

## Extended Abstract

<b>Paper/Poster Title</b>	Distance to destination and export price variation within Swiss agri-food firms
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<b>Abstract</b>	<b>200 words max</b>
<p>This paper assesses how bilateral distance affects observed spatial variation in free-on-board (fob) export prices across destinations. I estimate a linear model that regresses firm-product-destination-time fob unit values on distance, firm-product-time fixed effects, and destination country controls. I find that if distance doubles the average Swiss agri-food firm increases its fob export price by 2.3%. In all cases, I identify the distance effect solely from the within-firm-product variation of prices across destinations. My findings show that consumers in distant countries pay higher prices partly because firms charge higher prices net cost-insurance-freight costs. I explain my findings using trade models where firms endogenously choose destination-specific quality for their products.</p>	
<b>Keywords</b>	Agricultural trade; trade costs; export unit values; product quality; distance
<b>JEL Code</b>	Empirical studies of trade F14 Agriculture in international trade Q17 Agricultural Policy Q18
<b>Introduction</b>	<b>100 – 250 words</b>
<p>It is now obvious that there is substantial within-firm variation in export prices for the same goods destined for different countries. In 2020, a Swiss firm exported hard cheese (HS04069099) to 18 countries and charged fob prices ranging from a low of 10.70 CHF in Peru to a high of 16.00 CHF in South Korea. The role of distance in explaining this empirical regularity has received some attention in the manufacturing sector. Evidence from the agri-food sector is, however, non-existent. Since, different market situations characterise agriculture and manufacturing, I extend this literature to the latter.</p> <p>Empirically, I use unique customs data on 6369 Swiss firm-level exports of 738 HS8 digit products to 183 destinations from 2016 to 2020. My novelties are two folds. For manufacturing firms, a few studies examine export price variation across markets using firm-level data. I show that Swiss agri-food exporting firms behave in a similar manner. Second, I confirm the Alchian and Allen effect for agri-food products using firm-level data. Earlier attempts have all used country-product data. An inherent drawback in these studies is the assumption of a representative firm per country. My within-firm-product analysis provides insights into the heterogeneous firm behaviour within the agri-food sector.</p>	

On food policy implications, the pricing behaviour of firms has a large impact on consumers' welfare. Testing the validity of the law of one price is a popular question in agricultural economics. My findings show that specific trade costs also play a role in generating deviations from this law.

**Methodology**

100 – 250 words

To test how within-firm variations in agrifood FOB prices are related to distance, I estimate the following equation using ordinary least squares (OLS):

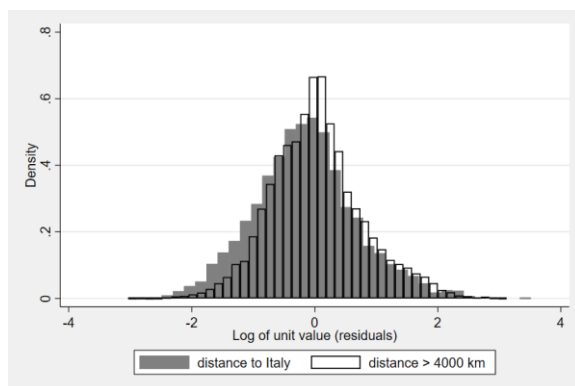
$$\ln UV_{fjkt} = \beta_0 + \beta_1 \ln \text{Distance}_j + b' \mathbf{w}_{jkt} + \Phi_{fkt} + \varepsilon_{fjkt} \quad (2)$$

where  $UV_{fjkt}$  is the price (unit value) — expressed in Swiss Francs per kilogram — of product  $k$  (defined at the HS8 digit level) exported by Swiss firm  $f$  to destination country  $j$  in year  $t$ .  $\text{Distance}_j$  is the bilateral distance between Switzerland and country  $j$ .  $\varepsilon_{fjkt}$  are robust standard errors that are clustered at the destination-time level.  $\Phi_{fkt}$  are firm-product-time fixed effects. They control for all observable (e.g., firm size) and unobservable firm- and product-specific effects that may affect unit values. Their inclusion means we use only within-firm variation across markets to identify  $\beta_1$ . This allows a direct test of the hypothesis that firms vary their export prices systematically by export market characteristics. This means that for the empirical analysis, I only include firms that export to at least two destination countries. I capture product variant and invariant destination country controls in vector  $\mathbf{w}_{jkt}$ . It includes at the country-level, a measure of market size and a demand-related control. At the country-product level, we control for bilateral tariffs, remoteness and average prices of HS6 digit product imports from all origins in the destination.

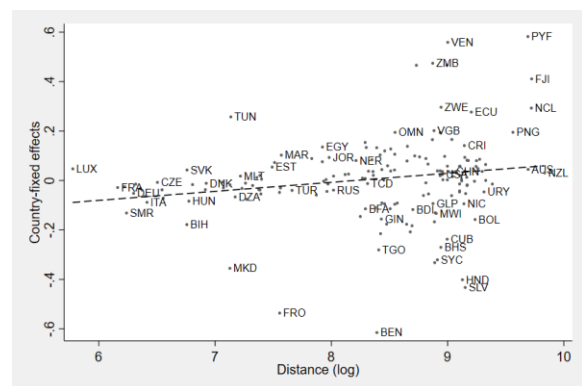
**Results**

100 – 250 words

First, I provide initial descriptive evidence on the distance and price effect. Figure 1a displays the relationship between (demeaned) firm-product-country unit values and distance. I regress observed unit values on a set of HS8 digit product fixed-effects before plotting the residuals by distance category. The histogram in grey bars corresponds to goods shipped from Switzerland to its neighbour Italy and those in white are the average unit values for goods shipped over a distance of >4000 km. Exports further away are shifted more rightward. Figure 1b, provides further preliminary evidence that firm-product-destination unit values increase with bilateral distance. On average, the lowest prices are charged on exports to Swiss neighbours.



(a) Distributions of unit values by distance



(b) Destination-specific prices and distance

Figure 1: Unit values and distance

My empirical findings (Table 1) confirm the descriptive analysis. In column (1), I control for only bilateral distance and find an elasticity of 0.031. Conditional on exporting, within-firm-product prices are increasing with bilateral distance. In columns (2) and (3), I add further controls. My findings remain unchanged; only the magnitude reduces from 0.031 to 0.023. If bilateral distance doubles, the average exporting firm increases its FOB export price by 2.3% *ceteris paribus*. In all cases, the estimates are statistically significant at the 1% level, and the coefficient of the distance variable is identified solely from the within-firm-product variation of unit values across destination countries. Thus, my findings imply that firms choose higher quality or goods that are more expensive when they decide to export to markets that are more distant.

Table 1: the effect of distance on within-firm export price variation

	(1)	(2)	(3)
Log Distance <sub>j</sub>	0.031*** (0.003)	0.023*** (0.004)	0.022*** (0.004)
Log GDP <sub>jt</sub>		-0.027*** (0.007)	-0.025*** (0.007)
Log GDP per capita <sub>jt</sub>		0.009** (0.004)	0.010*** (0.004)
Log Remoteness <sub>jt</sub>		0.012*** (0.005)	0.009** (0.005)
Log (1 + Tariff <sub>jkt</sub> )		0.010*** (0.002)	0.010*** (0.002)
Log Unit value <sub>jkt</sub>			0.013 (0.008)
Firm-product-time FE	Yes	Yes	Yes
Observations	78773	77522	59394
Adjusted R <sup>2</sup>	0.761	0.761	0.770

Notes: The dependent variable is the log of free on board unit values of firm  $f$ , HS8 digit product  $k$  to destination  $j$  in year  $t$ . All models are estimated using ordinary least squares.  $p$  values are in parentheses. \*\*\*, \*\*, \* denote significance at 1%, 5% and 10% respectively. Intercepts included but not reported.  $p$  is defined at the HS6 digit level and  $k$  is defined at the HS8 digit level.

## Discussion and Conclusion

100 – 250 words

What are the possible reasons for the positive relationship between variations in within-firm export prices and distance? Trade models where firms partly absorb transportation costs predict a negative relationship between distance and prices. In others, exporting firms charge the same fob price to all destinations. My findings indicate either (i) variable mark-ups, (ii) quality differentiation by firms across destinations or (iii) a combination of both. Several mechanisms may explain this finding. One possibility is that firms ship the good apple out. If transportation costs are a function of the physical quantity of products rather than their value, then firms will export higher quality products than sold in the domestic market. This requires that firms are able to differentiate their own goods even within quite narrow product categories. This finding is consistent with country-product level estimates from the agricultural literature.

In conclusion, this paper is the first to analyse how distance affects within-firm-product export price variations across countries in the agri-food sector. Existing works are at the country-product level and ignore the heterogeneity across firms within countries. My work fills this gap. I find that if distance doubles the average Swiss agri-food firm increases its fob export price by 2.3%. This finding holds true when controlling for the wealth, size, tariffs and level of price competition in the destination country.

My paper is not without limitations. My explanations of the distance-price effect embeds mechanisms closely related to prices – e.g., quality and mark-ups – that are largely unobservable or hard to quantify.