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Margins of Fair Trade Wines Along the Supply Chain: Evidence from South African Wine on the U.S. Market*

Robin M. Back [a], Britta Niklas [b], Xinyang Liu [c], Karl Storchmann [d], and Nick Vink [e]

Abstract
In this paper, we analyze profit margins and mark-ups of Fair Trade (FT) wines sold in the United States. We are particularly interested in whether and to what extent the FT cost impulse in production is passed on along the supply chain. We draw on a limited sample of about 470 South African wines sold in Connecticut and New Jersey in the fall of 2016; about 90 of them are certified FT. For these wines we have FOB export prices, wholesale prices, and retail prices, which allows us to compute wholesale and retail margins and analyze the FT treatment effect. We run OLS, 2SLS and Propensity Score Matching models and find evidence of asymmetrical pricing behavior. While wholesalers seem to fully pass-through the FT cost effect, retailers appear to amplify the cost effect. As a result, at the retail level, FT wines yield significantly higher margins than their non-FT counterparts. (JEL-Classifications: L11, L31, L43, L81, Q17)

Keywords: wine, Fair Trade, Propensity Score Matching, supply chain, pass-through

I. Introduction

Fair Trade (FT) as a concept refers to initiatives that aim to improve the lives of those involved in the production of predominantly agricultural products in developing countries by paying them higher than normal free market prices. This, in turn, should enable them to develop sustainable businesses under better conditions, both socially and environmentally (De Pelsmacker et al., 2006).

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Effectively, this means selling products from developing countries at a price premium in developed countries (Bird and Hughes, 1997). It was the advent of FT labeling, with its roots in the Netherlands in 1988, that enabled FT products to be sold by mainstream rather than just specialized retailers.

From these roots, a number of FT labeling schemes emerged in other countries, with an umbrella organization, Fairtrade Labeling Organizations International (FLO) formed in 1997. A common mark (using "Fairtrade" as a single word) was launched in 2002, and in 2004 FLO split into Fairtrade International, responsible for setting standards and providing support for producers, and *FLOCERT*, an independent certifying agency responsible for inspecting and certifying producer organizations and auditing traders. There are a number of FT organizations operating around the world today, including 19 national Fairtrade labeling organizations covering 21 countries, 3 Fairtrade producer networks (Asia and Pacific; Latin America and Caribbean; Africa and Middle East), and 9 Fairtrade marketing organizations (Fairtrade International, 2019a).

In the U.S., the FT market is fractured into four competing labels, *Fair Trade USA* (founded in 1998 as *TransFair USA*), *Fairtrade America (founded in 2012)*, *Fair for Life (entered the U.S. in 2007)*, and the *Small Producer Symbol (SPP)*[1]. Each one employs its own certification system with differing standards (Jaffe and Howard, 2016). Currently, only *Fairtrade America* and *Fair for Life* include wine in their product portfolio.[2] *Fair Trade USA* phased out its wine offerings in 2015, *SPP* focuses on coffee only.

The world's first two Fairtrade wine producers were certified in South Africa in 2003. There are currently 42 Fairtrade certified wine producers worldwide with 24 of these being in South Africa, which produces around two-thirds of all Fairtrade certified wine; Chile, Argentina

[1] *SPP* is the acronym of the Spanish name *Simbolo de Pequeños Productores*. SPP was founded in 2010.
[2] As of September 2019, there are exactly five FT-certified wine brands on the U.S. market. *Fairtrade America* markets the brands *Six Hats*, *Stonedance Wines* (both South Africa), *La Riojana* (Argentina), and *Vinedos Emiliana* (Chile); *Fair for Life* certified only *Stellar Winery* (South Africa).

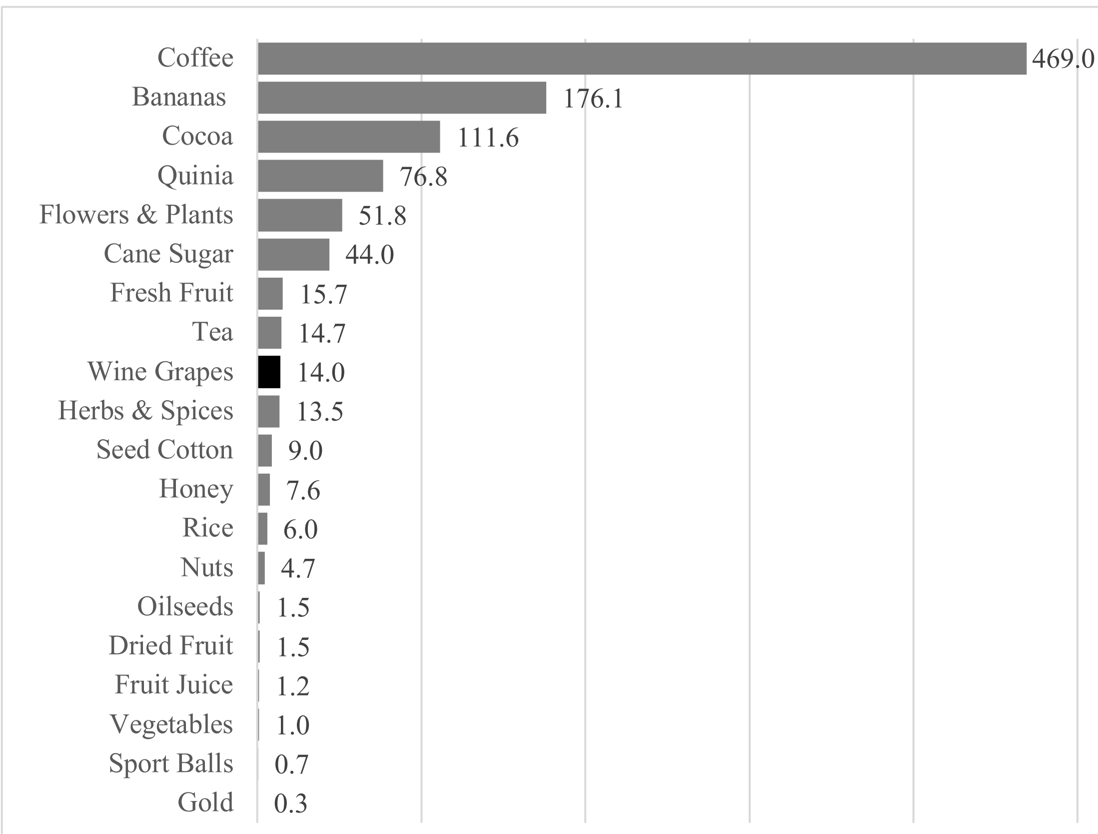
and Lebanon account for the remaining one third of Fairtrade certified wine production (Fairtrade Foundation, 2019).

Among FT traded goods, wine grapes and wine play only a minor role. As shown in Figure 1, during the fiscal year 2013/14, global FT producer wine grape sales accounted for €14 million, significantly behind coffee (€469m) or bananas (€176m).

Figure 1

Global Producer Sales Incomes for Main Fairtrade Goods, 2013–14

in million €



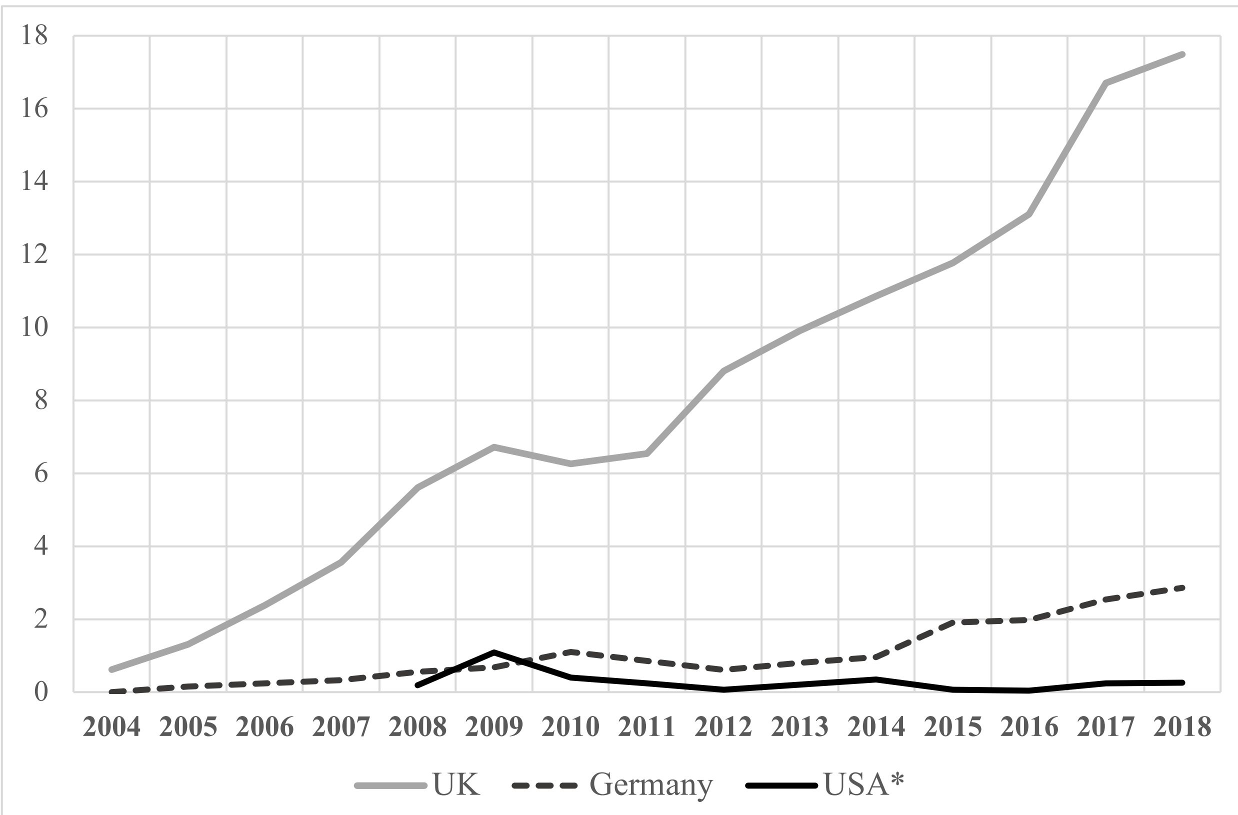
Source: Fairtrade International (2016).

The United Kingdom is the main market for FT wine (Figure 2). Since their UK launch in 2004, the volume of FT wines sold has grown from 620 tons to almost 12,000 tons (2015); in Germany sales rose to 2,000 tons (2016). In contrast, after FT wines were introduced to the U.S. in 2008, sales quickly rose to 1,110 tons in 2010, but plummeted thereafter. The latest U.S. data report FT sales of 107 tons for 2017, which equals approximately 0.09% of the overall U.S. wine import volume. In 2015, *Fair Trade USA* suspended its wine portfolio; *Fairtrade America* does not publish any wine data for the time after 2014 but provided 2016 and 2017 data upon request.

Figure 2

Sales of Fairtrade Wines in the UK, Germany and the U.S.

in million liters



Source: Fair Trade USA (2016), Fairtrade America, personal information, Fairtrade Germany, personal information, Fairtrade Foundation, personal information. *Combined data for Fair Trade USA and Fairtrade America.

A. The FT Price Floor

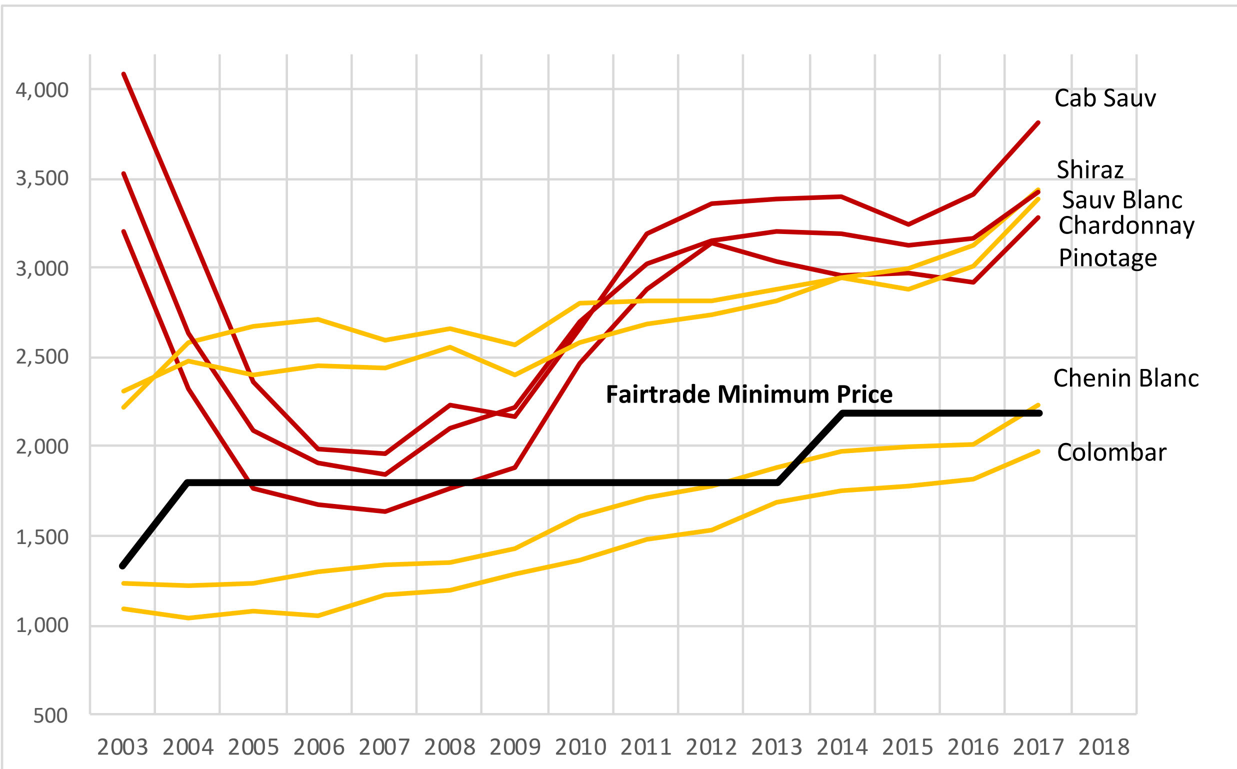
In order to achieve their mission and to cover the cost impulse stemming from certification process and adherence to various social, environmental, and economic standards, FT is financed by two basic components, a minimum price and a fixed price premium allocated by the producers (Linton, 2012).

The minimum price has been adjusted only twice in 16 years, in 2004 and in 2014. Since January 2014, the price floor has been set at ZAR 2.19/kg for conventionally grown wine grapes and ZAR 2.57/kg for organic grapes.

Figure 3 shows average producer cellar[3] prices for the most popular grape varieties in South Africa. Although producer cellar prices are much lower than trade prices, there are only two grape varieties, Chenin Blanc and Colombar, both white varieties, that are consistently below the current FT price floor. Chenin Blanc is South Africa's most planted wine grape variety and can produce some high quality single-varietal wines. In contrast, Colombar, the second most planted variety, is almost exclusively used in white blends. Among the red wine grape varieties, only Pinotage temporarily broke below the FT price floor. Against this background, we suspect that the predominance of white blends and Chenin Blanc among FT wines (see Section III. Data), and to some minor extent red Pinotage wines, is driven by their low prices. The FT price floor appears to attract the most inexpensive grapes.

[3] Producer cellars (co-operatives), process the grapes of their farmer member shareholders into wine. South Africa's 47 producer cellars (2018) press about 80% of South Africa's total wine harvest (WOSA, 2019).

Figure 3
Producer Cellar Winegrape Prices and Fairtrade Price Floor in South Africa, 2003-2017
price in Rand/ton



Source: SAWIS (2019) and Fairtrade International (2019b).

B. The FT Premium

The FT premium is paid in addition to the price of a FT product, irrespective of whether the price charged is the Fairtrade minimum price or a higher price. The FT premium is paid directly to farmers to fund projects that address both individual and community needs.[4] This premium is paid only once, by the first buyer of the product. In the case of unprocessed wine

[4] Loconto et al. (2019) provide a detailed report of FT premiums, their sources, and their uses.

grapes, the Fairtrade premium has been ZAR 0.60/kg since 2014, regardless of whether the grapes were grown organically or not.

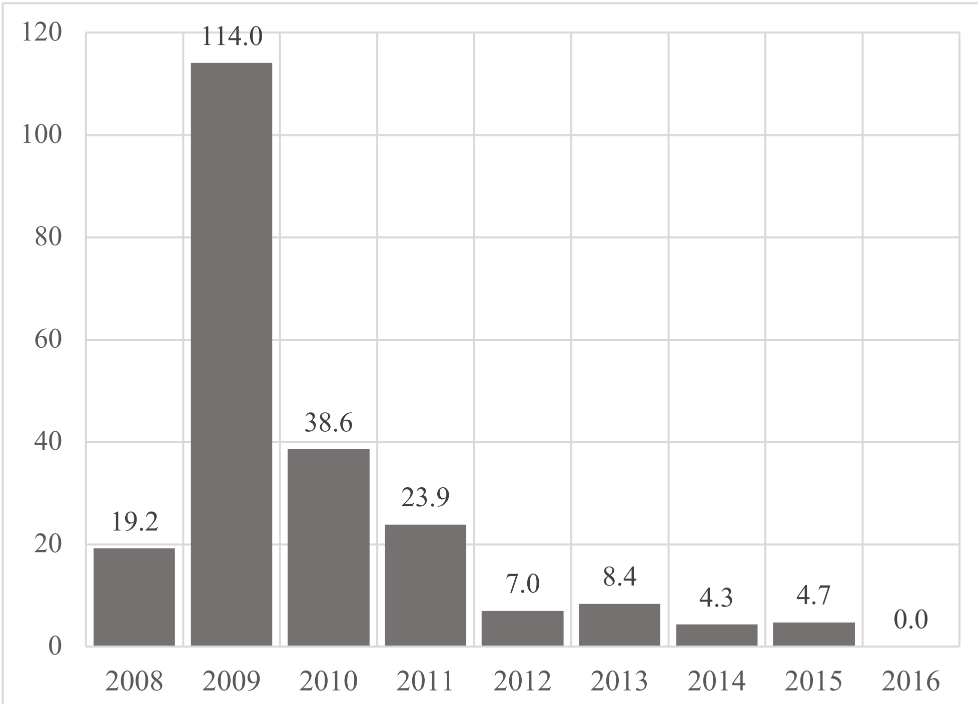
In the case of wineries that grow their own grapes, however, the premium becomes payable on the processed product, i.e., wine, by the first buyer of the wine, usually an importer, distributor, or retailer. In such cases there is a set conversion rate from unprocessed product to processed product based on average yield. For wine, 1 metric ton of wine grapes is equal to 700 liters of red wine or 630 liters of white wine (Flo-Cert GmbH, 2010). Since January 2014 the premium, based on this conversion, has been set at €0.72/liter for red wine and € 0.080/liter for white wine. The reality reported by wineries, however, is that the premium on finished wine is usually incorporated into the price rather than charged to the customer separately. The winery then simply deducts the appropriate amount and transfers it into the communal fund for the workers once the sale has taken place.

Figure 4 reports the premium payouts resulting from FT wine sales in the U.S. The data refer to Fair Trade USA only, and reflect the declining sales pattern after the peak in 2009.

Figure 4

Premium Payments for Wines Sold in the U.S.

in $1,000



Source: Fair Trade USA (2016).

The current paper sets out to shed some light on the cost pass-through process along the supply chain. In general, FT-induced cost impulses may be completely passed through, absorbed when the pass-through rate is less than 100%, or amplified when the pass-through rate exceeds 100%. As a result, margins and markups may remain unaffected, negatively affected, or positively affected by the FT treatment. Employing various models, OLS, 2SLS and Propensity Score Matching (PSM), we find evidence for asymmetric pass-through rates. Our findings suggest that the FT cost effect leaves wholesaler margins unaffected, implying a complete pass-through. In contrast, wine retailers appear to amplify the FT effect resulting in higher margins for FT wines compared to their non-FT counterparts.

The remainder of this paper is organized as follows. Section II discusses the relevant literature and Section III presents the data. In Section IV, we develop a simple theoretical double marginalization model. Sections V to VII report the results of various OLS, 2SLS and PSM models of prices and margins. Section VIII summarizes and interprets the findings.

II. Literature

There is a large and growing body of literature related to the economics and sociology of Fair Trade in general (see particularly Dragusanu, Giovannucci, and Nunn, 2014). Naturally, most research focuses on top grossing FT goods, such as coffee, bananas, and cocoa. Here, we will only focus on selection bias issues and possible consumer price effects.

A. ***Selection***

Although, being FT-certified is not a random treatment, it is *a priori* unclear whether the selection is positive or negative. On the one hand, disadvantaged and less skilled producers whose products fetch subpar prices may seek certification to benefit from the price floor and improve their position. On the other hand, completing the FT-certification process requires a certain level of organizational skills and consciousness. For coffee growers in Costa Rica, Dragusanu and Nunn (2018) find evidence of positive selection. FT-certification is associated with greater environmental and social consciousness and a higher degree of logistical and managerial ability. In contrast, Sáenz-Segura (2009), Ruben and Fort (2012) and Fort and Ruben (2009) find evidence of negative selection. Examining coffee growers in Costa Rica and Peru, respectively, their results suggest that low levels of education, experience, and income are positively associated with FT-certification.

B. Consumer Prices

In order to be able to pay premiums and above-market prices to growers, it is crucial that the cost impulse is passed on along the supply chain to the end consumer. There is ample evidence that consumers have a favorable view of FT products. For instance, Hainmueller, Hiscox, and

Sequeira (2015) ran several in-store experiments and placed FT labels on bulk bins of coffee that were Fair Trade certified. They find that sales grew by 10% if the coffee was labeled as FT. In another experiment examining coffee sold on eBay, Hiscox, Broukhim, and Litwin (2011) find that consumers are willing to pay an average premium of 23% for FT-labeled coffee.

While there is a substantial body of literature on non-wine FT products (Dragusanu, Giovannucci, and Nunn, 2014), the wine-related FT literature on prices is fairly sparse. There is, however, a rich body of price studies on certified sustainable and organic wine. For instance, Corsi and Strøm (2013) find significant (farm gate) price premiums for organic wine in Europe. However, Delmas and Grant (2014) find the opposite for the U.S.. Distinguishing between unpublished eco-certification and published eco-labeling they find that, while eco-certification yields a price premium, the use of the eco-label does not. Drawing on an online survey, Delmas and Lessem (2017) find that eco-certification lowers the probability of choosing the certified wine, particularly in higher price brackets, possibly because the eco-label may be deemed a signal of lower quality.

Similarly, Schäufele and Hamm (2017, 2018) show an attitude-behavior-gap for German wine consumers. Despite their positive attitude toward sustainable wine, many consumers, especially in lower income brackets, prefer to purchase conventional wine, suggesting the absence of a higher WTP for eco-certified wine.

Niklas, Storchmann, and Vink (2017) analyze retail prices of FT wines in the United Kingdom. First, they find a significant price discount for FT wines compared to their non-FT counterfactuals – even after controlling for quality, grape variety, age, and producer fixed-effects. Second, the price dispersion for FT wines appears to be higher than for non-FT wines, suggesting a higher search intensity. These results may indicate that, if the FT cost impulse does not reach the consumer, it must have been absorbed somewhere along the supply chain.

III. Data

Our analysis draws on price data for about 470 South African wines by 11 producers, sold in U.S. wine stores in New Jersey and Connecticut in October and November 2016. The retail data were collected from the website *wine-searcher.com* (Wine Searcher, 2016), an online site on which more than 10,000 U.S. wine stores post the prices of their wine inventory. All retail prices include the respective State wine taxes but do not include general sales taxes.

Since in both New Jersey and Connecticut the monthly publication of wholesale prices is mandatory, we also have wholesale prices. This allows us to compute wine retail markups for our sample. All wholesale prices are extracted from Beverage Network price books (Beverage Media Group, 2016a; Beverage Media Group, 2016b).

In addition to retail and wholesale prices, we also have import FOB (free on board) prices for most of our sample. These prices, provided by a private shipping company, enable us to compute wholesale margins and mark-ups. However, due to the fact that there is an addition importer-tier before wholesalers, these markups cannot solely be attributed to wholesalers. Instead, it should rather be deemed a combined importer-wholesaler markup.

Table 1 provides some descriptive statistics on grape varieties separate for FT and non-FT wine. Since all these variables are 0-1 dummies, the mean value reports the percentage occurrence. For instance, 7.2% of all non-FT wines contain Cabernet Sauvignon, compared to only 2.1% of FT wines. Likewise, 15% of non-Fairtrade wines contain Pinotage, while only 5.2% of Fairtrade wines do. In general, FT wines are predominantly red or white blends. In addition, Fairtrade wines are significantly more likely to be white than are non-FT wines, suggesting that the FT-treatment may be non-random.

Table 1

Descriptive Statistics: Fairtrade and Non-Fairtrade Wines by Grape Varietal

Variable	Obs	Mean	Std. Dev.	Min	Max
			Non-Fairtrade		
Red Grape Varieties					
Syrah/Shiraz	373	0.239	0.427	0	1
Pinotage	373	0.150	0.358	0	1
Cabernet Sauvignon	373	0.072	0.260	0	1
Pinot Noir	373	0.051	0.220	0	1
Merlot	373	0.019	0.136	0	1
Malbec	373	0.005	0.073	0	1
Mourvèdre	373	0.011	0.103	0	1
Grenache	373	0.005	0.073	0	1
Other Red	373	0.005	0.073	0	1
Red Blends	373	0.188	0.391	0	1
White Grape Varieties					
Chardonnay	373	0.030	0.117	0	1
Chenin Blanc	373	0.062	0.241	0	1
Viognier	373	0.021	0.145	0	1
Sauvignon Blanc	373	0.110	0.313	0	1
White Blends	373	0.024	0.154	0	1
Rose	373	0.008	0.089	0	1
			Fairtrade		
Red Wine					
Syrah/Shiraz	96	0.021	0.144	0	1
Pinotage	96	0.052	0.223	0	1
Cabernet Sauvignon	96	0.021	0.144	0	1
Pinot Noir	96	0.000	0.000	0	0
Merlot	96	0.000	0.000	0	0
Malbec	96	0.000	0.000	0	0
Mourvèdre	96	0.000	0.000	0	0
Grenache	96	0.000	0.000	0	0
Other Red	96	0.000	0.000	0	0
Red Blends	96	0.375	0.487	0	1
White Grape Varieties					
Chardonnay	96	0.021	0.144	0	1
Chenin Blanc	96	0.063	0.243	0	1
Viognier	96	0.021	0.144	0	1
Sauvignon Blanc	96	0.042	0.201	0	1
White Blends	96	0.250	0.435	0	1
Rose	96	0.135	0.344	0	1

Table 2 reports some descriptive statistics for critical wine scores, which are also from Wine Searcher (2016)[5], and our dependent variables, i.e., prices and margins, also differentiated by FT and non-FT wines. In general, the Table exhibits two patterns. First, FT wines cost about half of their non-FT counterparts at all levels (i.e., import, wholesale and retail). Second, FT wine prices exhibit a substantially lower standard deviation than non-FT wines. This pattern seems to a be a reflection of the respective critical scores. On average, FT wines are rated two critical points lower than their non-FT counterparts and display half their standard deviation.

For both FT and non-FT wines, average wholesale margins are significantly higher than retail margins. This appears to be particularly pronounced for FT wines. This is also reflected in the ratio of absolute retail/wholesale margins, which are, on average, smaller than one. While the average ratio equals 0.988 for non-FT wines, it is 0.844 for FT wines.

[5] Wine Searcher reports a weighted average calculated from a range of critical scores (Wine Searcher, 2016).

Table 2

Descriptive Statistics: Prices, Margins, and Critical Scores

Variable	Obs	Mean	Std. Dev.	Min	Max
			Non-Fairtrade		
Price Import FOB	373	10.53	5.577	4.58	34.33
Price Wholesale	305	13.97	6.764	6.09	30.90
Price Retail	277	18.14	9.496	6.95	45.99
Margin Wholesale %	302	0.386	0.220	-0.028	1.756
Margin Retail %	274	0.244	0.203	-0.033	1.030
Markup Wholesale	305	0.263	0.105	-0.029	0.637
Markup Retail	277	0.180	0.125	-0.034	0.583
Ratio Margins (retail/wholesale)	274	0.928	0.250	0.454	1.894
Critical Scores	370	87.5	1.613	84	92
			Fairtrade		
Price Import FOB	76	5.62	0.331	5.52	6.74
Price Wholesale	83	7.64	0.382	7.36	9.99
Price Retail	84	8.86	1.444	5.99	16.99
Margin Wholesale %	73	0.361	0.073	0.092	0.447
Margin Retail %	76	0.152	0.149	-0.062	0.753
Markup Wholesale	73	0.268	0.044	0.084	0.309
Markup Retail	76	0.119	0.100	-0.066	0.430
Ratio Margins (retail/wholesale)	71	0.844	0.132	0.691	1.306
Critical Scores	96	85.6	0.860	85	88

IV. Three-Tier System, Double Marginalization, and Margins

In 1933, Alcohol Prohibition was repealed by the 21st Amendment, which specifies that the power to regulate alcohol markets resides with the states. As one of the results, all states instated a three-tier system of alcohol distribution.[6] The three tiers are (1) producers or importers, (2) wholesalers or distributors, and (3) retailers. All alcoholic beverages, i.e., wine, beer, and spirits, must successively pass through all three tiers; bypassing any tier is prohibited. That is, importers can only sell to wholesalers who can only sell to retailers. Only retailers are allowed to sell to consumers.

In the three-tier system, with a few exceptions, wholesalers are pure monopolists, i.e., in most states, only one wholesaler carries a certain brand. All in-state retailers can purchase only from in-state wholesalers, i.e., they must not buy from out-of-state wholesalers. Retailers, however, compete horizontally with other retailers and only enjoy some degree of monopoly power.

The three-tier structure results in successive monopoly problems that give rise to a double markup on the wholesaler's marginal cost. This phenomenon, first described by Spengler (1950), is also known as *double marginalization*. In order to solve the interaction between retailer's and wholesaler's price policies, one solves the retailer's problem first and employs backwards induction to determine the wholesaler's quantity and price. Figure 5 shows the basic idea for the one-product case with a linear demand curve, and assuming that the wholesale price is the only marginal cost to the retailer.

The retailer faces the market demand curve, which is at least twice differentiable, and equates his marginal revenue and marginal cost (here, the wholesale price). The retailer's marginal revenue curve, in turn, becomes the wholesaler's demand curve. He too, equates his marginal revenue and marginal cost, here at point *A*, which sets the quantity at q_{dm} and the wholesale price at *w*. The wholesale price becomes the retailer's marginal cost. Following MR=MC, we will get retail price *p*. The resulting absolute margins, i.e., the difference between price and marginal cost, are depicted by the line *AB* for the wholesaler and *BC* for the retailer. The deadweight loss is thus given by the triangle *ACF*.

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[6] Seventeen states have adopted forms of the "control" model whereby they control the sale of some or all alcoholic beverages at wholesale level, with 13 of those states exercising some level of control over retail sales through state-owned stores or designated agents. Currently, Washington is the only state with a privately-operated retailing and distribution system that does not have legal three-tier requirements.

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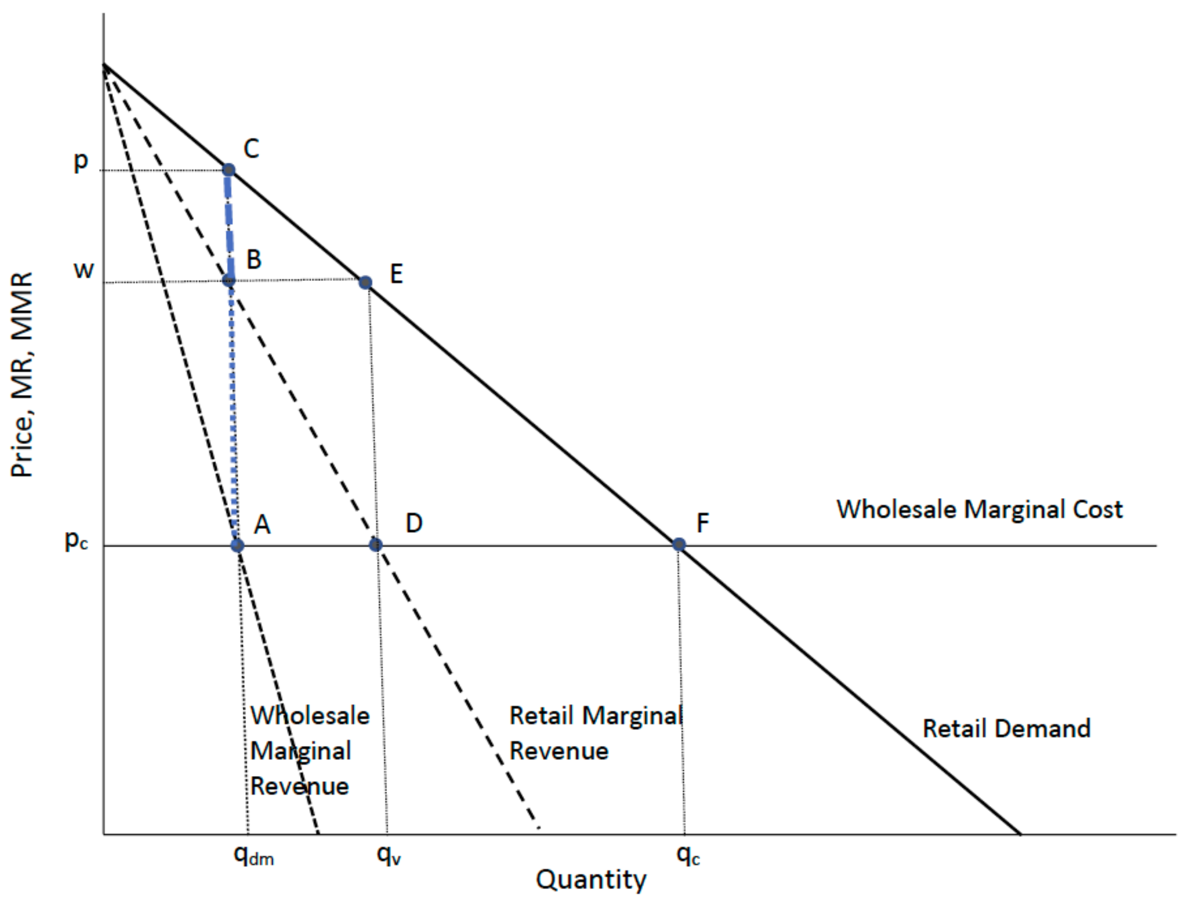
As can be seen from Figure 5, the double marginalization case if different from vertical integration, when only one monopolist sets quantity and price. The latter case would result in MR=MC at point *D* with the higher q_v, and the lower price *w*. The resulting deadweight loss is smaller than in the unintegrated case and given by the triangle *DEF*.

For the sake of comparison, point F depicts the competitive solution, with quantity q_c and price p_c, and no deadweight loss.

Figure 5

Double Marginalization Phenomenon



There is a large body of literature on the double marginalization problem and its effects on pass throughs and margins (e.g., Bresnahan and Reiss, 1985; Hong and Li, 2017; RBB Economics, 2014, provides a comprehensive survey).

Following Bresnahan and Reiss (1985), we decompose our problem into the retailer's selling problem and the wholesaler's pricing problem. The downstream retailer sets his marginal revenue $\mathrm{P}(Q) + \mathrm{Q}\frac{dP(Q)}{dQ}$ equal to his marginal cost, here assumed to consist of the wholesale price (*w*) and some other idiosyncratic marginal selling cost (*s*)

$$(1) \quad \mathrm{P}(Q) + \mathrm{Q}\frac{dP(Q)}{dQ} = w + s$$

The upstream wholesaler's pricing problem is solved by equating marginal revenue and marginal cost:

$$(2) \quad MMR(Q) = MR(Q) - s + Q\frac{dMR(Q)}{dQ} = c$$

where *MMR(Q*) denotes the wholesaler's marginal revenue and *c* his marginal cost, which comprises the import price, taxes, storage cost, and distribution cost.

The ratio of absolute retailer margins over wholesaler margins can then be expressed as

$$(3a) \quad \frac{P-(w+s)}{w-c} = \frac{Q[\frac{dP}{dQ}]}{Q(\frac{dMR}{dQ})} = \frac{slope\ of\ demand\ (dealer's\ demand)\ curve}{slope\ of\ marginal\ revenue\ (wholesaler's\ demand\ )\ curve}$$

By dividing by the respective prices, *P* and *MR*, we receive the ratio of relative margins as ratio of Lerner indices

$$(3b) \quad \frac{Q\left[\frac{dP}{dQ}\right]/P}{Q(\frac{dMR}{dQ})/MR} = \frac{1/\eta_R}{1/\eta_W} = \frac{Retailer's\ Lerner\ Index}{Wholesaler's\ Lerner\ Index}$$

where η denotes the respective price elasticities.

Further transforming equation (3a) yields

$$(4) \quad \frac{Q(\frac{dP}{dQ})}{2Q\left(\frac{dP}{dQ}\right)+Q^2(\frac{d^2P}{dQ^2})} = \frac{1}{2+Q\frac{(d^2P/dQ^2)}{dP/dQ}} = \frac{1}{2+\tau}$$

where τ denotes the quantity elasticity of the slope of the demand curve. τ summarizes the curvature of the demand curve and determines the distribution of rents between retail and wholesale.

For a linear demand curve, where the second derivative equals zero, τ will always be zero. Therefore, the ratio of margins will always be ½ and the retailer retains only 1/3 of the entire rent. However, a convex demand curve will yield margin ratios above ½. Hence an increase in the demand curve's convexity will increase the retailer's rent share.

V. Wine Prices: OLS and 2SLS

We consider prices in two states, Connecticut and New Jersey, that have different alcohol regulations. For instance, while New Jersey's wine tax amounts to \$0.88 per gallon, Connecticut's tax is only \$0.72 per gallon. In contrast, with \$0.24 per gallon, Connecticut's beer taxes are twice as high as New Jersey's.

Similar differences exist for posted wholesale prices. In both Connecticut and New Jersey binding wholesale bottle prices must be posted once a month. Connecticut prohibits wholesalers from granting any further discounts for larger quantities to retail stores (e.g., for the purchase of one or several cases). In contrast, in New Jersey, wholesalers are allowed to grant a price discount for the purchase of one case. Case discounts are posted and binding. Further quantity discounts are prohibited. However, New Jersey's liquor laws include the so-called *retail incentive program (RIP)*. "RIP is a form of rebate in which a wholesaler provides a financial incentive to a retailer to purchase a specific quantity of alcoholic beverages." [7] The financial incentive is given upfront and in cash and must not exceed $1,000. For wine, the incentivized quantity must not exceed 50 cases. As a result, RIP is a way to grant discounts for larger quantities and thus circumvent posted wholesale prices. In order to capture these and other state-specific and time-invariant effects we include a dummy variable for New Jersey.

Table 3 reports the results of a few simple OLS price regressions. All equations include a constant term and a full set of producer and varietal dummies (not reported in the Table). Note, since producers may produce FT wines and non-FT wines at once, the inclusion of producer-fixed effects will not cause an identification problem. The retail equations also contain a set of wine store-fixed effects. All regressions suggest the existence of a significant and substantial FT price premium ranging from approximately 36% to 41%. While import and wholesale price premia are at the lower end of this range, retail premiums appear to be larger than 40%. All prices are also positively associated with critical quality scores. The quality score effect seems to be higher for import and retail prices and somewhat less pronounced for wholesale prices.

Adding a state dummy variable (Table 3, columns (3) and (5)) yields significant wholesale (approx. 12%) and retail discounts (approx. 5%) for New Jersey – while all other coefficients remain virtually unchanged.

However, as already shown in the Introduction and the Data Section, we suspect that the FT treatment is non-random and endogenous. The low price floor and the price premium may attract low price wines made from inexpensive, predominantly white grapes (see Figure 3 and Table 1).

FT wines are of lower quality than their non-FT counterparts, prices are lower. We, therefore, assume that our OLS estimates are biased and run a 2SLS model in which upstream prices or downstream prices, respectively, serve as instruments. In particular, we use retail prices as instruments for both import and wholesale prices, and import prices as instruments for retail prices. Table 4 reports the 2SLS as well as the corresponding first-stage results. The Durbin and Wu–Hausman tests for all equations are highly significant, suggesting that we can reject the null

[7] New Jersey Administrative Code 13:2-24.1

of exogeneity of the FT variable. All equations are just-identified and the partial F-statistics on the instruments suggest that our instruments are not weak.

As expected, the first stage equations show negative correlations between the FT treatment and quality scores. The positive effect of the price instrument variable on the FT treatment expresses the FT price premium after controlling for all other exogeneous variables, i.e., a Jew Jersey dummy, fixed-effects for producers, varieties, and (in the case of retail prices) also retail outlets.

The 2SLS results indicate that the FT premiums may be significantly higher than suggested by the OLS equations in Table 3; on average, the treatment effects are more than twice as high. However, the fact that retail prices exhibit higher treatment premia than import and wholesale prices remains unchanged. Also, the 2SLS estimates yield marginal quality scores effects that are almost identical with the OLS results.

Table 3

OLS Price Equations

Dependent Variable ln(Price)

	(1) Import	(2) Wholesale	(3) Wholesale	(4) Retail	(5) Retail	(6) Retail
Fairtrade	0.368*** (5.69)	0.360*** (6.77)	0.361*** (7.70)	0.407*** (5.51)	0.409*** (5.71)	0.418*** (5.61)
Score	0.228*** (12.89)	0.193*** (11.65)	0.187*** (12.17)	0.220*** (13.95)	0.217*** (13.77)	0.217*** (12.12)
NJ			-0.127*** (-7.85)		-0.049*** (-2.62)	0.090*** (0.73)
Retail outlet fixed effects	no	no	no	no	no	yes
n	441	381	381	355	355	355
RMSE	0.168	0.146	0.133	0.161	0.160	0.149
R2 (%)	88.9	90.2	91.9	90.8	91.0	93.9

Robust t-statistics in parentheses. All equations include a constant term and a full set of producer and varietal dummies. The retail equations also contain a set of wine store-fixed effects.

Table 4
2SLS Price Equations
Dependent Variable ln(price)

	Import	Wholesale	Retail
Fairtrade	0.979***	0.687***	1.087***
	(12.44)	(11.90)	(16.78)
Score	0.270***	0.223***	0.277***
	(27.13)	(24.37)	(26.98)
NJ		0.063***	0.076***
		(0.75)	(0.81)
n	343	340	341
RMSE	0.116	0.113	0.126
R2 (%)	94.57	93.99	93.40
Durbin endog chi2	83.90***	114.31***	317.79***
Wu-Hausman endog F	80.31***	124.60***	3382.19***
Instrument	Retail Prices	Retail Prices	Import Prices
		First Stage Equation	
Instrument	0.028***	0.076***	0.076***
	(10.05)	(16.07)	(16.03)
Score	-0.158***	-0.225***	-0.224***
	(-11.03)	(-16.69)	(-16.65)
n	343	340	341
R2	90.15	93.13	93.19
Partial F statistic on instrument	100.97***	228.10***	256.98

Robust z-statistics in parentheses. All equations include a constant term and a full set of producer and varietal fixed effects. The retail equation also includes retail outlet fixed effects. Significance levels 1% (***)

VI. Margins and Markups: 2SLS

A. Wholesale

Due to the fact that the FT treatment variable appears to be endogenous in the price equations we continue with the instrumental variable 2SLS approach. We estimate various variants with four different dependent variables, i.e., margins, markups and their logarithms. *Margins* are defined as percentage premium over the purchase prices. For instance, the retail margin is defined as [(retail price/wholesale price)-1]. The markup is the percentage fractions of the price above marginal cost [(P-MC)/P)]. Accordingly, the retail markup is then
[(retail price/wholesale price)/ retail price].

Table 5 reports four 2SLS estimates for the wholesale segment. All equations are just identified, i.e., similar to the price equations, we use the retail price as exogenous instrument. The partial F statistics suggest that we have strong instruments. All four variants report insignificant treatment effects on the margins/markup, suggesting that, at the wholesale level, FT wines do not yield profits that are different from their counterparts. In contrast, being located in New Jersey and having high quality scores exert significantly negative effects on margins and markups.

The first-stage results reported in Table 5, however, also show that the treatment may not be endogenous. In particular the Durbin and Wu–Hausman tests for the margins equation (column (1)) suggest that we cannot reject the null of exogeneity. We, therefore, also show simple OLS regressions for the four variables in Table 6 and find similar results.

Table 5

2 SLS Wholesale Margin/Markup Equations

	margin wholesale	markup wholesale	Ln(margin) wholesale	Ln(markup) wholesale
	(1)	(2)	(3)	(4)
Fairtrade	-0.122	-0.043	-0.080	-0.020
	(-1.08)	(-0.83)	(-0.27)	(-0.08)
Score	-0.039***	-0.025***	-0.150***	-0.122***
	(-2.92)	(-3.54)	(-3.42)	(-3.54)
NJ	-0.193***	-0.087***	-0.378***	-0.251***
	(-10.55)	(-9.90)	(-6.96)	(-5.88)
n	339	339	338	338
RMSE	0.146	0.067	0.413	0.325
R2 (%)	45.57	51.21	47.20	46.41
Durbin endog chi2	0.70 (p=0.403)	2.87 (p=0.090)	4.05 (p=0.044)	4.84 (p=0.028)
Wu-Hausman endog F	0.66 (p=0.417)	2.75 (p=0.098)	3.89 (p=0.050)	4.65 (p=0.032)
		First Stage		
Instrument (Retail Price)	0.024***	0.024***	0.023***	0.023***
	(7.02)	(7.02)	(6.85)	(6.85)
Score	-0.148***	-0.148***	-0.150***	-0.150***
	(-7.88)	(-7.88)	(-7.89)	(-7.89)
n	339	339	338	338
R2	87.47	87.47	87.72	87.72
Partial F statistic on instrument	F(1,317) 50.78***	F(1,317) 50.78***	F(1,316) 48.32***	F(1,316) 48.32***

Robust z-statistics in parentheses. All equations include a constant term and a full set of producer, varietal, and retail outlet fixed effects. *** 1% significance level.

Table 6
OLS Wholesale Margin/Markup Equations

	margin wholesale	markup wholesale	Ln(margin) wholesale	Ln(markup) wholesale
Fairtrade	-0.211***	-0.116***	-0.642***	-0.493***
	(-4.98)	(-6.14)	(-6.19)	(-6.25)
Score	-0.040***	-0.026***	-0.163***	-0.132***
	(-3.75)	(-5.05)	(-5.21)	(-5.37)
NJ	-0.201***	-0.091***	-0.396***	-0.264***
	(-10.70)	(-10.50)	(-7.64)	(-6.54)
n	368	368	367	367
RMSE	0.153	0.068	0.413	0.322
R2 (%)	46.59	53.33	50.65	50.28

Robust t-statistics in parentheses. All equations include a constant term and a full set of producer, varietal, and retail outlet fixed effects. *** 1% significance level.

B. Retail

Our retail margin/markup equations, reported in Table 7, follow the same specifications as the wholesale equation, except, instead of retail prices we use import prices as instruments. However, the results are markedly different from those reported in Table 6. In contrast to the wholesale level, we find substantial and statistically significant positive FT treatment effects on retail margins and markups. This applies to both the linear and the logarithmic variants. Accordingly, after controlling for various fixed effects and quality scores, our estimates suggest that FT wines yield margins that are approximately 93% higher than those for non-FT wines. Similarly, markups are about 54% higher. This may appear high, but given the figures provided in Table 2 in the data section, retail margins and markups are in general significantly lower at the retail level than at the wholesale level. This is true for FT and as well as for non-FT wines. For instance, while average wholesale markups lie between 0.263 (non-FT) and 0.268 (FT), average retail markups range from 0.114 to 0.180 (see Table 2). A markup premium of 0.544 for FT wines will, therefore, lift retail markups above wholesale levels.

In addition to significantly positive FT premiums on retail margins and markups, retail also benefits from higher quality scores. Wine retail markups grow by approximately 4.9% per critical point (note: margins as well as markups are measured in percent). However, given the small range and low level of FT quality scores, the quality effect will mainly be driven by non-FT wines.

In the last column of Table 7, we report the effects of the FT treatment on the ratio of absolute margins (retail/wholesale). As expected, and in accordance with all prior results, being FT exerts a significantly positive effect on the margin ratio.

Table 7

2 SLS Retail Margin/Markup Equations

	margin retail	markup retail	Ln(margin) retail	Ln(markup) retail	Ratio absolute margins (retail/wholesale)
Fairtrade	0.934***	0.544***	2.595***	2.080***	0.354***
	(5.23)	(5.47)	(4.89)	(4.82)	(4.98)
Score	0.085***	0.049***	0.311***	0.257***	0.070***
	(4.31)	(4.09)	(4.05)	(3.86)	(5.70)
NJ	0.128	0.072***	0.382***	0.301	0.049
	(0.54)	(0.53)	(0.62)	(0.62)	(0.48)
n	344	337	295	298	289
RMSE	0.179	0.104	0.651	0.553	0.135
R2 (%)	15.44	26.81	35.96	37.85	61.01
Durbin endog chi2	26.16***	33.08***	21.30***	20.75***	8.42***
Wu-Hausman endog F	56.48***	99.88***	35.51***	31.42***	5.79**
				First Stage	
Instrument (Import Price)	0.027*** (6.95)	0.027*** (7.02)	0.032*** (7.21)	0.032*** (7.29)	0.081*** (15.93)
Score	-0.154***	-0.154***	-0.170***	-0.169***	-0.246***
	(-7.43)	(-7.45)	(-7.04)	(-7.07)	(-16.32)
n	344	347	295	298	289
R2	90.40	90.41	86.06	90.23	93.64
Partial F statistic on instrument	F(1,250) 50.30***	F(1,252) 51.04***	F(1,206) 56.09***	F(1,208) 57.00***	F(1,238) 101.70***

Robust z-statistics in parentheses. All equations include a constant term and a full set of producer, varietal, and retail outlet fixed effects; significance levels: *** (1%), ** (2%)

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VII. Wine Margins: Propensity Score Matching

In order to assess the robustness of our findings we also employ a propensity score matching (PSM) and compare its results with those derived from the 2SLS model reported in Section IV. PSM is aimed at isolating the treatment effect while purging it from other confounding factors (see also Rosenbaum and Rubin, 1983; Dehejia and Wahba, 1999, 2002; for a wine and restaurant-related example, see Gergaud, Storchmann, and Verardi, 2014).

PSM is designed as a two-step approach. In a first step, we employ a binary probit model to calculate the conditional probability of each observation to be assigned to the treatment group, i.e., being FT, given its pretreatment characteristics (propensity score). In step two, we match treated with untreated observations based on their respective propensity scores. This way we create a counterfactual situation which enables us to evaluate the treatment effect for matches with (almost) identical pretreatment characteristics.

Table 8 reports the results of the probit model for the treatment (i.e., FT) assignment. Accordingly, the probability of being treated grows with decreasing wine quality scores, the smaller the wine producing firm is, and the higher the firm-specific fraction of red wine production is. In addition, the negative effect of the red wine dummy variable indicates that white wines are more likely to be Fair Trade.

We then selected propensity score matches based on the "nearest neighbor" criterion. Due to the fact that our sample is relatively small, we did not find many matches. For the wholesale model we found matches for 12 of 76 Fair Trade wines. For the retail model we find between 8 and 10 matches, with negative consequences for the respective significance levels.

Nevertheless, the PSM results reported in Table 9, lend further support to our results from the preceding Section. We find negative average treatment effects for all margin/markup variants at the wholesale level – although the treatment effect attains statistical significance of 5% only for the percentage margin version.

In contrast, the average treatment effects for retail margins/markups are all positive and significant at the 1% level for the logarithmic dependent variables. In addition, the retail treatment effects are in magnitude not very different from the 2SLS results. For instance, for the logarithms margin variant, the Fair Trade PSM treatment yields an average effect of 3.22, compared to the corresponding 2SLS effect of 2.6.

Consequently, the ratio of retail over wholesale margin is also positively affected by the FT treatment.

Overall, the PSM model supports our 2SLS findings. While wholesale margins/markups remain largely unaffected by the FT status of a wine, retail margins are a positive function of the FT treatment. In other words, wine stores appear to amplify the FT cost-impulse.

Table 8

Probit Equation to Generate Propensity Scores

Dependent Variable: Fairtrade Treatment	
Wine Quality Score	-1.865*** (-7.34)
Firm's Production Size	-0.002*** (-4.27)
Fraction of Red Wine Produced by Firm	0.082*** (4.16)
Red Wine (dummy for individual wine)	-1.559*** (-4.33)
Constant	157.696*** (7.29)
Pseudo R2	0.722
LR (Ch2(4))	294.11
n	446

Robust z-statistics in parentheses; 1% significance level (***)

Table 9

Propensity Score Matching: Wholesale and Retail

	number of treated	number of matches	avg treatment effect	t-statistics
		Wholesale		
margin %	76	12	-0.189	-2.01*
markup	76	12	-0.070	-1.73
Ln(margin %)	76	12	-0.314	-1.65
Ln(markup)	76	12	-0.199	-1.53
		Retail		
margin %	76	10	0.075	0.87
markup	76	10	0.062	1.01
Ln(margin %)	76	8	3.306	3.13***
Ln(markup)	76	8	3.221	3.22***
		Ratio Absolute Margins Retail/Wholesale		
Ratio of absolute margins[a]	76	10	0.218	2.08*
Ln of margin ratio[b]	76	10	0.322	2.42**

Matches are based on the "nearest neighbor" criterion. Standard errors are based on 100 bootstrap repetitions. Significance levels * (5%), ** (2%), ***(1%), [a] (margin retail/margin wholesale), no bootstrapping, [b] ln(margin retail/margin wholesale), no bootstrapping

VIII. Conclusion

Our paper is set out to analyze whether and to what extent FT-induced cost impulse can be passed through and whether FT-certified wines affect the margins of wholesalers and retailers differently. Employing various models, i.e., OLS, 2SLS, and PSM, we find evidence for asymmetric FT effects. While wholesalers seem to completely pass through the FT effect, leaving their margin unaffected, retailers appear to amplify the FT effect. That is, retailer margins are a positive function of the FT treatment. As a result, the ratio of retailer over wholesaler margin is larger for FT wines than for their non-FT counterparts.

Referring to the theoretical model described in Section IV, our results point to the respective Lerner indices. Given its character as pure monopolist, we assume that the wholesaler's Lerner index is always larger than the retailers Lerner index. However, our results suggest that this ratio increases for FT wines. Within the context of our theoretical model, this can only be due to a lower elasticity of demand (on the retail market). A possible explanation could be the "warm glow effect" and the resulting higher willingness-to-pay for an ethically superior product. This would contradict Niklas, Storchmann and Vink (2017) who found smaller price dispersions for FT wines in the UK, indicating a higher degree of search and thus higher price elasticities than for non-FT wines. Likewise, Delmas and collaborators (e.g., Delmas and Grant, 2014; Delmas and Lessem, 2017) could not find any "warm glow" price effect for organic wines in the U.S.

The fact that our analysis focuses on prices only and disregards quantities sold may obscure the actual market behavior. One may think that a FT wine exhibited in a retail store may only serve as a "warm glow" signal -- showing the store's ethical consciousness. It is not meant to be sold but only exerts a positive external effect on the remaining non-FT inventory.

The dramatic decline of the U.S. FT wine market after 2011 may have resulted in fewer stores carrying FT wine, while the number of stores carrying non-FT wines remained constant. This explanation does not assume that it was the amplified pass-throughs at the retail level that caused the demise of the FT market but rather *vice versa*. Fewer FT wine stores with fewer FT wines allow for higher retail prices and margins. Investigating this hypothesis would, however, require a dynamic analysis which is out of the scope of the present cross-sectional snapshot.

References

Beverage Media Group (2016a). The Beverage Journal Connecticut. Various issues.

Beverage Media Group (2016b). The Beverage Journal New Jersey. Various issues.

Bird, K., & Hughes, D. R. (1997). Ethical Consumerism: The Case of 'Fairly-Traded' Coffee. *Business Ethics: A European Review*, *6*(3), 159-167.

Bresnahan, T. F., and Reiss, P. C. (1985). Dealer and manufacturer margins. *The Rand Journal of Economics*, 16(2), 253-268.

Corsi, A., and Strøm, S. (2013). The price premium for organic wines: Estimating a hedonic farm-gate price equation. *Journal of Wine Economics*, 8(1), 29-48.

De Pelsmacker, P., Janssens, W., Sterckx, E., and Mielants, C. (2006). Fair-trade beliefs, attitudes and buying behaviour of Belgian consumers. *International Journal of Nonprofit and Voluntary Sector Marketing*, *11*(2), 125-138.

Dehejia, R.H., and Wahba, S. (2002). Propensity score-matching methods for non-experimental causal studies. *Review of Economics and Statistics*, 84(1), 151-161.

Dehejia, R. H., and Wahba, S. (1999). Causal effects in nonexperimental studies: Reevaluating the evaluation of training programs. *Journal of the American Statistical Association*, 94(448), 1053–1062.

Delmas, M. A., and Grant, L. E. (2014). Eco-labeling strategies and price-premium: The wine industry puzzle. *Business & Society*, 53(1), 6-44.

Delmas, M. A., and Lessem, N. (2017). Eco-premium or eco-penalty? Eco-labels and quality in the organic wine market. *Business & Society*, 56(2) 318–356.

Dragusanu, R. E., Giovannucci, D., and Nunn, N. (2014). The Economics of Fair Trade. *Journal of Economic Perspectives,* 28(3), 217–236.

Dragusanu, R., and Nunn, N. (2018). The impacts of Fair Trade certification: Evidence from coffee producers in Costa Rica. Working Paper, https://scholar.harvard.edu/files/nunn/files/fair_trade_draft_february_2018.pdf (accesses, April 14, 2019).

Fair Trade USA (2016). Fair Trade USA, 2016 Almanac. Online at https://www.fairtradecertified.org/sites/default/files/filemanager/documents/FTUSA_MAN_Almanac2016_EN.pdf (accessed Sep 23, 2019).

Fairtrade Foundation (2019). Wine farmers and workers. Online at https://www.fairtrade.org.uk/Farmers-and-Workers/Wine

Fairtrade International (2016). Monitoring the scopes and benefits of Fairtrade. Seventh edition 2015. Online at http://fairtradeamerica.org/~/media/Fairtrade%20America/Files/Reports/2015-Fairtrade-Monitoring-Scope-Benefits_web.pdf (accessed Sep 23, 2019).

Fairtrade International (2019a). The Fairtrade system. Online at https://www.fairtrade.net/about/fairtrade-system (accessed Sep 13, 2019).

Fairtrade International (2019b). Fairtrade price and premium information. Online at https://www.fairtrade.net/standard/minimum-price-info (accessed Sep 13, 2019).

Flo-Cert GmbH (2010). Conversion rates for processed FT products: Explanatory document. Bonn, Germany: Flo-Cert GmbH.

Fort, R., and Ruben, R. (2009). The Impact of Fair Trade certification on coffee producers in Peru. In Ruben, R. (ed.), *The Impact of Fair Trade*. Wageningen: Wageningen Academic Publishers. 75–98.

Gergaud, O., Storchmann, K., and Verardi, V. (2014). Expert opinion and quality perception of consumers: Evidence from New York City restaurants. *Economic Inquiry*, 53(2), 812-835.

Hainmueller, J., Hiscox, M. J., and Sequeira, S. (2015). Consumer demand for Fair Trade: Evidence from a multistore field experiment. *The Review of Economics and Statistics*, 97(2), 242-256.

Herman, A. (2012). Tactical ethics: How the discourses of Fairtrade and Black Economic Empowerment change and interact in wine networks from South Africa to the UK. *Geoforum, 43*(6), 1121-1130.

Hiscox, M. J., Broukhim, M., and Litwin, C. (2011). Consumer demand for Fair Trade: New evidence from a field experiment using eBay auctions of fresh roasted coffee. Available at SSRN: https://ssrn.com/abstract=1811783 or http://dx.doi.org/10.2139/ssrn.1811783

Hong, G. H., and Li, N. (2017). Market structure and cost pass-through in retail. *The Review of Economics and Statistics,* 99(1), 151–166.

Jaffee, D., and Howard, P. H., (2016). Who's the fairest of them all? The fractured landscape of U.S. fair trade certification. *Agriculture and Human Values*, 33(4), 813–826.

Linton, A. (2012). Growing fair Trade in South Africa. *Globalizations, 9*(5), 725-740.

Loconto, A. M., Silva-Castaneda, L., Arnold, N., and Jimenez, A. (2019). *Participatory Analysis of the Use and Impact of the Fairtrade Premium*. Research Report, hal-02048855. Online at https://hal.archives-ouvertes.fr/hal-02048855/document (accessed Sep 23, 2019).

Niklas, B., Storchmann, K., and Vink, N. (2017). Fairtrade wine price dispersion in the United Kingdom. *Journal of Wine Economics*, 12(4), 446–456.

Rosenbaum, P., and Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41–55.

Ruben, R., and Fort, R. (2012). The impact of Fair Trade certification for coffee farmers in Peru. *World Development*, 40(3), 570–582.

RBB Economics (2014). *Cost Pass-Through: Theory, Measurement, and Potential Policy Implications*. A Report prepared for the Office of Fair Trading. OFT Discussion Paper. London: Office of Fair Trading.

Sáenz-Segura, F., and Zúñiga-Arias, G. (2009). Assessment of the Effect of Fair Trade on Smallholder Producers in Costa Rica: A Comparative Study in the Coffee Sector. In Ruben,

R. (ed.), *The Impact of Fair Trade*. Wageningen: Wageningen Academic Publishers. 117–135.

SAWIS (2019). Statistics: Grape Prices. Online at http://www.sawis.co.za/info/grapeprices.php

Schäufele, I., and Hamm, U. (2017). Consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review. *Journal of Cleaner Production*, 147, 379-394.

Schäufele, I., and Hamm, U. (2018). Organic wine purchase behaviour in Germany: Exploring the attitude-behaviour-gap with data from a household panel. *Food Quality and Preference*, 63, 1-11.

Spengler, J. (1950). Vertical integration and antitrust policy. *Journal of Political Economy*, 50, 347–352.

Wine Searcher (2016). Wine retail price database. *wine-searcher.com*

WOSA Wines of South Africa (2019). The Industry. Overview. Online https://www.wosa.co.za/The-Industry/Overview/ (accessed September 11, 2019)