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Income Inequality as a Determinant of Trade Flows*

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Abstract

Consumer studies have a long tradition of incorporating non-homothetic preferences in their models, whereas this has been very uncommon in studies of international trade. We use a model from Mitra and Trindade (2005) to set up a gravity model in which we include income distribution measures as explanatory variables for the exporting as well as for the importing countries. Our results indicate that non-homothetic preferences significantly affect both exports and imports.

JEL classification: F10, D31

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1. Introduction

About a century and a half ago, Engel presented his theory of how consumers change their relative consumption as their income increases (Engel, 1857 and 1881). This basically implies that, as income grows, consumers tend to shift their consumption from necessity into luxury goods. Even though consumer studies generally find consumer preferences non-homothetic, most trade models still assume the opposite. One of the exceptions is the theoretical contributions by Mitra and Trindade (2005) in which they introduce a model where countries differ solely in terms of income distribution. Given the different preference structures in the respective countries, they show that income distribution can be used to explain why countries trade. Furthermore, income distribution has an impact on both the exporting country and the importing country.

The purpose of this study is to empirically investigate whether the distribution of income within a country acts as a determinant of international trade in consumption goods.

This empirical study estimates gravity models for various groups of consumer goods and extends them with non-homothetic preferences as a determinant of trade flows. To further explore the importance of preferences in trade we study trade flows between subgroups of countries. In doing so, countries are classified according to their per capita income level and studied separately. The empirical analysis uses data from Comtrade and World Income Inequality Database and covers sixty countries, developing as well as developed.

The incorporation of non-homothetic preferences in trade models is relatively new, although theoretical contributions date back to the pioneering work by Burenstam Linder (1961). Empirical tests of the Linder hypothesis have been performed, but usually only considering average income level and not the within-country distribution of income. It was, to our knowledge, not until the late 1980s that empirical tests of non-homothetic preferences within a country started to appear. Two of the earliest contributions were Hunter and Markusen (1988) and Hunter (1990), who both study the effect of non-homothetic preferences on trade pattern. Hunter (1990) carries out a ‘demand neutralization’ procedure in accordance with homothetic preferences and finds that the

deviation from actual trade volume is considerable. The disparity is explained by the existence of non-homotheticity and differences in preferences. Francois and Kaplan (1996) study the connection between demand for product differentiation and income distribution. In the empirical estimations they verify that income distribution is an important contributor to aggregate expenditure patterns; higher income level and more unequal allocation of income within the country results in relatively larger imports of luxuries. The influence of income inequality on trade flows is tested in a gravity setting by Dalgin et al. (2004). They confirm the expectations that demand for necessities is negatively correlated with income distributions and that the demand for luxury goods is positively related to increases in income inequality. In selecting luxury and necessity goods they use different approaches. Tcharmourliyski (2002) finds that the exclusion of income distribution in a gravity model may result in overstating the effect of trade barriers.

The contribution of this paper is primarily that it includes the importance not just of the role of income distribution in the importing country, but the impact it has for the exporting country. Furthermore, the disaggregation of the data according to product groups *and* country income level makes a more detailed analysis possible. Our results show that it is essential to consider income distribution in both the exporting and the importing country. We also find that producers customize production to accommodate preferences on export markets and that consumer goods are differentiated by the country of origin.

The structure of this paper is as follows. It starts with a theoretical discussion on the role of income distribution in international trade, in which we present our main hypotheses. Section three contains a discussion of the methods used together with a presentation of the gravity model and a description of the data. In section four we present the results from the empirical investigation, starting with aggregate trade flows. We also add an extra dimension by identifying different income groups of countries and study trade flows between each group separately. Section five summarizes the main results and conclusions.

2. A model of trade flows and income distribution

The theoretical framework to follow is based on the article by Mitra and Trindade (2005). The model starts by assuming two countries, A and B, which are similar in all respects except for how income is distributed within the respective country. B's incomes are more evenly distribution of income than A's. We assume that each individual z receives income both from work (where we denote wages by w) and from capital (the interest rate is denoted by r). Labour (L) is evenly distributed across the population and, for simplicity there are no differences in the wage level. In other words the distribution of income is generated from the ownership of capital (capital is denoted by K) and we denote the share of capital owned by an individual as θ_z. Individual income can thus be expressed as

$$I_z = r\theta_z K + \frac{wL}{n} \qquad (1)$$

We will denote the share of income of the richer segment of the population σ.[1] This could in practise be constructed in different ways, but for our purpose in the theoretical section it suffices to state that a higher value of σ represents a more uneven distribution. The two countries have the same technology and equal amounts of production factors. This excludes any Heckscher-Ohlin explanations of trade.

2.1 The impact of income distribution on consumption

We will distinguish between two types of goods: necessities and luxuries. Non-homothetic preferences imply that budget shares for necessities and luxuries are different depending on the individual income level of people. Any difference in income distribution will therefore generate different consumption patterns. If we assume that the relative consumption of food will decrease as income expands, country A will have a higher demand for luxury goods than country B. We can therefore expect country A to import luxury goods.

[1] This is similar to the Gini measure which provides a comprehensive measure of how large share of income is represented across income groups. The exact properties of our measure σ will depend on how we define the richer share, but the maximum value of 1 is the same for all definitions and the measure will be increasing as inequality increases.

Our model will start with a discussion of the markets in autarky. It will then focus on what happens as the countries open up for trade and goods are exchanged between the two markets. Consider a market with *n* types of consumer goods denoted c_i. We presume that consumers maximize their utility, which we assume to be of a Cobb-Douglas nature. In the utility function non-homothetic preferences can be incorporated by stating that

$$U_z(X) = c_N^{\alpha(I_z)} c_L^{\beta(I_z)} \tag{2}$$

where I_z is the individual income of consumer z, and where income is used purely for consumption. Consumption of necessities is denoted by c_N and consumption of luxuries is denoted by c_L. Given the previous discussion on consumer behaviour we can conclude that $\alpha'(I_z) < 0$ and $\beta'(I_z) > 0$. There is no saving in the economy and the entire income is distributed over the two commodity groups. We will denote the budget share of luxuries as ϕ and consequently, the consumption of necessities will be denoted $1-\phi$. If we denote p as the relative price of luxuries to necessities, the budget share for luxuries can then be expressed as

$$\phi_z = \frac{pc_{Z,L}}{I_z} \tag{3}$$

Under the assumption of homothetic preferences, the budget shares are constant across income levels. The introduction of non-homothetic preferences implies that if two individuals have disparate incomes they will assign different shares of their income to necessities and luxuries respectively, which implies that the budget share is a function of income, $\phi(I, p)$. Individuals with a higher income will devote a larger share of its income to luxuries than people with lower income. The budget share for luxuries then increases as income increases, $\frac{\partial(\phi)}{\partial I} > 0$. In the case of necessity commodities, the person with the lower income allots a larger share of his budget to this group of commodities, which renders that budget shares for necessities are a decreasing function of income, $\frac{\partial(1-\phi)}{\partial I} < 0$.

Consumption of necessities and luxuries by individual *z* can be expressed as

$$C_{Z,N}(p, I_Z) = [1 - \phi(p, I_Z)] I_Z, \qquad C_{Z,L}(p, I_Z) = \frac{\phi(p, I_Z)}{p} I_Z \tag{4}$$

The marginal share of luxury goods to necessities can be formulated as follows,

$$\frac{\delta}{\delta I_Z}\frac{C_{Z,L}}{C_{Z,N}} = \frac{\delta}{\delta I_Z}\left[\frac{\phi(p, I_Z)}{p(1-\phi(p, I_Z))}\right] > 0 \qquad (5)$$

i.e. the share of luxuries to necessities increases over income. This is illustrated in figure 1 where non-homothetic preferences are shown by a non-linear income expansion path. Homothetic preferences would imply a linear income expansion path passing through the origin.

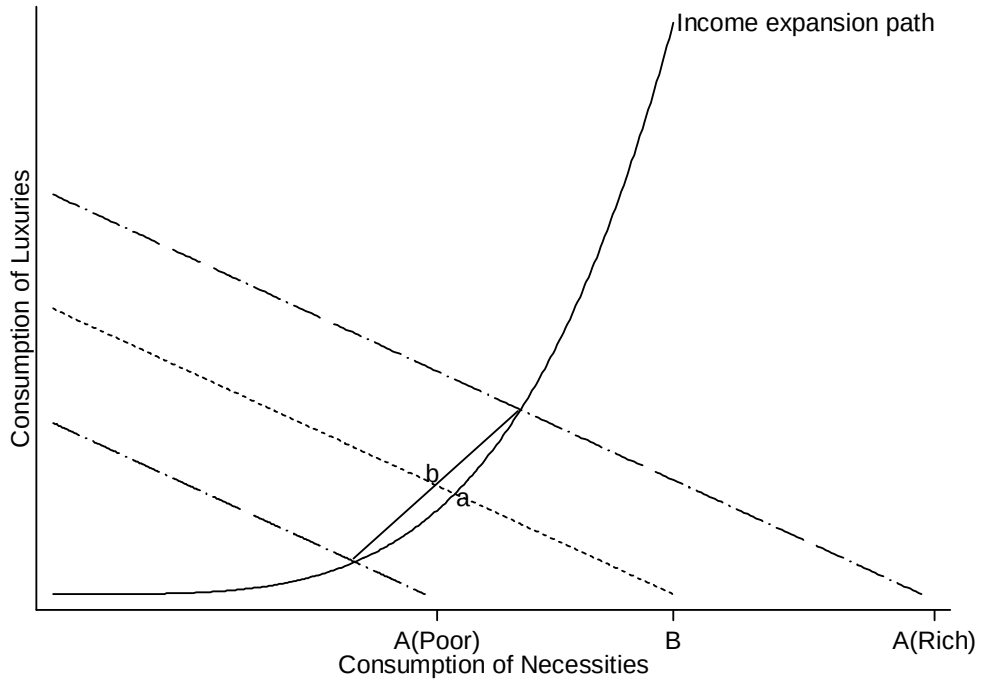

Figure 1 Non-homothetic preferences and the distribution of income.

The figure allows us to illustrate the effects of income distribution in a very simple manner. Start by considering a country (country B) where all consumers have identical income, illustrated by budget line in the middle. Next, consider an identical country in all respects but with a more uneven distribution of income (country A). We here suppose that there are two types of citizens; poor and rich. The poorer group in this country has an individual income of A(Poor) and the other half has an income of A(Rich). The average income will still be the same as in B, but distribution differs so that $\sigma_B < \sigma_A$. Given that the income expansion path is strictly convex to luxuries, the increase in luxury

consumption caused by the richer segment's consumption bundle will be larger than the decrease caused by the poorer group's reduction of consumption, which is also given by equation 5. In other words, a more unequal distribution of income will imply consumption containing more luxury goods, or $\frac{\delta C_L}{\delta \sigma} > 0$. This is shown by point *b* being placed above and to the left of point *a*.

The marginal share of only luxuries (se equation 5) divided by the budget share, ϕ (eq. 3) generates the income elasticity of a commodity. Luxury goods are often defined as goods with income elasticity above 1. This suggests that the marginal share has to be larger than the budget share. The opposite applies to necessities.

In the rest of the study we will treat prices as only serving the purpose of equating supply and demand and therefore any price effects on consumption patterns will not be considered.

2.2 The contribution of non-homothetic preferences when opening up for trade

In each of the two countries, production factors are used to produce both luxuries and food. If the market for one product is in equilibrium, automatically the other product will also be in equilibrium[2]. Thus we will for now narrow the analysis and focus only on luxuries.

Consider the market equilibria for luxuries in the two countries respectively. The supply curve is identical in the two countries, which is displayed by S in figure 2. Recalling the above discussion, we can expect demand to differ between the two countries. In country A, parts of the population have relatively high individual income and they have substituted food for luxuries while people at the other income end still mainly prefer food. In country B, which has a more even distribution of income, the degree of substitution from food to luxuries is not as extensive because of the lack of enough wealthy people. Thus there will be a higher demand for luxuries in country A than in country B. In autarky, consumption of luxuries will be less in country B than in

[2] Assumption of Walras' law in Mitra and Trindade (2005)

country A. When the two countries open up for trade, the lower autarky price in B and the higher demand for luxuries in A will result in producers from country B responding to the higher demand by starting to export to A. As a result, prices of luxuries will increase in country B and decrease in country A compared to autarky equilibria. The only source of trade is the differences in the aggregate consumption patterns between the two countries, explained by the assumption of non-homothetic preference.

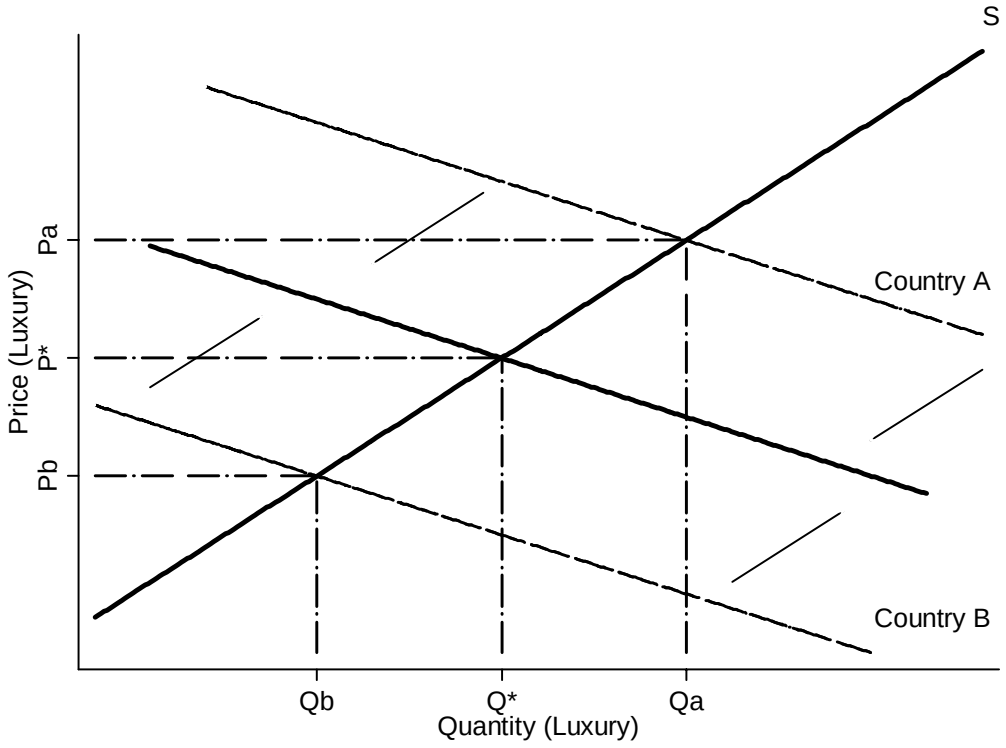

Figure 2. Equilibrium in the market for luxury products when countries open up for trade. Source: Adapted from Mitra and Trindade (2005)

We can summarize the above discussion by stating two hypotheses. First, we can expect that imports in a country will be affected by income distribution so that *a country with a more unequal income distribution will, all else equal, import relatively more luxury items than will countries with more equal distribution*. Secondly, the discussion indicates that also the export structure in a country is affected by the allocation of income and *countries with a more unequal income distribution will, all else equal, export relatively more*

necessities than will countries with more equal distribution. These hypotheses are expressed in table 1 as our expected findings.

Table 1. Effects of income distribution on product groups (Expected signs)

	Necessities	**Luxuries**
Exporting country GINI	+	-
Importing country GINI	-	+

3. Method

This section contains a discussion on the methods applied in the study. First, we discuss how to apply results from consumer studies into international trade data. In order to test our hypotheses we will use a gravity model, and some background to the model as well as an explicit formulation of the model applied in this study will be discussed. Finally, a description of the data is presented.

3.1 Applying consumer studies to international trade data

The first step in testing our hypotheses is therefore to start with consumer studies and categorise goods into groups suitable for our purpose. There is a plethora of consumer studies available for developed and developing countries, some of which are presented in Appendix A. We will rely on these previous findings and identify corresponding types of goods in the trade data. These previous findings allow us to find consumption patterns that are general across countries. Classification of consumer goods may vary somewhat between different studies, but a common classification includes the groups Food, Clothing, Housing, Durables, Medicine, Transport, and Recreation. Although there can be differences in consumption across countries, Appendix A clearly indicates that the estimated income elasticities follow general patterns, which allows us to use our classifications across countries.

Classification of commodities into necessities and luxuries generally apply income elasticities. We will refer to goods with an income elasticity below 1 as necessities, i.e. $\frac{\delta C_N}{\delta I}\frac{I}{C_N} < 1$, whereas luxuries are goods with an income elasticity above 1, $\frac{\delta C_L}{\delta I}\frac{I}{C_L} > 1$. Food has income elasticities well below one and is therefore by our definition a necessity in all samples, as is housing and medicine. All other categories have income elasticities above one. The process of translating these groups into trade data is fairly straightforward when it comes to Food, whereas Housing and Medicine contain a relatively large share of non-tradables or services, which at this point are not very well

documented in trade data. In addition to this, medicine is in many countries subject to several restrictions and public intervention that may affect the data and it will therefore be excluded from the study. The goods classified as luxury goods, i.e. Clothing, Transport, Durables and Recreation, show similar characteristics. Clothing and Durables are relatively simple to identify in the trade data but the Transport and Recreation groups produce more problems. In the category of transport, we focus on vehicles. Recreation and Housing will not be included since it consists to a very large extent of non-tradables or services that are not included in trade data.

Product groups have been selected on the six-digit level of the HS96 classification from the UN Comtrade database to embody the four categories.[3] Gravity models are then estimated for each of the groups.

3.2 Model Formulation

Trade flow is often estimated through the use of gravity models, which were introduced by Tinbergen (1962) and developed by, among others, Linnemann (1966) The theoretical underpinnings of the model have sometimes been questioned and it owes its popularity to the undisputable empirical success. Later studies have derived gravity models from various theoretical settings. Deardoff (1998) derives a gravity model from a Heckscher-Ohlin setting whereas Feenstra et al. (2001) claim the model to be consistent with several trade models. The theoretical framework set in a general equilibrium model was first developed by Andersson (1979), followed by Bergstrand (1985, 1989), Helpman and Krugman (1985) and Deardorff (1995).[4] The model formulated in equation 6 follows the basic structure of a gravity model and will be estimated for each of the product groups discussed above.

$$\begin{aligned}\ln Exp_{ij} = {} & \alpha + \beta_1 \ln(GDP/CAP)_i + \beta_2 \ln POP_i + \beta_3 GINI_i + \beta_4 \ln(GDP/CAP)_j \\ & + \beta_5 \ln POP_j + \beta_6 GINI_j + \gamma_1 D_{ij} + \gamma_2 Lang_{ij} + \varepsilon_{ij}\end{aligned} \qquad (6)$$

[3] Classification is available from the authors on request.
[4] For a discussion of the theoretical underpinnings of the gravity model, see Bröcker (2004)

Exp_{ij} is value of export from country *i* to *j*
$(GDP/CAP)_i$ is the average individual income level in country i.
POP_i is population size in country *i*.
$GINI_i$ measures the distribution of disposable income in country *i*.
$(GDP/CAP)_j$ is the average individual income level in country j.
POP_j is population size in country *j*.
$GINI_j$ measures the distribution of disposable income in country *j*.
D_{ij} is the distance between country *i* and *j*
$Lang_{ij}$ accounts for whether country *i* and *j* share the same official language. The use of the same language is indicated by 1 and if not by a 0.

The export value from country *i* to country *j* is determined by average individual income level, population and income distribution in the exporting and receiving country. In addition to these variables, two friction variables have been added, the geographic distance, **D_{ij}**, between capital cities in *i* and *j* to account for spatial correlation and the second, **$Lang_{ij}$**, covers whether two trading partners share the same official language. Population is used to proxy the market size and can thereby capture economies of scale. GDP per capita provides the average income level of the population in each country. The demand for consumer goods is naturally determined by the individual income level in a country. Studies have also assigned GDP per capita the role of approximating relative factor endowment (Bergstrand, 1989). Since the purpose of this study is to not only include the role of average income but also the distribution of it, we include Gini-coefficients for both the exporting and importing country. The theoretical framework has clearly shown that the allocation of income within a country can in itself have an effect on trade flows. Income level and the distribution of income are of main interest in this study.

The prevalence of non-homothetic preferences will have different effects on trade flows depending on the product group concerned. Table 1 presents the expected signs of the degree of income distribution on demand and supply of export for the various product groups.

3.3 Data overview

The study includes 60 countries spread over all continents. The majority of the countries are from the European, North American and Latin American part of the world (a

complete list is found in appendix C). Data to estimate the gravity model, formulated in equation 6, have been collected from four sources as displayed in table 2.

Table 2 List of variables, year 2000

	Definition	**Source**
Exp	Export value in US Dollars	Comtrade, UN
GDP/CAP	Per capita GDP measured in PPP adjusted international dollar, current value of year 2000.	World Development Indicators, World Bank
POP	Total population, year 2000	World Development Indicators, World Bank
GINI	The Gini index based on household per capita disposable income, in per cent 0<Gini<100.	World Income Inequality Database, WIID2a
D	Distance between the capital cities, in 1000 kilometres.	Centre d'etudes prospective et d'informations internacionales, CEPII
Lang	Common official language	Centre d'etudes prospective et d'informations internacionales, CEPII

For our purposes, the most relevant variable in the gravity models is the Gini coefficient. We have limited the observations to only include countries for which we have been able to find relatively reliable data.[5] In addition to this, the average individual income level is also important for our analysis. This is especially true for the later part. Table 2 displays summary statistics of these two income variables. It also provides the division of countries into three income categories, Low (L), Middle (M), and High (H), according to GDP per capita.

Table 3. Summary statistics of average individual income and the distribution of income

Total		**Min**	**Max**	**Mean**	**Median**
	GDP/CAP	802.8	56267.5	13609.5	9138.9
	Gini	21	62.9	39.1	36
Income groups		**Min**	**Max**		
	GDP/CAP	802.8	5715.1		
L	**Gini**	24.7	62.2		
	GDP/CAP	6153.2	16714		
M	**Gini**	24.6	63.0		

[5] A description of our selection criteria can be found in Appendix B

	GDP/CAP	17346.1	56267.5
H	**Gini**	21	39.4

The Gini coefficient is here displayed in percent which gives that the maximum dispersion of income would be at 100. It is clear from the above table that countries with higher income also have more compressed income structures. Among the poorer countries, especially Latin American countries, we find examples of very high levels of income inequality. In the next section we will address this problem by dividing the data into subsamples.

4. Empirical results

The first step in the empirical part is to test our hypotheses at an aggregate level. Separate estimations will be made for the commodity groups Food, Clothes, Transport, and Durables, as discussed in section 3.1. This will provide an aggregate picture, but there are at least two reasons for why we would be interested in disaggregating the data and make a more detailed analysis. The first and from our perspective most interesting reason is that the Linder hypothesis (Burenstam Linder, 1961) states that countries trade foremost with countries of similar level of development, given that preferences change as income changes. By dividing the countries in sub-groups, we can see to what extent trade patterns differ depending on country income levels. Secondly, an aggregate analysis may have a problem with multi-collinearity since poorer countries often have much more dispersed income. This is clearly shown in table 3. Again, the division into subgroups significantly reduces this problem.

4.1 The effect of demand structure on trade flows

The gravity model is estimated for the different categories of consumer goods. Table 4 displays the results for total trade in these groups. Recalling our hypotheses, we would expect the sign on the Gini coefficient of the exporting country ($Gini_i$) to be positive for necessities, i.e. Food, and negative for all other commodity groups. For the importing country's Gini index, we expect the opposite results (see Table 1).

Table 4. Results from regression analysis (Dependent variable: $\ln Exp_{ij}$)

	Food	**Clothes**	**Transport**	**Durables**
$\ln$**(GDP/CAP)$_i$**	0.322	-0.220	0.864	0.521
	(23.23)***	(22.31)***	(34.86)***	(20.94)***
$\ln$**POP$_i$**	0.229	0.546	0.623	0.633
	(45.13)***	(135.31)***	(60.62)***	(65.16)***
GINI$_i$	0.018	-0.026	-0.015	-0.022
	(16.52)***	(27.72)***	(7.27)***	(9.77)***
$\ln$**(GDP/CAP)$_j$**	0.461	0.858	0.895	0.911
	(38.33)***	(81.30)***	(39.90)***	(40.69)***
$\ln$**POP$_j$**	0.302	0.341	0.377	0.344
	(62.43)***	(81.99)***	(39.63)***	(36.73)***
GINI$_j$	-0.006	0.009	0.016	0.012
	(5.45)***	(9.59)***	(8.47)***	(6.14)***
D$_{ij}$	-0.069	-0.141	-0.147	-0.104
	(39.11)***	(88.26)***	(43.53)***	(31.07)***
Lang$_{ij}$	0.577	0.453	0.440	0.493
	(28.98)***	(24.09)***	(9.85)***	(11.12)***
Constant	-5.961	-9.828	-21.913	-18.766
	(28.85)***	(53.00)***	(54.47)***	(44.61)***
Observations	135372	151773	39521	33933
F-value	1473.20***	4200.85***	1210.92***	1016.50***

Absolute value of t statistics in parentheses, *** significant at 1%

Table 4 confirms our hypotheses that countries with a more uneven income distribution export more necessities. The remaining product groups, which have been identified as luxuries, show a negative effect of inequality in the exporting country.

It is interesting to note that there is a small positive correlation between the overall level of income and exports of food, meaning that richer countries export more necessities than poor countries. It would be reasonable to expect a negative sign of food, as is the case of clothes. The negative sign on GDP per capita for the exporting country is in line with the general perception that the production of clothes is very sensitive to wage levels. However, the agricultural sector is to a large extent subsidized, in the US as well as in the EU, and this could be the reason for why the sign turns out positive in our study. A second explanation could be a switch within the product group into more prepared types of food that would require more technology and thereby sell at a higher price. It is however beyond the scope of this paper to study this connection any further.

Results in table 4 also corroborate our hypotheses for the demand side. The expected signs for the importing country Gini are based on the assumption of non-

homothetic preferences. The negative effect of income distribution on the demand for food verifies that as people become wealthier, they assign a smaller part of their income to food. Since the other commodity categories are referred to as luxury goods, we expect the opposite effect of a more unequal distribution of income. The estimated positive coefficient on clothing, transport, and durables further asserts the non-homotheticity of preferences. When a fraction of the population in a country becomes better-off, they devote a larger share of their budget to consumption of luxuries rather than food. The average income level has a positive effect in all four cases, although the effect is smaller for food.

The remaining control variables show expected results. Total market size, captured by the population variable, contributes positively to the flow of goods for both the exporting and importing country. Common language also has positive effect on trade flows. Distance has the opposite effect, confirming that as distance increases trade flows reduces. This is entirely in line with theory and previous studies.

4.2 The flow of necessities and luxuries in international trade

The previous section applied consumer studies to international trade flows and identified consumption goods that are considered as necessities or luxuries. In each such group of commodity it is easy to find that products differ depending on the country of origin. Producers also differentiate production to accommodate specific export markets. By dividing countries into income groups of High (H), Middle (M) and Low (L), we aim to capture such country differences for the exporting country as well as for the importing country.[6] We interpret the estimated signs of the coefficients, $Gini_i$ and $Gini_j$, as indications to whether particular trade flows are perceived as necessities or luxury commodities. This method is similar to Dalgin et al. (2004), but with the exception that we include Gini indices for exporting and importing countries. This allows us to study perceived differences within commodity groups from both the exporter and importer perspective. Table 5 and 6 present the two perspectives separately. For each commodity group, Food, Clothes, Transport, and Durables, we present three-by-three matrices

[6] A matrix of the share of aggregate trade flows for each sub-group is presented in Appendix D.

containing the estimated effects of income distribution. The previous section verified our expectation that income distribution in the exporting country has a positive effect on the exchange of necessities and a negative effect on the export of luxuries. In the importing country, income distribution has the opposite impact on the two categories. For the purpose of this section it will suffice to report only the signs of the estimated coefficients for income distribution. In the upper left corner of each matrix, the effect of income distribution estimated on total trade is displayed within brackets. The analysis starts with the exporter perspective on how exports to different markets are perceived.

Table 5. Sign and significance level of the Exporting country Gini, $GINI_i$

(+)	**Food**			**(-)**	**Clothes**		
Exp \ Imp	**L**	**M**	**H**	**Exp \ Imp**	**L**	**M**	**H**
L	+++	+++	+++	**L**		--	---
M	+++	+++	+++	**M**		+++	---
H	+++	+++	---	**H**	+++	+++	---
(-)	**Transport**			**(-)**	**Durables**		
Exp \ Imp	**L**	**M**	**H**	**Exp \ Imp**	**L**	**M**	**H**
L		---	---	**L**	++	---	---
M	+++	+++		**M**	+++	+++	-
H		---	---	**H**	+++	+++	---

+++/--- denotes significance at the 1%-level, ++/-- significance at 5%-level and +/- significance at %-level. Results from aggregate analysis shown in parentheses.

For our first table, we will interpret positive signs as necessity consumption and negative signs as luxuries. From the exporter perspective income distribution consistently present positive effects on the export of food with one exception, which is trade between the richest countries. The negative sign indicates that this flow consists of commodities that are perceived as luxuries. The products in this group would most likely be different goods than those traded by the other income groups. When US consumers buy Italian food products, they most likely do not do it because of the low price of the goods. Rather, we can expect that these goods are products generally perceived as more exclusive goods.

When it comes to Clothes, Transport, and Durables, the general pattern indicates that countries export necessities to poorer countries and luxuries to richer countries. Exports to middle income countries show varying signs and are therefore more difficult

to interpret. Although we are not able to make any real distinction between products at this point, it seems reasonable to suspect that exports to developed countries should be more technology-intensive, more sophisticated and more expensive than exports to poorer countries. Our results indicate that countries target their exports according to local demand characteristics and export necessities to developing countries and luxuries to developed countries.

To sum up, we can conclude that export to rich countries tend to be viewed as luxury commodities. This is valid even for food, which is the most typical example of a basic good. Contrary to this, exports to poor countries are with no exceptions basic goods.

The next step is to perform a similar exercise from the importers' perspective. Here we interpret the signs in opposite ways and thus we interpret negative signs as necessities and positive signs as luxuries. Since this only captures the effect of income distribution in the importing countries, we interpret the signs as how the products are perceived in the importing country.

Table 6. Sign and significance level of the Importing country Gini, $GINI_j$

(-) Food				**(+) Clothes**			
Exp \ Imp	**L**	**M**	**H**	**Exp \ Imp**	**L**	**M**	**H**
L			---	**L**	++	+++	
M	---	---	---	**M**	+++	--	---
H		+++	---	**H**	+++	+++	---
(+) Transport				**(+) Durables**			
Exp \ Imp	**L**	**M**	**H**	**Exp \ Imp**	**L**	**M**	**H**
L		+++		**L**		+++	---
M		+++		**M**		+	
H	++	+++	---	**H**	+++	+++	---

+++/--- denotes significance at the 1%-level, ++/-- significance at 5%-level and +/- significance at %-level. Results from aggregate analysis shown in parentheses.

Estimated effects for imports of Food are, with one exception, considered as necessities. The only deviation is exports from rich to middle-income countries. We interpret this as an effect of richer consumers in middle-income countries importing their exclusive part

of the consumption from richer countries. Most likely, these are food products demanding a high level of technology and skills in their production.

Import of clothes is, as expected, luxury consumption in most markets. However, for consumers in richer countries clothes are considered necessities no matter what the country of origin is. The import by middle income groups is not as conclusive since they import necessities from poorer countries and luxuries from countries with similar or higher income than themselves. Transport and Durables show similar patterns in that rich countries consider their import to be necessities whereas all other countries perceive it as luxuries.

To sum up, high income countries seem to consider all their imports as necessities irrespective of the country of origin. It is likely that analysis on an even finer level would make it possible also to identify luxury products, but at present it is not. Imports to Low income countries are generally considered as luxuries, except for food. The findings for middle income countries are relatively similar to those of the poorest group, and are in most cases considered as luxuries. They do however consider some goods from countries of similar income level as necessities.

In addition to this, it is interesting to note that the importance of income distribution seems to be quite strong and the Gini coefficients turn out significant in most regression also at the disaggregated level.

4.3 Implications and policy discussion

Although it would be premature to draw any policy conclusions based on these results, there are some interesting findings that merit further attention. First, consider the finding that higher inequality seems to generate lower export of luxuries and higher exports of manufactures. Exporting more advanced products may imply positive dynamic effects such as learning by doing (see e.g. Bigsten et al., 2004). To the extent that these dynamic effects are concentrated to the actual exporting industry, it would be beneficial to export goods with high income elasticity. A country that already has a relatively high level of export in income-elastic goods ought to further develop their skills in an area that will expand as the world economy grows. If exports are concentrated to necessities, the dynamic effects may be limited to a stagnating international demand. The above results

could suggest that income inequality has negative effects on the potential of changing the focus of export towards more high income elastic commodities. More studies would however be needed on the issue before any conclusions could be drawn.

The effects in the clothing sector are also interesting. Clothing is a typical labor-intensive good and therefore it is somewhat different than many other luxury goods. One very obvious sign in international trade has been the relocation of production from the industrialized world to developing countries, and today, the clothing production is heavily concentrated to developing countries. The clothing industry is very sensitive to the wage level, which is also displayed by the negative sign on the GDP per capita. The combination of income elasticity above one and the labor intensity in production offers good prospectives for the developing world. Many developing countries have a comparative advantage in labor intensive production and thus producing clothes could provide a much better opportunity for growth and development than for example raw materials or necessity goods.

5. Conclusions

In this paper we focus on the role of income distribution in explaining the pattern of international trade flows. We add to the current discussion by empirically estimating the role of non-homothetic preferences in international trade. The conclusion is that income distribution bears a significant importance for the exporting country as well as for the importing country. Specifically, we find that higher inequality generates higher export of necessities and higher imports of luxury goods. Countries with more equal distribution of income tend to export more luxuries and import more necessities.

Secondly, we apply our knowledge of how income distribution affects the exchange of necessity and luxury commodities to analyze separate trade flows. We find that income distribution as an explanatory variable also can help understanding the direction of trade flows. Results indicate that exports to high income countries are generally thought of as luxuries, while exports to low and middle income countries may be of lower status. On the other hand, consumers in high income countries generally perceive any import, irrespective of the country of origin, to the necessity category.

Given the relatively few studies on the role of income distribution in international trade, much work is still needed in order to fully understand the mechanisms at work. Our study relies on a simple static framework, and a next step would be to consider the dynamics in the system. In addition to this, our results shows that trade flows are different depending on the level of income of the respective countries. This raises the question of whether income distribution may have an effect also on quality and product variety traded, and we expect to see more of this topic in future research.

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Appendix A. Income elasticities for different consumption goods

Source	Item	Food	Clothing	Housing	Durables	Medicine	Transport	Recreation
				Partly non-tradable		Partly non-tradable	Partly non-tradable	Partly non-tradable
Selvanathan & Selvanathan, 2003	Average for 23 developing countries	.72 (.04)	1.47 (.14)	.62 (.10)	1.55 (.15)	.77 (.11)	1.43 (.10)	1.00 (.11)
Selvanathan & Selvanathan, 2003	Average for 23 OECD countries	.60 (.09)	1.41 (.10)	.50 (.28)	1.59 (0.12)	.77 (.13)	1.90 (.18)	1.16 (.15)
Chen & Clements, 1996	Average for 13 countries	0.63 (0.05)	1.33 (0.12)	0.36 (0.36)	1.77 (0.14)	0.81 (0.16)	1.54 (0.12)	1.22 (0.12)
Clements & Qiang, 2001	Average of 18 rich countries	0.59	1.46	0.31	1.74	0.66	2.00	1.19
Clements & Qiang, 2001	Average of 13 poor countries	0.71	1.33	0.36	1.77	0.81	1.55	1.13
Clements, Yu & Zhang,	Average of 45 countries	0.66	1.32	0.62	1.46	0.94	1.58	1.08
Clements & Selvanathan, 1994	Average of 13 countries	0.654	0.994	0.893	1.572	-	1.712	1.253

(Standard errors are in parenthesis, available for some studies only)

Appendix B. Income distribution data – Country selection

Data on income distribution has been collected for 61 countries from the WIDER database. A complete list of countries follows below. The principle for selecting observations has been according to the following criteria:

- Observations are primarily from 2000, but exceptions have been made for cases where either the quality of the data was superior from a nearby year or there were no studies made in 2000 and we expect the distribution of income to have been stable over at least shorter periods of time. Quality of the data follows the Deininger-Squire classification.
- Collection units were household per capita disposable income. This implies that the collection unit is the household, but income is then corrected for household size. For selecting the type of income measured, we have accepted disposable income as well as monetary disposable income. For exact definition of these concepts and for more information of the collection methods, please see the WIID web page, http://www.wider.unu.edu/wiid/wiid.htm.
- Data for Brazil was collected from UNDP.
- We have chosen surveys covering the whole population with the once exception of Argentina. In this case we were able to obtain only urban estimates of 16 areas. Since the used figure includes nearly 90 per cent of the population we decided to make an exception.

Appendix C. List of countries

Table C1 Countries included in the study.

OECD	**Latin America**
Australia	Argentina
Austria	Bolivia
Belgium	Brazil
Canada	Chile
Luxembourg	Nicaragua
Mexico	Panama
The Netherlands	Paraguay
New Zealand	Peru
Czech Republic	Dominican Republic
Denmark	Ecuador
Norway	El Salvador
Poland	Guatemala
Portugal	Honduras
Finland	Venezuela, RB
Slovak Republic	(14)
Spain	**Europe (not OECD)**
France	Belarus
Sweden	Latvia
Germany	Lithuania
Greece	Macedonia, FYR
United Kingdom	Bulgaria
United States	Moldova
Hungary	Croatia
Ireland	Romania
Italy	Estonia
Korea, Rep.	Russian Federation
(26)	Slovenia
Asia (not OECD)	Ukraine
Armenia	(12)
China	**Africa**
Tajikistan	Cameroon
Georgia	(1)
Uzbekistan	
Israel	
Kyrgyz Republic	
(7)	

Appendix D

Table D1. Share of exports to total exports for different consumer and country groups

		Low	Middle	High
Food	**Low**	0.44	1.54	3.37
	Middle	1.61	3.71	10.39
	High	2.76	10.17	65.76
		Low	**Middle**	**High**
Clothes	**Low**	0.31	4.56	16.77
	Middle	0.66	1.21	20.32
	High	2.95	7.62	45.36
		Low	**Middle**	**High**
Cars	**Low**	0.04	0.23	0.55
	Middle	0.33	1.61	10.32
	High	1.09	8.38	77.39
		Low	**Middle**	**High**
Durables	**Low**	0.07	0.74	7.68
	Middle	0.71	1.85	19.91
	High	2.36	11.4	55.21

Source: Comtrade