Rich, Poor and Luxury

Trade in Luxury Goods in the World of Income Inequalities∗

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Abstract

This paper approaches international trade in luxury goods from the demand side. It associates demand for luxury goods with within-country income inequality, via a social interactions component, the so-called Veblen effect (Veblen, 1899). With the Veblen effect individual utility depends on the consumption choices of others. In the theoretical part, we propose a simple model of vertical differentiation with preferences displaying the Veblen effect. More precisely, in the case of luxury goods, the utility is decreasing with the number of the purchasers (snob effect, Leibenstein, 1950). The model predicts that both the price of and the demand for luxury goods increase with the income gap between the two socio-economic groups (rich and poor). These predictions are next confirmed using a sample of French high-end exporters (as defined by Martin and Mayneris, ming) from 2006 custom data at 8-digit CN firm-product-destination level. Both export values and average firm-product unit values of luxury goods increase with the level of income inequality in the importer country. The relationship is robust to inclusion of control variables as well as to use of alternative measures of income dispersion.

Keywords: International Trade, Conspicuous Consumption, Luxury Goods, Veblen Effects

JEL Classification: F1, F14, L13, L15

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1 Introduction

Trade patterns of luxury goods differ from the trade patterns of ordinary goods. Exports of luxuries are geographically more diversified, less sensitive to distance and more sensitive to income distribution (Martin and Mayneris, *forthcoming*). Standard quality models of international trade, in the spirit of Linder (1961), predict more trade in high quality goods between countries with high income per capita. One may expect that the same would hold for trade in luxury goods. Marketing and business studies however point to the growing role of emerging economies as markets for luxury goods,\(^1\) with BRIC countries at the first place (Shukla and Purani, 2012; Caroline et al., 2010).\(^2\)

Luxury items - so-called *status goods* - represent a very specific group of products and their supply is targeted to a particular type of consumers, consumers at the top of income distribution. Unlike necessities, individuals buy luxuries not only for their intrinsic quality but also to signal their wealth and confirm social status (Veblen, 1899). Value perception of luxury goods depends among other things on their rarity and uniqueness (e.g., Wiedmann et al., 2007). Consequence, the demand structure of luxury goods differs from the demand structure of ordinary goods. The decision to purchase a luxury good depends, besides preferences and income, on the purchase decision of the *relevant others* and hence on the socio-economic structure of society. Literature often associates the demand for luxury goods with the desire for distinction, where individual valuation of a given good decreases as the number of individuals purchasing it increases (Leibenstein, 1950).\(^3\) Considering the cross-country dimension of the luxury market, one could expect that demand for luxury goods would be higher in more unequal societies where the incentives to


\(^{2}\) According to Bain (2012) estimation, around 85% of the newly opened luxury stores is located in emerging countries.

\(^{3}\) Leibenstein (1950) distinguishes next to the snob effect, the bandwagon effect, where the market demand increases with the number of purchasing individuals.
confirm one’s social status are presumably stronger. At the same time, the anecdotal evidence claims difference in prices of the same luxury products sold on the Western markets and these sold in Asia or Middle-East.

Given the particular nature of luxury goods, one may expect that standard quality models of trade may be not appropriate tools to analyze trade patterns of this type of goods. The related consumption behaviour is a socio-economic phenomenon that goes beyond non-homothetic preferences. In order to understand the patterns of trade in luxury goods one also has to take into account the factors of social interactions and of the socio-economic composition of society. The present paper deals with this challenge both theoretically and empirically. We associate the demand for luxury goods with the within-country income inequality via the Veblen effect. The demand for and the price of luxury goods are predicted to be increasing with the degree of income inequality in the society. Data on French luxury exporters confirm these predictions.

We adopt a standard vertical differentiation oligopoly environment and we look at a hypothetical economy divided into two classes rich and poor. Individuals decide whether to purchase a luxury good or not. The utility that they derive from this purchase depends, via the Veblen effect, on the number and the identity of the other buyers. More precisely, the utility decreases as the number of people buying the luxury good increases. In addition, individuals are affected more negatively by the purchase of luxury good by a poor consumer than by a rich consumer. This corresponds to the effect of reference group or so-called snob effect, a concept widely studied in social economics. Further, we allow the luxury firm to export its goods to a country that is more unequal in terms of income distribution. The model predicts that demand for a lux-

\footnote{In a world where personal income is a private information and only the general level of income and the proportions of rich and poor in the society, individuals advertise their wealth by purchasing luxury items. Their incentives to do so are higher, the higher is the gap between the two socio-economics groups in the society.}

\footnote{See Section 2 for a literature overview.}
ury good increases with the income gap between the rich and the poor in the society. At the same time, luxury exporters set higher prices for more unequal countries taking advantage of the greater willingness to pay of consumers on these markets. We next test the predictions of the model on French exports of high-end goods using use 8-digit Combined Nomenclature firm-product-destination level custom data for 2006. We follow Martin and Mayneris (forthcoming) in identifying high-end producers among French exporters. Export prices are proxied by mean unit values while income inequality by the Gini index. The results correspond to the model predictions. Both average product prices and quantities sold by luxury exporters increase with the income gap of the destination market. The relation is robust to the inclusion of control variables as well as the use of alternative measures of income inequality, such as the income share of the top 20% wealthiest individuals of the population and the number of millionaires per capita.

With the present paper we provide a potential demand-side explanation for the price difference and the sky-rocketing sales of luxury goods in emerging economies such as Middle East and Asian economies or BRIC countries, i.e., countries that have experienced an important increase in income inequality (OECD, 2011). Our model highlights the important features of the international market of luxury goods, namely the existence of a cross-country price differential on the market of luxury goods. This empirical regularity has not yet found a theoretical explanation.

The paper makes several contributions to the literature. On the theoretical side, (i) we are the first to our knowledge to introduce a social interaction component (Veblen effect) into an international trade study; (ii) our simple model features a series of empirical and anecdotal regularities that have not been explained by the literature to date. On the empirical side, (iii) we confirm the existence of these regularities on a large sample of French luxury exporters. (a) First, we provide evidence of the importance of the within-firm variation in prices of luxury goods across destinations. (b) Next, we document the relationship between the variation in price of and the
demand for luxury goods and income inequality, thus confirming by the same the existence of the Veblen effect.

Given our focus on a very particular type of quality goods, our paper implicitly differs from standard trade in quality studies. While, along with the Linder hypothesis, higher income countries are expected to trade in higher quality goods, we put emphasis on higher luxury trade flows between more unequal countries. Country wealth and size do not seem to attract inflows of luxury goods by itself.

While there is a vast literature on luxury goods in both consumer theory and marketing studies, the subject has attracted very little attention among trade economists. The two notable exceptions are Fontagné and Hatte (2013) and Martin and Mayneris (forthcoming): the former analyzes exports of luxury goods on a sample of 176 countries, the latter focuses on French luxury firms.6 Yet, international trade in luxury goods is worthy of investigation as confirmed by its seer size with total sales maintaining two-digit annual growth and topping 200 billion euros in 2012 (Bain, 2012). The subject also gains in importance in the context of the current debate on the specialization of Northern economies in high quality production (see Fontagné et al., 2008).

The remainder of this paper goes as follows. Section 2 outlines a vast review of the literature on trade in quality and social interaction as a driver of consumer behaviour, as studied by different sub-fields of economics, business and sociology. Section 3 delivers a theoretical model of trade in luxury goods with vertical differentiation and Veblen effect. Section 4 describes data and discuss data-related issues. Section 5 presents econometric strategy and reports empirical results. Section 6 discusses the results and the limits of measurement strategy. Lastly Section 7 concludes.

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6See next section for a detailed description.
2 Motivation and Related Literature

Our paper lies at the inter-section of literatures on trade in quality, conspicuous consumption and luxury goods, studied in various sub-fields of economics, sociology, business and marketing.\(^7\)

The Curious Case of Luxury Goods

Before approaching luxury goods from an international trade perspective, it is important first to discuss the singularity of luxury goods as compared with ordinary goods. The concept of luxury is subjective and complex. There is no single definition of luxury. Outside of international trade, luxury goods are widely studied in economics in fields such as consumer theory and conspicuous consumption. In sociology and marketing they are perceived as a hybrid of social interactions, self-reward and status signaling among others.

"[...] When they buy luxury products consumers distance themselves from the mass and form one another through the emotional value of acquiring well-crafted and rare objects"    

*The great pretenders: the magic of luxury goods*


In his seminal book, Veblen (1899) emphasizes that individuals advertise their wealth through consumption and therefore, consumption cannot be only explained by preferences and intrinsic quality of goods but also by status seeking behaviour. Bagwell and Bernheim (1996) and Becker et al. (2000) provide models with consumers seeking higher social status through purchases of visible goods.\(^8\) The concept was further developed into a signalling model with social norms

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\(^7\)See Trigg (2001) for a survey in economics and sociology. See Shukla and Purani (2012) for a survey of marketing and business literature.

\(^8\)While Bagwell and Bernheim (1996) study the theoretical conditions under which a Veblen effect arises, Becker et al. (2000) argues that consumers may have incentives to gamble in order to change their relative wealth position.
components (Corneo and Jeanne, 1997). In a recent study, Charles et al. (2009) apply the signalling model to explain differences in spending on conspicuous consumption between different racial groups in the US. They show that two individuals with comparable income but belonging to reference groups with different income distribution have different incentives to signal their wealth.

Next to the literature on luxury goods, the Veblen effect in economics can also be found in studies on expenditure decision (Duesenberry, 1949), savings rate (Kosicki, 1987), or self-reported happiness (Luttmer, 2005). It was also widely studied in sociology, with the works of Simmel (1998), Goblot (1925) and Bourdieu (1979), among others.

In our paper, individual utility from consumption of luxury good depends on the purchase decision of (relevant) others. In this sense, our paper is related to the broad literature on social interactions and more precisely, on the formation of social norms (e.g., Akerlof, 1980; Jones, 1984; Elster, 1989; Cole et al., 1992; Kandori, 1992). Given that we apprehend social interactions in the

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9 Corneo and Jeanne (1997) study social norms as the factor influencing the occurrence of a snob or a bandwagon effect, with two possible types of incentives for conspicuous consumption: a desire not to be identified with the poor and a desire to be identified with the rich.

10 Hispanics and Blacks are found to spend on average 30-35% more of their expenditure on conspicuous goods. Charles et al. (2009) explain this phenomenon using the signalling model and they show that conspicuous consumption declines with the income of the reference group. The authors focus however on the income inequality within each of the racial groups and do not take into account social interactions between racial groups. Kaus (2013) extend the approach in the context of developing economy relying on South African data.

11 Duesenberry (1949) uses an example of the Smiths who are trying to "keep up with" the Jones in terms of their consumption. He argues that in their expenditure decisions, individuals, next to their own level of consumption, take also into account their relative consumption compared to others individuals belonging to their "reference group" (Leibenstein, 1950). More accurately, at a given level of consumption, the well being of an individual declines with the consumption level of the others. This is the so-called "demonstration effect".

12 Decisions taken relatively to the other have been explored by Kosicki (1987) who provides an empirical proof of the relative income hypothesis on the average propensity to save. He finds that at a given level of income, the savings decision is a function of of the income rank meaning that the same individual in terms of income saves differently depending on his income rank i.e. depending on the socio-economic environment in which he lives.

13 Luttmer (2005) testing Veblen’s thesis with data on self-reported happiness and others measures of well-being, finds that, at a given level of income, individual well-being is unambiguously negatively correlated to neighbors’ earning.
context of a consumption decision, our paper also relates to the concept of preference interactions (Manski, 2000) where individuals’ preferences are influenced by other agents’ choices.\textsuperscript{14}

In business and marketing, studies on luxury goods represent a field apart. Marketing research devotes a voluminous literature on consumer behaviour and brand strategies related to luxury products (see Vigneron and Johnson, 1999; Vickers and Renand, 2003; Vigneron and Johnson, 2004; Atwal and Williams, 2009 among others). These studies claim, first of all, the decisive role of status-seeking behaviour and not of intrinsic quality, as the driver of demand for luxury goods. Recent marketing studies focus also extensively on luxury value perception. Among factors influencing value perception, literature highlights the importance of prestige, uniqueness and self-identity, next to traditional price and quality values (Wiedmann et al., 2007).\textsuperscript{15} The desirability, and hence the value, of luxury goods depends on their perceived rarity and uniqueness (see e.g., Verhallen, 1982; Lynn, 1991). The importance of Veblen effect is also confirmed empirically. In an original study, Chao and Schor (1998) investigate the existence of the Veblen effect for luxury goods in a micro-approach showing that "visible goods" display a lower price-quality correlation and that higher priced brands are favoured in the pattern of brand buying.\textsuperscript{16}

The above literature highlights the particular character of luxury goods and the role of rarity and social interactions in their value perception. It seems therefore relevant to introduce the Veblen component into a study looking at the demand-side determinants of luxury trade.

\textsuperscript{14} Manski (2000) associates social interactions with non-cooperative games, such as the ones describing residential segregation (Schelling, 1971) or formation of conventions in absence of laws (Young, 1996).

\textsuperscript{15} See Caroline et al. (2010) for detailed literature review on luxury perception in marketing.

\textsuperscript{16} As more visible cosmetics, Chao and Schor (1998) define cosmetics that women tend to use more often in public, like ex. lipstick, that may be taken out at restaurants, on the subway, or powder rooms as opposed to products such as facial cleaners that usually remain left at home. The authors control for quality differences between the brands, by switching the content of lipstick containers of different brands. In their survey, a comparable number of women preferred a low-cost brand lipstick as women who preferred Chanel lipstick. By the same they have shown a quality-price correlation close to zero for the conspicuous consumption.
Trade in Quality *versus* Trade in Luxury

Luxury products are classified at the top of quality ladder. Our paper is therefore related to the vast and flourishing literature on trade in quality. Along with the Linder hypothesis, higher income countries are expected to trade more in high quality goods. While this hypothesis finds extensive support in the data, the focus of our paper is on a slightly different issue: associating the flows of luxury goods with the within-country income inequality level.

While most of the trade literature focused systematically on supply-side determinants, recently researchers have taken a renewed interest in the demand-side factors of quality flows (Simonovska, 2010; Fieler, 2011a; Bernasconi, 2013; Martinez-Zarzoso and Vollmer, 2011; Atkin, 2013). Literature on trade with vertical differentiation obeys this rule (see *inter alia* Flam and Helpman, 1987; Schott, 2004; Verhoogen, 2008; Fieler, 2011b). As for the demand-side studies, for a long time, most of the papers ignored the importance of non-homotheticity of preferences, and thus of income distribution, focusing only on cross-country income differences as a driver of quality patterns of trade (with Gabszewicz and Thisse, 1979 as a notable exception). Only recently, trade literature has re-introduced non-homothetic preferences, incorporating by the same a link between income distribution and quality (see for instance Matsuyama, 2000; Dalgin et al., 2008; Choi et al., 2009 or Caron et al., 2014). In a recent study, Dingel (2015) reconciles within a single model both demand- and supply-side approaches of quality specialization. In an empirical exercise on the U.S. cities, he disentangles the two mechanisms documenting that the demand side factors are at least as important as the supply side ones for the quality specialization.

Two papers associate demand for quality goods with income inequality in a context of non-homothetic preferences: Fajgelbaum et al., (2009) and Latzer and Mayneris, (2012). Fajgelbaum et al. (2009), in a vertically differentiated model, assume heterogeneity of consumers in terms of wealth facing a unit consumption choice. They show that an increase in the average income, in
a given country size and inequality, raises the fraction of consumers that buys high quality goods and, in turn, upwards the quality produced and exported. Latzer and Mayneris (2012) explore the implications of inequality in a framework of non-homothetic preferences. They find, as Fajgelbaum et al. (2009), that quality content of production and exports raises with average income but also with inequality, arguing that more unequal countries develop a comparative advantage in high quality varieties. Dalgin et al. (2008) focus on demand for imports rather than exports and specialization. In a gravity approach, they that imports of what they define as luxuries increase with importing country inequality and imports of necessities decrease with it.

Despite flourishing research in trade in quality, the literature dealing explicitly with international trade in luxury goods is very limited. To our knowledge, only two papers can be cited, Martin and Mayneris (forthcoming) and Fontagné and Hatte (2013). Analyzing French export data, Martin and Mayneris (forthcoming) report luxury exporters to be more sensitive to income per capita and less sensitive to distance. Moreover they document an important reshuffling in high-end exports toward emerging economies. The authors focus, however, on the macroeconomic implications of specialization of developed countries in high-end production and they do not look at the demand side determinants. Using data on 176 countries, Fontagné and Hatte (2013) compare export performance of high-end and low-end varieties. Consistently with Martin and Mayneris (forthcoming), they find that trade in high-end products decreases less with distance than trade in low-end products. In addition, they emphasize that for the countries associated to famous and luxury brands (especially Italy and France) exports of high-end products increase with the wealth of destination country.
3 The Model

Consider a domestic economy populated with two kinds of individuals, rich ($R$) and poor ($P$), of the same mass equalised to unity. Next, assume that individuals of the two groups differ in their income or willingness to pay, $\theta_i$, $i = \{R, P\}$, with rich having higher income than poor, $\theta_R > \theta_P$. Further, income of a poor individual can be also expressed as $\theta_P = \lambda \theta_R$, with $\lambda < 1$ standing for the inverse measure of income inequality between the two social groups.\footnote{Note that the assumption of the two populations of equal size is introduced only for the sake of computation. Notice that allowing population of, for instance, rich to get relatively bigger will result in the rise of inequality.}

Assumption 1. Individual income is private information. Agents only observe overall consumption level in the economy. They also know values of $\theta$ and $\lambda$.

In other words, individuals do not know who in the population is rich and who is not but they know the income distribution and the consumption level in the economy.

3.1 One Good

We start the analysis with a single good case, in which individuals have a choice between purchasing one unit of luxury good or purchasing nothing at all. Later in Section 3.2, we also look at a duopoly case, where individuals chose between vertically differentiated goods. If an individual does not make any purchase, her utility simply equals her income ($\theta_i$). Purchasing one unit of the luxury good gives to an individual of type $i$ the following utility:

$$U_i = \theta_i q - p - z_i$$

\footnote{Note that the willingness to pay is also interpreted as marginal rate of substitution between quality and income. Therefore a higher $\theta$ corresponds to lower marginal utility of income, so to the higher income. Tirole (1988) demonstrates that willingness to pay is the inverse of marginal utility of income.}
where \( p \) is the price of the luxury good of a quality \( q \). \( z_i \) corresponds to the Veblen effect. It captures the fact that individuals care not only about their own consumption but also about the consumption of the others. More accurately \( z_i = a_i \mu_R + b_i \mu_P \) where \( \mu_i \) is the number of individuals of type \( i \) purchasing a luxury good. Notice that this form of utility corresponds to a singular case of Bagwell and Bernheim (1996), where the pay-off of meeting the representative social contact is additively separable and linear. At the same time, note that our specification, linear in price, does not satisfy conditions of single-crossing property, enabling us by the same to have Veblen effect.\(^{19}\) Next, we restrict the utility function parameters to satisfy the conditions discussed below.

**Assumption 2.** Parameters of the Veblen component take values such that:

1. \( a_R > a_P \) and \( b_R \geq b_P \)
2. \( b_R > a_R \)

Condition (i) assumes a higher sensibility of the rich to the number of luxury buyers. Wealthy individuals are affected more negatively than poor by the overall number of rich buyers, \( a_R > a_P \) and they are also affected more negatively by the number of poor buyers, \( b_R > b_P \).\(^{20}\) Notice that we do not impose any restriction on the sign of the parameters. Given the character of luxury goods it seems plausible to assume that these parameters take negative values, i.e., individuals are affected negatively as the number of luxury buyers increase. As stressed in the literature review, the desirability, and hence the value, of luxury goods depends on their perceived rarity and uniqueness. Therefore we may expect that individuals of both groups could be affected negatively by the overall number of luxury buyers. This corresponds to consumer theory of the

\(^{19}\)See section I-F of Bagwell and Bernheim (1996).

\(^{20}\)Even though, income is a private information, with the assumption of rational expectations, individuals anticipate \( \mu_R \) and \( \mu_P \).
snob effect (Leibenstein, 1950). On the other hand, one could also expect poor buyers to be positively affected by the number of rich buying luxury goods, \( a_P < 0 \). This would correspond to the bandwagon effect, also widely studied in consumer theory and marketing. In such a case, the poor, as the followers, would be positively affected by the number of rich buying luxury goods. One can also for instance assume \( b_P = 0 \) meaning that poor buyers care only about the proportion of rich buyers. To sum up, the only restrictions that we need are those that rank \( a_i \) and \( b_i \) without restrictions on signs. Condition \((ii)\) implies that rich are more negatively affected by the proportion of poor buyers than by the proportion of rich buyers. In a game where buyers seek to signal status, it seems natural that individuals do not want to be assimilated to poor. Analogously, we could also reasonably impose \( b_P > a_P \), although this condition is not necessary for our proposition to hold.\(^{21}\)

### 3.1.1 Autarky

We study first a closed economy case. In this type of models, an equilibrium is a situation where each individual of the same type gets the same pay-off. From this we obtain demand functions for luxury goods for rich and poor. Since \( U_i(q) \) is a decreasing function of \( \mu_i \) and utility of consumers who buy nothing is independent of these proportion, there exists a unique equilibrium defined as a pair \( (\mu_R, \mu_P) \) that satisfies \( U_i(q) = U_i(0) \), where \( U_i(0) \) is the utility of individual of \( i \)-type if she buys nothing. Demand functions of rich and poor are simply the proportion of each type that

\(^{21}\)Notice that \((ii)\) corresponds to the assumption done by Bagwell and Bernheim (1996) where the utility of any individual (rich or poor) is better when he meets a rich rather than a poor. See sections I-A and I-B of Bagwell and Bernheim (1996).
buys the luxury good. They are respectively:

\[
\mu_R = \frac{\theta q(b_P - \lambda b_R) - p(b_P - b_R)}{b_P a_R - b_R a_P} \\
\mu_P = \text{Max} \left\{0, \frac{\theta q(\lambda a_R - a_P) - p(a_R - a_P)}{b_P a_R - b_R a_P} \right\}
\]

(2)
(3)

It can be immediately noticed that the number of rich buyers is increasing with the degree of income inequality while the opposite holds true for the number of poor buyers. Taking first derivatives of demand functions with respect to price, we find that demand for luxury good of the rich is increasing with price, \(\frac{\partial \mu_R}{\partial p} > 0\). This property can be a definition of a Veblen good (see Creedy and Slottje, 1991).

We turn now to the firm problem. A monopolist sets the price of a luxury good in order to maximize his profits. For the sake of simplicity, we equalize marginal cost of production to zero.\(^{22}\) Hence profit function is simply \(\pi = p(\mu_R + \mu_P)\) and firm sets price equal to:

\[
p = \frac{\theta q[b_P - a_P + \lambda(a_R - b_R)]}{2(b_P - b_R + a_R - a_P)}.
\]

(4)

It can be easily seen that price increases with degree of income disparity, \(\frac{\partial p}{\partial \lambda} < 0\) since \(b_R > a_R\) along with Assumption 2.

**Proposition 1.** The price of the luxury good increases with the degree of income inequality in the

\(^{22}\) Note that we could alternatively add a production cost such that the marginal cost would be increasing with quality of good. That would not however affect the main predictions of the model.
Proposition 1 states that the producer of luxury good sets a higher price for its good the higher the income gap between rich and poor in the economy. This prediction will be discussed in the next sub-section, in an open economy case.

In what follows, we set \( b_R = b_P = b \). This is a simplifying assumption and it does not affect the main prediction of our model. By replacing price by its value in equation (2) and equation (3), we obtain quantities of the luxury good sold to rich and to poor:

\[
\mu_R = \frac{\theta q (1 - \lambda)}{a_R - a_P} \quad \mu_P = \frac{\theta q [(a_R \lambda - a_P) - b (1 - \lambda)]}{2b (a_R - a_P)}
\]  

(5)

and the total demand for the luxury good is:

\[
\mu = \frac{\theta q [(a_R \lambda - a_P) + b (1 - \lambda)]}{2b (a_R - a_P)}
\]  

(6)

Taking first derivatives of equation (6) with respect to income inequalities, we see that the overall number of buyers of the luxury good is increasing with degree of income disparity in the economy,

\[ \frac{\partial \mu}{\partial \lambda} < 0. \]

Proposition 2. Demand for the luxury good increases with the degree of income disparity between the two social classes in the economy.

Notice that this result comes directly from the Veblen effect. The same model without the Veblen effect would not lead to the same proposition. In such a case, the relationship between price and inequality would not be monotonous. Starting for instance at \( \theta_P = \theta_R \) and increasing inequalities (e.g., \( \theta_P = \theta - \lambda \) and \( \theta_R = \theta + \lambda \)), at first the monopolist has an incentive to lower its price in order to keep the whole demand (poor and rich). Next, after a given threshold \( \bar{\lambda} \), the monopolist will find it more profitable to raise the price. The mechanism behind goes as follows: above a certain level of income gap, a price that the monopolist would have to set in order to keep serving the poor is too low. In such a case, the monopolist would stop supplying the poor and cover only the part of the market with the rich. At the same time, one could also argue that similar proposition can be derived from a model with non-homothetic preferences and without Veblen effect. First, it is true if the expenditure share (or the Engel curve) increases strictly convexly with income or if we assume that poor do not consume any unit of luxury good for any level of inequalities.
Propositions 1 and 2 are crucial for our analysis as they point to the relation between income inequalities and demand and price of luxury goods. They also reflect the series of stylised facts described in Section 2 that represent the motivation for our study.

3.1.2 Open Economy

We look now at the open economy case. We allow the domestic luxury producer to export his goods to a Southern economy at a given transport cost $\tau$. Preferences are the same in both countries. Income gap between rich and poor in the South is assumed to be higher than in the domestic country, $\lambda > \lambda^*$, where * stands for foreign economy. Furthermore, we let the luxury firm discriminate in prices between the two markets. Hence, the firm sets a price on each market by maximizing the following profit function:

$$\pi = p(\mu_R + \mu_P) + (p^* - \tau)(\mu^*_R + \mu^*_P)$$

From the first order conditions, we obtain prices of luxury goods and their quantities sold on both markets. As demand remains the same in the domestic country, then $p$ is the same as the equation (4).

$$\frac{\partial \pi}{\partial p^*} = 0 \Leftrightarrow p^* = \frac{\theta q[b_P - a_P + \lambda^*(a_R - b_R)]}{2(b_P - b_R + a_R - a_P)} + \tau$$

Along with Proposition 1, the luxury seller will face higher demand in country with higher degree of income inequalities, $\mu^* > \mu$. Also the price of luxury good will be higher on a more unequal market than in the domestic economy, $p^* > p$. Notice that price of luxury good increases with income inequalities independently of transport costs.
3.2 Two Goods

In Section 3.1, individuals had a choice between purchasing a luxury good and not making any
purchase at all. In this section, we look at the market of higher quality goods, where individuals
can either purchase a luxury good, that features the Veblen effect, or purchase a higher quality
good only for its intrinsic quality. The introduction of a higher quality good highlights the
importance of the status dimension of purchase luxuries. Predictions of the two-goods variant of
the model are analogous to these of the one-good specification, with an additional effect resulting
from the quality gap between luxury and higher quality goods. The model predicts that the price
of luxury good increases with the difference in quality between the two types of goods.

Individuals may purchase either one unit of good A or of good B. Good A is a luxury good
and good B is an ordinary good. The utility function of an individual of type \(i\) is:

\[
U_i = \begin{cases} 
\theta_i q_A - p_A - z_i - \theta_i & \text{if purchases } A \\
\theta_i q_B - p_B - \theta_i & \text{if purchases } B.
\end{cases}
\]  

(7)

where \(q_j\) stands for quality of good \(j\) and \(p_j\) for its price, with \(j = \{A, B\}\). Notice that Veblen
effect, \(z_i = a_i \mu_R + b \mu P\), remains specific to luxury good. Market is assumed to be fully covered.

3.2.1 Autarky

On the firm side, we consider a classic domestic duopoly model with vertical differentiation.
Firm A sells a luxury product of quality \(q_A\) at price \(p_A\) while firm B sells an ordinary good
of quality \(q_B\) at price \(p_B\). Good A is assumed to be of higher quality than good B, \(q_A > q_B\).
Solving for a consumer indifferent between the two goods, we obtain the number of rich and poor
individuals purchasing luxury good as a function of prices, respectively:

\[ \mu_R^A = \frac{\gamma \theta_R (1 - \lambda)}{\delta}, \quad \mu_P^A = \frac{\gamma \theta_R [\lambda a_R - a_P] - \delta (p_A - p_B)}{b \delta} \]  

(8)

with \( \delta = a_R - a_P \) and \( \gamma = q_A - q_B \) corresponding to the difference in qualities between luxury and ordinary goods. The demand function for the luxury good in a duopoly case is analogous to the one in a monopoly case with the additional component of difference in qualities between the two goods. Looking at the demand of the rich, it can be easily noticed that it is increasing not only with degree of income disparity but also with quality gap between the two goods.

Proposition 3. Demand for the luxury good of rich individuals is increasing with the quality gap between the two types of goods available in the economy. This effect is magnified by the degree of income disparity in the economy.

Finally, the overall number of consumers purchasing the luxury good is:

\[ \mu_A = \frac{\gamma \theta_R [b(1 - \lambda) + \lambda a_R - a_P] - \delta (p_A - p_B)}{b \delta} \]  

(9)

Next, we obtain the number of purchasers of good \( B \) by subtracting the number of buyers of \( A \) from the total number of individuals in the economy.\(^{24}\)

\[ \mu_R^B = 1 - \mu_R^A = \frac{\delta - \gamma \theta_R (1 - \lambda)}{\delta}, \quad \mu_P^B = 1 - \mu_P^A = \frac{b \delta - \gamma \theta_R (\lambda a_R - a_P) + \delta (p_A - p_B)}{b \delta} \]  

(10)

The overall demand for good \( B \) is:

\[ \mu_B = \frac{2 b \delta - \gamma \theta_R [b(1 - \lambda) + \lambda a_R - a_P] + \delta (p_A - p_B)}{b \delta} \]  

(11)

\(^{24}\)Notice that here both masses are normalized to unity.
3.2.2 Open Economy

Turning to the firm problem, we have a standard duopoly with vertical differentiation. Take firm $A$ as luxury exporter that sells its goods on a foreign market where it faces a local producer of higher quality good $B$. Firms $A$ and $B$ solve respectively the following programs:

$$\max_{p_A} \pi_A = (p_A - \tau)\mu^A$$
$$\max_{p_B} \pi_B = p_B\mu^B$$

with $\tau$ corresponding to the transport cost of exporting good $A$ to the foreign market. Each firm sets profit maximizing prices.

$$\begin{align*}
  p_A(p_B) &= \frac{\gamma\theta R [b(1-\lambda)+\lambda a_R-a_P]+\delta p_B}{2b} + \delta \tau + \delta p_B \\
  p_B(p_A) &= \frac{2b\delta - \gamma\theta R [b(1-\lambda)+\lambda a_R-a_P]+\delta p_A}{2b} + \delta \tau
\end{align*}$$

$$\begin{align*}
  p_A &= \frac{\gamma\theta R [b(1-\lambda)+\lambda a_R-a_P]+2\delta (b+\tau)}{3b} \\
  p_B &= \frac{4b\delta - \gamma\theta R [b(1-\lambda)+\lambda a_R-a_P]+\delta \tau}{3b}
\end{align*}$$

Since prices are the strategic complement in this types of models, both prices are increasing in trade cost. Taking the first derivatives of price of luxury good with respect to the income inequalities, we obtain $\frac{\partial p_A}{\partial A} = \frac{\theta R \gamma (a_R-b)}{3b} < 0$ along with Assumption 1. $b > a_R$. This condition is sufficient at a given $\theta R$. Then lowering $\lambda$ tends to lower average income.\textsuperscript{25} A way to keep average income the same when income inequalities raises is to increase $\theta R$. This just reinforces the mechanism of our model. Last, notice that this inequality holds when the difference in quality between the two goods is important enough. Similar results can be obtained for demand functions.

\textsuperscript{25}Average income is simply $(\theta R + \theta P)/2$
for the luxury good.

\[
\begin{align*}
\mu^A &= \frac{\gamma \theta_R [b(1 - \lambda) + \lambda a_R - a_P] + 2b\delta - \delta \tau}{3b\delta} \\
\mu^B &= \frac{4b\delta - \gamma \theta_R [b(1 - \lambda) + \lambda a_R - a_P] - 2b\delta + \delta \tau}{3b\delta}
\end{align*}
\]

Therefore, in economies with larger income disparities between the rich and the poor and where the quality gap between the luxury goods and the goods of higher quality is big enough, demand for the luxury good is greater and the luxury producer/exporter sets higher prices. This corresponds to the cross-country evidence discussed in Section 2. Developing economies, especially these fast-growing and highly, are important markets for luxury goods.

The price of luxury goods is higher in countries with higher income inequalities and this effect is reinforced when the difference between higher quality goods and luxury goods in the economy is higher.

**Proposition 4.** For the quality gap important enough, demand for and price of luxury good increase with degree of income disparity between wealthy and non-wealthy individuals in the economy.

The sufficient condition for the demand and for the price of the luxury good to be increasing in the quality gap between the two types of goods is: \( b(1 - \lambda) + \lambda a_R > a_P \). The relation between the quality gap between the two types of goods and the price of luxury good is intuitive. The greater the difference between the two types of quality goods in the economy, the greater will be the incentive of the (rich) individuals to purchase luxury goods in order to signal their wealth.
4 Data

We use French custom data recording French exports at 8-digit Combined Nomenclature firm-product-destination level. Dataset provides both value and volume (in kg) of exports. We look at the cross-section of export for 2006. Although customs provide data also for more recent period, we have chosen 2006 for two reasons, first (i) as a pre-crisis year and more importantly (ii) because starting from 2006 reporting the volume of exports to the French customs become non-compulsory.\footnote{Martin and Mayneris (forthcoming) report that with this new regulation, the rate of missing information on volume of exports rose in 2006 from 1\% as compared to the previous years, and over 30\% in the period after.}

4.1 Luxury Exporters

Given the focus of the paper, we are interested in data related to luxury firms among the universe of French exporters in our data. Since however there is no clearly established definition of luxury goods, in order to identify luxury exporters in the customs data, we follow Martin and Mayneris (forthcoming) and use their two lists of firms exporting luxury goods. The first, narrow, list is based on professional association and contains 76 firms with numerous French top brands among them.

Exports done by these firms account for over 17 000 observation (out of 1 700 000 observations in the customs data). The second, large, list extends the former by all the French exporters in direct competition with the firms from the narrow list.\footnote{This refers to all the firms charging prices at least as high as the firms from the narrow list.} See Martin and Mayneris (forthcoming) for a detailed description of the identification strategy.\footnote{We are thankful to Julien Martin and Florian Mayneris for providing us the list of the HS6 sectors that they define as luxury.} This strategy enables us to enlarge our sample to over 239 000 observations. In the econometric part, we run the same series of estimations
on both restricted and large samples of French luxury exporters (luxury and extended-luxury exporters, henceforth).

4.2 Unit Values of Luxury Goods

The dependent variable in our analysis is the price of exports at firm-product-destination level. French customs data do not report export prices directly, they can be however proxied by calculating unit values from quantities and values of exports available in the dataset. Unit values of exports by product category \( k \) charged by a firm \( f \) in a given market \( c \), \( p_{fkc} \), are calculated in the standard way, as the ratio of export value to the quantity exported.\(^{29}\)

Next to the unit values as dependent variable, we look also at the variation of the difference between the unit value of luxury item with respect to the median unit value of this good charged in a reference country. We calculate it as a difference between the unit value of product \( k \) exported to market \( c \) by firm \( f \) and the median unit value of the corresponding HS6 product category \( k \) charged by French exporters in the reference country, Germany (\( p_{k,DEU}^{med} \)).\(^{30}\) Germany is the first destination of French exports both in terms of quantity and value, hence the choice of this country as the reference country seems relevant. In addition, given geographical proximity of Germany (common border) and the fact that both countries are members of Eurozone, one can expect that the prices charged at the neighbouring German market would not differ much from the domestic French prices.

\(^{29}\)i.e. \( p_{fki} = \frac{V_{fkc}}{Q_{fkc}} \), where \( V_{fkc} \) and \( Q_{fkc} \) stand respectively for value and quantity of product \( k \) exported by firm \( f \) to the country \( c \).

\(^{30}\)i.e. \( p_{diff_{fki}} = p_{fki} - p_{k,DEU}^{med} \).
4.3 Measure of Income Gap and Other Variables

We use two alternative measures of within-country income gap, \((a)\) Gini index and \((b)\) the income share held by the top 20% richest people in a given country and the number of millionaires per capita. The Gini index is known to contain many errors and missing values for different countries and years. To deal with too many missing observations, we take the mean values of Gini index for 2000-2010. We also combine several sources of Gini index. For the EU countries we take the Gini index directly from Eurostat, for other countries in our sample we combine data from World Income Inequality Database (United Nations) and from United States CIA Factbook. The top 20 income share comes from World Development Indicators (World Bank). Data are based on primary household survey obtained from government statistical agencies and World Bank country departments. Data for high-income economies are from the Luxembourg Income Study database. We include several additional control variables from different sources. Bilateral distance comes from CEPII. Income and income per capita (PPP) data come from World Development Indicators 2009. The average unit values per destination are computed using BACI trade flows data from CEPII.

5 Empirical Strategy and Results

5.1 Descriptive Statistics

Before analyzing in details the relationship between income inequality and prices of luxury goods, we look closer at the price variation itself.\(^{31}\) As discussed in Introduction, given our proxy of prices, average unit values at firm-product level, the observed price variation may be a result of different phenomena. It can be due to strategic pricing of luxury companies who may discriminate

\(^{31}\)We refer as a price to average unit values within firm-product categories.
between different markets, as suggested by anecdotal evidence. It also may result from a large variation in quality (or exclusivity) of items classified to the same category, such as handbags or necklaces (see Section 6 for further discussion).

Given the large variation in prices of different variants of similar luxury products, depending for instance on whether a given model of handbag is made from calfskin or alligator leather, one may expect that the within firm-product variation in unit values of luxury exporters would differ from the same variation for the overall universe of exporting firms. Moreover, variation in prices within firm-product categories and across destinations has recently attracted lot of attention in trade literature. Several country-level studies document a positive relation between firm-product unit values and geographical distance to the destination market (Martin, 2012; Bastos and Silva, 2010; Manova and Zhang, 2012).

Therefore, an exercise of price decomposition on within and between firm effect for luxury exporters appears as interesting exercise. We compare unit values dispersion specific to the luxury firms with the one for all the firms within luxury sectors and one for the total sample of French exporters. We follow here Martin (2012) and run a simple exercise of price decomposition, where for each CN8 product category, unit values variation with respect to the average product unit values is decomposed into within- and between-firm effects. More accurately, the following expression is computed:

\[
\sum_{f,c}(p_{fc} - \bar{p})^2 = \sum_{f,c}(p_{fc} - p_f)^2 + \sum_f(p_f - \bar{p})^2 + 2\sum_f(p_{fc} - p_f)(p_f - \bar{p})
\]

with \(p_{fc}\) price of exports charged by firm \(f\) in country \(c\), \(\bar{p}\) average price of a given CN8 product category and finally \(p_f\) standing for average price charged by \(f\) averaged across all the products. Hence, unit value variation with respect to the average CN8 unit value (LHS) is decomposed
respectively into within- and between-firm variation and the covariance of the last two (RHS). Next the contribution of each of these three terms to the unit value variation is computed by dividing LHS by RHS.

Table 1 reports average results for within and between unit values variation for different percentiles for four samples, (i) restricted list of luxury exporters, (ii) all non-luxury firms in the sectors where luxury firms are present, and (iii) total French exports. It is important to note that we are running the price decomposition exercise on samples of very different sizes. Samples (i)-(iii) differ considerably in size. To ensure that our results are not driven by these sample size differences, in the last group (iv), we draw a random sample from the sample of all non-luxury firms operating in the sectors where luxury producers are present. This sample has a size comparable to (i) and is drawn among the firms that have similar value of exports that the luxury firms (i). From Table 1, while for the samples (ii)-(iv), for a median product the between-firm-product variation counts for about 65%, for the luxury firms this variation counts for 93%. This simple exercise shows that in the case of luxury goods, the major unit values dispersion across countries is due to the within-firm variation. The results go along with our discussion on price dispersion between different products and models within the same product category in Section 6.

As mentioned in the introduction, geographic distribution of luxury exports across countries differs from the one of overall exports. Table 2 simply lists the top 20 destinations of French exports for the four sub-samples of exporters, namely (a) full sample of French exporters, (b) exports in sectors where luxury firms are present, (c) exports by extended and (d) restricted luxury firms. While the list of the top 10 overall importers (a) seems to reflect the gravity equation with dominating presence of neighbouring European countries, for the restricted luxury exporters (d), Japan, Hong Kong, Singapore and Russia confirm their importance. Looking at this simple ranking, without running any econometric analysis, it can be easily seen that trade
flows in luxury goods differ from trade flows of ordinary goods. One can conclude from this that luxury trade flows may be driven by different factors than the flows of ordinary goods.\textsuperscript{32}

5.2 Baseline Estimation

The main prediction of our model is that, luxury exporters charge higher prices on markets with larger income disparities. In the econometric approach we test the following equation:

\[ p_{fkc} = \alpha \text{Inequality}_c + \beta X_c + \mu_{fk} + \epsilon_{fkc} \]

where \( p_{fkc} \) corresponds to the log average unit value charged by firm \( f \) on product \( k \) exported to a country \( c \) and \( \text{Inequality}_c \) is a degree of income disparity in country \( c \) as measured by Gini index. Controls include logs of GDP, GDP per capita and bilateral distance. \( \mu_{fk} \) corresponds to firm-product fixed effects and \( \epsilon_{fki} \) is the error term. In addition, we control for the degree of competition on the destination market by taking average unit values of imports per HS6 product-category. The average unit values are calculated from BACI database provided by CEPII. \( \alpha \) is our coefficient of interest. Its positive sign means that export prices of luxury goods increase with the degree of income inequality in the importer country. As mentioned above, we use two different dependent variables, log of prices and log of difference in prices with respect to the median price of the product category charged in the reference country as described in the previous section. To check the robustness of our results, we run the same estimation using alternative measures of income inequality, namely the share of the top 20% richest households in the population as well as number of millionaires per capita.

\textsuperscript{32}In this paper, we focus on the demand-side factors affecting trade patterns of luxury goods. Martin and Mayneris (forthcoming) adapt supply-side approach and provide a series of descriptive statistics comparing export behaviour of luxury firms with the one of other French exporters.
5.3 Econometric Results

5.3.1 Income Inequality and Luxury Prices

Table 4 presents results of the baseline estimation. The logarithm of average unit values is regressed on the logarithm of Gini index for three sub-samples of firms, the restricted luxury firms (columns 1 to 4), the extended luxury firms (columns 5 to 8) and all the non-luxury firms in the sectors where luxury is present (columns 9 to 12). In all the estimations, firm-product fixed effect are used and errors are clustered at the destination level. Unit value elasticity of luxury goods with respect to income gap is positive in all the specifications but it remains significant to inclusion of controls only for the restrained sample of high-end exporters. Columns (1), (5) and (9) show the simple relation between the two variables of interest for the respective sub-samples. Degree of income inequality appears to have positive and very significant effect on export prices. As expected, this effect is more significant for luxury sample than for the other other samples. 1% increase in the level of income gap at the destination market is associated with 0.28% increase in the unit value of items exported by a firm from restricted list to that country. In column (2), (6) and (10) we include additionally destination income and income per capita levels to control for market size and wealth. For (2) and (6), the coefficient of Gini index is slightly lower than in previous specifications, but it remains positive and very significant. The effect of market size is non-significant in all the specifications. More interestingly, destination wealth has a negative sign for the luxury sample. This is quite surprising and goes in the opposite direction to the prediction of our model, where the effect of income gap is increasing with economy’s wealth. This opposite results may be due to the anecdotal cases of overpriced luxury items sold in the least developed economies with a small fraction of very wealthy individuals. For the non-luxury firms, along with the evidence documented by the prior literature.\footnote{See Section 2.} In a series of regressions not reported in the
table, we estimated also effect of sole income and income per capita on export unit values for the three sub-samples of firms. In all the three cases, GDP has no significant effect on export prices, whereas the effect of income per capita is negative for luxury and extended-luxury firms.

In columns (3-4), (7-8) and (11-12), we further control for distance (columns (3), (7) and (11)) and for a cross variable GDP per capita times Gini index. We clearly see that coefficients associated to Gini are higher and more significant for the first sample than for the others. Interestingly, we see that the coefficient affected to the distance is not significant for the first sample, while it is for the two last sample. This is in line with Martin and Mayneris (2018) who demonstrate that trade in luxury goods is less sensitive to distance.

In columns (3-4), (7-8) and (11-12) of the table 4, we additionally control for both distance and the level of competition in the destination market. We also run the same regression on the full sample (column 13). The empirical relation between distance and within firm-product export prices has recently attracted lot of attention of trade researchers. Several micro-level studies document positive and persistent relation between the two variables (Martin, 2012; Bastos and Silva, 2010; Gorg et al., 2010 for respectively French, Portuguese and German firms). The results for luxury firms (3-4) do not however confirm these findings. The effect of distance on the unit value of luxury exporters while positive remains non-significant. At the same time, including

34 As mentioned in the introduction, the Linder hypothesis predicts more trade in high quality goods between high income countries.

Our results on restricted sample of luxury exporters suggest that luxury exporters charge higher prices in countries that have lower income per capita. In Section 6 we discuss the limits of using unit values as a proxy for prices. If higher unit values reflect higher quality and not necessary higher prices for a given product, our results suggest that the goods for the highest quality go not necessarily to the countries with higher income per capita, but to the countries with higher income inequality.

In Subsection 5.4, we use interaction term for luxury exporters and run regressions on the whole sample of French exporters. While the coefficient for income per capita for the overall sample is positive

35 Among possible theoretical explanations of the positive relationship between unit values and distance, literature suggests quality sorting of product mix across destinations along with Alchian and Allen 1964 theorem or strategic pricing-to-market behaviour of exporters analyzed in industrial organization studies.
distance shrinks the coefficient of Gini index to 0.19% and makes it less significant. On the other hand side, for the extended-luxury firms (7-8), the effect of distance is positive while again both, the significance and the size of the income gap effect, decrease. Lastly, for the full sample of sectors with luxury firms (11-12), the coefficient of distance is positive and significant. The coefficient of foreign export competition is insignificant for all the three subsamples. In the last part of the exercise, we add the interaction term between income gap and income per capita of destination (columns 4, 8 and 12). As mentioned above, our model predicts the effect of income gap on unit values to be increasing with the level of income, with luxury firms charging higher unit values in countries that are wealthier and have larger income disparities. We do not find however a support for this prediction in the data. The interaction term is non-significant for luxury and extended-luxury firms while it is significant for the non-luxury firms. In the last specification (column 13), we run our baseline regression on the entire sample of French exporters. Interestingly, we find that inequality has a positive effect also on export prices, the coefficient is however lower and significant only at 10%. In addition, country wealth, distance as well as level of competition have positive effect. This last result is consistent the numbers found by Martin (2012) on the the full sample of French exporters for 2003.

In Table 5, we run the analogous series of estimations. Instead of looking at the effect on export prices, we analyze the impact on the difference between price of the good $k$ charged in the market $c$ by a firm $f$ with respect to the median unit value of the (HS6) product category charged in the reference market, Germany. The sample used here is smaller for two reasons. First, because we look only at these firms that export to Germany and second, since our variable is in log, therefore, we loose all the observations where the charged unit value is smaller than the German median. The estimated coefficient are higher than in the previous specification. This is driven by the drop of negative values of unit value difference. As in the baseline equation the
effect of income gap is more important for the luxury firms than for the entire sample. Economy size has a negative effect on the unit value of luxury goods (luxury and extended-luxury firms). Hence, luxury exporters seem to charge higher unit values in more small economies with larger income gap.

5.3.2 Luxury Exports and Income Inequality

Our model predicts also a positive relation between income gap and quantity of luxury exports. Table 6 presents the results of the estimation for value of exports on Gini index. As in the previous case, we compare the outcomes for the three sub-samples. The results here are more mitigated. The estimated elasticities are positive for all 12 columns, but they are significant to the inclusion of all control variables only for the luxury firms. The coefficient of income gap is much higher for the volume of export than for the unit values. For the luxury firms, one percent increase in the level of income gap is associated with 1.18 percent increase in volume of exports, controlling for distance, economy size and wealth. These results are consistent with the recent widely established evidence reporting the importance of luxury sales in the markets such as China, Russia or Middle East countries (see for instance Bain, 2012). Turning to other variables, both distance and economy size have expected, respectively negative and positive, effects on the volume of exported items. Also, comparing the results of the full estimation specification (columns 3, 7 and 11), we see that distance affects less negatively export of luxury firms, than the entire sample of exporters. This finding is consistent with Martin and Mayneris (forthcoming) who find luxury exporters to be less sensitive to distance. Finally, income per capita is significant only for the sub-sample of luxury exporters.
5.3.3 Alternative Measures of Income Disparity

Gini index is known to be a noisy measure of income inequality. In order to test the validity of our model, we use also two alternative indicators of income disparity, namely the share of total income of the country held by the 20% wealthiest individuals and the number of millionaires (in USD) per capita.

The share of top 20% richest households in the economy provided by the World Bank is available only for 34 countries.\textsuperscript{36} These 34 countries represent however over 93% of the total value of exports done by French luxury firms. Table 7 reports the results of the estimation using this alternative measure of income gap. The results confirm the findings reported previously using Gini index. The coefficients of top 20 income share are higher that for the Gini index but they have lower level of significance. The coefficient is however no more significant for the luxury goods in the full specification, i.e. when we add distance (column 3). Interestingly, it is significant for the full sample of sectors where luxury firms are present (column 9).

Our second alternative measure of income disparity, number of millionaires per capita, is available only for 26 countries.\textsuperscript{37} This again limits considerably our sample. We find however among these 26 countries all the top 10 destination of French luxury exports done by the extended-luxury firms and reported in the Table 2. See Table 3 for rankings of top 20 countries in terms of absolute and relative number of millionaires.

Table 8 presents the results of estimation of the relation between number of millionaires per capita and luxury goods exports for the full sample of sectors. The coefficient is higher than for the Gini index and the luxury goods in the full specification. This result is consistent with the view that millionaires are an important group for luxury goods.

\textsuperscript{36}The sample shrinks to 34 countries: Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Denmark, Finland, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Korea, Rep., Malaysia, Mexico, Netherlands, Norway, Panama, Poland, Portugal, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom, United States.

\textsuperscript{37}Boston Consulting Group has released two rankings, one for top 20 countries with the highest absolute number of millionaires and one similar with the highest number relative to population. By combining these two rankings (i.e., respectively dividing or multiplying by population), we end up with a sample of 26 countries. These are: Australia, Bahrain, Belgium, Canada, China, Denmark, Germany, Hong Kong, India, Ireland, Israel, Italy, Japan, Kuwait, Netherlands, Oman, Qatar, Saudi Arabia, Singapore, Spain, Switzerland, Taiwan, United Arab Emirates, United Kingdom, United States.
capita and unit values of luxury exports. The coefficients of number of millionaires, while positive
and highly significant in almost all specifications, are smaller than these found for the variables
used in the previous series of regressions. Looking at the estimation for the sample of luxury firms
for the full specification (column 3), it can be seen that an increase in the number of millionaire
per capita of one percent is associated with 0.022% increase in the average unit values of exports
per firm-product category. We see that coefficients are (slightly) higher in the first sample than for
the two others. This tends to confirm our previous results even if difference between coefficients
is not high.

5.4 Difference in difference approach

In the final exercise, we test the validity of our results, we run an analogous series of regressions
using including luxury dummy interacted with Gini index. The following equation is estimated:

\[ p_{fkc} = \alpha_1 \text{Inequality}_c + \alpha_2 \text{Luxury} \times \text{Inequality}_c + \beta X_c + \mu_f + \epsilon_{fkc} \]

The specification applies subsequently three alternative \textit{Luxury} dummies, corresponding to the
sub-sampling from the regressions above. The consecutive dummies correspond respectively to
restrictive sample of luxury firms, extended sample and all the non-luxury firms from the sectors
where luxury is present. Our coefficient of interest is \( \alpha_2 \). Its positive sign means that luxury
exporters set higher prices for the same category products on markets with higher degree of
inequality. The results confirm the predictions of the model. Table 9 reports the results with
three panels corresponding to the three respective samples. We directly compare results for the
full specification estimation (Columns 5, 9 and 13).

The coefficient for Gini index is positive and significant in most of the specifications. Firms
in general seem to price discriminate on more unequal markets. The coefficient of the interaction term is also positive and significant for in the two first panels, but is non-significant and has negative sign for the dummy for luxury sectors confirming the predictions of our model. As for the remaining variables, destination wealth has positive effect on export prices, while market size in non-significant. Lastly, price seem to also increase with the average import price on the market.

Lastly, the same estimation strategy is applied to the regression for export value. The results are reported in Table 10. While the coefficient for Gini is non significant in all specifications, the interaction term is positive and significant for both subsamples of luxury firms. It is only weakly significant in the last sample. The total value of exports is higher in countries with higher level of inequalities. The remaining variables have coefficients consistent with literature, with value of exports increasing with the size of the market and decreasing with distance. The coefficient for GDP per capita is non-significant.

6 Discussion of the Results - Measuring Veblen Effect

The downside of our approach is however that we proxy prices of luxury goods by mean unit values of product categories for individual exporters on each destination.\(^{38}\) Despite the use of very detailed product categories, unit values may not correspond exactly neither to export prices nor prices paid by the final consumer (which include margins and eventually taxes). Importantly, our imperfect measure can be flawed by composition effects where countries with higher income disparities buy a bundle of products of higher quality within each product category. We cannot ascertain whether firms upgrade their product mix within fine product categories or adjust their price on the markets characterized by higher income disparities. However in either case, our

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\(^{38}\)At the same time, it should be noted that the use of mean unit values as a proxy of export prices is a conventional wisdom in trade literature. We discuss further the limits of this approach in Section 6.
results report a higher willingness to pay for luxury goods in these markets. See Section 6 for further discussion.

The dependent variable of our study is the price of luxury exports at firm-product-destination level. French customs data do not however report export prices directly. The conventional wisdom is to proxy prices with unit values calculated from quantities and values of exports available in the dataset. Nevertheless in our analysis, we are very careful as for the interpretation of the results related to unit values. In particular we do not dare to associate directly unit values with \textit{fob} prices of luxury goods. Unit values are considered in general as a noisy measure of prices (see for instance Silver, 2008). Martin (2012) argues that a high level of disaggregation limits the risk of having products of different quality within the same product categories. This argument appears less relevant for luxury goods, as luxury brands may charge very different prices for products classified into the same even very narrowly defined categories. We illustrate this with an example of Birkin 30, a flagship product of Hermès, one of the major French luxury companies. Birkin 30 is a medium size leather handbag. Its basic version, made with calfskin leather, can be purchased for 6 000 euros. The same model made with crocodile leather costs at least 15 000 euros. The price of the same crocodile leather bag but with diamond hardwares can easily attain over 50 000 euros. In the customs data, all the three version of Birkin are classified into CN8 \textit{Handbags, whether or not with shoulder straps, including those without handles, with outer surface of leather, composition leather or patent leather}, i.e., into the same category that all the other models of company’s medium size handbags. Therefore, if Hermès sells mainly the crocodile-diamond version of Birkin in the Middle East and the calfskin version in Europe, our analysis will report a considerable variation in the unit values for within firm-product categories across these markets. This example shows clearly to which extend proxying prices of luxury goods by unit values may be misleading,
even when using highly disaggregated data.\textsuperscript{39}

In the empirical exercise, we find a positive relation between unit values of luxury goods and within-country income inequality. These results can be related to two different phenomena. \textit{(a)} First, luxury firms may use pricing-to-market strategies. They may charge higher prices on more unequal markets, where, as suggested by our model, more wealthy individuals are willing to pay more to distinguish themselves from the individuals from the bottom of income distribution. \textit{(b)} Second, in a country with higher income disparity, luxury producers may sell relatively more of expensive products, i.e. goods of higher quality, or rather higher \textit{degree of exclusivity} (these diamond hardwares on luxury bags). While the anecdotal evidence provides various examples of both phenomena,\textsuperscript{40} our data do not allow us identifying which of the two prevails. At the same time, one should not forget that luxury goods are purchased mainly for prestige and not for their intrinsic quality. This prestige and exclusivity of luxury goods are presumably reflected in their prices. Therefore, the higher unit values of luxury exports in more unequal countries (whether they result from \textit{(a)} or \textit{(b)}), suggest that (wealthy) individuals in these countries have higher willingness to pay for luxury goods. This higher willingness to pay can be associated with a stronger incentives of wealthy people to signal their status in more unequal societies, exactly as suggested by our theory. Thus, we take this positive relation between income gap and unit values as the evidence confirming the existence of the Veblen effect on a macroeconomic level.

\textsuperscript{39}The price decomposition exercise run in Section 5.2 confirms these limits. The within firm-product variation of the unit values of the luxury exporters is considerably higher than for non-luxury exporters.

\textsuperscript{40}On one hand side, various anecdotal stories report endless examples of "extremely" luxurious version of cars or \textit{haute couture} dresses decorated with diamonds finding their buyers for instance in oil-countries. On the other, a number of others stories claims price disparity between the same luxury products sold in Europe and some Middle East or Asian countries arguing that the price gap exceeds difference in taxation.
7 Conclusion

In this paper, we look at the top of the quality ladder of trade. We focus on the status goods and the drivers their trade patterns. Our approach emphasizes the importance of social interactions in the demand for this type of goods. The status-seeking behaviour, by definition specific to luxury goods, makes luxury demand go beyond the standard non-homotheticity of preferences. Through the Veblen effect, we associate demand for luxury goods with within-country inequality. In the absence of perfect information, desire of confirm one’s status increases with the degree of dissimilarity between individuals in the society. These higher incentives for distinction result in higher willingness to pay of individuals in these societies. Both prices and exports of luxury goods are expected to be higher in societies where the gap between the rich and the poor is wider. Our theoretical predictions find their confirmation in the French export data. The values of exports and average product unit values increase with the degree of income inequality of the exporter. The paper highlights distinction between trade in luxury goods and ordinary goods. While the Linder hypothesis predicts more trade in high quality goods between high income countries, trade flows in luxury goods do not seem to follow these patterns. This places our paper outside the main stream of trade literature. Luxury goods represent of course only a modest, but growing, fraction of the total trade flows. Understanding however patterns of these and their singular character seems worth analyzing. The question appears even more important given the specialization of western economies in higher quality goods.
References


Fontagné, L. and Hatte, S. (2013). European high-end products in international competition. *mimeo*.


## Appendix

<table>
<thead>
<tr>
<th>Percentiles</th>
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<td><strong>Total exports</strong></td>
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<td><strong>Non-luxury firms (random)</strong></td>
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</table>

**Notes:** Table reports the contribution of within and between firm components to the price dispersion at the product level. For each CN8 category the following equation is calculated: \( \sum_{f,c}(p_{fc} - \bar{p})^2 = \sum_{f,c}(p_{fc} - p_f)^2 + \sum_{f}(p_f - \bar{p})^2 + 2 \sum_{f}(p_{fc} - p_f)(p_f - \bar{p}) \), with \( p_{fc} \) price of exports charged by firm \( f \) in country \( c \), \( \bar{p} \) average unit value of a given CN8 product category and finally \( p_f \) standing for average unit values charged by the firm. The reported within and between contributions are the averages across all the CN8 categories. The results are reported for four sub-samples, (i) luxury firms, (ii) a comparable sample of firms that are not luxury but that operate in the sectors where luxury producers are present, (iii) the sample of all non-luxury firms in the luxury sectors and finally (iv) the overall sample of French exporters.

Table 1: Price Decomposition - Within and Between Firm-Product Variation
### Total Exports | Sectors with luxury | Extended-luxury | Luxury
---|---|---|---
1 DEU 5245659 | GBR 370397.4 | USA 347233.3 | USA 91993.99
2 ESP 3506942 | USA 362167.8 | GBR 326646.7 | JPN 79376.34
3 ITA 3331093 | DEU 310092.3 | DEU 262533.2 | ITA 43144.8
4 GBR 3142929 | ESP 227662 | ITA 20749.4 | HKG 42703.71
5 BEL 2550942 | ITA 22950.1 | ESP 180647.6 | GBR 35000.04
6 USA 2508866 | BEL 210413.8 | BEL 179249.2 | CHE 31190.74
7 NLD 2508866 | JPN 168143.1 | JPN 163066.4 | DEU 29606.32
8 CHE 2500866 | CHE 132977.5 | CHE 125130.6 | SGP 26089.79
9 CHN 7699909.5 | NLD 102163.2 | NLD 87620.3 | ESP 19520.94
10 POL 682662.8 | RUS 81636.48 | HKG 77465.07 | RUS 15390.48
11 JPN 526041.4 | HKG 78090.17 | RUS 74066.84 | KOR 15131.04
12 TUR 499955.8 | SGP 74636.84 | SGP 72025.29 | CHN 13380.86
13 SWE 498398 | CAN 57849.61 | CAN 52212.28 | BEL 10498.09
14 PRT 469463.2 | PRT 42365.07 | ARE 40507.36 | ARE 9668.307
15 RUS 433245.8 | ARE 42289.5 | PRT 33700.21 | NLD 6537.88
16 AUT 365322.3 | GRC 35299.45 | KOR 33694.13 | TWN 6208.216
17 ARE 329430.7 | KOR 34406.82 | GRC 32781.17 | GRC 5765.481
18 DZA 328886.7 | DNK 34377.39 | DNK 30765.85 | CAN 5562.908
19 GRC 312928.8 | SWE 27425.48 | CHN 24477.7 | MEX 4722.253
20 SGP 311700.4 | CHN 26748.78 | SWE 24106.32 | DNK 3993.26

**Notes:** The values of exports are reported in 10 000 of euro. Country codes correspond to ISO classification. Table ranks the top 20 destinations of French exports for respectively the full sample of exports, exports from the sectors where luxury firms are also present, exports of extended sample of luxury firms and finally exports by luxury firms.

Table 2: Top Destinations of French Exports
Ranking of countries with both respectively, relative to population and absolute, the highest numbers of High Net Worth Individuals, i.e. millionaires (in USD) for 2012, released by Boston Consulting Group.

Table 3: Ranking of countries by number of millionaires per capita
<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Unit Values</th>
</tr>
</thead>
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</tr>
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</tr>
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<td>[0.023]</td>
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Fixed effects: | Firm x Products |
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<tr>
<td>Observations</td>
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<tr>
<td>R-squared</td>
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</table>

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS. Columns (1)-(4) report results for luxury firms only, columns (5)-(8) for extended-luxury group of firms, whereas columns (9)-(12) for the entire sample of firms in the sectors where luxury is present. The dependent variable is the log of average unit values charged by firm \( f \) for product category \( k \) in country \( c \). The table investigates relation between variation of unit values across countries and within firm-product as a function of degree of income disparity at the destination market. Explanatory variables are degree of income disparity (Gini index), size of the economy (GDP), wealth of the economy (GDP per capita) and bilateral distance. We use additionally the interaction term between Gini index and the GDP per capita.

Table 4: Baseline equation - Unit values of luxury exports and income inequality
<table>
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<tr>
<th>Dependent variable</th>
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<th>Unit Value (difference from the median)</th>
<th>Extended-luxury firms</th>
<th>Sectors with luxury</th>
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<tr>
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<td>1</td>
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<td>3</td>
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<td>0.494***</td>
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<td>-0.032**</td>
<td>-0.032**</td>
</tr>
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</table>

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS. Columns (1)-(4) report results for luxury firms only, columns (5)-(8) for extended-luxury group of firms, whereas columns (9)-(12) for the entire sample of firms in the sectors where luxury is present. The dependent variable is the log value of exports of product category $k$ by firm $f$ to country $c$. The table investigates relation between variation of volume of exports across countries and within firm-product as a function of degree of income disparity at the destination market. Explanatory variables are degree of income disparity (Gini index), size of the economy (GDP), wealth of the economy (GDP per capita) and bilateral distance. We use additionally the interaction term between Gini index and the GDP per capita.

Table 5: Income inequality and difference from the median in unit values of luxury exports
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<td>0.495***</td>
<td>0.495***</td>
<td>0.350***</td>
<td>0.286***</td>
<td>0.350***</td>
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<td>0.524***</td>
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<td>-0.200***</td>
<td>-0.200***</td>
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<td>0.286***</td>
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Fixed effects

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<td>R-squared</td>
<td>0.556 0.669 0.673 0.673</td>
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</table>

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS. Columns (1)-(4) report results for luxury firms only, columns (5)-(8) for extended-luxury group of firms, whereas columns (9)-(12) for the entire sample of firms in the sectors where luxury is present. The dependent variable is the log of difference between the average unit values charged by firm \( f \) for product category \( k \) in country \( c \) and the median unit value charged for the corresponding HS6 product category across all the exporters in the reference country, Germany. The table investigates relation between variation of unit values this difference across countries and within firm-product as a function of degree of income disparity at the destination market. Explanatory variables are degree of income disparity (Gini index), size of the economy (GDP), wealth of the economy (GDP per capita) and bilateral distance. We use additionally the interaction term between Gini index and the GDP per capita.

Table 6: Value of luxury exports and income inequality (Gini index)
### Table 7: Quantity of luxury exports and income disparity (top 20% richest)

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<thead>
<tr>
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<th>Unit Value</th>
</tr>
</thead>
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<td>[0.051]</td>
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<td>GDP</td>
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<tr>
<td></td>
<td>[0.016]</td>
</tr>
<tr>
<td>Distance</td>
<td>0.051**</td>
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<td>[0.020]</td>
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<td>[0.013]</td>
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<th>Frirm x Products</th>
</tr>
</thead>
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</tbody>
</table>

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS. Columns (1)-(3) report results for luxury firms only, columns (4)-(6) for extended-luxury group of firms, whereas columns (6)-(9) for the entire sample of firms in the sectors where luxury is present. The dependent variable is the log value of exports product category k sold by the firm f in the country c. The dependent variable is the log value of exports of product category k by firm f to country c. The table investigates relation between variation of volume of exports across countries and within firm-product as a function of degree of income disparity at the destination market. Explanatory variables are degree of income disparity (share of income held by the top 20% richest households in the economy), size of the economy (GDP), wealth of the economy (GDP per capita) and bilateral distance. We use additionally the interaction term between Gini index and the GDP per capita.
<table>
<thead>
<tr>
<th>Dependent v</th>
<th>Unit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Luxury</td>
</tr>
<tr>
<td>VARIABLES</td>
<td>1</td>
</tr>
<tr>
<td>Millionaires per capita</td>
<td>0.022***</td>
</tr>
<tr>
<td>[0.006]</td>
<td>[0.007]</td>
</tr>
<tr>
<td>GDPcap</td>
<td>-0.020</td>
</tr>
<tr>
<td>[0.039]</td>
<td>[0.041]</td>
</tr>
<tr>
<td>GDP</td>
<td>0.030</td>
</tr>
<tr>
<td>[0.021]</td>
<td>[0.022]</td>
</tr>
<tr>
<td>Distance</td>
<td>0.061***</td>
</tr>
<tr>
<td>[0.017]</td>
<td>[0.013]</td>
</tr>
<tr>
<td>ImportPrice</td>
<td>-0.018</td>
</tr>
<tr>
<td>[0.015]</td>
<td>[0.009]</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>Firm x Products</td>
</tr>
<tr>
<td>Observations</td>
<td>4,378</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.820</td>
</tr>
</tbody>
</table>

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS. Columns (1)-(3) report results for luxury firms only, columns (4)-(6) for extended-luxury group of firms, whereas columns (6)-(9) for the entire sample of firms in the sectors where luxury is present. The dependent variable is the log of average unit values charged by firm \( f \) for product category \( k \) in country \( c \). The table investigates the relation between the variation of product unit values across countries as a function of number of millionaires (in USD) per capita in the destination country \( c \). Explanatory variables are degree of income disparity (Gini index), size of the economy (GDP), wealth of the economy (GDP per capita) and bilateral distance. We use additionally the interaction term between Gini index and the GDP per capita.

Table 8: Unit values of luxury exports and number of millionaires (USD) per capita
## Dependent v. Unit Value

<table>
<thead>
<tr>
<th>Sample</th>
<th>Colbert</th>
<th>Colbert extended</th>
<th>Luxury sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
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<tr>
<td>5</td>
<td></td>
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<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Income Disparity (Gini Index)

<table>
<thead>
<tr>
<th>GINI</th>
<th>0.165***</th>
<th>0.171***</th>
<th>0.073*</th>
<th>0.071*</th>
<th>0.122***</th>
<th>0.126***</th>
<th>0.032</th>
<th>0.030</th>
<th>0.171***</th>
<th>0.176***</th>
<th>0.078*</th>
<th>0.075*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[0.039]</td>
<td>[0.041]</td>
<td>[0.041]</td>
<td>[0.041]</td>
<td>[0.037]</td>
<td>[0.039]</td>
<td>[0.039]</td>
<td>[0.039]</td>
<td>[0.038]</td>
<td>[0.041]</td>
<td>[0.041]</td>
<td>[0.041]</td>
</tr>
</tbody>
</table>

### Gini×Lux

<table>
<thead>
<tr>
<th>GINI×Lux</th>
<th>0.245**</th>
<th>0.241**</th>
<th>0.220**</th>
<th>0.222**</th>
<th>0.335***</th>
<th>0.335***</th>
<th>0.334***</th>
<th>0.334***</th>
<th>-0.007</th>
<th>-0.008</th>
<th>-0.007</th>
<th>-0.004</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0.096]</td>
<td>[0.095]</td>
<td>[0.094]</td>
<td>[0.094]</td>
<td>[0.010]</td>
<td>[0.010]</td>
<td>[0.010]</td>
<td>[0.010]</td>
<td>[0.024]</td>
<td>[0.023]</td>
<td>[0.022]</td>
<td>[0.021]</td>
<td></td>
</tr>
</tbody>
</table>

### GDPcap

<table>
<thead>
<tr>
<th>GDPcap</th>
<th>0.020**</th>
<th>0.005</th>
<th>0.025**</th>
<th>0.022**</th>
<th>0.004</th>
<th>0.022**</th>
<th>0.020**</th>
<th>0.005</th>
<th>0.025**</th>
<th>0.022**</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0.009]</td>
<td>[0.012]</td>
<td>[0.010]</td>
<td>[0.010]</td>
<td>[0.011]</td>
<td>[0.009]</td>
<td>[0.009]</td>
<td>[0.012]</td>
<td>[0.010]</td>
<td>[0.010]</td>
<td>[0.010]</td>
</tr>
</tbody>
</table>

### GDP

<table>
<thead>
<tr>
<th>GDP</th>
<th>-0.002</th>
<th>0.000</th>
<th>0.000</th>
<th>-0.001</th>
<th>-0.000</th>
<th>-0.000</th>
<th>-0.000</th>
<th>0.000</th>
<th>0.000</th>
<th>0.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0.005]</td>
<td>[0.006]</td>
<td>[0.006]</td>
<td>[0.005]</td>
<td>[0.006]</td>
<td>[0.005]</td>
<td>[0.005]</td>
<td>[0.006]</td>
<td>[0.006]</td>
<td>[0.006]</td>
<td>[0.006]</td>
</tr>
</tbody>
</table>

### Distance

<table>
<thead>
<tr>
<th>Distance</th>
<th>0.055***</th>
<th>0.047***</th>
<th>0.048***</th>
<th>0.046***</th>
<th>0.046***</th>
<th>0.047***</th>
<th>0.048***</th>
<th>0.048***</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0.010]</td>
<td>[0.012]</td>
<td>[0.012]</td>
<td>[0.012]</td>
<td>[0.012]</td>
<td>[0.011]</td>
<td>[0.011]</td>
<td>[0.012]</td>
<td>[0.012]</td>
</tr>
</tbody>
</table>

### ImportPrice

<table>
<thead>
<tr>
<th>ImportPrice</th>
<th>0.010***</th>
<th>0.010***</th>
<th>0.010***</th>
<th>0.010***</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0.003]</td>
<td>[0.002]</td>
<td>[0.002]</td>
<td>[0.002]</td>
<td>[0.002]</td>
</tr>
</tbody>
</table>

### Fixed effects:

<table>
<thead>
<tr>
<th>Firm x Product</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
<th>955,837</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>0.868</td>
<td>0.867</td>
<td>0.867</td>
<td>0.868</td>
<td>0.870</td>
<td>0.870</td>
<td>0.870</td>
<td>0.870</td>
<td>0.867</td>
<td>0.867</td>
<td>0.868</td>
<td>0.868</td>
</tr>
</tbody>
</table>

### R-squared

| R-squared | 0.868   | 0.867   | 0.867   | 0.868   | 0.870   | 0.870   | 0.870   | 0.870   | 0.867   | 0.867   | 0.868   | 0.868   |

**Notes:** ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS on the full sample. In columns (2)-(5), Gini is interacted with dummy for restricted luxury firms sample, in columns (6)-(9) with dummy for extended-luxury firms, whereas columns (10)-(13) for dummy for all non-luxury firms in the sectors where the firms from extended luxury sample are present. The dependent variable is the log of average unit values charged by firm $f$ for product category $k$ in country $c$. The table investigates relation between variation of unit values across countries and within firm-product as a function of degree of income inequality at the destination market. Explanatory variables are degree of income disparity (Gini index), size of the economy (GDP), wealth of the economy (GDP per capita) and distance from France and average import price.

---

**Table 9:** Interaction term for luxury firms - Unit values of luxury exports and income inequality
<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luxury dummy</td>
<td>Colbert Colbert extended Luxury sectors</td>
</tr>
<tr>
<td>Sample:</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13</td>
</tr>
<tr>
<td>GINI</td>
<td>0.266-0.106 0.439 0.435 0.268-0.104 0.442 0.439 0.212-0.146 0.402 0.397</td>
</tr>
<tr>
<td>[0.529 [0.355 [0.280 [0.281 [0.531 [0.355 [0.280 [0.282 [0.520 [0.337 [0.266 [0.268</td>
<td></td>
</tr>
<tr>
<td>GINI x Lux</td>
<td>0.926** 0.854** 0.985** 0.986** 0.102*** 0.089*** 0.097*** 0.097*** 0.468** 0.363* 0.356* 0.360*</td>
</tr>
<tr>
<td>[0.367 [0.405 [0.424 [0.423 [0.014 [0.012 [0.012 [0.012 [0.218 [0.197 [0.191 [0.185</td>
<td></td>
</tr>
<tr>
<td>GDPcap</td>
<td>-0.103* 0.021 -0.088 -0.092 0.021 -0.088 -0.092 0.021 -0.087 -0.092</td>
</tr>
<tr>
<td>[0.057 [0.050 [0.053 [0.057 [0.050 [0.055 [0.057 [0.050 [0.055 [0.057</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.362*** 0.353*** 0.350*** 0.350*** 0.353*** 0.350*** 0.350*** 0.353*** 0.350*** 0.350***</td>
</tr>
<tr>
<td>[0.028 [0.030 [0.027 [0.027 [0.030 [0.027 [0.027 [0.030 [0.027 [0.027</td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>-0.220*** -0.264*** -0.264*** -0.264*** -0.264*** -0.264*** -0.264*** -0.264*** -0.264*** -0.264***</td>
</tr>
<tr>
<td>[0.058 [0.064 [0.063 [0.063 [0.064 [0.063 [0.063 [0.064 [0.063</td>
<td></td>
</tr>
<tr>
<td>ImportPrice</td>
<td>0.016 0.015 0.015 0.015 0.016 0.015 0.015 0.015 0.016 0.015</td>
</tr>
<tr>
<td>[0.017 [0.018 [0.018 [0.018 [0.018 [0.018 [0.018 [0.018 [0.018</td>
<td></td>
</tr>
</tbody>
</table>

Fixed effects: | Firm x Product |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>955,837 955,837 955,837 955,837 955,837 955,837 955,837 955,837 955,837 955,837 955,837 955,837</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.664 0.636 0.664 0.668 0.668 0.636 0.664 0.668 0.668 0.636 0.664 0.668 0.668</td>
</tr>
</tbody>
</table>

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Standard errors reported in the brackets are clustered by country. All variables are in log. All estimations use firm-product (CN8) fixed effects. Estimation is by OLS on the full sample. In columns (2)-(5), Gini is interacted with dummy for restricted luxury firms sample, in columns (6)-(9) with dummy for extended-luxury firms, whereas columns (10)-(13) for dummy for all non-luxury firms in the sectors where the firms from extended luxury sample are present. The dependent variable is the log of average unit values charged by firm f for product category k in country c. The table investigates relation between variation of unit values across countries and within firm-product as a function of degree of income inequality at the destination market. Explanatory variables are degree of income disparity (Gini index), size of the economy (GDP), wealth of the economy (GDP per capita) and distance from France and average import price.

Table 10: Interaction term for luxury firms - Exports of luxury exports and income inequality