Quantifying a vertical differentiation trade model

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Motivation

- Quality is the third margin of trade, after intensive and extensive margins
- Extensive empirical literature quality and trade (Schott 2004, Manova and Zangh 2012, Feenstra-Romalis 2014, ...)
- Theory often about demand shifter, partial equilibrium or few countries. Some about general equilibrium (Khandelwal 2010, Feenstra-Romalis 2014, ... Fagelbaum-Helpman 2008,2010, Fieler 2012, Eaton-Fieler 2018...)
- Vivid IO literature on vertical differentiation where quality is the sole margin. (Mussa-Rosen 1978, Gabszewicz-Thisse 1979, Shaked-Sutton 1982, etc.) Non-homothetic models
- The objective is to make a quantitative link with this IO literature in trade model with many countries

What we do

Theory:

- Extend (non-homothetic) vertical-differentiation model with many goods and countries (Picard and Tampieri, 2024)
- Obtain useful aggregation properties

Empirics:

- Fit model with data on trade data flows and unit prices. Recover parameters (no input from other models). Validate model.

Policy:

- Study effect of trade costs, Brexit, and Trump tariffs on share of high quality goods

Model

Setup

- N trading countries with population shares m_i, $i \in \{1, ..., N\}$.
- Continuum of individuals h with *labor productivity units* s_{ih} (skills, education, effort, time) with c.d.f. F_i.
- Wage per productivity unit w_i.
- Individual income $w_i s_{ih}$
- Country average labor productivity $s_i = \int s_{ih} \mathrm{d}F_i(s_{ih})$
- Country average income: $w_i s_i$.

Goods

Between goods (sectors): horizontal differentiation

- HS4 level, motor-cars HS-8703
- indexed by $z \in [0, 1]$
- heterogeneous cost and preference

Within each good (sector): both vertical and horizontal diff.

- horizontal: combustion/electric cars
- vertical: low/high cylinder capacity
- number of horizontal varieties n_{ij}, indexed by $\nu \in [0, n_{ij}]$
- two high and low quality levels $k \in \{H, L\}$
- symmetric cost $a_k(z)$ and preference $b_k(z)$

Consumption

Armington (1969) assumption:

- each variety and quality is produced only in one country, but is consumed by all consumers in every country.

Each individual consumes a single unit of each variety but chooses its quality version.

- $b_H(z) > 0$ utility units for the high-quality version of a variety.
- $b_L(z) > 0$ for its low-quality version.

Consumption

An individual in country i maximizes the utility

$$U_i = \int_0^1 \left(\sum_j n_{ij} \sum_{k=H,L} b_k(z)\, x_{ijk}(z) \right) \mathrm{d}z$$

subject to the budget constraint

$$\int_0^1 \left(\sum_j n_{ij} \sum_{k=H,L} p_{ijk}(z)\, x_{ijk}(z) \right) \mathrm{d}z = w_i s_{ih}$$

where:

- $p_{ijk}(z) > 0$ is the (destination) consumer prices
- $x_{ijk}(z) \in \{0, 1\}$ is the unitary consumption (decision) of variety z, with $x_{ijH} + x_{ijL} = 1$
- $w_i s_{ih}$ is individual income

Demand

- Individual h in i buys the high-quality version H of a variety ν of a good z iff:

$$b_H(z) - \frac{1}{\mu_{ih}} p_{ijH}(z) \geq b_L(z) - \frac{1}{\mu_{ih}} p_{ijL}(z)$$

and the low-quality version L otherwise.

Parameter μ_{ih}:

- measures the inverse of the marginal utility of income;
- is the inverse of the Lagrange multiplier of the budget constraint;
- is a proxy for income: higher $w_i s_{ih}$ implies higher μ_{ih}.

Production and trade

- The production of each variety z requires $a_H(z)$ and $a_L(z)$ labor productivity units for the high and low-quality versions.
- Iceberg trade cost $\tau_{ij} \geq 1$
- Perfect competition: price equals unit cost

$$p_{ijk}(z) = \tau_{ij} w_j a_k(z), \quad k = H, L$$

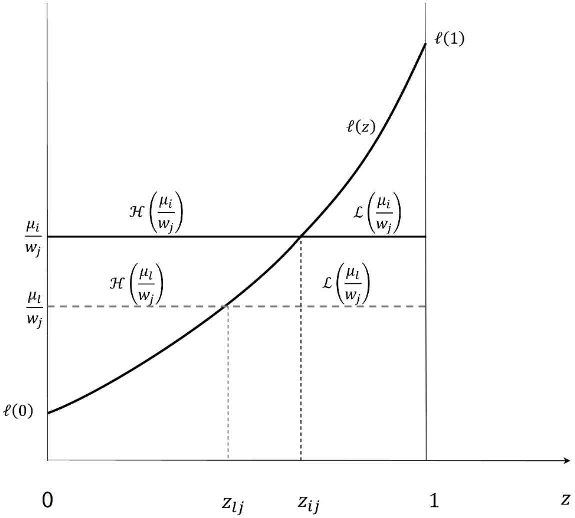
Demand

- Individual h in country i purchases high-quality varieties $[0, n_{ij}]$ of good z produced in country j iff

$$\frac{\mu_{ih}}{\tau_{ij} w_j} \geq \ell(z) = \frac{a_H(z) - a_L(z)}{b_H(z) - b_L(z)},$$

where $\ell(z)$ denotes the per-quality-unit labor input needed to upgrade variety z.

Demand



$\ell(1)$
$\ell(z)$
$\mathcal{H}\left(\frac{\mu_i}{w_j}\right)$
$\mathcal{L}\left(\frac{\mu_i}{w_j}\right)$
$\frac{\mu_i}{w_j}$
$\mathcal{H}\left(\frac{\mu_l}{w_j}\right)$
$\mathcal{L}\left(\frac{\mu_l}{w_j}\right)$
$\frac{\mu_l}{w_j}$
$\ell(0)$
0
z_{lj}
z_{ij}
1
z

Expenditure

- The expenditure of individual h in country i on goods produced in j is:

$$E_{ijh} = \int_{\mathcal{H}\left(\frac{\mu_{ih}}{\tau_{ij} w_j}\right)} n_{ij}\tau_{ij} w_j a_H(z)\mathrm{d}z + \int_{\mathcal{L}\left(\frac{\mu_{ih}}{\tau_{ij} w_j}\right)} n_{ij}\tau_{ij} w_j a_L(z)\mathrm{d}z$$

- This can be re-written as:

$$E_{ijh} = n_{ij}\tau_{ij} w_j E\left(\frac{\mu_{ih}}{\tau_{ij} w_j}\right)$$

where $E(\cdot)$ is called the *real expenditure function of a variety*

Specification for quantification

Four profiles $a_k(z)$ and $b_k(z)$, $k \in H, L$

Impose three restrictions :

- Proportionate cost upgrade: $a_H(z)/a_L(z) = \alpha/(\alpha - 1) > 1$, with $\alpha > 1$.
- Proportionate utility upgrade: $b_H(z)/b_L(z) = \beta/(\beta - 1) > 1$, with $\beta > 1$.
- Linear real expenditure function $E(y) = y - r$
  - Intercept becomes $r = \alpha\ell(0) - (\alpha - 1)\ell(1)$
  - Per-quality input becomes $\ell(z) = \frac{\Delta a(0)}{\Delta b(z)} + \int_0^z \Delta a(z)\mathrm{d}z$ quality

Specification for quantification

Quality

$$b(z) = \frac{a(z)}{\frac{a(0)}{b(0)} + \int_0^z a(\zeta)\,\mathrm{d}z}.$$

Linearity model

Individuals

- Linear expenditure $E_{ijh} = n_{ij}\left(\mu_{ih} - r\tau_{ij}w_j\right)$
- Linear inverse marginal utility $\mu_{ih} = w_i s_{ih} + r\sum_{l=1}^{N}\tau_{il}w_l n_{il}$

Aggregates

- Linear country average $\mu_i = \int \mu_{ih} dF(s_{ih}) = w_i s_i + \dots$
- Linear country average expenditure: $E_{ij} = n_{ij}\tau_{ij}w_j E\left(\frac{\mu_i}{\tau_{ij}w_j}\right)$
- Linear trade balance system: $\sum_j m_i E_{ij} = \sum_j m_j E_{ji}$

Remarkable properties

- Equilibrium independent of within-country inequality (like Cobb-Douglas/CES)
- Equilibrium exists, is (generically) unique, easy to solve
- Linear gravity equation:

$$E_{ij}^{\text{cif}} = \left(w_i s_i \frac{n_{ij}}{n_i}\right) - r\left(\tau_{ij}n_{ij}w_j\right) + r\frac{n_{ij}}{n_i}\left(\sum_{l=1}^{N}\tau_{il}n_{il}w_l\right)$$

Linearity of aggregates in μ_i and s_i

Individuals

- Expenditure E_{ijh} is linear in μ_{ih}.

$$
\begin{aligned}
E_{ijh} &= n_{ij}\tau_{ij} w_j E\left(\frac{\mu_{ih}}{\tau_{ij} w_j}\right) \\
&= n_{ij}\tau_{ij} w_j \left(\frac{\mu_{ih}}{\tau_{ij} w_j} - r\right) \\
&= n_{ij}\left(\mu_{ih} - r\tau_{ij} w_j\right).
\end{aligned}
$$

- Budget constraint: inverse marginal utility $\mu_{ih} = w_i s_{ih} + r\sum_{l=1}^{N} \tau_{il} w_l n_{il}$ is linear in income

Linearity of aggregates in μ_i and s_i

Aggregates

- Country average $\mu_i = \int \mu_{ih} dF(s_{ih})$ is linear in average income $w_i s_i$
- Country average expenditure $E_{ij} = n_{ij}\tau_{ij} w_j E\left(\frac{\mu_i}{\tau_{ij} w_j}\right)$ is linear in μ_i
- Trade balance $\sum_j m_i E_{ij} = \sum_j m_j E_{ji}$ is a system of linear equation in μ_i and w_i :

$$\sum_j m_i \left(\mu_i - r\tau_{ij} w_j\right) n_{ij} = \sum_j m_j \left(\mu_j - r\tau_{ji} w_i\right) n_{ji}.$$

- Trade equilibrium solves linear equations and is independent of within-country income distribution

Gravity equation

- We derive nominal per-capita expenditure on import from j to i (at `c.i.f.` prices):

$$E_{ij}^{\text{cif}} = \left(w_i s_i \frac{n_{ij}}{n_i} \right) - r \left(\tau_{ij} n_{ij} w_j \right) + r \frac{n_{ij}}{n_i} \left(\sum_{l=1}^{N} \tau_{il} n_{il} w_l \right)$$

- Trade expenditure rises with:
  - higher importer's higher income per capita $s_i w_i$
  - higher exporter's unit wage w_j
  - lower bilateral trade cost τ_{ij}
  - higher higher remoteness $\left(\sum_{l=1}^{N} \tau_{il} w_l n_{il}\right)$ (multilateral resistance, Anderson and Van Wincoop's 2003)

Theoretical excerptum (Picard- Tampieri 2024)

Model is theoretically consistent with stylized facts

- **Proposition 1** A country with larger per capita earnings *imports a wider range of high-quality varieties from a same country l*
- **Proposition 2** Country *l* imports more numerous high quality products *from the more productive country amongst the exporters of same size*
- **Proposition 3 (Linder Hypothesis)** *Two high income countries specialize in the production of higher quality goods and trade more of those.*
- **Proposition 4** A country ships higher quality goods to the countries that are more central to the geographical center of its trade network.

Empirics

Data

- **Trade Flows**
  - BACI database by Gaulier and Zignago (2010).
  - Bilateral trade flows between 30 OECD countries, years 2000-2014.
- **Trade Unit Values**
  - F.O.B. unit values from Trade Unit Value Database, years 2000-2014 (Berthou and Emlinger, 2011)
  - Within each HS4 category, we rank all HS6 products by their unit values.
  - We discard top 10% and bottom 10% since these items may not be regular products (e.g. spare parts).
  - We split all HS6 products within a given HS4 category into high quality and low quality products (40% top vs 40% bottom).

Data

- **Gravity Controls**
  - CEPII's "Gravity" dataset by Head et al. (2010).
  - Geographical distance, trade facilitation measures (RTA), proxies for cultural proximity (contiguity, language, colonial ties) and proxies for sizes (GDP of origin and destination), year 2000-2014.

Estimation strategy: summary

We estimate all parameters and variables:

- Estimation of trade costs τ_{ij} from regress $p_{ijk}^{\mathrm{cif}}(z) = \tau_{ij} w_j a_k(z)$
- Estimation of quality $\alpha/(\alpha-1)$ from regress $p_{ijH}(z)/p_{ijH}(z)$
- Estimation of prices of labor productivity w_j/w_l from regress triplets: $p_{ijk}^{\mathrm{fob}}(z)/p_{ilk}^{\mathrm{fob}}(z)$
- Estimation of labor endowment s_i from per-capita GDP_i divided by w_i
- Estimation of parameter r for linear gravity equation
- Estimation of profile of quality upgrade cost $a_k(z)$ as

$$\text{average}_{ij}\left[\frac{unit\_value_{ij,zk,t}^{\mathrm{fob}} quantity_{ij,z,t}}{\widehat{T}_{ij,t} N_{ij,t} \widehat{W}_{j,t}}\right]$$

Estimation of trade costs τ

- Theory-grounded price relationship:

$$p_{ijk}^{\text{cif}}(z) = \tau_{ij} w_j a_k(z), \text{with } k = H, L$$

- Gravity specification:

$$\log P_{\omega,t}^{\text{cif}} = \theta_0 * dist_{ij} + X_{ij,t} + FE_k \times FE_z + FE_j + FE_t + \varepsilon_{\omega,t}$$

where $X_{ij,t}$ are typical gravity controls.

Estimation of trade costs τ

Dependent variable: log cif price - BACI						
	(1)	(2)	(3)	(4)	(5)	(6)
Distance in km	0.0000637***	0.0000555***	0.0000322***	0.0000316***	0.0000308***	0.0000450***
	(9.23e-08)	(0.000000101)	(5.73e-08)	(6.38e-08)	(6.20e-08)	(9.03e-08)
Common language		-0.0851***	-0.0260***	-0.138***	-0.135***	-0.0769***
		(0.00140)	(0.000792)	(0.000852)	(0.000828)	(0.000944)
Colonial links		-0.109***	-0.0508***	-0.0278***	-0.0219***	-0.0121***
		(0.00173)	(0.000977)	(0.000977)	(0.000950)	(0.000966)
Common border		-0.380***	-0.212***	-0.214***	-0.208***	-0.220***
		(0.00140)	(0.000793)	(0.000806)	(0.000783)	(0.000811)
Product k FE			Yes	Yes	Yes	Yes
Destination j FE				Yes	Yes	Yes
Year t FE					Yes	Yes
Origin i FE						Yes
Observations	17,921,006	17,921,006	17,921,006	17,921,006	17,921,006	17,921,006
Adjusted R^2	0.0259	0.0321	0.692	0.705	0.721	0.729

- Recovering trade costs: $\widehat{T}_{ij} = \exp(\widehat{\theta}_0 * dist_{ij} + X_{ijt})$
- Recovering the c.i.f. expenditures: $E^{\text{cif}}_{ij,t} = \widehat{T}_{ij} E^{\text{fob}}_{ij,t}$ where $\widehat{T}_{ii} = 1$

Estimation of quality ratio $\gamma = \alpha/(\alpha - 1)$

Dependent variable: log of f.o.b. unit values. - Trade Unit Values						
	(1)	(2)	(3)	(4)	(5)	(6)
High Quality dummy			1.090***		1.088***	1.057***
			(0.000)		(0.000)	(0.000)
log Pair distance ij					0.279***	0.170***
					(0.002)	(0.003)
High Quality $\times$ *log Pair distance ij*						0.209***
						(0.002)
Fixed effects:						
orig. country	Yes	Yes	Yes	Yes	Yes	Yes
dest. country	Yes	Yes	Yes	Yes	Yes	Yes
years	Yes	Yes	Yes	Yes	Yes	Yes
HS4 product		Yes	Yes		Yes	Yes
High Quality $\times$ *HS4 product*				Yes		
Observations	8,694,818	8,694,818	8,694,818	8,694,818	8,694,818	8,694,818
Adjusted R^2	0.041	0.816	0.912	0.923	0.912	0.912

Estimation of quality ratio γ

- $\gamma = \exp(1.09) = 2.97$ which yields $\alpha = 1.507$
- Ratio remains almost the same whatever the shipment distance,
- Higher-quality goods are more expensive at longer shipping distance, which matches with the Alchianâ€“Allen effect effect:

Estimation of prices of labor productivity units

- Model prediction on price triplets of same destination i and two alternative origins j, l :

$$\frac{p^{\text{fob}}_{ijk}(z)}{p^{\text{fob}}_{ilk}(z)} = \frac{w_j}{w_l}$$

- Estimated specification :

$$\log P^{\text{fob}}_{ijk\omega,t} - \log P^{\text{fob}}_{ilk\omega',t} = \sum_{n=1}^{N} LOGW_{n,t}\left(1_{\{n=j\}} - 1_{\{n=l\}}\right) + \varepsilon'_{\omega\omega',t}$$

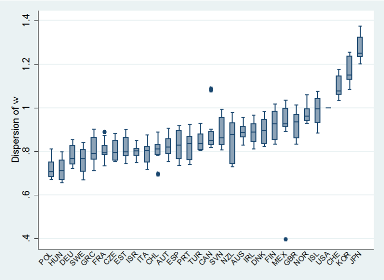
- We recover the prices of labor productivity units as $\widehat{W}_{n,t} = e^{\widehat{LOGW}_{n,t}}$

Estimation of labor prices

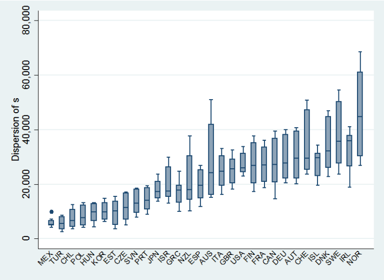
Dependent variable: log of f.o.b. unit values. - Trade Unit Values						
	(1)	(2)	(3)	(4)	(5)	(6)
D_FRA	-0.139***	-0.138***	-0.138***	-0.123***	-0.118***	-0.118***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
D_DEU	-0.165***	-0.176***	-0.176***	-0.159***	-0.150***	-0.150***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
.....	.....	.....	.....	.....	.....	.....
D_NZL	-0.169***	-0.127***	-0.127***	-0.150***	-0.177***	-0.177***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
D_ESP	-0.176***	-0.165***	-0.165***	-0.152***	-0.151***	-0.151***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls:						
HS4 product FE		Yes	Yes	Yes	Yes	
High quality			Yes	Yes	Yes	
Bilateral trade costs and nb. of varieties				Yes	Yes	Yes
High Quality × *HS4 product* FE						Yes
Destination country FE					Yes	Yes
Observations	14,808,280	14,808,280	14,808,280	14,808,280	14,808,280	14,808,27
Adjusted R^2	0.022	0.044	0.045	0.049	0.050	0.053

Notes: This table reports estimations of wage per unit of productivity w. Dependent variable is the natural logarithm of relative prices. Th columns (3-5) include controls for High Quality dummy. The columns (4-6) include the following controls: (a) logarithm of ij bilateral trad costs, (b) logarithm of il bilateral trade costs, (c) logarithm of number of varieties.

Values of w_i and s_i by countries and years



(a) Price w_i



(b) Endowment s_i

Gravity estimations: parameter r

$$E^{\text{cif}}_{ij,t} = c_0 \left(INC_{i,t} \frac{N_{ij,t}}{N_{i,t}} \right) + c_1 R_{ij,t} + c_2 \frac{N_{ij,t}}{N_{i,t}} R_{i,t} + \delta_{ij,t}$$

- Country income $w_i s_i$ is proxied by $INC_{i,t} =$ annual expenditure on non-service goods
- Bilateral trade cost $\tau_{ij} n_{ij} w_j$ is proxied by $R_{ij,t} = \widehat{T}_{ij} N_{ij,t} \widehat{W}_{j,t}$
- Remoteness $\sum_{l=1}^{N} \tau_{il} n_{il} w_l$ proxied by $R_{i,t} = \sum_{l=1}^{N} \widehat{T}_{il} N_{il,t} \widehat{W}_{l,t}$.
- Number of varieties n_{ij} is proxied by $N_{ij,t} =$ number of HS6 categories over the number of HS4 goods
- Total number of varieties n_i is proxied by $N_{i,t} = \sum_j N_{ij,t}$

Gravity estimations

Dependent variable: Per-capita trade flow - BACI					
	(1)	(2)	(3)	(4)	(5)
GDP per capita $= I \times \frac{N_{ijt}}{N^{I}_{it}}$	0.728***	0.726***	0.727***	0.728***	0.754***
	(0.0224)	(0.0215)	(0.0202)	(0.0202)	(0.0217)
Pair distance $= R_{ijt}$	-189.3***	-203.3***	-104.3***	-103.6***	-94.44***
	(9.937)	(9.517)	(9.281)	(9.290)	(9.402)
Remoteness $= \frac{N_{ijt}}{N^{I}_{it}} \times R_{it}$	199.4***	220.4***	125.5***	125.3***	138.7***
	(10.40)	(9.965)	(9.664)	(9.664)	(9.900)
Common language		-242.6***	-141.0***	-139.0***	-135.1***
		(6.989)	(7.033)	(7.134)	(7.156)
Common border			-279.1***	-278.5***	-275.1***
			(6.823)	(6.833)	(6.851)
Colonial links				-16.10	-13.40
				(9.535)	(9.536)
Year fixed effects					Yes
Observations	13050	13050	13050	13050	13050
Adjusted R^2	0.253	0.316	0.394	0.394	0.395

Constrained gravity estimations

Dependent variable: Per-capita trade flow - BACI					
	(1)	(2)	(3)	(4)	(5)
$R_{ijt} - \frac{N_{ijt}}{N^I_{it}} \times R_{it}$	-187.4***	-202.4***	-102.4***	-101.3***	-100.1***
	(10.05)	(9.603)	(9.357)	(9.361)	(9.341)
Common language		-249.5***	-144.6***	-140.7***	-135.8***
		(7.004)	(7.067)	(7.183)	(7.185)
Common border			-282.3***	-280.9***	-275.8***
			(6.865)	(6.879)	(6.882)
Colonial links				-28.90**	-12.49
				(9.438)	(9.593)
Year fixed effects					Yes
Observations	13050	13050	13050	13050	13050
Adjusted R^2	0.0259	0.112	0.214	0.214	0.219

- Assumption: $\alpha = 1$ and $c_1 = -c_2$

Quality upgrade cost profile

- Estimate the quality-input profiles $a_k(z)$ as

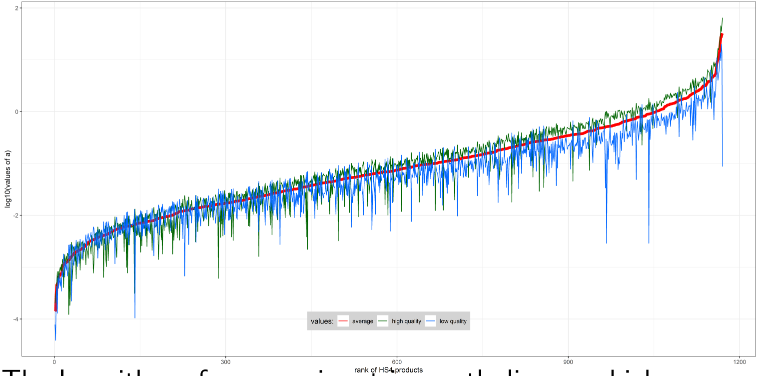
$$A_{zk,t} = \text{average}_{ij}\left[\frac{UV^{\text{fob}}_{ij,zk,t}Q_{ij,z,t}}{\widehat{T}_{ij,t}N_{ij,t}\widehat{W}_{j,t}}\right]$$

  where

  - UV^{fob} is F.O.B unit value
  - $Q_{ij,z}$ is the annual per-capita consumption quantity of good z with quality k (e.g. kg) of good z in country pairs i, j

Distribution of labor inputs a - BACI + Trade Unit Values

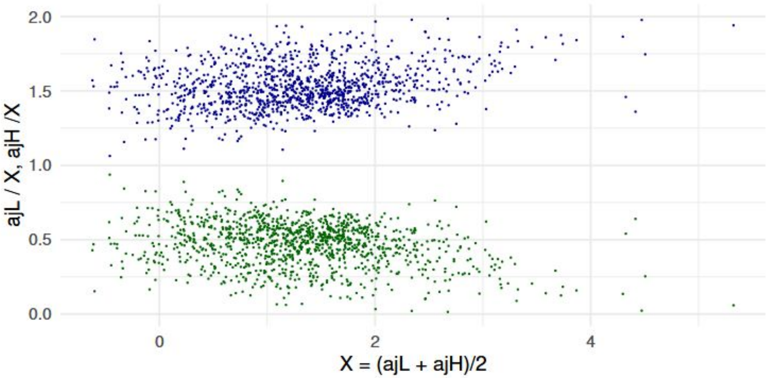
- We rank the goods in increasing order of the average of input per quality: $A_{zM,t} = (A_{zH,t} + A_{zL,t})/2$



- The logarithm of average input is mostly linear, which suggests a power distribution.

Unit values of high quality and low quality goods

Figure 3: Difference between unit values of high quality and low quality products.



Estimations of labor inputs a

	(1)	(2)	(3)	(4)
ζ	2.967***	2.966***		
	(0.004)	(0.004)		
$log_{10}(1-\zeta)$			-1.827***	-1.825***
			(0.006)	(0.006)
Constant	-2.696***	-2.697***	-2.006***	-2.022***
	(0.002)	(0.005)	(0.004)	(0.011)
Fixed effects:				
years		Yes		Yes
Observations	17619	17619	17619	17619
Adjusted R^2	0.964	0.964	0.825	0.825

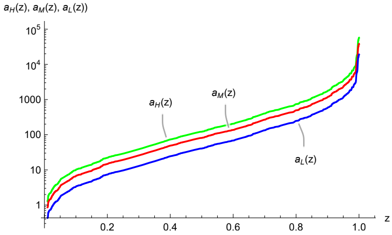
Notes: This table reports estimations of number of labor units a. Dependent variable is base 10 logarithm of average a. The columns 2 and 4 include a fixed effect for years. Robust standard errors are in parentheses.

- The average differences between quality versions is $\log_{10} 2.97 = 0.47$.
- The last two columns account for the Pareto distribution. The fit is less good.

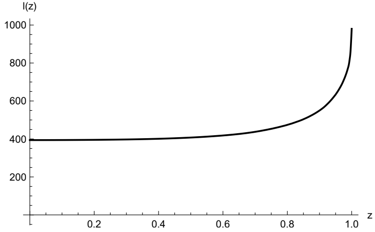
Calibration - year 2014

τ_{ij}	$\hat{T}_{ij}$
s_i	$\hat{S}_i$
α	1.5
r	102.4
$\ell(z)$	$\hat{\ell}(z)$

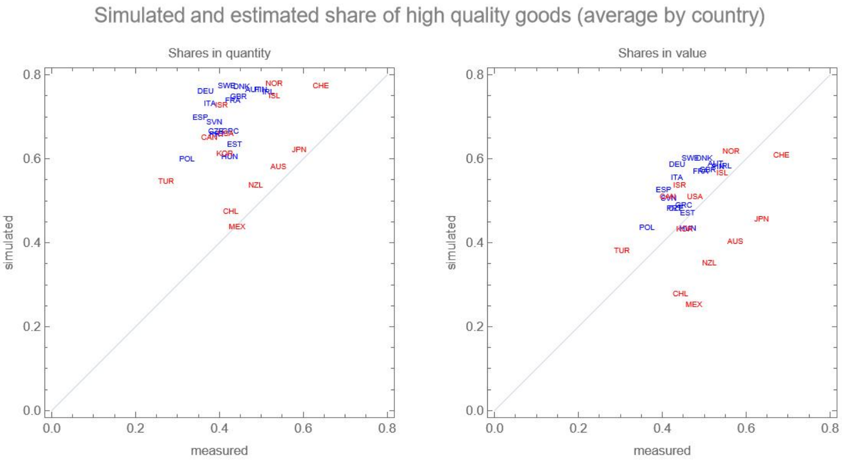
Calibration of high– and low– quality input–cost schedule (USD)



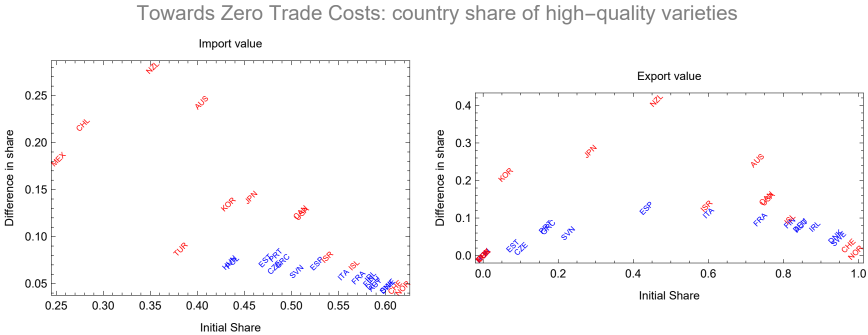
Input–per quality schedule



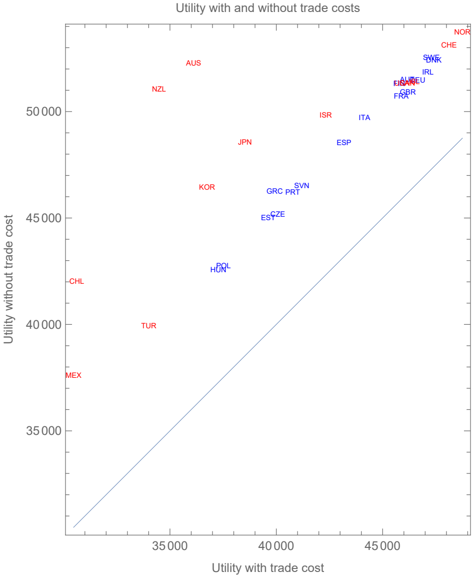
Model validation



Counterfactual: Zero trade cost

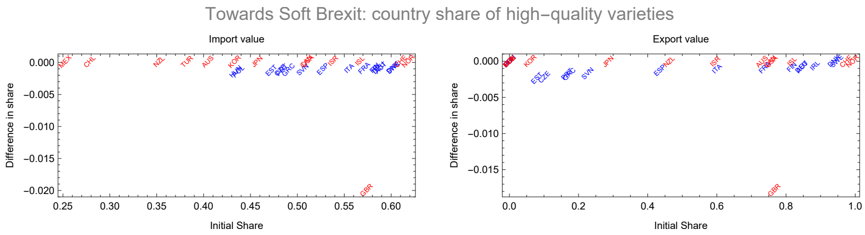


Counterfactual: Zero trade cost



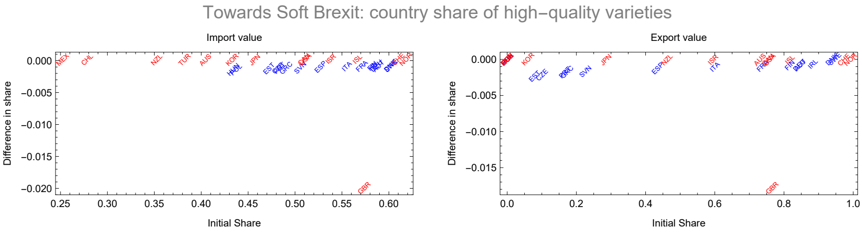
Counterfactual: Soft Brexit

- Tariff-free and quota-free trade but non-tariff barriers (custom checks, paper work, congestion, delays, product norm compatibility issues, etc.) So, a rise by 5 % of trade cost τ_{ij} between EU and UK



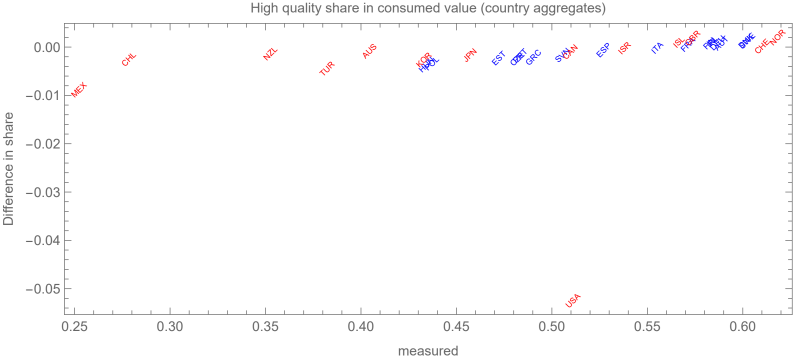
Counterfactual: Hard Brexit

- UK has 'third country' status submitted to tarifs and custom control. So, a rise by 15 % of trade cost τ_{ij} between EU and UK



Counterfactual: Trump's tariffs

- US import tariffs: 25 % MEX, CAN; 15% EU, UK, JPN, ...
- Big impact on US consumption, lower impact on others (because Armington)



Concluding remarks

- Non-homothetic model with vertical differentiation à la Mussa and Rosen (1978).
- Assumption of linear expenditure: equilibrium is a linear system and aggregation of income effects (like CES/Cobb-Douglas)
- Fit model with the data from BACI and Trade Unit Values (no input from other models).
- Trade cost decreases share of high quality by 5 to 25 %
- Soft Brexit decreases share of high quality of imported (exported) goods by 2 (10) % in UK and by 0.1 (0.2) % in EU
- Trumps' tariffs mostly harm the share of high quality consumption in the US
- Limitation: fixed extensive margin, ...