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European Firms In a Global Economy EFIGE

SEVENTH FRAMEWORK PROGRAMME

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The demand and supply of quality: a case study of televisions*

Miklós Koren† and Balázs Muraközy‡

March 3, 2011

Abstract

We estimate the demand and the supply of quality in 13 European countries utilizing data on exports and imports of various types of television sets. Large-screen TVs have a higher unit value, on average, but there is a large dispersion of unit values across source countries and destinations. Richer countries tend to export large-screen TVs at a lower price relative to small-screen TVs, potentially because they have a comparative advantage in producing in quality. We also find that there is a downward sloping demand for quality, with countries facing a larger quality premium buying fewer large-screen TVs. This suggests that there is no simple quality-quantity tradeoff (unlike in many recent trade models), and the demand for quality should be modeled separately.

1 Introduction

This paper estimates the demand and the supply of quality in 13 European countries utilizing trade data. What is quality? A consumer good is thought to be of a higher quality if all consumers would prefer to purchase it at a given price. Production inputs and machines are of a higher quality if they are more reliable or more productive.

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Quality upgrading is an important part of the development process. There is ample evidence that less developed countries tend to produce lower quality goods. In a case study of the Indian machine tool industry, Sutton (2000) shows that machine tools imported from Japan and Taiwan are perceived as more reliable, more accurate and more productive than similar Indian machines. Using cross-country trade data, Schott (2004) finds that richer countries tend to export higher unit value variants of the same good than poorer ones. Hausmann et al. (2007) show that the time a country starts exporting a higher quality variant (e.g., lingerie *vs* linen sheets) is a good indicator of a country's level of development and growth potential. Schott (2008) conducts a similar analysis for China. Khandelwal (2010) estimates for each trade partner of the U.S., where on the "quality ladder" they are located. A potential policy conclusion from these existing studies that Central and Eastern European countries can catch up to the European frontier by specializing in higher quality products and services.

A growing literature argues that the *demand for quality* also differs across countries. Johnson (2010) and Baldwin and Harrigan (2011) document that richer countries buy higher-unit value variants within identical product categories. (Some of this pattern may follow from pricing to market of identical products, see Simonovska (2010) and Alessandria and Kaboski (2011)).

Turning to producer goods, the quality of goods used in the production process may have important implications for productivity and, hence, welfare. Using Hungarian firm-level data, Halpern et al. (2010) find that firms importing some of their intermediate inputs are more productive than firms using only domestic inputs, partly because imported inputs are of better quality. On the same data, Halpern et al. (2011) show that firms with imported machinery are more productive, particularly if the machine is coming from a country with high R&D expenditures. Koren and Csillag (2011) document that imported machinery raises the demand for skilled labor, suggesting that there are important capital-skill complementarities. These complementarities, in turn, may affect the demand for quality. Kugler and Verhoogen (2008) document on Colombian data that plants producing higher-unit-value goods also purchase higher-unit-value inputs. In other words, it takes quality to produce quality.

Given the dual role of quality in the development process, we set out to jointly measure the demand and supply of quality using trade data on 13 European countries. We look at exports and imports of various types of television sets in these countries.[1] Using the 8-digit Combined Nomen-

[1] This is a pilot study to illustrate the conceptual and methodological issues. We intend to bring in more countries and more sectors into the analysis later.

clature product codes, we identify six different types of TV sets. They are distinguished by the aspect ratio of the screen (4:3 or 16:9) and the screen size. The former is a horizontally differentiating attribute: while some people prefer wide-screen TVs suitable for movies, some may prefer regular TVs, which are more suitable for broadcast programs. Larger screen size is almost invariantly a desired attribute for all buyers: we hence classify bigger-screen TVs as higher quality. We do not know any other characteristic of the TV set, most importantly, we do not know its brand.

Our data includes the bilateral trade flows of the six types of TVs between the 13 European countries. The sample period is from 2004 to 2009. We measure traded quantities by the number of TV sets shipped in either direction. We measure price by unit value: the value of shipments divided by quantity.

We start by looking at how the unit value varies between product types and between countries. Large-screen TVs have a higher unit value, on average, but there is a large dispersion of unit values across source countries and destinations. There are also systematic differences across countries. Exporter and importer dummies are significant explanators of unit values, meaning that some countries buy all types of TVs at higher prices than other countries, while some sell all types at higher prices. This may be because differences in local costs (wages, inputs, exchange rates) and trade costs.

To control for cross-country variation in local costs and other factors, we measure the *relative price* and *relative quantity* of large-screen TVs within both sets of TVs (wide screen and regular aspect ratio). Countries that have a comparative advantage in producing quality should sell the large-screen variant at a relatively lower price. Countries that have a high demand for quality should buy relative more of the large-screen variant at given relative prices.

We first study how relative prices vary across countries. Richer countries tend to export large-screen TVs at a lower relative price. This is consistent with the notion that these countries have a comparative advantage in producing in quality. Richer countries also pay somewhat higher relative prices for their imported large-screen TVs. This may be because higher markups, or because of unobserved quality differences. We also find some weak support for the Achien-Allen conjecture of "shipping the good apples out" (Hummels and Skiba (2004)). Distance reduces the relative price of large-screen TVs, probably because the ad valorem transport cost on these is lower than on small-screen TVs.

We then estimate the demand for quality by regressing the relative quantity of large-screen TVs on their relative price in a country-specific regression. This tells us the relative demand for large-screen TVs at a given price (a de-

mand for quality), as well as the price elasticity of this demand. We find that there is a downward sloping demand for quality: countries facing a higher relative price of large-screen TVs (possibly because of trade costs, see above) import relative fewer large-screen TVs. The elasticity of substitution between large- and small-screen TVs is, however, rather low.[2] This suggests that different-quality variants of the same product are far from perfect substitutes.

Our paper fits in a broad literature on cross-country analysis of quality. The most related study is that by Imbs et al. (2009), looking at how prices of TV sets vary across European countries. There are two key differences. First, we are looking at quantities of TVs imported (and exported), not only prices, which enables us to study the downward sloping demand for quality. Second, Imbs et al. (2009) have more product characteristics (including TV brand), and hence our hedonic price equations are admittedly cruder than theirs.

More generally, there are two approaches to measuring quality. The first is to measure prices or unit values as a proxy for quality (e.g., Schott (2004)). This approach stems from the assumption that higher quality goods are more valued at a given price. To make consumers indifferent between variants of different qualities, prices would have to exactly reflect the quality differences. The problem with this approach is that consumers will not, in general, be indifferent with respect to purchasing the different variants. The variants may have horizontal attributes making them imperfect substitutes (see Hallak and Schott (2008) and Khandelwal (2010)).

The second approach is to model quality as a multiplicative demand shifter and estimate that demand shifter. Quality is hence only a redefinition of units (see, e.g., Crozet et al. (2009), Baldwin and Harrigan (2011), Johnson (2010)). For example, a bottle of high-quality wine may yield the same utility as two bottles of low-quality wine. The convenience of this approach is that we do not need a separate model of quality; a simple quality-quantity transformation is sufficient. We see two problems with this approach. First, as the wine example already suggests, the tradeoff between quality and quantity is not as simple in most applications. Those who prefer high-quality wines will not see low-quality wines as perfect substitutes. Second, if we model quality as a demand shifter, we cannot ask the question of what determines the *demand for quality*. Everybody likes to achieve higher utility, but not everyone may have the same preference for quality.

[2] A key concern is that the relative price might endogenous with respect to relative demand. We instrument the relative price by gravity variables (exporter, importer dummies and distance) and find similar results.

Our approach is to think of products as a bundle of characteristics, some of which are horizontally, some of which are vertically differentiating. There is, of course, a wide literature on hedonic pricing (Sheppard (1999)) and estimating such demand systems (see, for example, Deaton (1986)). We know of relatively few papers applying this method in an international trade context (e.g., Verhoogen (2008), Auer (2009), and Fajgelbaum et al. (2009)).

2 Empirical framework

2.1 Data

In this paper, we use data from the EU external trade database published by Eurostat. The data includes exports and imports of member states at the 8-digit Combined Nomenclature product level. The data includes both the value of each such observation and the quantity units (usually measured in piece for differentiated goods). It is available from 1995 for most countries.

In this pilot study, our aim was to identify such 8-digit product categories which are similar to each other in all important dimensions except one, which can be interpreted as quality: i.e., consumers would value one product more than the other. One such group of products is television, where product categorization distinguishes between TVs "with integral tube, excluding incorporating video recording or reproducing apparatus and video monitors" with different aspect ratio (4:3 vs. 16:9) and different screen size. In particular, we identified 4 categories within TVs with a 4:3 aspect ratio : "with a diagonal measurement of screen" $\leq$42 cm; from 42 to 52 cm; from 52 to 72 cm; and $>$72 cm.[3] For televisions with 16:9 aspect ratio, there are two categories: below 75 cm and above it.[4]

We use exports and imports of these products for 13 EU member states[5], including a similar number of old and new member states for 2003-2009. One problem was that product codes changed during the period under study, which we took into account. As a result, we gained an unbalanced panel which includes yearly value and quantity of trade for these product groups among the 13 member states.

As a measure of price, we use unit value: export revenue divided by the number of televisions traded. This can be measured either from the data

[3]Their 8-digit HS codes in 2009 were 85287231, 85287233, 85287235 and 85287239, respectively.

[4]Their 8-digit HS codes in 2009 were 85287251 and 85287259.

[5]These countries are Austria, Belgium, Bulgaria, the Czech Republic, Germany, Spain, France, UK, Hungary, Italy, the Netherlands, Poland and Romania.

reported by the exporter or the importer. As our main interest is on the demand side, we use the unit value reported by the importer country, if not otherwise stated. One has to mention, that the revenues and quantities reported by the exporter and the importer in each trade relationship sometimes differ significantly, suggesting that some shipments are registered as exports to country j but they are registered as imports by another country.

When analyzing demand for quality, we also compare relative quantity and unit value of higher and lower quality goods. For this we created two product pairs. The first product pair is constructed from 4:3 televisions. The lower quality product is TVs with a screen size $\leq$72 cm, and the higher quality product has a larger screen size than 72 cm.[6] The second pair includes 16:9 televisions. The lower quality product has a screen size $\leq$75 cm and the higher quality products's scree is larger than 75 cm.

We first verify that the higher quality good is more expensive and that the differences between the high and low quality categories are large enough relative to the differences within each category. Figure 1 shows the distributions of log unit values for the two pairs of products. It shows that the log difference between the means of the higher and lower quality products are meaningful in economic terms (more than 20 percent) and that this difference is larger than the within-product standard error, suggesting that the product categories are able to meaningfully distinguish between different quality products.

An advantage of this approach is that we can calculate two further variables: *relative quantity* and *relative price* of the high quality good relative to the lower quality member of the same pair. The relative quantity is $relative\ q_{ijt} = \ln q_{ijt}^{high} - \ln q_{ijt}^{low}$, and the relative price is $relative\ p_{ijt} = \ln uv_{ijt}^{high} - \ln uv_{ijt}^{low}$, where i indexes exporters, j denotes importers, t is time and uv is unit value.

With this method, we can calculate relative prices and quantities for each country pair that traded both the higher and lower quality goods in the given year. The number of observations where we can calculate relative prices and quantities and summary statistics are reported in Tables 6 and 7 in the Appendix.

2.2 Empirical methods

We use two approaches in this paper. First, we follow the literature, for example Imbs et al. (2009) in estimating a hedonic equation. Our contribution

[6]Naturaly, other pairs can also be constructed from the four 8-digit products. We have choosen this to be similar to the other pair. Our results are similar for other cutoffs.

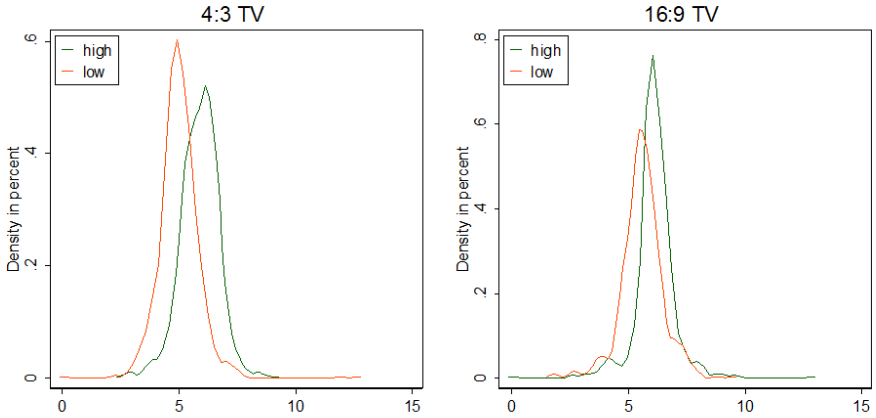

Figure 1: Log unit values of televisions with different screen size

is to study whether different countries value observable quality differently. Second, we estimate a 'demand function for quality', in which we try to explain the relative quantity of higher- vs lower quality goods with their relative price and destination country characteristics.

The hedonic equation has the following form:

$$\ln uv_{ijt}^{q} = screen\ size^{q}\gamma_{ij} + \theta_{it} + \theta_{jt} + \varepsilon_{ijt}^{k} \tag{1}$$

where q indexes 8-digit product categories. The equation shows, that the valuation of quality may depend both on the exporter (for example its cost of producing higher quality goods) and the importer, as different countries may have different demands for quality. To test whether γ_{ij} is different for different source and destination countries, we include interactions of the price variable with source and destination dummies and test whether they are significantly different from each other. Also, prices are related to importer-year and exporter-year effects, which are captured by dummies.

The problem with this specification is that it does not take into account the possible simultaneity between the quantity and price of higher quality goods exported to each market. To analyse this question, we directly estimate a "demand function of quality," in which relative quantity is related to relative price.

In our specification, we consider the demand function of country j:

$$relative\ q_{ijt} = relative\ p_{ijt}\sigma_{j} + \xi_{jt} + \nu_{ijt} \tag{2}$$

where σ_j is the elasticity of the demand for quality in destination country j. ξ_{jt} represents the horizontal shift in the destination country's demand curve when relative price is held constant. One possible problem with this equation is that the relative price and quantity can be simultaneous as the source countries may price to market, which can lead to a correlation between the relative price and ν_{ijt}. To mitigate this problem, in some specifications we predict the relative price variable from source country characteristics and the distance between the two trade partners, and use this predicted value instead of the observed relative price in the demand equation.

Thus, the predicted relative price is estimated from the following equation:

$$relative\_p_{ijt} = \delta_{it} + \ln dist_{ij}\kappa + \epsilon_{ijt} \tag{3}$$

where δ_{it} represents source country-year interactions.

Note that the identification of the demand equation comes from different source countries shipping the products at different prices to the destination country. When instrumenting the relative price, the predicted variable will only reflect source country exogenous variation (and distance between the two countries), thus mitigating the simultaneity problem. Also, when calculating inference, we always cluster standard errors at the country pair level.

3 Empirical results

3.1 Determinants of relative price

The first question of our approach is whether relative prices are meaningfully related to other important economic variables. To study this, we run a simple regression, in which we explain relative price by gravity variables: the GDP and per capita GDP of the exporter and importer country, their distance and country-year dummies. The results are reported in Table 1.

The results suggests that gravity variables of the trading country pair can explain about 7-8 percent of the variation of relative prices, while importer-year and exporter-year dummies can explain between 20 and 35 percent of the variation. The high significance level of the F-test for the joint significance of the sets of dummies suggest that both exporting and importing country characteristics are important determinants of relative prices. This relationship, however, cannot be straightforwardly characterized with gravity variables, as their estimated coefficients differ between the two product groups. To put it simply, within Europe, different countries price quality differently, but gravity does not explain it too well.

	(1) 4:3 TV	(2) 4:3 TV	(3) 4:3 TV	(4) 16:9 TV	(5) 16:9 TV	(6) 16:9 TV
Per capita GDP, exp.	-0.196***	-0.197***		-0.079	-0.029	
	(0.054)	(0.055)		(0.073)	(0.072)	
GDP, exporter	0.102***	0.103***		-0.018	-0.042	
	(0.029)	(0.030)		(0.041)	(0.041)	
Per capita GDP, imp.	0.004		0.011	0.177**		0.243***
	(0.053)		(0.054)	(0.075)		(0.078)
GDP, importer	0.078***		0.080***	-0.020		-0.031
	(0.028)		(0.029)	(0.040)		(0.041)
ln distance	-0.099**	-0.057	-0.085*	0.009	0.066	0.037
	(0.043)	(0.047)	(0.051)	(0.059)	(0.064)	(0.069)
Observations	496	496	496	272	272	272
R-squared	0.073	0.243	0.204	0.084	0.367	0.366
importer-year dummies		0.003			0.001	
exporter-year dummies			0.149			0.001

Table 1: Relative price and gravity variables

Similarly, the quality composition of television imports and export (Figures 2 and 8 in the Appendix, respectively) of countries differ substantially, but there is no clear relationship between development or other gravity variables and quality composition of television trade. Note also, that we calculate the quality composition only from the trade flows in our sample, and it is easily possible that full imports and exports exhibit different patterns.

As we are interested in the demand for quality, it is also important to check whether relative quantities and prices are related to each other in importing countries. Figure 3 shows this for each observation (importer-exporter pairs). The figures displays a negative relationship, showing that countries import less high quality televisions from exporters which price quality higher. To present the differences between countries, Figure 4 shows imports aggregated up to the country level. Here a slight negative relationship is still present, although it is much weaker. However, similarly to earlier pictures, there is no clear pattern in the sense that similar countries would pay consistently higher or lower prices for quality.

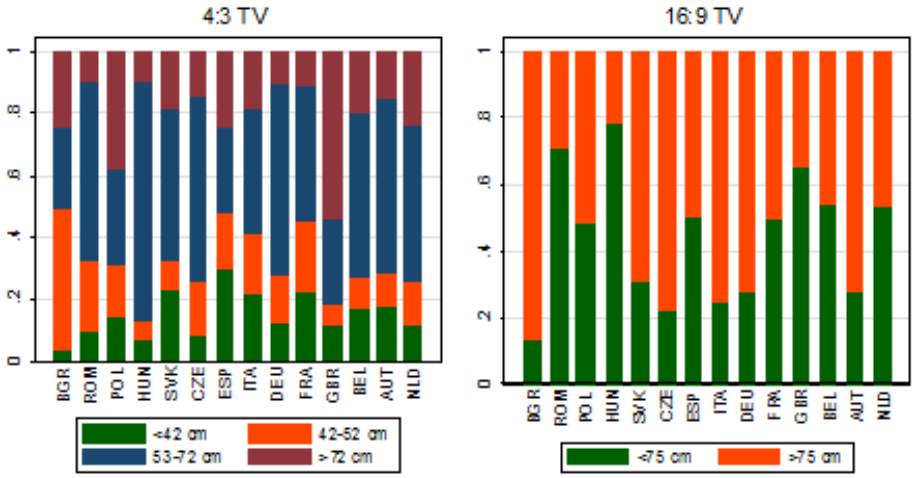

Figure 2: Quality composition of imported televisions

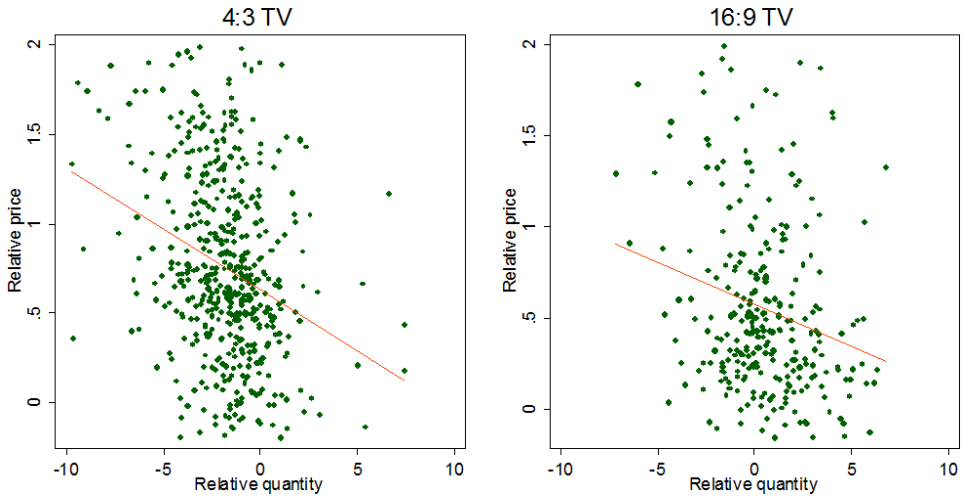

Figure 3: Relative prices and relative quantity for televisions with different screen size

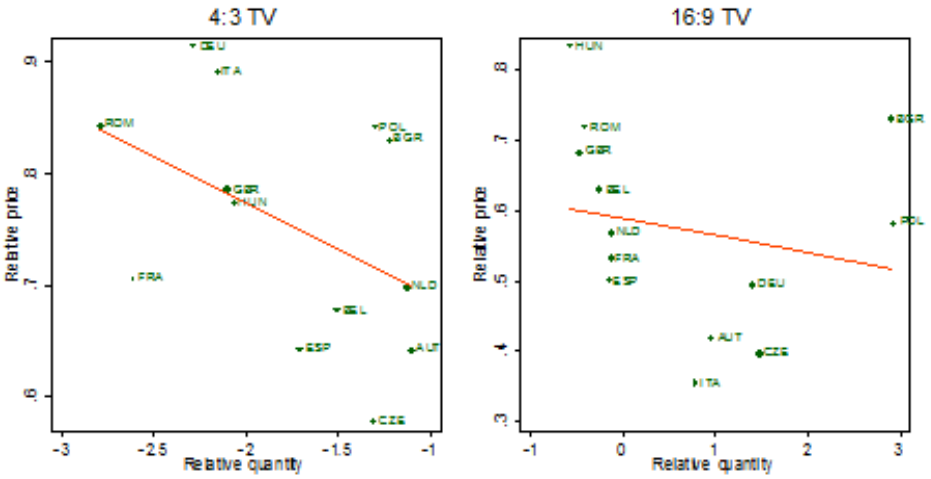

Figure 4: Relative price and quantity at the importing country level

3.2 Hedonic pricing

In this section we follow Imbs et al. (2009) in estimating the hedonic equation (1) to analyse the factors which explain the prices consumers pay for different television sets. First, in Table 2 we assume that each country values observable dimensions of quality similarly. The quality dummies show the price premium paid for televisions with different screen size. When 4:3 TVs are considered, consumers pay 25 % more for 42-52 cm TVs, 46 % more for 53-72 cm televisions and 116 % more for larger than 72 cm televisions than for the smallest television category. In the case of wide screen TVs, consumer pay 52 percent more for TVs with larger screens.

Second, we distinguish between CEE and non-CEE countries both at the export and the import side. Both CEE dummies has a negative point estimate, showing that consumers in a CEE country pay less for the same TV than consumers in other member states, and that TVs produced in CEE countries can be sold at a lower price. In columns (2) and (4) we include exporter-year and importer-year dummies to conclude that both sets of dummies are highly significant: television sets with the same observable attributes are sold at different prices in different countries. Note that this conclusion is in line with that of Imbs et al (2009).

To see which countries pay more for televisions, Figure 5 shows the importer dummies from columns (2) and (4).[7] The pictures suggest that there

[7]More precisely, there are importer-year dummies in the equations, which we averaged

	(1) 4:3 TV	(2) 4:3 TV	(3) 16:9 TV	(4) 16:9 TV
quality 2	0.247***	0.288***	0.518***	0.526***
	(0.055)	(0.053)	(0.066)	(0.068)
quality 3	0.463***	0.475***		
	(0.046)	(0.048)		
quality 4	1.165***	1.174***		
	(0.051)	(0.051)		
CEE importer	-0.454***		-0.098	
	(0.082)		(0.089)	
CEE exporter	-0.175**		-0.143*	
	(0.068)		(0.078)	
Observations	2,761	2,761	944	944
R-squared	0.220	0.364	0.086	0.331
P-values:				
importer dummies		0.000		0.000
exporter dummies		0.000		0.000

Table 2: Hedonic model of television prices

are important differences across countries, and CEE countries pay less for the same quality televisions; more generally, the hedonic price of televisions is increasing in income. Also, there are some countries where both kinds of televisions are expensive: the UK, Austria and the Netherlands. Naturally, because of the nature of our data, it cannot be excluded that these differences are a result of unobserved differences in imported televisions across countries: it is easily possible that richer countries import more premium brand televisions.

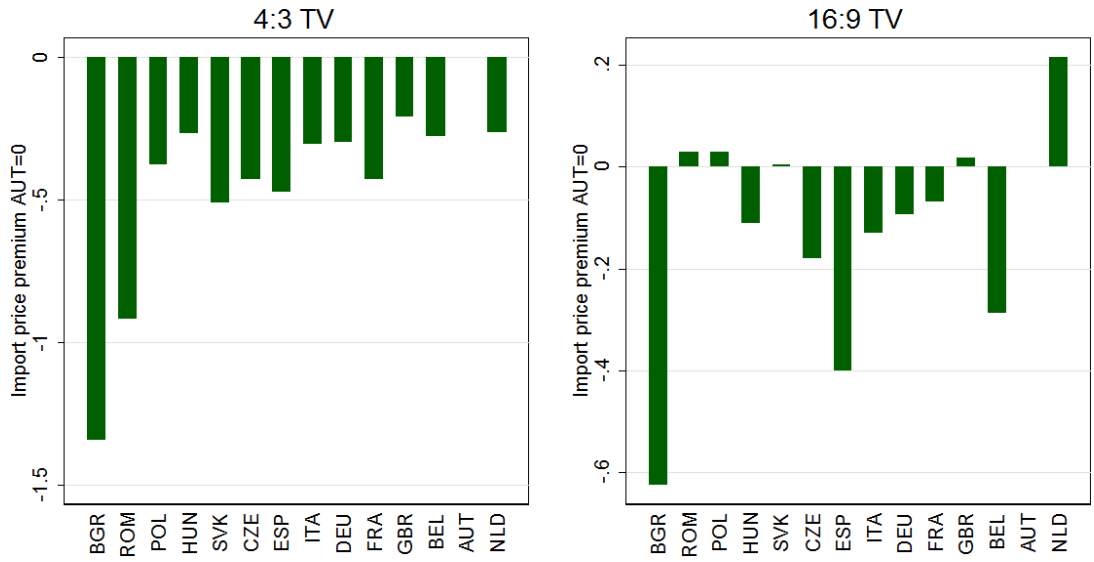

Figure 5: Importer fixed effects from the hedonic price equation

While these results showed differences in price *levels,* our main interest lies in differences in the valuation of quality. To investigate this questions, we included interactions of importer dummies and the quality dummies to Equation (1). The results are reported in Table 3.

The most important lesson from these regression is that the interactions are highly significant: different countries value quality differently, and the valuation of quantity also depends on the exporter. The estimated coefficients of quality for each importer are shown in Figure 6.[8] The results suggest that the differences across countries are significant economically. For wide-screen TVs, there is a clear pattern that quality is more expensive in

for each importer.

[8]For easier interpretation, we omitted the exporter-quality interactions from the estimated equation. Including them leads to very similar results.

VARIABLES	(1) 4:3 TV	(2) 4:3 TV	(3) 16:9 TV	(4) 16:9 TV
Observations	2,946	2,946	925	925
R-squared	0.371	0.410	0.402	0.424
P-values				
importer-year dummies	0.009	0.000	0.353	0.000
exporter-year dummies	0.000	0.689	0.667	0.710
importer cee-quality interactions	0.000		0.000	
exporter cee-quality interactions	0.000		0.000	
importer-quality interactions		0.000		0.000
exporter-quality interactions		0.000		0.000

Table 3: Hedonic model of television prices with different valuations of quality

some CEE countries - Bulgaria, Romania and Hungary. From Western European countries, quality is the most expensive on Belgium, Austria and the UK. The picture is somewhat more messy for 4:3 televisions, but there are some similarities, notably the high prices in Bulgaria, Hungary, Belgium and Austria.

This subsection showed not only that the prices of similar products differ across importers and exporters, but the price of quality also differs across countries. Next, we turn to a more structural approach and estimate a demand equation for quality.

3.3 Demand for quality

The estimates of Equation 2, with assuming a constant σ for all countries are reported in Table 4. The table shows that there is a clear negative relationship between relative price and relative quantity. For 4:3 TVs, the elasticity of relative quantity with respect to relative price is -1.3, and the explanatory power of this variable alone is above 12 %. The elasticity estimate is closer to -1 for wide-screen TVs. The result is robust to the inclusion of importer dummies, which are - consistently with the results in Table 3 - highly significant, showing that different countries value quality differently.[9]

As we have already mentioned, replacing 'raw' relative price with relative price predicted from Equation 3 may mitigate simultaneity problems, which

[9]In column (3) and (6), the regression includes importer dummies, year dummies and their interactions. The reported F-test test only the importer dummies.

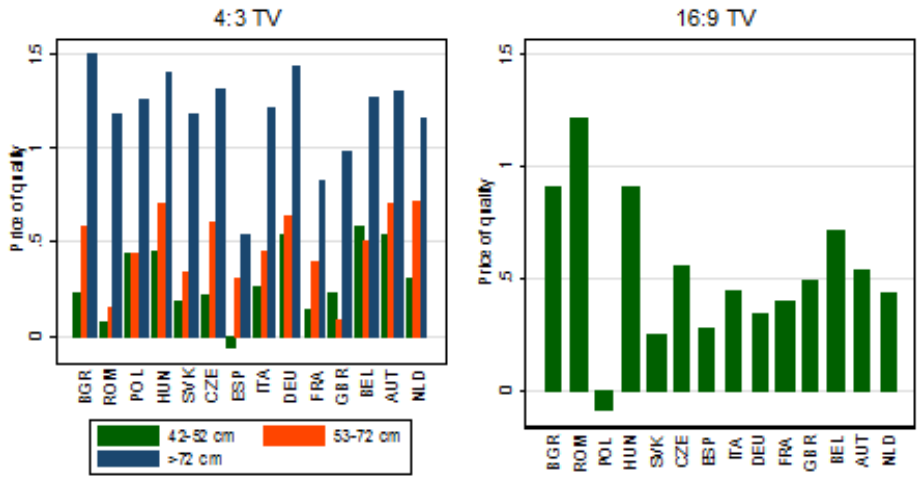

Figure 6: Valuation of quality in different countries

	(1) 4:3 TV	(2) 4:3 TV	(3) 4:3 TV	(4) 16:9 TV	(5) 16:9 TV	(6) 16:9 TV
Relative price	-1.319***	-1.319***	-1.302***	-1.072***	-1.170***	-0.941**
	(0.199)	(0.202)	(0.207)	(0.379)	(0.387)	(0.396)
CEE importer		0.249			0.758*	
		(0.265)			(0.439)	
Observations	496	496	496	272	272	272
R-squared	0.123	0.126	0.295	0.065	0.086	0.379
p-value: importer dummies			0.000			0.000

Table 4: Hedonic model of television prices with different valuations of quality

	(1) 4:3 TV	(2) 4:3 TV	(3) IV 4:3 TV	(4) 16:9 TV	(5) 16:9 TV	(6) IV 16:9 TV
predicted relative price	-1.522***			-0.560		
	(0.421)			(0.590)		
Observations	496	496	496	272	272	272
R-squared	0.245	0.313	0.263	0.357	0.447	0.414
p-values:						
importer-year dummies	0.000	0.000	0.000	0.000	0.000	0.000
importer-price interactions		0.285	0.590		0.000	0.000

Table 5: Hedonic model of television prices

is shown in columns (1) and (4) of Table 5. The point estimates are negative for both types of televisions, but the coefficient is only significant for TVs with a 4:3 tube size. This provides some evidence that the negative elasticity is not only a consequence of simultaneity. In columns (2) and (5) we report estimates where we allow σ to differ across countries. The F-test shows that these differences are only significant for wide-screen televisions. Finally, in columns (3) and (6) we estimated the equation with the interaction of the predicted price variable and the importer dummies, to conclude again that the σs are heterogenous for 16:9 televisions.

Figure 7 shows the σs estimated for each country in columns (2) and (4) of Table 5. The point estimates are all negative and similar for 4:3 TVs, while more diverse for wide-screen TVs. There are, however, no clear patterns with respect to main country characteristics.

4 Conclusions

We estimated the demand and the supply of quality in Central and Eastern European (CEE) countries utilizing data on exports and imports of various types of television sets. We found large-screen TVs to have a higher unit value, on average, but we also uncovered a large dispersion of unit values across source countries and destinations. Richer countries tend to export large-screen TVs at a lower price relative to small-screen TVs, potentially because they have a comparative advantage in producing in quality. We also found a downward sloping demand for quality, with countries facing a larger quality premium buying fewer large-screen TVs. This suggests that there is no simple quality-quantity tradeoff (unlike in many recent trade models),

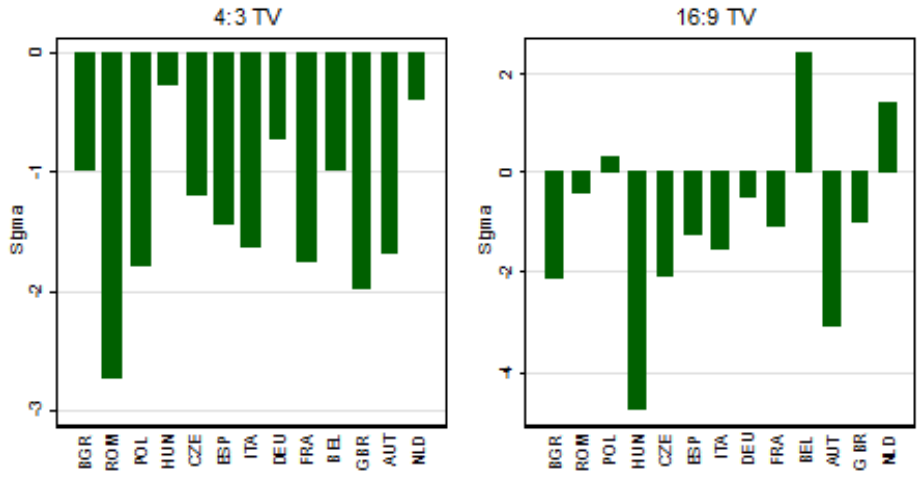

Figure 7: Estimated σ for different countries

and the demand for quality should be modeled separately.

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5 Appendix

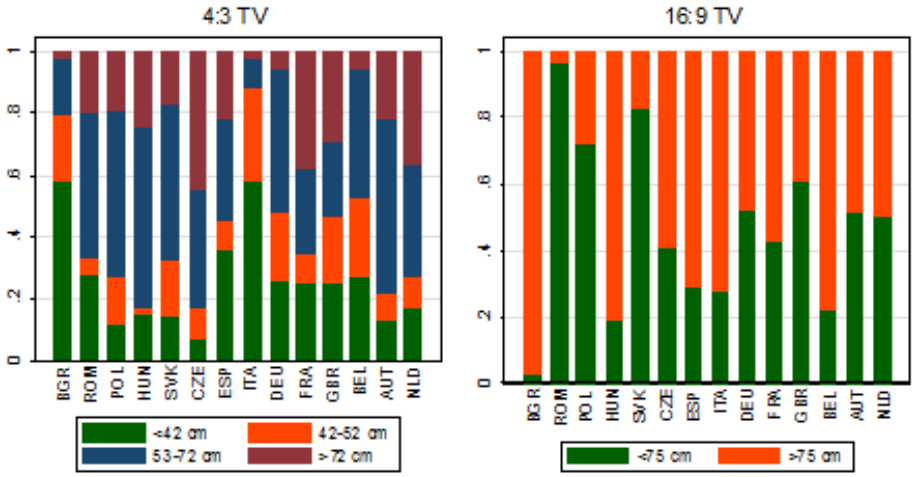

Figure 8: Quality composition of television exports

		Export		Import	
reporter	stats	relative price	relative quantity	relative price	relative quantity
AUT	N	47	47	38	38
	mean	0.9136552	-0.945711	0.6422717	-1.106307
	sd	0.3764426	2.326291	0.4395619	2.85383
BEL	N	31	31	40	40
	mean	1.140655	-2.439898	0.6780929	-1.505868
	sd	0.4731174	1.578918	0.5406908	1.701611
BGR	N	9	9	35	35
	mean	0.8484119	-2.493386	0.8312146	-1.219785
	sd	0.3259293	1.646842	0.514608	1.675867
CZE	N	59	59	48	48
	mean	0.8225394	-1.451149	0.578833	-1.309364
	sd	0.5258661	2.726663	0.4821803	2.332853
DEU	N	61	61	53	53
	mean	1.204168	-3.317106	0.9143685	-2.286398
	sd	0.4941326	1.468184	0.4658374	1.869682
ESP	N	26	26	37	37
	mean	0.6125824	-2.12909	0.6431879	-1.705055
	sd	0.3680457	2.159246	0.4716321	2.216683
FRA	N	47	47	41	41
	mean	1.061583	-0.3446842	0.7064659	-2.612268
	sd	0.4817915	2.320344	0.4336817	2.237945
GBR	N	49	49	23	23
	mean	0.997912	-0.7398796	0.7857695	-2.099988
	sd	0.4992819	1.932221	0.5904274	2.252581
HUN	N	56	56	39	39
	mean	0.7133754	-1.692849	0.7745356	-2.064089
	sd	0.3892914	1.579571	0.5109508	2.128796
ITA	N	28	28	40	40
	mean	1.182606	-4.048072	0.89195	-2.163201
	sd	0.5327696	2.915337	0.4748605	2.491774
NLD	N	37	37	45	45
	mean	0.7016561	-0.7821055	0.6987186	-1.128194
	sd	0.4019321	2.879818	0.4876713	1.275063
POL	N	52	52	32	32
	mean	0.5618378	-1.814439	0.8425766	-1.298787
	sd	0.246264	1.71733	0.5398363	2.359876
ROM	N	10	10	25	25
	mean	1.032964	-1.678173	0.8438578	-2.788734
	sd	0.3937659	1.344802	0.5889217	2.397463
Total	N	512	512	496	496
	mean	0.9008	-1.731472	0.7521975	-1.76726
	sd	0.4856875	2.347467	0.5028995	2.192725

Table 6: Number of observations and summary statistics, 4:3 televisions

reporter	stats	relative price	relative quantity	relative price	relative quantity
AUT	N	21	21	17	17
	mean	0.573541	0.1678168	0.4188689	0.9614412
	sd	0.4334886	3.139276	0.434998	3.144444
BEL	N	19	19	19	19
	mean	0.8856691	1.319246	0.6296332	-0.2535466
	sd	0.5869659	2.587126	0.4051698	1.540472
BGR	N	0	0	10	10
	mean	.	.	0.7312315	2.912462
	sd	.	.	0.4804349	2.105846
CZE	N	20	20	22	22
	mean	0.7188476	0.3717677	0.398039	1.468641
	sd	0.3977191	2.881791	0.3207906	2.470919
DEU	N	38	38	28	28
	mean	0.5955701	0.74557	0.4965172	1.411562
	sd	0.4404299	1.744273	0.4748503	2.074074
ESP	N	16	16	22	22
	mean	0.5055821	1.458438	0.5008963	-0.1622057
	sd	0.3486425	1.608816	0.5140563	1.854149
FRA	N	30	30	36	36
	mean	0.482582	0.931089	0.5318441	-0.137756
	sd	0.404663	1.652688	0.4825873	2.474694
GBR	N	19	19	20	20
	mean	0.8201337	-0.033811	0.6847174	-0.4682192
	sd	0.5733783	2.543166	0.50769	1.723154
HUN	N	25	25	15	15
	mean	0.4389636	2.345163	0.8341638	-0.5728197
	sd	0.2168861	1.927496	0.5127674	3.482032
ITA	N	6	6	25	25
	mean	0.5927006	1.263169	0.3545688	0.7851548
	sd	0.2897417	2.864502	0.3153613	1.858875
NLD	N	16	16	23	23
	mean	0.6892834	0.0579381	0.5675031	-0.1303093
	sd	0.5096539	1.506579	0.3627206	1.622684
POL	N	45	45	11	11
	mean	0.6856842	-0.8308253	0.5816992	2.938966
	sd	0.3972799	1.904806	0.6884131	1.721037
ROM	N	0	0	24	24
	mean	.	.	0.7198364	-0.4139543
	sd	.	.	0.6580235	1.880675
Total	N	255	255	272	272
	mean	0.6291946	0.5675688	0.5552203	0.4596568
	sd	0.4402771	2.12.31388	0.482893	2.370439

Table 7: Number of observations and summary statistics, 16:9 televisions