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Demand for Luxury Goods in a World of Income Disparities [*] [†]

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Abstract

This paper approaches international trade in luxury goods from demand side. It associates demand for luxury goods with within-country income disparities, via a social interactions component, the so-called Veblen effect (Veblen 1899). In the theoretical part, we propose a simple model of vertical differentiation with preferences displaying a Veblen effect. The model predicts that demand for luxury goods increases with the income gap between the two socio-economic groups (wealthy and non-wealthy agents). Furthermore, wealthy individuals in societies with higher income disparities have higher incentives to purchase luxury goods and hence they are willing to pay more for these. Next, we provide an empirical validation of these predictions on a sample of French high-end exporters (as defined by Martin and Mayneris, 2013) from French 8-digit CN custom data for 2006 at firm-product-destination level. Both demand for and average firm-product unit values of luxury goods are increasing with the income gap in 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, Luxury Goods, Veblen Effects

JEL Classification: F1, F14, L13, L15

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1 Introduction

Trade patterns of luxury goods differ from 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, 2013). Standard quality models of international trade, in the spirit of Burenstam 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[1] claim however the growing role of emerging economies as markets for luxury goods (ex. Bain 2012).[2]

Luxury items represent a very specific group of goods and their supply is addressed to particular type of consumers, consumers from the top of income distribution. Unlike necessities, individuals buy luxuries not only for their intrinsic quality but also to confirm social status (Veblen, 1899). By consequence, demand structure for luxury goods differs from demand structure for ordinary goods. Decision to purchase a luxury good depends, beyond preferences and income, on the purchase decision of the relevant others and hence on the socio-economic structure of society. Literature often associates demand for luxury goods with a desire of distinction, where individual valuation of a given good decreases as the number of purchasing it individuals increases (Leibenstein, 1950). Considering cross-country dimension of luxury market, one may expect that demand for luxury goods will be higher in societies with larger income disparity where a need to confirm one's social status is stronger.[3]

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 exception are Fontagné and Hatte (2013) who analyze exports of luxury goods on a sample of 176 countries and Martin and Mayneris (2013) who focus on French luxury firms.[4] Trade in luxury goods however keep confirming its global character with total sales continuing tow-digit growth and topping 200 billion of euro in 2012 (Bain, 2013). The subject gains also in importance in the context of the current debate on specialization of Northern economies in high quality production (see Fontagné et al., 2008).

Given particular character of luxury goods, one may expect that standard quality models of trade may represent rather a poor tool to analyse patterns of trade in these goods. The related consumption behaviour is a socio-economic phenomenon going beyond non-homothetic preferences. In order to understand the patterns of trade in luxury goods, one has to also take into account the factors of social interactions and

[1] http://www.nytimes.com/2011/06/25/business/global/25iht-luxury25.html?pagewanted=all$_r$ = 0

[2] Bain and Company's the 2012 Luxury Goods Worldwide Market Study states for instance that one-in-four global luxury consumers are now Chinese.

[3] If personal income is a private information and individuals know only general level of income and the proportions of wealthy people in the society, in order to confirm their status, individuals advertise their wealth by purchasing luxury items. Their incentive to do so will be higher, the higher is the gap between the two socio-economics groups in the society.

[4] See next section for a detailed description.

socio-economic composition of society. The present paper deals with this challenge.

We study purchase decision of luxury goods in a standard vertical differentiation approach into which we integrate a social interaction component, the Veblen effect. We look at a hypothetical economy divided into two classes of individuals, wealthy and non-wealthy agents, who decide whether to purchase a luxury good or not. The utility that they derive form this purchase decreases as the number of people buying this good increases. In addition, consumers care not only about the overall number of luxury buyers but also about their identity. More precisely, an individual is affected more negatively by purchase of luxury good by a non-wealthy agent than by the same purchase done by a wealthy one. This corresponds to the effect of reference group, a concept widely studied in social economics.[5] Further, we allow the luxury firm to export its goods to a country with larger income disparities. The model predicts that demand for luxury good increases with income gap between the two socio-economic groups on destination market. In addition, individuals in a society with larger income disparities are willing to pay more for luxury goods. The higher willingness to pay in countries with higher income disparities is reflected in higher prices of luxury goods in these countries.

Next, we test the predictions our model on French exports of high-end goods using highly disaggregated (8-digit Combined Nomenclature) firm-product-destination French custom data for 2006. We follow Martin and Mayneris (2013) in identifying high-end producers among French exporters.

Using unit values and total value of exports from one hand side, and Gini index as a proxy of income gap from the other, we confirm the predictions of our model. Both unit values and the quantity of luxury exports increase with the income gap at the destination market. The relation is robust to the inclusion of control variables such as size and wealth of economy and bilateral distance. Similar results are found when we use an alternative measure of income gap, namely the income share of the top 20% of the population. The result is also robust to other controls We find also similar results when running the same exercise but using the number of millionaires and the number of millionaire per capita instead of the income gap. We provide by the same a potential demand-side explanation of the sky-rocketing sales of luxury goods in the emerging economies such as Asian, Middle East economies and BRIC countries (Bain 2012), i.e., countries diagnosed to experience an important increase in the degree of income disparity (OECD, 2012).

Our paper makes several contribution to the literature. On the theoretical side, (i) we are the first to our knowledge to introduce a social interaction (Veblen) component in a context international trade. (ii) Our simple model features a series of empirical and anecdotal regularities that have not been explained by the literature to the 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 an evidence of the importance of the

[5]See Section 2 for a literature overview.

within-firm variation of unit of luxury goods across destinations. (b) Second, we document the relation between variation in unit values of luxury goods and income gap, confirming by the same existence of Veblen effect.

The downside of our approach is however that we use mean unit values of product categories for individual exporters on each destination as a proxy of prices.[6] Despite the use of very detailed product categories, this is neither 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 characterised by higher income disparities. But in any case, we observe in our results a higher willingness to pay for quality goods in these markets. See Section 6 for further discussion.

The remaining of this paper goes as follows. Section 2 provides a large review of literature on social interactions driving consumers behaviour and trade in quality studied by different sub-fields of economics, business and sociology. Section 3 draws 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 discuss the results and the limits of measurement strategy. Lastly Section 7 concludes.

2 Motivation and Related Literature

Our paper relies on a cross-section of literatures on trade in quality, visible consumption and luxury goods studied in various sub-fields of economics, sociology and business.

Looking first at trade studies, only few papers deal with luxury goods. Moreover, despite a boom in research on trade in quality, most of the papers focus on the supply-side determinants (*inter alia* Flam and Helpman, 1987; Schott, 2004; Verhoogen, 2008; Fieler, 2011a; Fieler, 2011b). As for the demand-side studies, for a long time, most of the papers ignored the importance of non-homethecity of preferences, and thus of income distribution, focusing only on cross-country income differences as 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; or Choi et al., 2009).

[6]Note however that the use of mean unit values as a proxy of export prices is a conventional wisdom in the trade literature. We discuss further the limits of this approach in the Section 6.

The two papers the most closely related to ours are, Fajgelbaum et al. (2009) and Latzer and Mayneris (2012). They both associate demand for quality goods with income inequality. Fajgelbaum et al. (2009) in a vertically differentiated model, they assume heterogeneous consumers in terms of wealth facing a unit consumption choice. They show that an increase in the average income, at 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 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. They find in a gravity approach that imports of what they define as luxuries increase with importing country inequality and imports of necessities decrease with it.

Turning to the studies on trade in luxury goods, to our knowledge, only two papers can be cited. Martin and Mayneris (2013), using French export data, find that luxury exporters are more sensitive to income per capita and less sensitive to distance. In addition, they report also an important reshuffling in high-end exports toward emerging economies. Their focus is however on the macroeconomic implications of specialization of developed countries in high-end production and they do not look at the demand side determinants. Fontagné and Hatte (2013) compare export performances of high-end and low-end varieties on a sample of 176 countries. Consistently with Martin and Mayneris (2013), they find that trade in high-end products decreases less with distance than trade in low-end product. Moreover, they show that for countries associated to famous and big luxury brands (peculiarly Italy and France) exports of high-end products increase with the wealth of destination country.

While international economics consecrates little attention to high-end goods, trade in luxury gains in importance at the global stage with total sales reaching over 200 billion euro in 2012 (as compared to 131 billion in 2001) (Bain (2012)). Moreover, a study of demand drivers of luxury trade appears important in the context of specialization of Northern economies in high-end production (see Fontagné et al., 2008).

More importantly, our paper is also related to the abundant literature on visible consumption vastly studied in various fields of economics, sociology and marketing. The seminal book of Veblen (1899) refers the to idea that individuals advertise their wealth through consumption. Hence, 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.[7] The concept was further developed to a signalling model with social

[7]While Bagwell and Bernheim, 1996 study the theoretical conditions under which a Veblen effect arises, Becker

norms components (Corneo and Jeanne, 1997).Next to the literature on luxury goods, the Veblen effect in economics can also be found in the studies on expenditure decision (Duesenberry, 1949),[8] saving rate (Kosicki, 1987),[9] or self-reported happiness (Luttmer, 2005).[10] It was also widely studied in sociology, with works of Simmel (1998), Goblot (1925) and Bourdieu (1979), among others.

In business and marketing, studies on luxury goods represent a field apart. Marketing research consecrate a voluminous literature to 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 the decisive role of status-seeking behaviour, and not of intrinsic quality, as driver of demand for luxury goods. The importance of Veblen effect finds also its confirmation empirically. Chao and Schor (1998) investigate the existence of 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 favored in the pattern of brand buying.[11]

Therefore, it seems relevant to introduce this component into a study of demand-side determinants of luxury trade in a context of vertically differentiated industries.

3 The Model

Consider a domestic economy populated with two kinds of individuals, wealthy (R) and non-wealthy (P) people , of the same mass equalised to unity. Next, assume that individuals of the two groups differ in their income or willingness to pay, θ_i, where $i = \{R, P\}$, with wealthy individuals having higher income than non-wealthy ones, $\theta_R > \theta_P$.[12] The income of a non-wealthy individuals can be also expressed in a form $\theta_P = \lambda\theta_R$, with $\lambda < 1$ standing for the inverse measure of income gap between the two social groups.

et al. (2000) argue that consumers may have an incentive to gamble in order to change their relative wealth position.

[8]Duesenberry (1949) argues that in the expenditure decision, 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".

[9]Decision taken relatively to the other had 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 save differently depending on his income rank i.e. depending on the socio- economic environment in which he lives.

[10]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.

[11]As more visible cosmetics, Chao and Schor (1998) define cosmetics that women tend to use more often in public, like p.ex. lipsticks, that may be taken out at restaurants, on subway, or powder rooms to the opposite with products such as facial cleaners that usually remain left at home.

[12]Note that the willingness to pay is also interpreted as marginal rate of substitution between quality and income. Therefore a higher θ 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.

Assumption 1. *Individual income is a private information. Agents observe only overall consumption level in the economy. In addition, they also know values of* θ *and* λ*.*

In other worlds, individuals do not know who in the population is wealthy 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 by an one good case, where individuals have a choice between purchasing one unit of luxury good or purchasing nothing at all. Later in Section, we look also at the duopoly case, where individuals chose between vertically differentiated goods.

The utility of purchasing nothing is simply the income (θ_i). Purchasing a luxury good gives to an individual following utility:

$$U_i = \theta_i q - p - z_i \tag{1}$$

where p is the price of luxury good of a quality q and z_i is the Veblen effect, $z_i = a_i\mu_R + b_i\mu_P$ with μ_i number of individuals of type i purchasing a luxury good and a_i, and b_i parameters capturing size of the Veblen effect. The utility from purchasing a luxury good is assumed to be decreasing with the number of luxury buyers, $a_i, b_i > 0$. In addition, we impose that individuals care not only about the overall number of buyers of luxury good but also about buyers identity. More precisely, they are affected differently by the number of wealthy and by the number of non-wealthy buyers, $a_i \neq b_i$. This corresponds to the effect of reference group, well known in the social economics literature. If individual does not make any purchase, her utility simply equals her income. Further, we introduce three additional assumptions on the parameters of the Veblen effect.

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

(i) $b_i > a_i$

(ii) $a_R > a_P$ *and* $b_R > b_P$

(iii) $a_R b_P > a_P b_R$

The first two points of the assumption 2take into account the assumed social interaction shaping the consumption behavior. (i) implies that individuals of both groups are affected more negatively by a purchase of luxury good by a non-wealthy than by a wealthy individual. (ii) refers to the higher sensibility of wealthy individuals to the number of luxury buyers. Rich are affected more negatively than non-wealthy by the overall number of wealthy buyers, $a_R > a_P$ and they are also affected more negatively

by the number of non-wealthy buyers, $b_R > b_P$. Wealthy are more sensitive to the purchase of luxury goods by the other individuals and they are especially affected more negatively by the purchases made by individuals belonging to the non-wealthy class in the society. Lastly, (*iii*) ensures the resolvability of the model. Notice that it holds when $a_P < 0$. In this case, non-wealthy are affected positively by the number of wealthy purchasing a luxury good. This would correspond to a conformist, or imitating, behaviour of non-wealthy, known in the literature as the bandwagon effect.

3.1.1 Autarky

We find demand for luxury goods of each type of individuals from equilibrium where each individual of the same type obtains the same payoff. Namely, as $U_i(q)$ is a decreasing function of μ_i and utility of consumers who buy nothing is independent of these proportion, there exists a unique equilibrium defined as a pair (μ_R, μ_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 wealthy and non-wealthy are simply the proportion of each type that buys the luxury good. They are respectively:

$$\mu_R = \frac{\theta q(b_P - \lambda b_R) - p(b_P - b_R)}{b_P a_R - b_R a_P} \tag{2}$$

$$\mu_P = Max\left\{0; \frac{\theta q(\lambda a_R - a_P) - p(a_R - a_P)}{b_P a_R - b_R a_P}\right\} \tag{3}$$

It can be immediately noticed that the number of wealthy buyers is increasing with income disparity while the opposite holds for the number of non-wealthy buyers. Taking first derivatives of the demand functions with respect to price, we find that demand for luxury good of rich individuals is increasing with its price, $\frac{\partial \mu_R}{\partial p} > 0$, while the opposite holds true for the non-wealthy, $\frac{\partial \mu_P}{\partial p} < 0$. This propriety is characteristic for luxury goods.

We turn now to the firm problem. A monopolist sets price of luxury good in order to maximize his profits. For the sake of simplicity, we equalize marginal cost of production to zero.[13] Hence the profit function of the firm simply equals to $\pi = p(\mu_R + \mu_P)$ and the producer of luxury good sets price equal to:

$$p = \frac{\theta q[b_P - a_P + \lambda(a_R - b_R)]}{2(b_P - b_R + a_R - a_P)}. \tag{4}$$

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. *Price of the luxury good increases with degree of income disparity in the economy.*

[13]Note that we could alternatively add a production cost such that the marginal cost will be increasing with quality of the good. That would not however affect the main predictions of the model.

Proposition 1 states that the producer of luxury good sets higher price for its good, the higher is the income gap between the two types of individuals in the economy. This prediction will be discussed in details in the next sub-section, for an open economy case.

In what fallows, 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 the equation (2) and the equation (3), we obtain the quantities of luxury good sold to each of the socio-economic groups:

$$\mu_R = \frac{\theta q(1-\lambda)}{a_R - a_P}, \qquad \mu_P = \frac{\theta q[(a_R - a_P) - b(1-\lambda)]}{2b(a_R - a_P)} \tag{5}$$

and the total demand for luxury good is:

$$\mu = \frac{\theta q\left[(a_R\lambda - a_P) + b(1-\lambda)\right]}{2b(a_R - a_P)} \tag{6}$$

Taking first derivatives of the equation (6) with respect to income gap, it can be easily shown that the overall number of buyers of luxury good is increasing with degree of income disparity in the economy, $\frac{\partial \mu}{\partial \lambda} < 0$, since $b_R > a_R$.

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

Propostions 1 and 2 are crucial to our analysis as they draw relation between income gap and demand for and price of luxury goods. They reflect also the series of stylised facts described in Section 2 which represent the motivation for our study.

3.1.2 Open Economy

We look now at the open economy case. We allow domestic luxury producer to export her goods to a Southern economy at a given transport cost τ. Preferences are the same in both countries. Income gap between the two socio-economic classes 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 producer to set different prices on different markets. She 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 and quantities sold of luxury goods. 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, luxury seller will face higher demand, $\mu^* > \mu$. Thus, prices on the more unequal market is higher than on the domestic market, $p^* > p$. Notice that price of luxury goods increases with income gap independently on transport costs.

Proposition 3. *Both prices and demand of luxury goods are higher on a market with larger income gap, all others things remaining equal.*

Proposition 3 states that both demand for luxury goods as well as their prices are increasing with degree of income disparity between the two socio-economics classes in the economy. Luxury producer sells then more goods and at higher prices on more markets with larger income gap.

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 the purchase decision of the luxury good. Predictions of the two-goods variant of the model are analogous to the one-good specification, with an additional effect resulting form differences in qualities between luxury and higher quality goods. The model predicts that price of luxury good increases with this gap.

Individual 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. Purchasing different types of goods reports to individual of type i following utility:

$$U_i = \begin{cases} \theta_i q_A - p_A - z_i - \theta_i & \text{if purchases } A \\ \theta_i q_B - p_B - \theta_i & \text{if purchases } B. \end{cases} \tag{7}$$

where q_j stands for the quality of the good 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, so we eliminate the possibility of no-purchase.

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 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 wealthy and non-wealthy individuals purchasing luxury good as a function of prices, respectively:

$$\mu_R^A = \frac{\gamma\theta_R(1-\lambda)}{\delta} \ , \quad \mu_P^A = \frac{\gamma\theta_R\left[\lambda a_R - a_P\right] - \delta(p_A - p_B)}{b\delta} \tag{8}$$

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 luxury good in the duopoly case is analogous to the one in the monopoly case with an additional component of difference in qualities of the two goods. Looking at the demand of wealthy individuals, 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 4. *Demand for luxury good of wealthy individuals is increasing with 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:

$$\mu^A = \frac{\gamma\theta_R\left[b(1-\lambda) + \lambda a_R - a_P\right] - \delta(p_A - p_B)}{b\delta} \tag{9}$$

Next, we obtain the number of purchasers of good B by subtracting the number of buyers of A form the total number of individuals in the economy:[14]

$$\mu_R^B = 1 - \mu_R^A = \frac{\delta - \gamma\theta_R(1-\lambda)}{\delta} \ , \quad \mu_P^B = 1 - \mu_P^A = \frac{b\delta - \gamma\theta_R(\lambda a_R - a_P) + \delta(p_A - p_B)}{b\delta} \tag{10}$$

The overall demand for good B is:

$$\mu^B = \frac{2b\delta - \gamma\theta_R[b(1-\lambda) + \lambda a_R - a_P)] + \delta(p_A - p_B)}{b\delta} \tag{11}$$

3.2.2 Open Economy

Turning to the firm side, we have a standard duopoly problem with vertical differentiation. Consider that firm A as luxury exporter selling its goods in a foreign economy where it faces a local producer of

[14] Notice that here both masses are normalized to unity.

higher quality good B. Firms A and B solve respectively following programs:

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

$$\max_{p_B} \pi_B = p_B \mu^B$$

with τ corresponding to the transport cost of exporting good A to the foreign market. Each firm sets profit maximizing prices taking the other firm prices as given. In such a model, it is usual to have prices, as best response functions, to be strategic complement.

$$\begin{cases} p_A(p_B) = \frac{\gamma\theta_R[b(1-\lambda)+\lambda a_R - a_P)]+\delta\tau+\delta p_B}{2\delta} \\ p_B(p_A) = \frac{2b\delta-\gamma\theta_R[b(1-\lambda)+\lambda a_R - a_P)]+\delta p_A}{2\delta} \end{cases} \Leftrightarrow \begin{cases} p_A = \frac{\gamma\theta_R[b(1-\lambda)+\lambda a_R - a_P)]+2\delta(b+\tau)}{3\delta} \\ p_B = \frac{4b\delta-\gamma\theta_R[b(1-\lambda)+\lambda a_R - a_P)]+\delta\tau}{3\delta} \end{cases}$$

Since prices are strategic complement in this types of models, both prices are increasing in trade cost. Taking first derivatives of price of the luxury good with respect to the income gap, we obtain $\frac{\partial p_A}{\partial \lambda} = \frac{\theta_R\gamma(a_R-b)}{3\delta} < 0$ along with Assumption 1. $b > a_R$. This condition is sufficient at a given θ_R. Then lowering λ tends to lower average income.[15] A way to keep average income the same when income gap raises is to increase θ_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 function for the luxury good.

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

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

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

Proposition 5. *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.*

[15] Average income is simply $(\theta_R + \theta_P)/2$

The sufficient condition for the demand for and 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 stronger will be the difference between the two types of quality goods in the economy, (rich) individuals will have stronger incentive 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 costums 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 form 2006 reporting the volume of exports to the French customs become non-compulsory.[16]

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 custom data, we follow Martin and Mayneris (2013) 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.[17] See Martin and Mayneris (2013) for a detailed description of the identification strategy.[18] 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 custom data do not report export prices directly, they can be however proxied by calculating unit values

[16] Martin and Mayneris (2013) report that with this new regulation, the rate of missing information on volume of exports rose in 2006 form 1% as compared to the previous years, and over 30% in the period after.

[17] This refers to all the firms charging prices at least as high as the firms from the narrow list.

[18] We are thankful to Julien Martin and Florian Mayneris for providing us the list of the HS6 sectors that they define as luxury.

form 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, UV_{fkc}, are calculated in the standard way, as the ratio of export value to the quantity exported.[19]

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 ($p^{med}_{k,DEU}$).[20] 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 form the domestic French prices.

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. 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 form Eurostat, for other countries in our sample we combine data form 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.

Next to the income gap measures, we use also data on number of millionaires per country published by Boston Consulting Group. We use additionally several control variables from different sources. Bilateral distance comes from CEPII. Income and income per capita (PPP) data come from World Development Indicators 2009. We also compute average unit values per destination using BACI database provided by CEPII.

[19] i.e. $UV_{fki} = \frac{V_{fkc}}{Q_{fkc}}$, where V_{fkc} and Q_{fkc} stand respectively for value and quantity of product k exported by firm f to the country c.

[20] i.e. $uv.diff_{fki} = uv_{fki} - uv^{med}_{k,DEU}$.

5 Empirical Strategy and Results

5.1 Descriptive Statistics

Before investigating in details the relation between within firm-product unit values and income gap, we look closer first at the within firm-product variation of unit values itself. As discussed in the previous section, in the case of luxury goods, variation of the unit values for the same firm-product categories may be a result of different phenomena. Either it can be due to a large variation in quality/exclusivity and hence prices of different luxury products classified into the same narrow category, like handbags or necklaces, or to strategic pricing of luxury companies. Given a large variation in price of different quality variants of similar products, 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, the variation in unit values across destination and within firm-product categories 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).

Thus, a 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 fallowing expression is computed:

$$\sum_{f,c}(uv_{fc} - \bar{uv})^2 = \sum_{f,c}(uv_{fc} - uv_f)^2 + \sum_{f}(uv_f - \bar{uv})^2 + 2\sum_{f}(uv_{fc} - uv_f)(uv_f - \bar{uv})$$

with uv_{fc} export unit value of firm f charged in country c, $\bar{uv}$ average unit value of a given CN8 product category and finally uv_f standing for average unit value charged by the firm. Hence, unit value variation with respect to the average CN8 unit value (LFH) 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 three samples, *(i)* restricted list of luxury exporters, *(ii)* all firms in the sectors where luxury firms are present and *(iii)* total French exports. While for the latter two samples, for a median product the between firm-product variation counts on average for about 67%, for the firms from the extended list

this variation counts for 93%.[21] 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 form 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 doing any econometrics, one can conclude that trade in luxury goods may be driven by other factors than these affecting trade in ordinary goods.[22]

5.2 Estimated Equation

The main prediction of our model is that unit values of luxury exports are higher on markets with larger income disparity. In the econometric approach we test the following equation:

$$uv_{fkc} = \alpha IncomeGap_c + \beta controls_c + \mu_{fk} + \epsilon_{fkc}$$

where uv_{fkc} corresponds to the log average unit value charged by firm f on product k exported to a country c and $IncomeGap_c$ is a degree of income disparity in country c as measured by Gini index or alternatively by the share of the top 20 wealthiest people in the population. Controls include logs of GDP, GDP per capita and bilateral distance. μ_{fk} corresponds to firm-product fixed effects and ϵ_{fki} is the error term. In addition, we control for the degree of competition on the destination market by taking average unit values of exports per HS6 product-category. The average unit values are calculated form BACI database provided by CEPII. α is our coefficient of interest. Its positive sign means that unit values of exports increase with income gap in the importer country. As mentioned above, we use two different dependent variables, log of unit values and and log of differential in unit values with respect to the median unit value of the product category charged in the reference country as described in the previous sub-section.

[21] Similar results were obtained when we took the extended list of luxury exporters.

[22] In this paper, we concentrate closely on the demand factors that may influence the trade patterns of luxury consumers. Martin and Mayneris (2013) 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 Unit Values of Exports and Income Gap

Table 4 presents results of the baseline estimation. The logarithm of average unit value is regressed on the logarithm of Gini index for the three sub-samples of firms, the restricted luxury firms (columns 1 to 4), the extended luxury firms (columns 5 to 8) and finally all the 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 dispersion has a positive and very significant effect of export unit values. As expected, this effects is bigger for restricted list of luxury exporters than for the larger sample of the firms. 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. Column (2), (6) and (10) control additionally for the size and the wealth of the destination market by including income and income per capita. The coefficient for Gini index is slightly lower than in previous specifications, but it remains positive and significant. Both controls are insignificant, except for column (2) where income per capita is negative and significant at 10%. This is quite surprising and goes in the opposite direction to the prediction of our model, where the effect of income 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. 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 unit values, whereas the effect of income per capita is negative for luxury and extended-luxury firms. In the remaining set of columns, (3-4), (7-8) and (11-12), we additionally control for distance to the destination market. The relation between distance and within firm-product export unit values has recently attracted lot of attention of trade empirists. 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).[23] 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 distance shrinks the coefficient of Gini index to 0.19% and

[23] Among possible theoretical explanations of the positive relationship between unit values and distance, literature suggests quality sorting of product mix across destinations along with Alchain-Allen theorem (1954) or strategic pricing-to-market behaviour of exporters analyzed in industrial organization studies.

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. This result is consistent the numbers found by Martin (2012) on the the full sample of French exporters for 2003. 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 positive and significant for the overall sample of firms.

In Table 5, we run exactly the same set of estimations, but we use as dependent variable, instead of logarithm of unit value, the logarithm of the difference between the unit value 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 Gap

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 2013). 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 (2013) 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 gap. In order to test the validity of our model, we also use two alternative indicator of income disparity, namely the share of total income of the country held by the 20% richest people and the number of millionaires (in USD) per capita in the economy).

The share of top 20% richest from World Bank is available only for a limited number of countries[24] and our sample shrinks to 126 204 observations. These 34 countries for which the measure is available represent however over 93% of the total value of exports of luxury firms. Our alternative measure of income gap confirms the results found previously using Gini index. The coefficients of top 20 income share are higher but they have lower level of significance. For the luxury firms, the coefficient is no more significant 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, also limits considerably our sample, as it is available only for 26 countries,[25] See Table 3 for rankings of top 20 countries in terms of absolute and relative number of millionaires. We find however among these 26 countries all top 10 destination of French luxury exports done by extended-luxury firms and reported in the Table 2. Table 8 presents the results of estimation of the relation between number of millionaires per 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 0.07% increase in the average unit values of exports per firm-product category.

[24]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.

[25]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.

To our surprise, the coefficients are non-significant in the regressions without controls for the two remaining samples (columns 4 and 7). They become however significant when we add the controls (columns 5, 6 and 8, 9). More interestingly, the coefficient of the number of millionaires increases as we expand the sample to the extended luxury firms and it almost doubles for the sample of all the firms in sectors where luxury is present (column 9). This may be due to either a higher general level of prices in these economies,[26] or to the fact that these economies, as more wealthy ones, import also higher quality *ordinary* (as opposite to luxury) goods.

6 Discussion of the Results - Measuring Veblen Effect

The dependent variable in our study is the price of luxury exports at firm-product-destination level. French custom data do not however report export prices directly. The conventional wisdom is to proxy prices with unit values calculated form quantities and values of exports available in the dataset. Nevertheless in our study, we are very careful as for the interpretation of our results related to unit values. In particular we do not dare to associate directly unit values with *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 however as not relevant for luxury goods, as a luxury brand may charge very different prices for products classified to the same very narrowly defined category.

We illustrate this with the example of one of major French luxury firms and one of its flagship product, a medium size leather handbag. The basic version of this bag, 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 custom data, these three version of the handbag will be all classified into 42022100 of CN8, *Handbags, whether or not with shoulder straps, including those without handles, with outer surface of leather, composition leather or patent leather*, i.e., to the same category as all other models of company's medium size handbags. This example shows clearly at which point proxying prices of luxury goods by unit values can be misleading, even when using a nomenclature on a highly disaggregated level.[27]

In the empirical exercise, we find a positive relation between unit values and within-country income disparity. This can be related to two different phenomena. (*a*) First, on markets with larger income disparities, luxury producers may sell relatively more of expensive products, i.e. goods of higher quality,

[26] For instance, Hong Kong and Singapore are known to be more expensive countries relatively to the neighbouring economies.

[27] A 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.

or rather higher degree of exclusivity (these diamond hardwares on luxury bags). (b) Second, luxury firms may use pricing-to-market strategies. While anecdotal evidence provides various examples of both phenomena,[28] our data do not allow us identifying which of these two prevails.

However, luxury goods are often purchased for prestige independently from their intrinsic quality and this prestige and exclusivity of luxury goods are presumably reflected in their prices. Therefore, higher unit values of luxury exports (whether they result form (a) or (b)) in countries with higher income disparities, 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 countries, exactly as suggest our our theory. Hence, we take this positive relation between income gap and unit values as the evidence confirming the existence of Veblen effect on a macroeconomic level.

7 Conclusion

This study approaches trade in luxury goods form the demand side. Through this paper we put emphasis on the importance of income disparities (via social interactions Veblen component) as a driver of demand for luxury goods. We proposed a simple model of trade in luxury goods where we introduced the Veblen effect to otherwise standard model of vertical differentiation. With the Veblen effect, utility that an individual derives from consumption of a good depends not only on the intrinsic quality of the good but also on the number and the identity (i.e., social group) of purchasing it individuals. Our model predicts that demand for and unit values of luxury goods increase with degree of income disparity in the importer market. These predictions find their confirmation in the French export data of high-end producers. Using several alternative measures of income disparity, we find positive and significant relation between income gap in destination market and both, volume and within firm-product average unit values of exports.

[28] On one hand side, various anecdotal stories provide endless examples of "extremely" luxurious version of cars or *haute couture* dresses decorated with diamond 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 of Asian countries arguing that the price gap exceeds difference in taxation.

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Appendix

Table 1: Price Decomposition - Within and Between Firm-Product Variation

	Percenties:	5	25	50	75	95
Luxury firms	Within	0.27	0.73	0.93	1	1
	Between	0	0	0.03	0.24	0.89
Sectors with Luxury firms	Within	0.13	0.45	0.68	0.84	0.99
	Between	0.01	0.07	0.24	0.51	0.93
Total exports	Within	0.1	0.4	0.67	0.91	1
	Between	0	0.05	0.29	0.65	1.03

Notes: Table reports the contribution of within and between firm components to the unit values dispersion at the product category. For each CN8 category the fallowing is computed: $\sum_{f,c}(uv_{fc} - \bar{uv})^2 = \sum_{f,c}(uv_{fc} - uv_f)^2 + \sum_{f}(uv_f - \bar{uv})^2 + 2\sum_{f}(uv_{fc} - uv_f)(uv_f - \bar{uv})$, with uv_{fc} unit values of exports of firm f charged in the country c, $\bar{uv}$ average unit value of a given CN8 product category and finally uv_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 the three sub-samples, (i) luxury frims, (ii) sectors where luxury firms are active and finally (iii) the overall sample of French exporters.

Table 2: Top Destinations of French Exports

	Total Exports		Sectors with luxury		Extended-luxury		Luxury	
	Country	Exports	Country	Exports	Country	Exports	Country	Exports
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	202749.4	HKG	42703.71
5	BEL	2550942	ITA	222950.1	ESP	180647.6	GBR	35000.04
6	USA	2500866	BEL	210413.8	BEL	179249.2	CHE	31190.74
7	NLD	1408455	JPN	168143.1	JPN	163606.4	DEU	29606.32
8	CHE	827283.1	CHE	132977.5	CHE	125130.6	SGP	26089.79
9	CHN	769909.5	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

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 3: Ranking of countries by number of millionaires per capita

	Country	Millionaires (per capita)		Country	Millionaires (absolute)
1	Singapore	15.5	1	United States	5220000
2	Switzerland	9.9	2	Japan	1530000
3	Qatar	8.9	3	China	1110000
4	Hong Kong, China	8.6	4	United Kingdom	570000
5	Kuwait	8.5	5	Germany	400000
6	United States	5.5	6	Switzerland	300000
7	United Arab Emirates	5	7	Taiwan	280000
8	Taiwan	3.6	8	Italy	270000
9	Israel	3.4	9	Hong Kong, China	200000
10	Belgium	3.1	10	India	190000
11	Japan	3	11	Canada	180000
12	Bahrain	2.6	12	Singapore	170000
13	Ireland	2.3	13	Netherlands	170000
14	Netherlands	2.3	14	Spain	160000
15	United Kingdom	2.2	15	Belgium	140000
16	Oman	2.1	16	Australia	130000
17	Saudi Arabia	2	17	Saudi Arabia	90000
18	Denmark	1.7	18	Israel	80000
19	Australia	1.6	19	United Arab Emirates	50000
20	Canada	1.4	20	Kuwait	40000

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 4: Baseline equation - Unit values of luxury exports and income disparity

Dependent variable:	Unit Values											
	1	2	3	4	5	6	7	8	9	10	11	12
Gini	0.277***	0.256***	0.191*	0.227**	0.203***	0.209***	0.120*	0.125*	0.162***	0.170***	0.077*	0.045
	[0.078]	[0.094]	[0.103]	[0.102]	[0.065]	[0.073]	[0.067]	[0.066]	[0.051]	[0.050]	[0.045]	[0.040]
GDPcap		-0.043*	-0.036			-0.015	-0.005			0.015	0.033***	
		[0.022]	[0.023]			[0.016]	[0.016]			[0.014]	[0.012]	
GDP		-0.010	-0.008	-0.008		-0.012	-0.011	-0.011		0.002	0.003	0.003
		[0.012]	[0.012]	[0.012]		[0.008]	[0.008]	[0.008]		[0.007]	[0.006]	[0.006]
distance			0.023	0.023			0.035**	0.035**			0.045***	0.045***
			[0.020]	[0.020]			[0.014]	[0.014]			[0.015]	[0.015]
Gini x GDPcap				-0.036				-0.005				0.033***
				[0.023]				[0.016]				[0.012]
Fixed effects:	Firm x Products											
Sample:	Luxury firms				Extended-luxury firms				All sectors with luxury			
Observations	7,869	7,869	7,869	7,869	20,596	20,596	20,596	20,596	151,917	151,898	151,898	151,898
R-squared	0.814	0.814	0.814	0.814	0.863	0.863	0.864	0.864	0.841	0.842	0.842	0.842

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Standard errors reported in the brackets are clostured 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 5: Income disparity and difference form the median in unit values of luxury exports

Dependent variable:	Unit Value (difference form the median)											
	1	2	3	4	5	6	7	8	9	10	11	12
Gini	0.494***	0.448***	0.360**	0.473***	0.317***	0.325***	0.200**	0.234**	0.279***	0.252***	0.125**	0.153**
	[0.133]	[0.138]	[0.171]	[0.179]	[0.098]	[0.100]	[0.100]	[0.104]	[0.069]	[0.070]	[0.063]	[0.060]
GDPcap		-0.122***	-0.113***			-0.049**	-0.034			-0.049***	-0.028*	
		[0.037]	[0.037]			[0.024]	[0.023]			[0.018]	[0.016]	
GDP		-0.046***	-0.045**	-0.045**		-0.030***	-0.030***	-0.030***		-0.006	-0.005	-0.005
		[0.017]	[0.018]	[0.018]		[0.011]	[0.010]	[0.010]		[0.008]	[0.008]	[0.008]
distance			0.031	0.031			0.050**	0.050**			0.059***	0.059***
			[0.034]	[0.034]			[0.020]	[0.020]			[0.019]	[0.019]
Gini x GDPcap				-0.113***				-0.034				-0.028*
				[0.037]				[0.023]				[0.016]
Fixed effects:	Firm x Products											
Sample:	Luxury firms				Extended-luxury firms				All sectors with luxury			
Observations	5,99	5,99	5,99	5,99	18,684	18,684	18,684	18,684	80,358	80,346	80,346	80,346
R-squared	0.724	0.728	0.728	0.728	0.825	0.826	0.826	0.826	0.745	0.746	0.746	0.746

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clostured 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 disparity (Gini index)

Dependent variable:	Value of Exports											
	1	2	3	4	5	6	7	8	9	10	11	12
Gini	1.061*	2.205***	1.183***	0.736**	0.813	1.534***	0.679*	0.573	0.774	1.473***	0.695*	0.657*
	[0.620]	[0.588]	[0.406]	[0.364]	[0.691]	[0.479]	[0.396]	[0.353]	[0.670]	[0.469]	[0.386]	[0.350]
Distance		-0.386***	-0.179**	-0.179**		-0.311***	-0.215***	-0.215***		-0.303***	-0.217***	-0.217***
		[0.112]	[0.075]	[0.075]		[0.108]	[0.078]	[0.078]		[0.105]	[0.079]	[0.079]
GDPcap			0.448***				0.106				0.039	
			[0.109]				[0.099]				[0.087]	
GDP			0.490***	0.490***			0.359***	0.359***			0.349***	0.349***
			[0.061]	[0.061]			[0.038]	[0.038]			[0.035]	[0.035]
Gini x GDPcap				0.448***				0.106				0.039
				[0.109]				[0.099]				[0.087]
Fixed effects:	Firm x Products											
Sample:	Luxury firms				Extended-luxury firms				All firms in sectors with luxury			
Observations	14,632	14,632	14,632	14,632	239,03	239,03	239,026	239,026	370,351	370,351	370,328	370,328
R-squared	0.557	0.573	0.659	0.659	0.585	0.596	0.634	0.634	0.590	0.599	0.633	0.633

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clostured 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 luxuryt 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 7: Quantity of luxury exports and income disparity (top 20% richest)

Dependent variable:	Value of Exports								
	1	2	3	4	5	6	7	8	9
TOP20	0.426**	0.492**	0.266	0.306*	0.357*	0.149	0.269**	0.307**	0.188*
	[0.207]	[0.234]	[0.231]	[0.178]	[0.206]	[0.179]	[0.112]	[0.124]	[0.103]
GDPcap		0.070	0.085*		0.043	0.059		0.035	0.060*
		[0.051]	[0.048]		[0.040]	[0.036]		[0.032]	[0.030]
GDP		0.020	0.021		0.002	0.001		0.005	0.005
		[0.016]	[0.018]		[0.010]	[0.012]		[0.012]	[0.011]
distance			0.050**			0.052***			0.043***
			[0.020]			[0.017]			[0.015]
Fixed effects:	Firm x Products								
Sample:	Luxury firms			Extended-luxury firms			All firms in sectors with luxury		
Observations	6,196	6,196	6,196	16,639	16,639	16,639	126,203	126,203	126,203
R-squared	0.823	0.823	0.824	0.875	0.875	0.875	0.858	0.858	0.859

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clostured 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 8: Unit values of luxury exports and number of millionaires (USD) per capita

Dependent Variable	Unit Value								
	1	2	3	4	5	6	7	8	9
Millionaires per capita	0.055***	0.098***	0.068**	0.006	0.082**	0.090***	0.018	0.089**	0.119***
	[0.014]	[0.026]	[0.029]	[0.015]	[0.035]	[0.030]	[0.014]	[0.034]	[0.030]
GDPcap		-0.120**	-0.054		-0.016	-0.013		0.011	0.012
		[0.057]	[0.063]		[0.030]	[0.035]		[0.036]	[0.027]
GDP		0.039	0.026		-0.071*	-0.090**		-0.068*	-0.107***
		[0.024]	[0.025]		[0.035]	[0.033]		[0.035]	[0.034]
Distance			0.071***			0.074***			0.079***
			[0.017]			[0.012]			[0.013]
	Firm x Product								
	Luxury			Extended luxury			All firms in sectors with luxury		
Observations	4,769	4,682	4,682	13,828	13,561	13,561	99,061	98,107	98,107
R-squared	0.807	0.809	0.811	0.876	0.877	0.879	0.873	0.874	0.876

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. Robust standard errors reported in the brackets are clostured 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.