export-specific strategic flexibility (Ipsmiller et al., 2021). As a result, farmers of QDOs are expected to have a greater probability of exporting directly than the rest of the farmers of DOs. This study, therefore, includes a dummy variable representing the qualified designation of origin as a control variable.

When exporting wine, industry farmers must adapt their wines to conform to consuming traditions, cultural specificities, and market trends in international countries (Khemakhem, 2010). Some wine farmers go to international wine fairs to distribute their wines. At the same time, they obtain accurate and adequate information and knowledge about changes in the wine market. As a result, farmers assisting international fairs might be able to directly export their wines more effectively than farmers who do not obtain market information from fairs (Johanson and Vahlne, 2017). Given this, we include a distribution mode variable as a control variable. The distribution mode is measured as a dummy, which equals 1 if farmers use wine fairs above average and 0 otherwise.

This study also uses an exporting mode network variable as a control variable to identify whether other farmers situated in geographical proximity use direct exporting. The justification of the exporting mode network variable is supported by agglomeration externalities on export behavior (Díez-Vial and Fernández-Olmos, 2013). The exporting mode network variable is measured by the number of farmers with direct export channels (controlled by the size of each DO). The entrepreneurship literature embodies the decision-making practices and processes farmers use to enact an export channel choice and represents their willingness to take risks in the exporting business (Kalinic and Brouthers, 2022). When farmers make the decisions individually, their desire to venture into the unknown and invest in projects with uncertain outcomes, such as exporting directly, will be greater than farmers engaging in collective decision-making processes with others. This is because the risk-taking propensity of each farmer will be different. A dummy variable representing the individual was created to identify whether a wine farmer makes decisions individually or collectively.

4. Results and discussion

4.1. Descriptive results

Table 1 presents the definitions and descriptive statistics of the selected variables. The table shows that around 17.3 % of farmers reported that their wines were sold at retail prices higher than 36 euros per bottle. The ratio of exported volume to total production (i.e. export volume) was 37.45 % on average. The ratio of exported value to total value (i.e. export value) was 38.99 % on average. An average farmer chooses to export his wine to around 12 countries. Most wine-exporting farmers (82.9 %) in Spain choose direct wine export. The descriptive statistics of the control variables revealed that around 30.3 % of wine farmers chose to use sponsorships. About 42.4 % of wine farmers had agronomists as employees. Only 16.1 % of farmers reported that they could make decisions individually.

Table 2 presents the mean differences between direct and indirect exporters in the selected variables. It shows no significant differences in export performance variables (export price, export volume, export value, export diversity, and export satisfaction) between the two groups of farmers, even at the 10 % significance level. However, the mean comparisons here did not control for confounding factors that influence wine farmers' decisions to export and export performance indicators. This could not be used to conclude how export channel choice affects wine farm export performance. The direct exporters and indirect exporters are systematically different in terms of observed characteristics. For example, in terms of production mode, direct exporters are less likely to use sponsorships than indirect exporters. Regarding human resources, direct exporters are less likely to use agronomists than indirect exporters. Direct exporters are more likely to be qualified in designation of origin than indirect exporters. Likewise, direct exporters are more likely to make decisions individually than indirect exporters. These observed differences highlight the importance of addressing the selection bias issue of export channel choice when estimating its impact on wine farm export performance.

4.2. Empirical results

4.2.1. Determinants of export channel choice

Table 3 presents the results of the treatment model, which are estimated by Eq. (2) using a probit model. The second and last columns show the regression coefficients and estimated marginal effects. Although the estimated coefficients help understand the direction of the association between the control variables and wine farmers' decisions to choose direct export, they could not be used to explain the magnitudes of the influence. In comparison, the marginal effects estimates give us a more intuitive understanding. Therefore, we rely on the results of the marginal effects estimations for interpretations.

The marginal effect of the wine differentiation variable is negative and statistically significant, suggesting that farms with a higher proportion of wines at the entry-level are 0.1 % less likely to choose direct export. The finding is consistent with previous studies (Jose Manuel and Mauro, 1999), reporting that the distribution of high-quality wines positively affects the probability of direct exporting.

² DO is a system used to control wine quality and each region is governed by a Regulatory Council.

³ Agostino and Trivieri (2014) obtain that quality wines produced in specified regions are associated with higher exports values.

Table 1
Variable definitions and summary statistics.

Variables	Definition	Mean	SD
<i>Outcome variables</i>			
Export price	1 if the export retail price is higher than 36 euros per bottle, 0 otherwise	0.173	0.379
Export volume	The ratio of exported volume to total production (in liters)	37.482	26.695
Export value	The ratio of exported value to total value (in euros)	38.989	26.655
Export diversity	The number of countries a farmer exports wine to	11.685	14.837
Export satisfaction	A factor extracted from 6 items: satisfaction with volume, price, countries, labels, logistics and brands in the export markets.	Alpha: 0.852 Eigenvalue >1: factor 1	
<i>Treatment variable</i>			
Exporting mode	1=direct export, 0=indirect export	0.829	0.377
<i>Control variables</i>			
Wine differentiation	% of wines in entry-level	52.689	40.232
Promotion mode	1 if a farmer uses sponsorships above average, 0 otherwise	0.303	0.460
Activity diversification	Number of activities (e.g. oil production) that farmer does	0.952	1.162
Size	The natural logarithm of temporal employees	2.066	1.098
Human resources	1 if there are agronomists working on the farm, 0 otherwise	0.424	0.495
Low exporting experience	1 if a farmer's exporting experience is less than 5 years, 0 otherwise	0.184	0.388
High exporting experience	1 if a farmer's exporting experience is more than 20 years, 0 otherwise	0.244	0.430
Qualified designation of origin	1 if DO is qualified (Rioja or Priorat Dos), 0 otherwise	0.278	0.448
Distribution mode	1 if a farmer uses wine fairs above average, 0 otherwise	0.417	0.494
Exporting mode network	For each DO, it is calculated the number of farmers with direct export channel (controlling by size of each DO)	0.829	0.129
Individual decision-making	1 a farmer makes decisions individually, 0 otherwise (collective decision-making)	0.161	0.368
Observations			479

Table 2
Mean differences of the selected variables between direct and indirect exporters.

Variables	Direct exporters	Indirect exporters	Mean differences
<i>Dependent variables</i>			
Export price	0.174 (0.379)	0.171 (0.379)	0.003
Export volume	38.217 (27.761)	33.927 (26.243)	4.289
Export value	39.526 (26.589)	36.390 (26.985)	3.136
Export diversity	11.826 (14.684)	11.000 (15.630)	0.826
Export satisfaction	13.187 (3.509)	13.013 (3.177)	0.174
<i>Independent variables</i>			
Wine differentiation	50.221 (39.969)	64.634 (39.594)	-14.4127***
Promotion mode	0.282 (0.451)	0.402 (0.493)	-0.120**
Activity diversification	0.960 (1.161)	0.915 (1.178)	0.0450
Size	2.071 (1.103)	2.043 (1.080)	0.028
Human resources	0.401 (0.491)	0.537 (0.502)	-0.1361**
Low exporting experience	0.174 (0.379)	0.232 (0.425)	-0.058
High exporting experience	0.252 (0.435)	0.207 (0.408)	0.045
Qualified designation of origin	0.302 (0.460)	0.159 (0.367)	0.144***
Distribution mode	0.426 (0.495)	0.378 (0.488)	0.048
Exporting mode network	0.849 (0.114)	0.732 (0.151)	0.117***
Individual decision-making	0.176 (0.382)	0.085 (0.281)	0.091**
Sample size	397	82	

Note: Standard deviation is presented in parentheses; ** and *** indicate significance at the 5 % and 1 % levels, respectively.

The negative and significant marginal effect of the promotion mode variable indicates that farms with sponsorships are 8 % less likely to choose direct export. Therefore, farmers with sponsorship have a lower probability of choosing to export directly.

The marginal effect of the human resource variable is significant and negative. The findings suggest that farms with agronomists as employees are 3.9 % less likely to choose direct export. This is contrary to our expectations. One possible explanation could be that many export assistance programs provided by Regulatory Councils assist farmers with the export process. It is more likely that the farmers who take the most advantage of these programs to export indirectly are those with formation. The marginal effect of the variable representing distribution mode is positive and significantly different from zero. The findings indicate that farmers with greater assistance to international fairs are 7.1 % more likely to export directly. International wine fairs effectively provide access to new customers and face-to-face meetings, which helps farmers export directly (Rodríguez et al., 2020).

The exporting mode network variable positively and significantly impacts direct export. The marginal effect estimates suggest that farmers in a cluster with neighbours exporting wines directly to international markets are 88.2 % more likely to export in the same mode. This finding is well in line with the fact that farmers located in a cluster could also gain access to the knowledge held by other exporting firms located around them, that is, export externalities (Díez-Vial and Fernández-Olmos, 2013; Lovely et al., 2005). Finally,

Table 3
Determinants of direct export channel: probit model estimates.

Variables	Coefficients	Marginal effects
Wine differentiation	−0.004 (0.002)**	−0.001 (0.000)*
Promotion mode	−0.354 (0.161)**	−0.080 (0.039)**
Activity diversification	0.077 (0.070)	0.016 (0.014)
Size	0.015 (0.071)	0.003 (0.015)
Human resources	−0.368 (0.158)**	−0.039 (0.035)**
Low exporting experience	−0.310 (0.194)	−0.072 (0.050)
High exporting experience	0.112 (0.192)	0.022 (0.038)
Qualified designation of origin	−0.177 (0.210)	−0.036 (0.048)
Distribution mode	0.351 (0.159)**	0.071 (0.031)**
Exporting mode network	4.217 (0.687)***	0.882 (0.141)***
Individual decision-making	0.475 (0.239)**	0.082 (0.033)**
Constant	−2.150 (0.582)***	
<i>Summary statistics</i>		
McFadden's pseudo R2	0.178	
Model χ^2	LR chi2 (11)= 78.20 Prob>X2 =0.0000	
Log-likelihood	−180.171	
Correctly classified	83.09 %	
Sample size	479	

Note: Robust standard errors are presented in parentheses; *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels, respectively.

the individual decision-making variable positively and significantly impacts direct export. The marginal effect estimate suggests that if farmers can decide to choose the export channel individually, the probability of choosing direct export will increase by 8.2 %. It can be explained by the fact that numerous factors related to the personality of the farmer are relevant, such as the individual tolerance for uncertainty or personal differences in subjective evaluations of how attractive export channels are (Schade and Koellinger, 2007). Considering that their preferences differ in a group of decision-makers, getting agreement about the riskiest export channel will be more improbable.

4.2.2. ATT estimates

Table 4 presents the results for the treatment effects of export channel choice on wine farm export performance.⁴ The results show that the export price received by the direct exporters is significantly lower than the same received by the indirect exports. We explain the findings based on transaction costs (Masten, 2000) and asymmetric wine quality information (Akerlof, 1970). On the one hand, the export price can be lower in direct export channels because wine is supplied directly by farmers, and there is no intermediation cost in the transaction process. On the other hand, wine is a highly differentiated product, partly due to the complexity of its production process. The wine market is characterized by information asymmetries, in which prices cannot convey the information that the supply and demand sides require to converge in exchanges (Odorici and Corrado, 2004). Although geographical indications such as Denominations of Origin play an important role in signaling quality, there are so many different Denominations that it is difficult for the average consumer to know wine characteristics at the time of purchase (Mérel et al., 2021). In this scenario of the "lemons market" (Akerlof, 1970), intermediaries can have a vital role in the international marketing of wine, shaping foreign consumers' perception of wine alternatives (Odorici and Corrado, 2004),

We also find no significant differences between direct and indirect exporters in export volume, value, diversity, and satisfaction. The costs of intermediation can partly explain this last finding. Although the average price of exporting is higher in indirect exporting, farmers' profit margin seems not to be significantly different than in direct exporting due to the profit margin of intermediaries. Thus, it aligns with the fact that export satisfaction between these two channels does not show significant differences.

5. Conclusions, implications, and future research

The literature on export channels recognizes that direct and indirect export (i.e., using intermediaries) can serve as essential channels that help farmers operate in international markets. However, there is no evidence to verify whether direct exporting helps improve export performance more than indirect exporting in the Spanish wine industry. We addressed the research gap in this study by examining the impact of export channel choice on the export performance of wine farmers using data collected from Spain. We used four objective variables (export price, export volumes, export value, export diversity) and one subjective variable (export satisfaction) to reflect wine farm exporting performance. To address the endogeneity issue associated with export channel choice, we employed a double-robust IPWRA estimator to analyze the survey data of 479 wine-exporting farmers collected from all the Denominations of Origin in Spain.

The empirical results provided insights into the factors influencing farmers' direct or indirect decisions to export. The results

⁴ Following Rosenbaum (2002), we conducted a sensitivity analysis to assess whether our estimated results based on matching are robust to the possible presence of an unobserved confounder. The results confirmed that there is no hidden bias from an unobserved confounder.

Table 4

Average treatment effects of export channel choice on export performance: IPWAR estimator.

Outcome variable	Mean outcomes		ATT	Change (%)
	Direct exporters	Indirect exporters		
Export price	0.164 (0.018)	0.318 (0.040)	−0.154 (0.043)***	−93.902
Export volume	37.611 (1.369)	35.920 (2.818)	1.691 (3.060)	4.496
Export value	38.908 (1.358)	38.401 (2.892)	0.503 (3.122)	1.303
Export diversity	11.491 (0.702)	11.774 (1.299)	−0.283 (1.399)	−2.463
Export satisfaction	13.100 (0.175)	13.275 (0.338)	−0.175 (0.376)	−1.336

Note: ATT refers to average treatment effects on the treated; Robust standard errors are presented in parentheses; *** indicates significance at the 1 % level.

showed that farmers producing wines at entry level (wine differentiation), using sponsors (promotion mode), and having agronomists on farms (human resources) are less likely to choose to export wines directly. In contrast, farmers using wine fairs (distribution mode), having more neighbours who use direct export (exporting model network), and making individual decisions (individual making) are more likely to export their wines directly. The results of the IPWRA estimates showed that indirect export significantly increases export prices than direct export. However, there are no significant differences between direct and indirect exporters in export volume, value, diversity, and satisfaction.

These results offer significant implications for export researchers, managers, and policymakers. The finding of the positive impact of indirect export using intermediaries on export price highlights the necessity of the Regulatory Councils of the Denomination of Origins in helping link wine farmers to export intermediaries who can further link wine farmers to international markets. This is especially important for wine farmers who have difficulty in entering international markets independently due to a lack of export experience. We find that export channel choice does not generate differentiated profits. The finding highlights that choosing direct or indirect export channels is not very important when linking wine farmers to international markets. Stakeholders should help wine farmers select the channel they can easily access to sell their products.

This study has two limitations. First, our data encompassed just a sample of 479 wine farmers in Spain collected in 2021, so we cannot capture the dynamic impacts of export channel choice on the export performance of wine farmers. Thus, when required panel data are available, future studies should explore how export channel choice affects wine farm export performance over time. Future research should also expand this study by investigating how the export channel choice influences the export performance of other major agricultural products in Spain, such as olive oil, citrus fruit, and pork. This can help generalize our understanding of the association between export channel choice and export performance.

Second, this paper examines data from the Spanish wine sector after the COVID-19 crisis, which experienced a significant drop in national and international sales during 2019–2020. Unfortunately, there is no way of correcting this macroeconomic shock of COVID because we only have data for one year, but this effect is common to all wineries. More research remains needed to study the recovery of the wine sector after the current COVID crisis and its impact on export channel selection and performance. Likewise, we recognize that a limitation of our paper is the geographical location limited to Spain. We think it may be generalizable to other countries belonging to the Old World Wine Regions, such as France and Italy, whose wines are associated with a type of terroir, with each wine grower's tradition. In these regions, wine is a highly differentiated product associated with the appellation of origin to which the wine grower belongs. Based on this argument, a future line of research could be to replicate this study in other wine-producing countries belonging to the New World Wine Regions, such as California, Australia, and Chile, where there is more standardization and mass production of wine.

Finally, there is a need to look at the destinations of exports to understand better the effect of export channel choice on export performance at the wine farmer level. Building on the institutional theory, it is suggested that the institutional distance between Spain and export markets can be a critical determinant of the export channel choice decision and affect the export performance of wine farmers. Likewise, the type of intermediary could be correlated with export performance. These are interesting areas to be explored in future research.

Data availability statement

The data that support the findings of this study are available from Marta Fernández upon request.

Declaration of Competing Interest

There is no conflict of interest.

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