Income distribution and vertical comparative advantage
Theory and evidence

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Climbing up the quality ladder

- Climbing up the quality ladder = Important objective for many developed and developing countries
- The position of a country's production and exports on the quality ladder is an important issue
  - Hausmann et al (2007): countries exporting more sophisticated products grow faster
  - Aghion et al (2002): climbing up the quality ladder is a way to escape competition
  - High quality varieties, greater source of technological spillovers and less likely to delocate?
- So far, in the literature, main emphasis on **supply-side determinants** of vertical patterns of trade
  - quality content of exports explained by exporter production techniques and exporter relative factor endowment (Flam and Helpman, 1987; Schott, 2004; Verhoogen, 2008; Fieler, 2011a, 2011b)

Vertical home-market effect

- Evidence of quality-upgrading of Chinese and Eastern European exports (Pula and Santabarbara, 2011; Cheptea et al., 2010; Porter and Ketels, 2007 etc.), along the emergence of new middle classes

$\Rightarrow$ Causal impact of income distribution on the vertical comparative advantage of countries?

- **Home-market effect**: production follows demand (Krugman, 1991; Davis and Weinstein, 2003; Hanson and Xiang, 2005)
  - Both theoretical results and empirical evidence obtained in a **horizontal, intra-industrial framework**
- Our paper focuses on the **demand-side** determinants of vertical comparative advantage: **vertical home market effect**

Literature review

- Literature already tackled the demand-driven determinants of the quality content of imports (Hallak, 2006; Choi et al, 2009; Bekkers et al, 2012)
- Only one paper tackled the demand-driven determinants of the quality content of exports
  - Fajgelbaum, Grossman and Helpman, 2011: income distribution and the corresponding patterns of aggregate demand translate into patterns of vertical specialization and trade (Linder hypothesis, home markets effect)
  - Positive impact of avg income, positive impact of ineq. in "poor" economies only
  - However, theoretical model of unit consumption precluding any adjustment of the quality content of consumption along the intensive margin (extensive margin only)
- In this paper, adjustment of the quality content of individual consumption in a framework where consumers buy both high and low quality varieties
  - "joint-purchase" feature relevant for many categories of goods (Gabszewicz and Wauthy, 2009)
  - adjustment of the quality content of aggregate demand through the "intensive" margin, and not only the "extensive" margin
  - very general and tractable framework, suitable for various empirical exercises on both individual and aggregate data

Main results of our paper

- **Main theoretical contributions:**
  - Confirmation of results obtained by Fajgelbaum et al. (2011), in a model featuring love for variety for both high and low quality varieties
    $\Rightarrow$ Demonstration, in a vertical framework, of the equivalence between heterogeneous consumers models and love for variety models, highlighted in a horizontal framework by Anderson et al. (1992)
  - Heterogeneous impact of inequalities on the quality mix of exports along the average income dimension
- **Empirical contribution:**
  - Empirical tests on trade flows within enlarged EU (integrated market, important disparities in terms of average income and inequality levels)
  - For a given HS6 product, unit values of exporters positively related to:
    - average income
    - the interaction of average income and inequalities
  - Results robust to instrumentation and inclusion of controls for supply-based determinants of vertical comparative advantage
  - Quantitative assessment of the effects: potentially non negligible impact of inequalities, magnified when coupled with an increase in average income
    $\Rightarrow$ Critical role of middle classes in quality upgrading of exports?

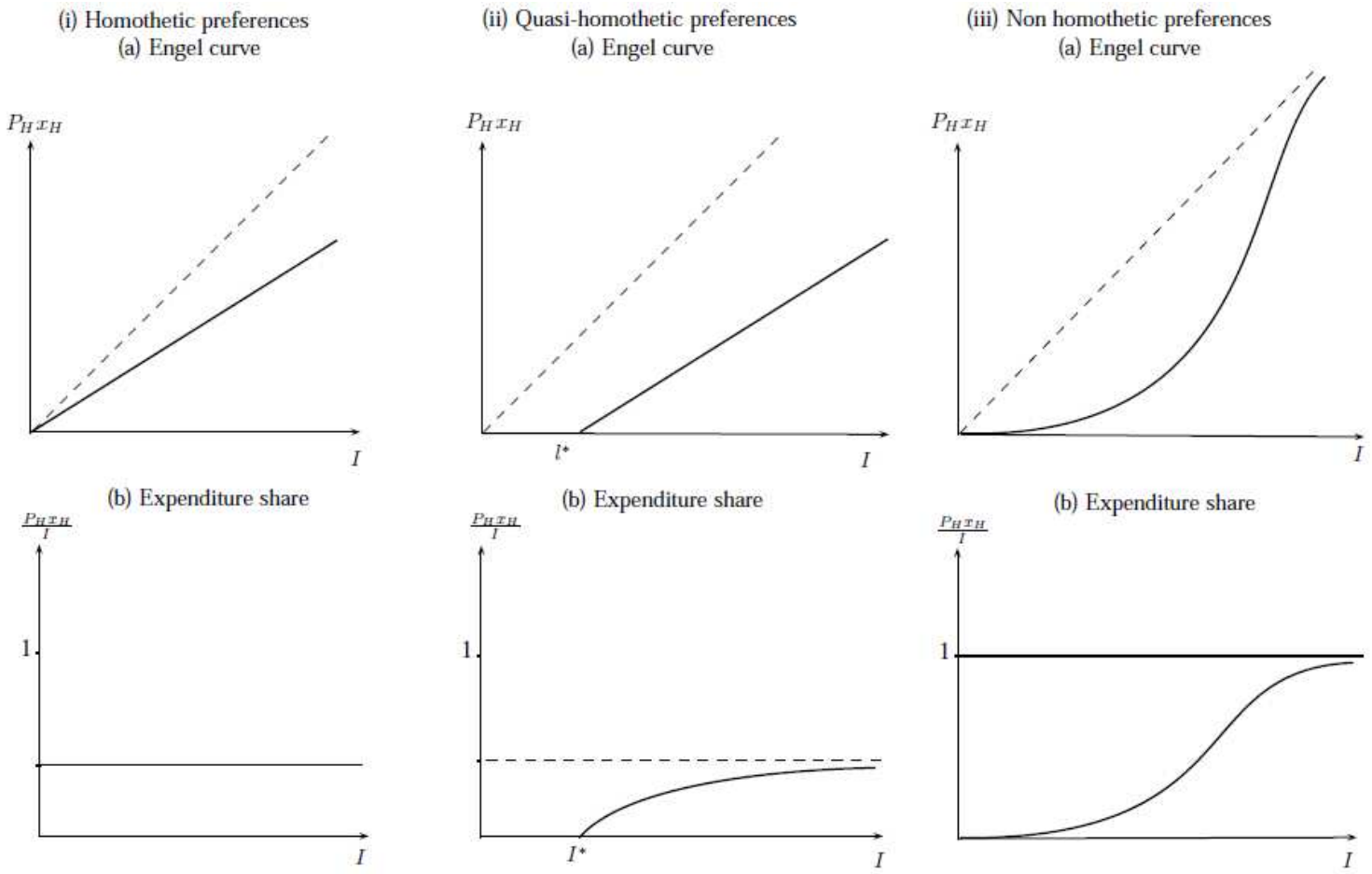
Modeling non homothetic preferences

- For the distribution of income to influence the demand structure, we need non-homothetic preferences, i.e. variations in the consumption bundle along income
- Ignoring strategic pricing:
  - (1) Models of discrete *qualitative adjustment*: either fixed unit consumption and increasing number of high quality consumers (Flam and Helpman, 1987; Fajgelbaum et al., 2011), or both increasing number and quality level of goods consumed (Foellmi et al., 2010; Fieler, 2011)
  - (2) Models of *quantitative adjustment*, using VES individual utility functions with a variable elasticity of substitution across vertically differentiated varieties along the consumption level (in a horizontal framework, Zhelobodko et al., 2012; Dhingra and Morrow, 2012; in a vertical framework, Hallak, 2006; Bekkers et al., 2011)
- We build along this second line of models

Non-homothetic preferences - main properties

- Assumption: Consumption of two qualitites H and L of the same good
- Utility function $U(C_H, C_L)$ with a variable elasticity of marginal utility along the consumption level: $|\frac{C_H U''(C_H)}{U'(C_H)}| = f(C_H)$ with $\frac{\partial f}{\partial C_H} > 0$ ...
- ...which yields a variable marginal propensity to consume along the income level: $\frac{\partial P_H C_H}{\partial y} = g(y)$ with:
  - $g(y) > 0$ for all income levels: marginal utility of high quality increases with income
  - $\frac{\partial g}{\partial y} > 0$ up to a certain income level: convexity of the Engel curve up to a certain income level, i.e. existence of at least one inflection point before the Engel curve converges to the first bisector

Non-homothetic preferences - Engel curves and expenditure shares



Consumers: income heterogeneity

- Fixed number N of consumers, with an overall labor supply of L units of effective labor paid at an exogenous wage $w = 1$
- Two-class society with rich (R) and poor (P) consumers, being distinguished by their labor endowment (l_R and l_P)
- Income distribution:
  - Share of poor consumers within the population: β
  - Ratio of the labor endowment of a poor consumer *relative* to the average per-capita labor endowment: $d = \frac{l_P}{L/N}$
  - We hence have $l_P = d\frac{L}{N}$ and $l_R = \frac{1-\beta d}{1-\beta}\frac{L}{N}$

Consumers: preference structure

- Cobb-Douglas utility function:

$$\mathcal{U}_i = (U_i[C_{iH}, C_{iL}])^{\theta} A^{1-\theta}$$

with A being the consumed quantity of the homogeneous good, and U_i a two-tier function of two bundles of the vertically differentiated good.

- In order to focus on the quantitative adjustment between the two bundles C_{iH} and C_{iL}, we fix the allocation rule between the horizontally differentiated varieties of a given quality segment by imposing CES bundles:

$$C_{ij} = \left[\int_0^{n_j} c_{ij}^{\frac{\sigma-1}{\sigma}}(k)dk \right]^{\frac{\sigma}{\sigma-1}}$$

with

$$c_{ij}(k) = \left(\frac{p_j(k)}{P_j} \right)^{-\sigma} C_{ij}$$

Properties of the consumption bundle

- Allocation of θI_i between C_{iH} and C_{iL} following optimization of $\mathcal{U}_i$ under budget constraint

$$A + P_H C_{iH} + P_L C_{iL} = I_i$$

- Strict non-homotheticity of $\mathcal{U}_i$, so that, denoting $s_j(I_i) = \frac{P_j C_{ij}}{\theta I_i}$ the average propensity to consume quality j, we have the following three properties

(1) *The average propensity to consume varieties of high- (resp. low-) quality increases (resp. decreases) along income:* $\frac{\partial s_H(I_i)}{\partial I_i} > 0$, $\frac{\partial s_L(I_i)}{\partial I_i} < 0$.

(2) *The marginal propensity to consume varieties of high- (resp. low-) quality increases (resp. decreases) along the income level:* $\frac{\partial^2 P_H C_{iH}}{\partial I_i^2} > 0$, $\frac{\partial^2 P_L C_{iL}}{\partial I_i^2} < 0$.

(3) *The average propensity to consume varieties of high- (resp. low-) quality is convex (resp. concave) along the income level:* $\frac{\partial^2 s_H(I_i)}{\partial I_i^2} > 0$, $\frac{\partial^2 s_L(I_i)}{\partial I_i^2} < 0$

Equilibrium equations

- Otherwise classic monopolistic competition model
- Constant fixed and marginal labor production costs for each quality
- Free entry and market-clearing conditions:

$$\pi_L = a_L\left(\frac{\sigma_L}{\sigma_L - 1} - 1\right) n_L^{\frac{\sigma_L}{1-\sigma_L}} D_L - f_L \leq 0, \quad n_L \pi_L(n_H, n_L) = 0$$

$$\pi_H = a_H\left(\frac{\sigma_H}{\sigma_H - 1} - 1\right) n_H^{\frac{\sigma_H}{1-\sigma_H}} D_H - f_H \leq 0, \quad n_H \pi_H(n_H, n_L) = 0$$

- The two equilibrium equations boil down to:

$$\frac{f_L \sigma n_L}{\theta} = \beta d L \; s_L(I_P) + (1 - \beta d) L \; s_L(I_R)$$

$$\frac{f_H \sigma n_H}{\theta} = \beta d L \; s_H(I_P) + (1 - \beta d) L \; s_H(I_R)$$

- For given income distribution parameters and under strict non-homotheticity of U_i, unique positive solution (n_L, n_H) to the system

Comparative statics (1)

- Due to resource constraint, for fixed L, any increase in n_H must be compensated by a decrease in n_L
- Number of firms active on each quality segment positively related to the size of **aggregate demand** for each segment
- Unambiguous positive impact of average income on quality content of production
  - $\frac{\partial n_H}{\partial N} < 0$: for a given L and d, number of high quality firms increases with average income
  - $\frac{\partial n_L}{\partial N} > 0$: for a given L and d, number of low quality varieties decreases with average income

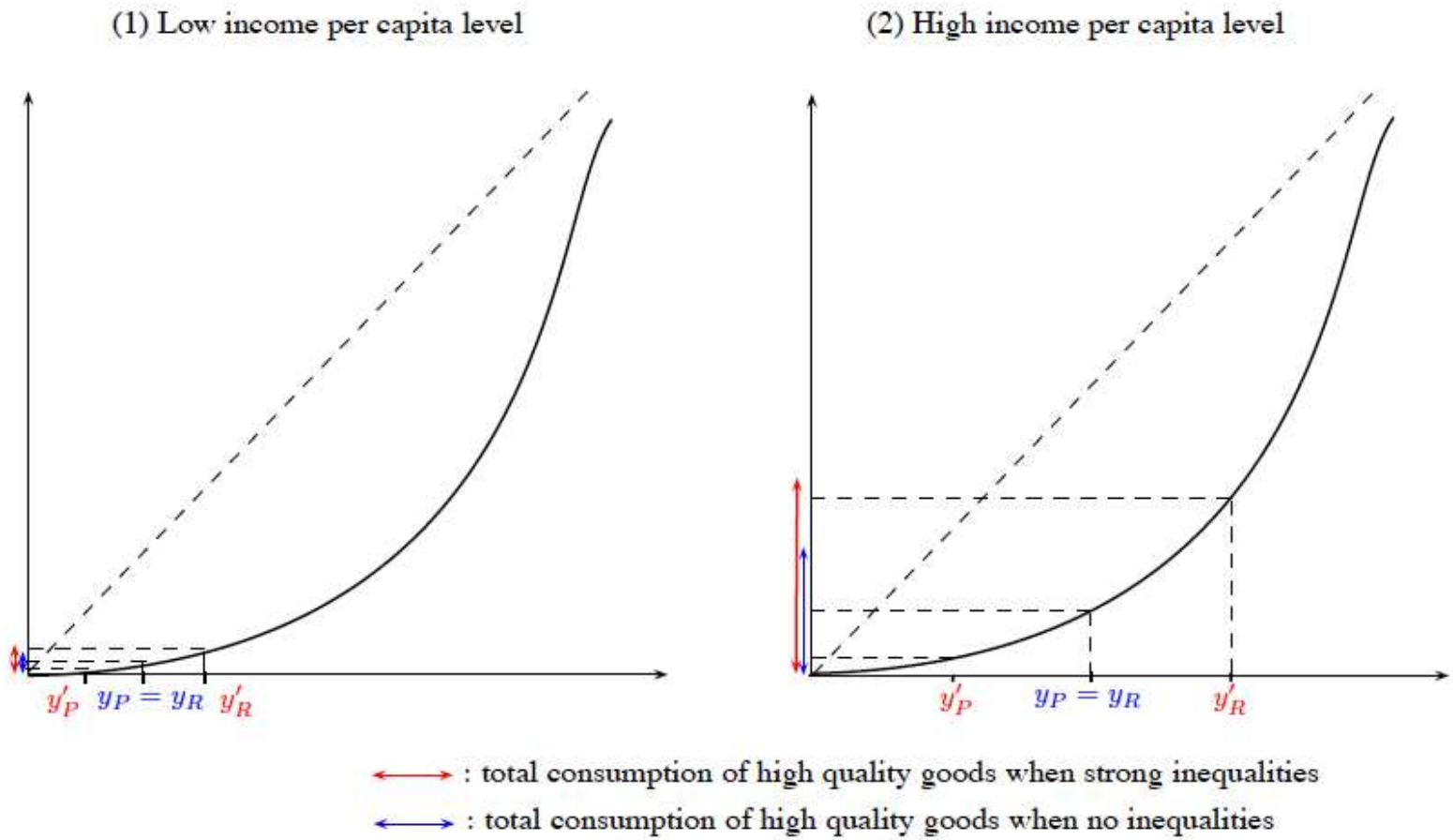
$\Rightarrow$ Quality content of production increases with average income

Comparative statics (2)

- When both rich and poor are on the convex part of the Engel curve, heterogenous impact of inequalities
  - $\frac{\partial n_H}{\partial d} < 0$: for a given $\frac{L}{N}$, number of high quality firms increases with inequalities
  - $\frac{\partial^2 n_H}{\partial d \partial N} < 0$: number of high quality firms increases with inequalities more and more rapidly along income
  - The opposite is true for the number of low quality varieties

  $\Rightarrow$ Heterogeneous positive impact of inequalities on the quality content of production along income

Graphical intuition



The model in open economy (1)

- We model two countries D and F, identical in all characteristics except for their level of inequalities (d_D and d_F) and average income (N_D and N_F)
- Iceberg trade costs: a firm needs to ship τ_k ($\tau_k \geq 1$) units of a good belonging to the quality category k to sell 1 unit on the foreign market
  - We assume that the homogenous good is freely traded ($\tau_A = 1$), which equalizes wages across countries
  - $\tau_H = \tau_L = \tau > 1$
- We define the number of "effective competitors" of quality k present on the domestic market r as $\tilde{n}_k^r = n_k^r + \tau^{1-\sigma} n_k^s$
  - number of foreign competitors n_k^s discounted by a factor $\tau^{1-\sigma}$, expressing the fact that those foreign producers are less competitive on the local market

The model in open economy (2)

- Equilibrium defined by two independent systems of two equations, each one jointly determining $\tilde{n}_H^r$ and $\tilde{n}_L^r$, $r = D, F$:

$$\pi_k^D \leq 0, \quad \tilde{n}_k^D \pi_k^D = 0, \quad j = H, L$$
$$\pi_k^F \leq 0, \quad \tilde{n}_k^F \pi_k^F = 0, \quad j = H, L$$

...each system is exactly similar to the equilibrium conditions that defined the distribution of firms across qualities in a closed economy, except that n_j has been replaced by $\tilde{n}_j^r$

- We have $n_k^r = \frac{\tilde{n}_k^r - \tau^{1-\sigma}\tilde{n}_k^s}{1-\tau^{2(1-\sigma)}}$, positive provided $\tau^{1-\sigma} < \frac{\tilde{n}_k^r}{\tilde{n}_k^s} < \frac{1}{\tau^{1-\sigma}}$
- We restrict ourselves to parametric cases where both countries produce at least one of the two qualities (trade with partial or total specialization)
  - for highly asymmetric countries and low enough trade costs, both qualities are entirely produced and exported by the big country
  - this parametric case is however not captured by our empirical strategy (comparison across EU25 countries of the weighted average unit value of their exports to other EU25 members for a given product)

Vertical home market effect

- Predictions on $\tilde{n}_k^r$ translate into predictions on n_k^r
- Trade costs and fixed production costs: at equilibrium, firms will tend to follow demand
- Predictions concerning variations of $\tilde{n}_j^r$ along N_r and d_r similar to the ones obtained in closed economy for n_j
- **"Vertical home market effect":** a domestic demand tilted towards high-quality goods translates into a higher quality content of a country's exports
- **Main prediction:** the impact of inequalities on the quality content of exports is all the more positive that average income is high, provided that rich and poor are both on the convex part of the Engel curve of $P_H C_H$

Quality content of exports and unit value

- Unit value at the product-exporter level can be written as $q^e = \frac{n_H d_H p_H + n_L d_L p_L}{n_L d_L + n_H d_H}$
- In our framework, we have

$$q^e = \frac{\theta L}{\frac{\theta L f_L(\sigma-1)}{a_L} + n_H f_H(\sigma-1)\left(\frac{a_L - a_H f_L \sigma}{a_H a_L}\right)}$$

- If $a_H > \frac{a_L}{f_L \sigma}$, $\frac{\partial q^e}{\partial n_H} > 0$
- q^e being a convex function of n_H, non-linear relationship along income between inequality and n_H also holds for unit values

Data

- Empirical part focused on bilateral trade flows between EU25 countries because
  - highly integrated market, which limits inteference between trade policy and quality content of production (Zhou et al., 2002)...
  - ...displaying huge heterogeneity across countries in terms of average income and inequalities...
  - ...and with reliable information on country-level characteristics and trade flows
- BACI database for years 2005-2007 recording bilateral trade flows at the HS-6 product level (around 5000 product lines), in value and in volume
  - We use the data to compute for each bilateral trade flow between EU25 members unit value of the flow
  - **Assumption: the higher the unit value, the higher the quality mix of products nested into the HS-6 considered product category**
- Country-level information on income, inequalities (Gini index and interquintile ratio), wages, population and skills in Eurostat databases

Quality measure

- Limitation of unit value as a proxy for quality: it might capture other determinants of prices, like production costs or strategic pricing-to-market
- Alternative quality indices have been recently proposed, combining information on prices and quantities
  - Hallak and Schott (2011): for a given price, countries with lower trade deficits produce a higher quality. However, index based on a model with homothetic preferences
  - Khandelwal (2010): for a given price, countries that sell more produce a higher quality. However, index that is hardly comparable across importers
- In this paper, we rely on unit values (as in Schott, 2004; Choi et al., 2009; Fieler, 2011b; Bekkers et al., 2012)
  - Results robust to inclusion of controls for skills of the workforce and labor costs

Estimated equation (1)

- Our theoretical model yielded two main empirical predictions:
  - *(1) Within a given product category, richer countries specialize in high quality varieties, and thus exhibit higher unit values of exports than their partners.*
  - *(2) Within a given product category, within-country inequalities have a heterogeneous impact on vertical specialization. Inequalities increase specialization in high-quality varieties more strongly for richer countries.*
- To test directly prediction (2), we implement the following regression:

$$\text{uv}_{xpt} = \alpha \text{avg\_inc}_{xt} + \beta \text{ineq}_{xt} + \eta \text{avg\_inc}_{xt} \times \text{ineq}_{xt} + \gamma \text{bal}_{xpt} + \mu_{pt} + \epsilon_{xpt}$$

Estimated equation (2)

- Dependent variable: for a given exporter x/product p at time t, unit value of its exports to importer m
- Explanatory variables:
  - avg_inc_{xt}: average PPP income of country x
  - ineq_{xt}: Gini index for country x
  - bal_{xpt}: Balassa index of revealed comparative advantage (in volume), since prices in comparative advantage industries are potentially lower due to tougher firm selection (Bernard, Redding and Schott, 2007)
- Estimation of results exploiting cross-country differences in repeated cross-sections: importer/product/year fixed effect μ_{mpt}
- All regressions clustered at the exporter/year level (Moulton, 1990)

Demand based determinants - Endogeneity

- Interpretation of our results as demand-based determinants of vertical comparative advantage
- Strictly speaking, average income and inequalities can capture both demand and supply based determinants. However:
  - Skills, but also skills dispersion might confer countries specific comparative advantages (Grossman and Maggi, 2000; Bombardini et al., 2011)
  - Results robust to inclusion of population skills and skills diversity
  - Heterogeneous impact of inequalities that cannot be accounted for by these supply-based explanations
- Inequalities might reflect specialization in terms of quality and not the opposite (Verhoogen, 2008; Costinot and Vogel, 2010)
  - Reverse causality probably reduced here
    - focus on income inequality and not wage inequality
    - cross-sectional analysis: long-run effects, so that skills supply should have adapted to movements in relative wages
  - However, reverse causality tackled thanks to instrumentation strategy

Instrumentation strategy

- Average income and inequalities both assumed as potentially endogeneous
- Two sets of variables potentially correlated with current income and inequalities without being directly correlated with current quality content of exports
  - *Average income:* GDP per capita in 1992 and geographic centrality of the country, as measured by the distance to Germany
  - *Inequalities:* Value of the Gini index in the 1990's and number of years with left-wing governments from 1991 to 2000
- Rationale for the choice of instruments
  - Persistency in income and inequalities, that can explain current income distribution, beyond important changes that European countries might have experienced in the income distribution and supply conditions over the past 20 years (especially Eastern European countries)
  - Geographic centrality, which determines income in a standard home market effect framework, without directly effecting technology or quality choices (Head and Mayer, 2006; Hering and Poncet, 2010; Head and Mayer, 2011)
  - Number of years with left-wing government, which might have impacted redistribution policies and thus inequalities, but not directly technology or quality choices

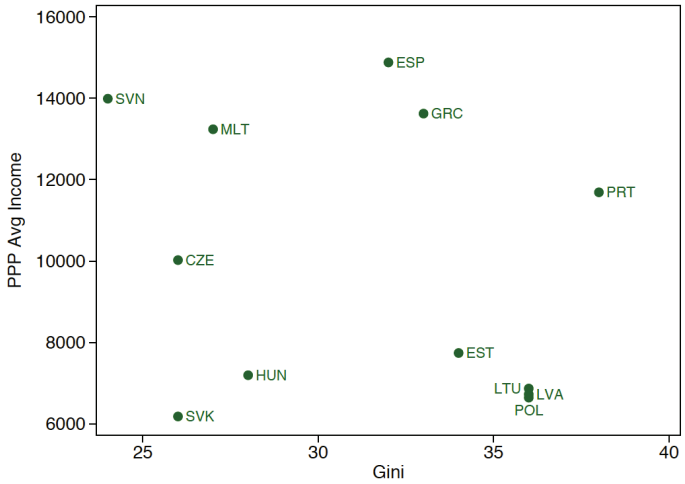
Descriptive statistics (1)

Table: Average income and inequalities in the enlarged EU in 2005 - PPP

	Poor countries		Rich countries		All countries	
	Mean	Sd	Mean	Sd	Mean	Sd
Average income	9900	3376	18970	1883	14435	5348
1st quintile Average income	4084	1593	8311	923	6197	2507
5th quintile Average income	19005	6489	35233	5059	27119	10053
Interquintile ratio	4.88	1.23	4.28	0.71	4.58	1.03

- Distinction between "rich" and "poor" countries: PPP average income higher or lower than 16000 euros over the period
  - "Rich" countries: Italy, Sweden, Finland, France, Denmark, Germany, Belgium-Luxembourg, Netherlands, Cyprus, Ireland, Austria and UK
  - "Poor" countries: Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, Slovenia, Spain

Descriptive statistics (2)



Poor countries

Rich countries

All countries

First stage regressions

	Ln Average PPP income		Gini	
Ln GDP per cap. 1992	0.760[a]			
	(0.034)			
Geographic centrality		0.312[a]		
		(0.014)		
Gini 1990's			0.705[a]	
			(0.014)	
# years with left-wing gvt 1991-2000				-0.171[b]
				(0.036)
N	72	72	72	72
Year fixed effects	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses [a], [b] and [c] respectively denoting significance at the 1%, 5% and 10% levels. Standard errors are clustered by year. Geographic centrality is the inverse of distance to Germany.

Bilateral export prices and exporter characteristics

	Dependent Variable: Ln uv_{xmpt}					
	OLS				IV	
Model :	(1)	(2)	(3)	(4)	(5)	(6)
Ln Avg PPP Income$_{xt}$	0.242^{a}	0.225^{a}	-0.161	0.269^{a}	-0.328^{c}	-0.485^{a}
	(0.0204)	(0.0249)	(0.117)	(0.0244)	(0.182)	(0.184)
Gini $_{xt}$	-0.00163	-0.00471^{b}	-0.127^{a}	0.00395	-0.187^{a}	-0.251^{a}
	(0.00172)	(0.00203)	(0.0355)	(0.00317)	(0.0547)	(0.0557)
Ln Balassa ind. vol.$_{xpt}$	-0.0790^{a}	-0.0841^{a}	-0.0852^{a}	-0.0833^{a}	-0.0854^{a}	-0.104^{a}
	(0.00289)	(0.00298)	(0.00294)	(0.00285)	(0.00264)	(0.00291)
Ln Pop$_{xt}$		-0.0132^{c}	-0.0173^{b}	-0.0246^{a}	-0.0295^{a}	-0.0370^{a}
		(0.00737)	(0.00755)	(0.00729)	(0.00728)	(0.00936)
Ln Distance$_{xmt}$		0.126^{a}	0.125^{a}	0.117^{a}	0.117^{a}	0.135^{a}
		(0.00754)	(0.00759)	(0.00800)	(0.00836)	(0.00891)
Ln Avg PPP Income$_{xt}$ × Gini$_{xt}$			0.0130^{a}		0.0201^{a}	0.0268^{a}
			(0.00384)		(0.00595)	(0.00609)
N	2421908	2421908	2421908	2421908	2421908	1039233
Importer-Product-Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Kleinbergen-Paap test				30.50^{a}	14.95^{a}	15.99^{a}
Sargan-Hansen test (p-value)				0.33	0.24	0.17
	All manuf. prod.					Vert. diff. prod.

Note: Standard errors in parentheses ^{a}, ^{b} and ^{c} respectively denoting significance at the 1%, 5% and 10% levels. Standard errors are clustered at the exporter-year level.

Additional controls

	Dependent Variable: Ln uv_{xmpt}				
			IV		
Model :	(1)	(2)	(3)	(4)	(5)
Ln Avg PPP Income	-8.711^a	-0.359	-0.151	-0.595^b	-2.009^a
	(1.879)	(0.249)	(0.510)	(0.286)	(0.659)
Gini	-0.287^a	-0.0458	-0.191^c	-0.209^a	-0.396^b
	(0.0886)	(0.267)	(0.110)	(0.0806)	(0.179)
Ln Avg PPP Income × Gini	0.0302^a	0.0219^b	0.0202^c	0.0220^b	0.0417^b
	(0.00935)	(0.00853)	(0.0119)	(0.00878)	(0.0189)
Ln Balassa ind. vol.	-0.102^a	-0.105^a	-0.104^a	-0.103^a	-0.106^a
	(0.00277)	(0.00312)	(0.00282)	(0.00262)	(0.00254)
Ln Pop	-0.0361^a	-0.0472^a	-0.0322^b	-0.0354^a	-0.303^a
	(0.00880)	(0.0163)	(0.0127)	(0.00877)	(0.0790)
Ln Distance	0.156^a	0.141^a	0.137^a	0.137^a	0.163^a
	(0.00832)	(0.00924)	(0.00870)	(0.0106)	(0.00859)
Ln ^{2} Avg PPP Income	0.436^a				
	(0.0932)				
Gini^2		-0.00270			
		(0.00342)			
Ln Wage			-0.0835		
			(0.101)		
LnGraduates in math, science & tech. per 1 000 of pop.				-0.765	
				(1.786)	
Ln Avg PPP Income × Ln Grad. in math, sc. & tech. per 1 000 of pop.				0.0886	
				(0.188)	
Ln Nb of people with post sec. non tert. educ.					-3.098^b
					(1.270)
Ln Nb of people with ter. educ.					2.545^c
					(1.495)
Ln Avg PPP Income × LnNb of people with post sec. non tert. educ.					0.345^b
					(0.136)
Ln Avg PPP Income × Ln Nb of people with ter. educ.					-0.259^c
					(0.154)
Skills diversity					0.0666
					(0.0704)
Observations	1039233	1039233	1039233	1033474	1039233
Importer-Product-Year fixed effects	Yes	Yes	Yes	Yes	Yes
Kleinbergen-Paap test	16.43^a	10.66^b	24.64^a	9.41^c	25.06^a
Sargan-Hansen test (p-value)	0.10	0.17	0.17	0.27	0.03

Note: Standard errors in parentheses ^{a}, ^{b} and ^{c} respectively denoting significance at the 1%, 5% and 10% levels.
Standard errors are clustered at the exporter-year level.

Alternative samples

	Dependent Variable: Ln uv_{xmpt}				
	IV				
	Final goods	w/o flows <10,000$	w/o CYP and MLT	w/o LVA LTU and POL	w/o DNK GBR and IRL
Ln Avg PPP Income	-0.394^{c}	-0.429^{b}	-0.509^{a}	-0.681^{a}	-0.319
	(0.222)	(0.207)	(0.179)	(0.251)	(0.256)
Gini	-0.214^{a}	-0.243^{a}	-0.259^{a}	-0.327^{a}	-0.189^{b}
	(0.0661)	(0.0630)	(0.0544)	(0.0860)	(0.0801)
Ln Balassa ind. vol.	-0.0782^{a}	-0.120^{a}	-0.106^{a}	-0.103^{a}	-0.104^{a}
	(0.00358)	(0.00326)	(0.00295)	(0.00315)	(0.00267)
Ln Pop	-0.0427^{a}	-0.0412^{a}	-0.0366^{a}	-0.0412^{a}	-0.0254^{a}
	(0.00886)	(0.0111)	(0.00973)	(0.0118)	(0.00985)
Ln Distance	0.116^{a}	0.139^{a}	0.134^{a}	0.131^{a}	0.133^{a}
	(0.0121)	(0.00956)	(0.00928)	(0.00954)	(0.0104)
Ln Avg PPP Income × Gini	0.0229^{a}	0.0261^{a}	0.0277^{a}	0.0347^{a}	0.0197^{b}
	(0.00721)	(0.00687)	(0.00594)	(0.00910)	(0.00889)
Observations	233641	782921	994165	968718	886347
Importer-Product-Year fixed effects	Yes	Yes	Yes	Yes	Yes
Kleinbergen-Paap test	16.09^{a}	16.15^{a}	16.15^{a}	23.08^{a}	21.80^{a}
Sargan-Hansen test (p-value)	0.23	0.20	0.17	0.18	0.23

Note: Standard errors in parentheses ^{a}, ^{b} and ^{c} respectively denoting significance at the 1%, 5% and 10% levels. Standard errors are clustered at the exporter-year level.

Results robust if...

- ... interquintile ratio instead of Gini
- ... income instead of PPP income
- ... average unit value (exporter/product) instead of bilateral unit value

Quantitative assessment

- In the sample
  - average income = 14,435 euros, sd of income = 5,348
  - average Gini = 29.7, sd of interquintile ratio = 4.5
- Three thought experiments
  - One standard deviation of avg income around the mean $\Rightarrow$ +9.8% in terms of uv
  - One standard deviation of gini around the mean $\Rightarrow$ +2.6% in terms of uv
  - One standard deviation of both avg income and gini around the mean $\Rightarrow$ +16.2% in terms of uv
- Matching income distribution in Czech Republic with income distribution in France...
  - ...in terms of avg income $\Rightarrow$ +11.1% in terms of uv
  - ...in terms of inequalities $\Rightarrow$ 0.8% in terms of uv
  - ...both in terms of avg income and inequalities $\Rightarrow$ +13.1% in terms of uv

Conclusion

- Theoretical contribution:
  - Model with non-homothetic preferences and monopolistic competition leading to patterns of trade in quality, predicting...
  - ... a positive impact of average income on the quality mix of exports...
  - ... a heterogeneous impact of inequalities along the average income dimension
- Empirical contribution:
  - As predicted by the model, for a given HS6 product, unit values of EU25 exporters positively related to:
    - average income
    - the interaction of average income and interquintile ratio (or Gini index)
  - Results robust to the inclusion of controls for supply-based determinants of vertical comparative advantage
- Non negligible impact of inequalities, magnified if coupled with an increase in average income
  $\Rightarrow$ Crucial need to strengthen the middle classes to climb up the quality ladder