

Income fosters cultural diversity ... up to a point

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Abstract:

Increasing purchasing power is likely to influence the diversity of imports through its impact on the intensive and the extensive margin of trade. A positive correlation of income with the diversity of imports would be worrisome as it would imply a decrease in consumer's welfare as well as a reduction in innovation. These questions are even more compelling in the audiovisual sector, as trade is a contentious issue and there exists fears of cultural homogenization with increasing purchasing power. To address these questions, this paper provides a comprehensive analysis of the relationship between per capita income and the geographical diversity of imports of cultural goods and services relying on the predictions derived from a heterogeneous firms framework. Two dimensions of diversity are investigated: the number of geographical origins (extensive margin) and the distribution of audiovisual imports across exporters (intensive margin). The results evidence a positive correlation of income with the number of sources but also with more concentration on the most efficient origins. The empirics also confirm the existence of a nonlinear relationship between income and the extensive margin in latter stage, implying that importers restrict the variety of import sources passed a certain income threshold.

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1 Introduction

Trade data reveals that a small number of source countries account for the bulk of imports for almost all commodities: the top five partners frequently represent 50 per cent or more of the total value of imports (and interestingly, more than that of total exports)¹. This high concentration across origins of the imports can be worrisome as economists have long emphasized the importance of the diversity of imports as it not only increases the welfare of consumers that have a taste for variety, but it also stimulates innovation and productivity and provides an insurance against shocks affecting a specific exporter. Therefore, studying how this concentration evolves is a relevant question, especially when the purchasing power, and thus the consumption bundle, of individuals expands. Recently, a number of trade economists have incorporated the influence of income in the explanation of trade patterns in existing trade models² evidencing its positive impact on the number of products or origin of the imports but disregarding its influence on the *concentration* of imports. This paper investigates how income influences the diversity of imports relying on theoretical predictions derived from a trade model with heterogeneous firms applied to data about imports of audiovisual products.

Jaimovic (2012) and Parteka and Tamberi (2013) both analyzed empirically the impact of income on the concentration of import flows relying on highly disaggregated panel trade data. Jaimovich (2012) showed that as income rises, the concentration of imports across geographical origins decreases and flows originating from more distant market increases. Parteka and Tamberi (2013) also evidenced a negative impact of income on the concentration of imports across products relative to the world structure of trade. Our study contributes to this literature through the derivation of theoretical predictions about the impact of income on the diversity of imports. Furthermore, I use a broader definition of diversity to disentangle the effect of income on two dimensions: the number of origins and the concentration of flows across origins. In addition, the model provides a theoretical explanation for the existence of a nonlinear relationship between income and the diversity of imports that has been shown only empirically in these previous studies. I apply these predictions to the cultural sector for which the diversity of imports is a sensitive issue in international trade agreements³. This is another contribution of the paper: I provide results on the influence of income on the diversity of the cultural imports bundle to confront existing fears about cultural homogenization correlated with economic development using an original dataset combining both goods and services imports.

I apply the Helpman-Melitz and Rubinstein (2008) model to describe trade in cultural goods as this

¹See Panagariya and Bagaria (2013) that provides highly detailed stylized facts about the concentration of trade across products and partners for 33 countries in the early 2000.

²Whether in a Ricardian setting (Fieler, 2011, Hopenstrick and Tarasov, 2012), in a Heckscher-Olin model (Markusen, 2013), in a Krugman framework (Foellmi, Hopenstrick and Zweimuller, 2010, Sauré, 2012) or within the Melitz model (Simonovska, 2015).

³As an illustration of the tensions surrounding trade in cultural goods, in 2007, 121 countries, but the United States, ratified the UNESCO convention on the promotion and protection of cultural expressions according to which cultural goods and services deserve a specific treatment due to their dual “economic and cultural nature, because they convey identities, values and meanings, and must therefore not be treated as solely having commercial value”.

framework is the most appropriate to explain the absence of trade flows across many country pairs as well as the selection of artists into export markets (Ferreira and Waldfogel, 2013)⁴. Therefore, I am able to develop new stylized facts about the relationship between per capita income and diversity in cultural imports. Though the predictions of the model could be applied to any economic sector with heterogeneous products, the implications in terms of diversity of imports are far more compelling for the cultural sector, as the composition of imports remains a highly controversial matter, recently corroborated by the exclusion of that sector during the Transatlantic Trade and Investment Partnership discussions. I apply these theoretical predictions to audiovisual trade data, of both goods and services, from 1998 to 2012. It is to our knowledge the first study about cultural trade that combines data about both goods and services, which is increasingly relevant in the context of the growing digitization of the sector. The basic results are as follows: income leads to a diversification of imports sources consistent with the predictions of the model whilst there is an increasing concentration of imports on the most efficient partners. In addition, the results also evidence the existence of a nonlinear relationship at the extensive margin that is a reconcentration on a smaller number of partners in latter stage.

The paper is organized as follows: the theoretical predictions are exposed in section 2. The data and the empirical strategy are presented in section 3. The relationship between income and diversity in cultural trade is investigated in section 4 and section 5 concludes.

2 Theoretical predictions

In order to derive predictions about the impact of increasing income on the variety of imports, I rely on a model that explicits the process of firm selection into exports as a function of income in the destination country, and that allows the number of exported varieties to vary across countries. Furthermore, as highlighted by Hanson and Xiang (2011) and Ferreira and Waldfogel (2013), the characteristics of the audiovisual industry are better represented using an heterogeneous firms framework: fixed cost matters, artists differentiate their product and not all varieties produced by one country are exported. Therefore, I rely on an heterogenous firms framework using a truncated Pareto distribution as it is done in Helpman, Melitz and Rubinstein (2008) model, HMR hereafter. The use of a *truncated* Pareto instead of the usual unbounded distribution is consistent with the empirical evidence that not all countries may export and the number of profitable exporting firms varies across exporters. More importantly, this truncation implies that the characteristics of the importing countries, including the level of income, matter in the selection of imported varieties. Accordingly, I replicate the basic features of their model,

⁴Indeed, the most recent economic analysis about audiovisual trade have relied on the heterogeneous firms framework: Hanson and Xiang (2011) to describe US motion pictures exports, Ferreira and Waldfogel (2013) to analyze music flows and Hellmanzik and Schmidt (2015) to study trade in audiovisual services.

using the same notation, that I apply to the cultural good case (through the definition of a cultural good-specific sub-utility function and the reinterpretation of trade costs), and derive from it the relevant predictions to answer the research question: what is the impact of an increase in income on the geographical diversity of imports?

2.1 HMR setup in the cultural good context

Consumers

In a world with J countries, the utility derived from the consumption of a good is given by the following sub-utility function (in a general homothetic system of preferences with constant income shares). Here, I focus solely on the consumption of audiovisual products, therefore I consider a sub-utility function. I assume that a constant income share κ is devoted to the consumption of cultural goods: as income rises, individuals do not increase the portion of their income devoted to cultural goods consistent with both theoretical (Becker, 1965) and empirical evidence (Seaman, 2006). Hence, for simplicity sake, I can omit hereafter the scalar κ . The sub-utility function is defined as follows:

$$u_j = \left[\int_{l \in B_j} x_j(l)^\alpha dl \right]^{1/\alpha}$$

where $x_j(l)$ is the consumption of variety l , B_j the set of variety available in country j and α , which is comprised between 0 and 1, determines the elasticity of substitution across varieties $\epsilon = \frac{1}{1-\alpha}$. Consumers maximize their utility under a budgetary constraint with Y_j the expenditure level of j (equal to the income).

Therefore, the demand for variety l in country j is given by :

$$x_j(l) = \frac{p_j(l)^{-\epsilon} Y_j}{P_j^{1-\epsilon}} \quad (1)$$

with $p_j(l)$ the price of variety l in country j and P_j the ideal price index in j defined as follows:

$$P_j = \left[\int_{l \in B_j} p_j(l)^{1-\epsilon} dl \right]^{1/1-\epsilon} \quad (2)$$

Firms

Each country has N_j firms that each produces a distinct variety, hence there are $\sum_{j=1}^J N_j$ varieties in the world. A firm, or an artist, in country j produces one unit of a variety with a cost equal to $c_j a$, where $1/\alpha$ represents the productivity level of the firm, or the artist, and c_j the cost in j that is country-specific. Productivity level $\frac{1}{a}$ is distributed following a truncated Pareto distribution with support $[a_L, a_H]$ and is the same across countries: such that $G(a) = \frac{a^k - a_L^k}{a_H^k - a_L^k}$ with k the shape parameter ($k > \epsilon - 1$). When a firm wants to sell in another country i it has to bear additional costs: f_{ij} a fixed cost for exporting to i and τ_{ij} a bilateral trade cost.

The second adaptation of the HMR to the audiovisual good context resides in the interpretation of bilateral trade costs. I apply Hanson and Xiang's definition of costs (2011) that is not only relevant for the audiovisual sector but also to describe costs for both goods and services: the variable trade costs τ_{ij} (variable as it depends on the number of copies provided and the length of distribution) includes additional fees imposed on foreign revenues, "transaction costs in negotiating contracts" between distributors and exhibitors, advertising and printing expenses. Fixed costs for exporting f_{ij} are incurred from the allocation of the right to distribute a movie or a show in a given country, the cost of setting an international marketing campaign, the editing for a foreign public and adding subtitles to movie dialogues.

As monopolistic competition is assumed, I can write the standard markup pricing equation and define the price paid in i for variety l produced in j as follows:

$$p_j(l) = \tau_{ij} \frac{c_j a}{\alpha} \quad (3)$$

All N_j firms are able to sell in the domestic market, however only a subset can cover the fixed cost of exporting and sell in market i . More precisely, only firms with $a < a_{ij}$ find it profitable to export to i , with a_{ij} the productivity threshold characterizing the least productive firm from j that can export to i that is defined by the zero profit condition:

$$(1 - \alpha) \left(\frac{\tau_{ij} c_j a_{ij}}{\alpha P_i} \right)^{1-\epsilon} Y_i = c_j f_{ij} \quad (4)$$

Accordingly, firms from j will not be able to export to i whenever $a > a_{ij}$, and no single firms from j would export to i if $a_{ij} \leq a_L$.

I can now characterize the bilateral trade volumes:

$$V_{ij} = \begin{cases} \int_{a_L}^{a_{ij}} a^{1-\epsilon} dG(a) & \text{for } a_{ij} \leq a_L \\ 0 & \text{otherwise.} \end{cases}$$

Using the definition of V_{ij} , the price index can be rewritten as follow:

$$P_i^{1-\epsilon} = \sum_{j=1}^J \left(\frac{c_j \tau_{ij}}{a} \right)^{1-\epsilon} N_j V_{ij} \quad (5)$$

Replacing the cumulative distribution function $G(a)$ by the truncated Pareto defined above, I can

express V_{ij} as:

$$V_{ij} = \frac{ka_L^{k-\epsilon+1}}{(k-\epsilon+1)(a_H^k - a_L^k)} W_{ij} \quad (6)$$

where

$$W_{ij} = \max \left\{ \left(\frac{a_{ij}}{a_L} \right)^{k-\epsilon+1} - 1, 0 \right\} \quad (7)$$

For the workability of the model, I follow HMR and use the following latent variable Z_{ij} (derived from (4) and (7)) instead of W_{ij} :

$$Z_{ij} = \left(\frac{(1-\alpha)Y_i}{c_j^\epsilon f_{ij}} \right)^{\frac{1}{\epsilon-1}} \frac{P_i \alpha}{a_L \tau_{ij}} \quad (8)$$

If Z_{ij} is superior to the unity, then there exists a firm in j that is productive enough to sell in market i .

2.2 Predictions about the impact of income on the diversity of imports

Now that the basic features of the model have been exposed, I can derive comparative statistics regarding the impact of increasing income on the geographical diversity of imports in i .

2.2.1 The effect of income on the extensive margin of trade

From the definition of the model, income should affect bilateral trade flows (V_{ij}) through the selection of firms into exports (W_{ij}) and more precisely through the productivity threshold a_{ij} defined from (4), as follows:

$$a_{ij} = \left(\frac{(1-\alpha)Y_i \left(\frac{\alpha P_i}{c_j \tau_{ij}} \right)^{\epsilon-1}}{c_j^\epsilon f_{ij}} \right)^{\frac{1}{\epsilon-1}} \quad (9)$$

In other words, a variation in Y_i influences the number of firms that can break even in market i through a modification of the cutoff a_{ij} affecting the number of varieties that can profitably export to i . Using (5), (6) and (8), the productivity threshold becomes:

$$a_{ij} = \frac{[(1-\alpha)Y_i]^{\frac{1}{\epsilon}}}{\tau_{ij}} \left(\frac{1}{c_j^\epsilon f_{ij}} \right)^{\frac{1}{\epsilon-1}} \left[\frac{(k-\epsilon+1)(a_H^k - a_L^k)}{ka_L^{k-\epsilon}} \right]^{\frac{1}{\epsilon}} \left[\sum \frac{N_j}{\tau_{ij}^\epsilon} \left(\frac{1}{c_j^{\epsilon^2-\epsilon-1} f_{ij}} \right)^{\frac{1}{\epsilon-1}} \right]^{\frac{-1}{\epsilon}} \quad (10)$$

The proportion of exporting firms from each origin is given by (provided that $a_{ij} < a_L$):

$$G(a_{ij}) = \frac{[(1-\alpha)Y_i]^{\frac{k}{\epsilon}}}{\tau_{ij}^k} \left(\frac{1}{c_j^\epsilon f_{ij}}\right)^{\frac{k}{\epsilon-1}} \left(\frac{k-\epsilon+1}{ka_L^{k-\epsilon}}\right)^k (a_H^k - a_L^k)^{k-1} \left[\sum_j^J \frac{N_j}{\tau_{ij}^\epsilon} \left(\frac{1}{c_j^{\epsilon^2-\epsilon-1} f_{ij}}\right)^{\frac{1}{\epsilon-1}} \right]^{\frac{-k}{\epsilon}} - \frac{a_L^k}{a_H^k - a_L^k} \quad (11)$$

As it is assumed for simplicity sake that $\forall i, f_{ii} = 0$, i.e. the fixed cost of selling in the domestic market is null, there exists an infinite pool of entrants in all origins, so the proportions $G(a_{ij})$ are comparable across origins j ⁵.

An increase in the income of consumers of i will allow more varieties to enter the market through an increase in the productivity threshold a_{ij} necessary to attain for foreign firms to enter the destination market. Due to the increase in demand in market i , firms that were slightly above the threshold prior to the increase in i 's income are now able to export, therefore, the increase in income should result in an increase in the number of varieties imported.

Proposition 1 $\forall i$ and j , and $i \neq j$, a_{ij} is increasing in Y_i , all else equal. As a firm from j is able to export to i only if $a < a_{ij}$, then the number of varieties exported from j to i is also increasing in Y_i .

Proof. Given that all parameters in (12) and (13) are positive, the partial derivative of a_{ij} and $G(a_{ij})$ with respect to Y_i is always positive.

$$\frac{\partial a_{ij}}{\partial Y_i} = \frac{1}{\epsilon} Y_i^{\frac{1-\epsilon}{\epsilon}} \frac{(1-\alpha)^{\frac{1}{\epsilon}}}{\tau_{ij} (c_j^\epsilon f_{ij})^{\frac{1}{\epsilon-1}}} \left[\frac{(k-\epsilon+1)(a_H^k - a_L^k)}{ka_L^{k-\epsilon}} \right]^{\frac{1}{\epsilon}} \left[\sum_j^J \frac{N_j}{\tau_{ij}^\epsilon} \left(\frac{1}{c_j^{\epsilon^2-\epsilon-1} f_{ij}}\right)^{\frac{1}{\epsilon-1}} \right]^{\frac{-1}{\epsilon}} > 0 \quad (12)$$

and,

$$\frac{\partial G(a_{ij})}{\partial Y_i} = \frac{k}{\epsilon} Y_i^{\frac{k-\epsilon}{\epsilon}} \frac{(1-\alpha)^{\frac{k}{\epsilon}}}{\tau_{ij}^k} \left(\frac{1}{c_j^\epsilon f_{ij}}\right)^{\frac{k}{\epsilon-1}} \left(\frac{k-\epsilon+1}{ka_L^{k-\epsilon}}\right)^k (a_H^k - a_L^k)^{k-1} \left[\sum_j^J \frac{N_j}{\tau_{ij}^\epsilon} \left(\frac{1}{c_j^{\epsilon^2-\epsilon-1} f_{ij}}\right)^{\frac{1}{\epsilon-1}} \right]^{\frac{-k}{\epsilon}} > 0 \quad (13)$$

■

Therefore, countries for which the most productive firms are situated just above the threshold are likely to enter market i with the increase in the income level and thus the increase in the threshold productivity level. As a consequence, an increase in the income level in i should be correlated with an increase in the number of varieties imported but also in the number of origins of imports.

Furthermore, looking at the second-order derivative reveals the existence of a nonlinear relationship between Y_i and $G(a_{ij})$ under certain conditions.

⁵Relaxing this assumption does not modify the conclusions and the predictions derived from the model.

Proposition 2 $G(a_{ij})$ is concave in Y_i . If $k < \epsilon$, there exists a threshold value of Y_i such that $G(a_{ij})$ is nonlinear in Y_i .

Proof. Given that $\epsilon > 1$ and $k > \epsilon - 1$, the second-order derivative of $G(a_{ij})$ is negative if $k < \epsilon$.

$$\frac{\partial^2 G(a_{ij})}{\partial Y_i^2} = \frac{k}{\epsilon} \frac{k-\epsilon}{\epsilon} Y_i^{\frac{k-2\epsilon}{\epsilon}} \frac{(1-\alpha)^{\frac{k}{\epsilon}}}{\tau_{ij}^k} \left(\frac{1}{c_j^\epsilon f_{ij}} \right)^{\frac{k}{\epsilon-1}} \left(\frac{k-\epsilon+1}{ka_L^{k-\epsilon}} \right)^k (a_H^k - a_L^k)^{k-1} \left[\sum^J \frac{N_j}{\tau_{ij}^\epsilon} \left(\frac{1}{c_j^{\epsilon^2-\epsilon-1} f_{ij}} \right)^{\frac{1}{\epsilon-1}} \right]^{\frac{-k}{\epsilon}}$$

■

This implies that if the elasticity of substitution across varieties is greater than the shape parameter, i.e. the elasticity of $G(a_{ij})$ with respect to a_{ij} , then the increase in income, passed a certain threshold, results in a tougher competition across varieties for foreign firms that outstrips the positive impact on the easing of entry of firms such that it could lead to the exit of less productive firms (i.e. a decrease in $G(a_{ij})$).

Existing studies that have investigated the values of both k and ϵ show that the value of the shape parameter is indeed inferior to the elasticity of substitution (in Bernard et al. (2003): $k = 3.6$ and $\epsilon = 3.8$; in Ghironi and Melitz (2005): $k = 3.4$ and $\epsilon = 3.8$; in Corcos et al (2012): k is estimated for each european industry and reveal that it is systematically below the usual value for ϵ). Accordingly, a nonlinear relationship between the level of income and the extensive margin should be observed empirically.

Prediction 1: $\forall i$ and $i \neq j$, an increase in Y_i is correlated with an increase in the number of varieties imported in i and in the number of origin countries. Yet, assuming that $k < \epsilon$, there exists a nonlinear relationship between income and the proportion of exporting firms to i .

2.2.2 The effect of income on the intensive margin of trade

When considering the geographical diversity of imports, looking only at the number of origins may be insufficient to assess the diversity of imports, especially if the destination country's imports are heavily concentrated on a single origin though it imports from all existing exporters. Therefore, I investigate another dimension of the diversity of imports in this section, that is the distribution of import flows across origins.

Using (5), (6) and (8), bilateral trade flows can be defined for any given level of a_{ij} , provided that $a_{ij} < a_L$, as follows:

$$V_{ij} = \left[\frac{ka_L^{k-\epsilon}}{(k-\epsilon+1)(a_H^k - a_L^k)} \right]^{\frac{\epsilon-1}{\epsilon}} [(1-\alpha)Y_i]^{\frac{1}{\epsilon}} \left(\frac{1}{\tau_{ij}^{\epsilon-1} c_j^\epsilon f_{ij}} \right)^{\frac{1}{\epsilon-1}} \left[\sum^J \frac{N_j}{\tau_{ij}^\epsilon} \left(\frac{1}{c_j^{\epsilon^2-\epsilon-1} f_{ij}} \right)^{\frac{1}{\epsilon-1}} \right]^{\frac{-1}{\epsilon}} \quad (14)$$

It is clear from (14) that the level of bilateral trade flows V_{ij} is a negative function of the level of costs, that are origin-specific (c_j , f_{ij} and τ_{ij}). For instance, if j and k are identical in all respect but for the

distance from the destination market i such that $\tau_{ij} > \tau_{ik}$, then $V_{ij} < V_{ik}$. Therefore, import flows are concentrated on the most efficient origins, i.e. those with lower costs, as productivity level a is assumed to be identically distributed across origins.

Proposition 3 $\forall j$ and $\forall a_{ij} < a_L$, V_{ij} can be ranked in decreasing order of the level of origin-specific costs $\tau_{ij} \left(c_j^\varepsilon f_{ij} \right)^{\frac{1}{\varepsilon-1}}$.

Proof. This proposition follows from the assumption that productivity level a is drawn from a Pareto distribution, truncated to the support $[a_L; a_H]$, that is uniform across origins. ■

Therefore, the most efficient origins, in terms of origin-specific costs, exports the largest volume to i and thus represents the higher share in total imports of i .

How does income affect the volume of bilateral trade flows? From (14), bilateral trade flows are a positive function of income: $\forall j$ and $\forall a_{ij} < a_L$, as the first-order derivative of V_{ij} with respect to Y_i is unambiguously positive, an increase in income is correlated with an increase in the amount of trade flows. An increase in income not only results in an increase in existing trade flows but also in the emergence of flows from “new” origins j , as it increases the value of Z_{ij} incorporated in V_{ij} .

Now, the question is whether an increase in income accentuates the concentration of trade flows or rather allows for a catching up of the least efficient origins in the destination market. To answer that question, it is sufficient to analyze whether the variation in trade flows induced by the increase in income differs across origins according to their initial level of bilateral trade flows; and the answer is no as explained in Proposition 4.

Proposition 4 $\forall j$ and $a_{ij} < a_L$, the percent change increase in V_{ij} due to an increase in Y_i is identical across j .

Proof. Differentiating (14) with respect to Y_i and dividing by the initial V_{ij} yields the percent change in bilateral trade flows caused by the increase in i 's income, which is identical across origins j :

$$\frac{\partial V_{ij}}{\partial Y_i} \frac{1}{V_{ij}} = \frac{1}{Y_i \varepsilon}$$

Therefore, an increase in income does not imply a catching up of the less efficient firms in i 's imports. ■

This proposition evidences the fact that increasing demand in the destination market benefits all exporting countries but in absolute value even more the already dominant exporters as $\frac{V_{ij}}{Y_i \varepsilon}$ (the resulting additional volume of bilateral trade) is greater for the most efficient origins (see Proposition 3). As a consequence, the increase in Y_i leaves the ranking of origins in total i 's import flows unchanged.

In order to conclude about the impact of income on the level of concentration of import flows across exporters, it is sufficient to verify that the trade flows from the new origins (“new” in the sense that prior to the increase in Y_i , they could not export to i) are inferior to the import flows from the old origin (“old” in the sense that prior to the increase in Y_i , they were already exporting to i). This is easily shown as by definition the level of cost in the new origin is superior to the level of cost in the old origin

(explaining why the former could not export in the first place), such that, from (14), $\forall j$ and $a_{ij} < a_L$, $V_{i,old} > V_{i,new}$.

Therefore, Propositions 3 and 4 altogether demonstrate that an increase in income should not affect the concentration of import flows in i across old exporters and would tend to increase as new exporters appear in i .

Using the general entropy index for measuring concentration makes this conclusion clearer:

$$\text{Entropic concentration index}_i = \frac{1}{n} \sum_j \frac{x_{ij}}{\bar{x}_i} \ln \frac{x_{ij}}{\bar{x}_i} \quad (15)$$

x_{ij} is the trade flow from j to i , n is the potential number of origins (hence invariant⁶), and \bar{x}_i the average value of imports of i calculated as follows: $\bar{x}_i = \frac{\sum_j x_{ij}}{n}$. From this, an increase in (15) means an increase in the concentration of import flows across origins. In our framework, an increase in i 's income should affect both x_{ij} and \bar{x}_i and there will be an increase in the concentration level if $\Delta \sum_{ij} x_{ij} > \Delta \bar{x}_i$ ⁷. In the case, of "old" origins, from Proposition 4, we have $\Delta \sum_{ij} x_{ij} = \Delta \bar{x}_i$. And we know, that the arrival of "new" origins will decrease the average value of import flows (Proposition 3); therefore, income should increase the concentration index.

Prediction 2: an increase in Y_i is correlated with an increase in the concentration of import flows across origins.

3 Data and empirical strategy

3.1 The database

In the framework of this study, I focus on trade in audiovisual products using the UNESCO (2005) definition: that category gathers motion pictures products, radio, television programs, and musical recordings. I use the BACI database produced by the CEPII to retrieve data about trade flows of audiovisual goods (such as cinematographic films, CD or DVD)⁸. The BACI database is more suited to the analysis of trade when a large number of developing countries are included to maximize the observations since it reconciles import and export data records based on the method known as "mirror data" taking into account the quality of countries' declarations, the evaluation of cost insurance and freight

⁶This assumption is standard in the application of the entropy index on trade flows, see Jaud et al. (2013). Furthermore, this assumption is consistent with the distinction I make about the impact of income on the number of active origins, on one hand, and the concentration across import flows on the other hand.

⁷Indeed, (15) would increase if income is positively correlated with the different components, i.e. if $\Delta \frac{1}{n} \sum_j \frac{x_{ij}}{\bar{x}_i} \ln \frac{x_{ij}}{\bar{x}_i} > 0$ that can be sum up to the analysis of $\Delta \sum_j \frac{x_{ij}}{\bar{x}_i} > 0$ and equivalently to $\Delta \sum_{ij} x_{ij} > \Delta \bar{x}_i$.

⁸Within the Harmonized System (classification 1992), cinema products are grouped in the following categories : 370600; 370690; 370610 ; 370590. Music goods are comprised in 852410 ; 852490 ; 852421 ; 852422 ; 852423 ; 852490 ; 490400. Furthermore, within these categories, it is possible to distinguish the core cultural goods from related cultural products. For instance: the DVD "Star Wars" would be labeled as a core cultural product while a writable CD would be classified as a related one.

rates (Gaulier and Zignago, 2008). Yet, using data only about goods would lead to an underestimation of the total amount of trade flows due to the increasing digitization of the sector, therefore, in a second step I complete this dataset with the database about trade in audiovisual *services* collected by Hellmanzik and Schmidt (2015). This dataset covers the transactions related to the purchase of audiovisual immaterial products such as mp3 files as well as the licenses for broadcasting purposes but for a limited number of countries. Data about audiovisual services are retrieved from countries' declaration to various sources (UN, OECD and Eurostat) therefore the sample of countries varies across years (more details about the sample in appendix - section 6.1). As a consequence, I use this dataset as an additional control for the robustness of the results over a restricted sample of countries.

In total, the sample covers the imports of audiovisual goods for 178 countries between 1998 and 2012 and the imports of audiovisual services for at most 59 countries between 2000 and 2012. It is to our knowledge the first study about cultural trade that combines both audiovisual goods and services. Recent technological progress in that sector makes this choice particularly relevant and unavoidable when analyzing cultural trade. In addition, I use an alternative dataset for the music sector, that is based on the data provided by the International Federation of the Phonographic Industry for the years 1992-2005 as a robustness check in appendix (Section 6.3).

Data about income are approximated through the GDP per capita measured in purchasing power parity terms and in constant (base 2011) terms that are provided by the World Bank (World Development Indicators, 2014).

3.2 Measuring the extensive and the intensive margins with the Theil index

According to the theoretical predictions presented in section 2, I now investigate empirically the diversity of audiovisual imports along two dimensions:

- **Prediction 1:** The number of origin countries increases with income⁹ and there exists a nonlinear relationship;
- **Prediction 2:** The concentration of import flows across origins increases with income.

In order to analyze these two components comprehensively, I rely on the additive decomposability property of the entropic Theil index, that allows to take into account the inequality both across and within sub-groups (defined here, as active and inactive trade pairs). Therefore, I decompose this index into two components to explain concentration (Cadot, Carrere and Strauss-Kahn, 2011; Jaud, Cadot and Suwa-Eisenmann, 2013): a between component (extensive margin) that measures the number of active

⁹According to the predictions of the model, income is correlated with the two extensive margins of trade: the product-level and the country-level. Yet, firm-level data does not exist for trade in audiovisual goods and services, therefore, I focus on the effect of income on the extensive margin at the country-level to test Prediction 1. As a consequence, finding evidence of a positive impact on the country-level extensive margin could be interpreted as a confirmation of the positive correlation between income and the overall extensive margin.

origins, and a within element (intensive margin) that measures the distribution of imports among the different origins. Omitting time and sector subscript, the Theil index is computed as follows:

$$T_i = \frac{1}{n} \sum_{j=1}^n \frac{x_{ij}}{z_i} \ln\left(\frac{x_{ij}}{z_i}\right) \quad (16)$$

Where,

$$z_i = \frac{\sum_j^n x_{ij}}{n}$$

i refers to the importer, j to the exporter, x_{ij} is the bilateral audiovisual trade flow and n is the number of potential origins of the imported goods¹⁰. The decomposition of this index yields the two components that will be used as dependent variable in the empirical section (details about the decomposition are provided in appendix - section 6.1).

The between-group component of the Theil index is measured as follows:

$$T_i^B = \sum_{g=0}^1 \frac{n_i^g}{n} \frac{z_i^g}{z_i} \ln \frac{z_i^g}{z_i} \quad (17)$$

Where z_i is the average import value, z_i^g the average import value in group g . Simplifying this expression shows that the between component represents the number of active origins (see Appendix - Section 6.1). Therefore, this component of the index is used as the dependent variable to test the first prediction.

The within-group component of the Theil index is also simplified as follows (see Appendix - Section 6.1):

$$T_i^W = \frac{1}{n} \sum_{j \in G1} \frac{x_{ij}}{z_i} \ln \frac{x_{ij}}{z_i} \quad (18)$$

According to this expression, the within component represents the concentration of import shares across active origins. This component is used as the measure of concentration within total imports, and hence the measure for Prediction 2.

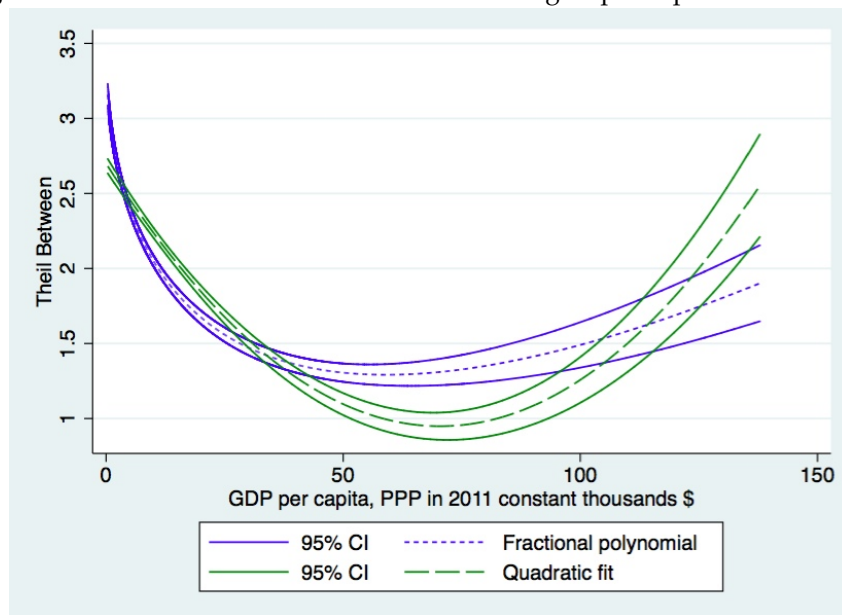
The lower the values of these different components, the higher the level of diversification.

¹⁰ In this case, I simply define the number of potential exporter as the number of origin that exports during the period. Using different definition of the number of total origins, especially regarding the duration of exports, yield similar results. Furthermore, in order to verify that the influence of income on the concentration of imports can not be attributed to changes in the universe of potential exporters, i.e n , (and as a consequence interpret the diminution of potential suppliers as an increase in concentration while the actual number of active origin has not changed), I re-run all specifications of the present paper using a time invariant n and found similar results, that are available upon request.

3.3 Descriptive statistics

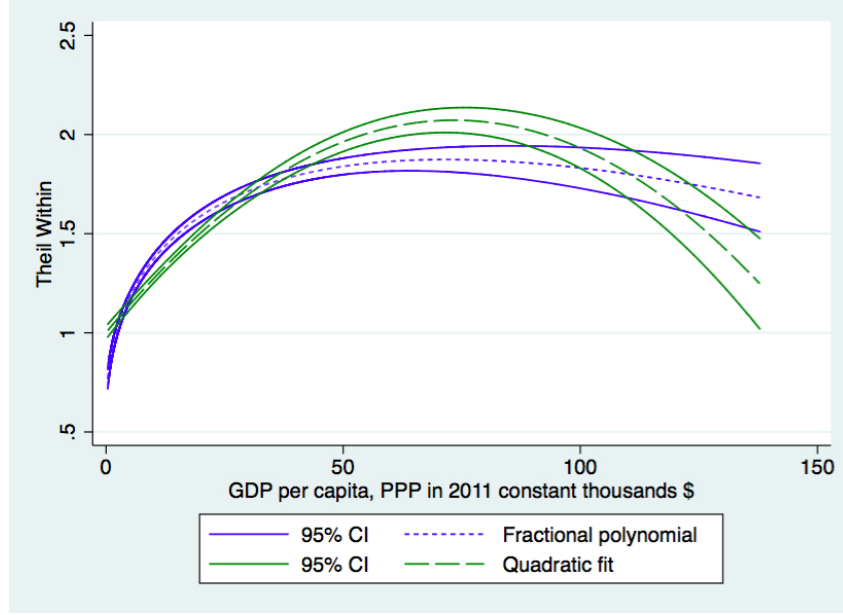
Figure 1 and Figure 2 respectively plot the between (within)-group component of the Theil against GDP per capita for all importing countries in the sample between 1998 and 2012 (for audiovisual good imports). The computation of a quadratic and fractional polynomial fit reveals the existence of a convex correlation of the between component of the index with GDP per capita, in line with Prediction 1. And as expected from Prediction 2, income seems to be correlated with an increase in the concentration across origins. I report similar figures for the restricted sample of audiovisual goods and services imports in appendix (Figure 3 and Figure 4) that suggest the same correlations.

Figure 1: Correlation of Income and the Between-group component of the Theil



The between component of the Theil is computed on the imports of audiovisual goods for 175 countries over the period 1998-2012.

Figure 2: Correlation of Income and the Within-group component of the Theil



The within component of the Theil is computed on the imports of audiovisual goods for 175 countries over the period 1998-2012.

4 Results

4.1 Results for prediction 1: the extensive margin

Ensuing these preliminary steps, I investigate the non linear relationship between income and diversity of audiovisual imports through the estimation of the following equation:

$$TB_{it} = \beta_1 GDP_{cit} + \beta_2 GDP_{cit}^2 + \delta_i + \gamma_t + \epsilon_{it} \quad (19)$$

Where TB_{it} is the between group component of the Theil for country i at time t , and $gdpc$ its PPP gross domestic product per capita (in constant 2011 US dollars from WDI, 2014). In addition, I add an individual fixed effects δ_i to capture time invariant characteristics that may have an impact on the concentration of imports (for instance the relative distance from the majors' market, language and other cultural characteristics). I also introduce γ_t a year specific effect, to capture the level of competition in the audiovisual market (the last component of equation (13), that is identical across origins but varies across years). Following Proposition 1 and the hump shape of the functions revealed in Figure 1, I add a quadratic term among our explanatory variables in order to test for the existence of a nonlinear impact of income on the concentration of cultural imports. According to Lind and Melhum (2010), the significance of the quadratic term is not a sufficient condition to establish the existence of a nonlinear impact: "this criteria is too weak" and leads to a misinterpretation of a convex but yet monotone relationship¹¹.

¹¹ Adapting Sasabuchi procedure, they test the significance of the turning point by considering two additional conditions: i) the estimated threshold must be contained in the data range, ii) slopes on each side of the turning point should correspond to a hump shaped curve.

I report the Lind-Melhum-Sasabushi test (named LMS test henceforth) for all quadratic estimations to confirm the significance of the nonlinear relationship. In addition, I provide in appendix the same tests using an alternative income measure that eventually yield the same results (section 6.4).

Table 1: Impact of income per capita on the decomposition of the Theil index

Dependent variable: Decomposition of the Theil index				
Estimation technique	Fixed Effect regression			
	Prediction 1 - Theil Between		Prediction 2 - Theil Within	
	(I)	(II)	(III)	(IV)
GDP_{it}	-0.0194*** (0.00634)	-0.0361*** (0.0121)	0.0124** (0.00556)	-0.0151 (0.0119)
GDP_{it}^2	0.000124*** (3.64e-05)	0.000212** (9.10e-05)	-5.74e-05* (3.03e-05)	8.25e-05 (8.31e-05)
Constant	2.411*** (0.0694)	1.351*** (0.164)	1.140*** (0.0664)	1.389*** (0.161)
Observations	2,574	2,001	2,574	2,001
R-squared	0.440	0.461	0.200	0.218
LMS test	3.05***	1.5**	0.95	-
Turning point (US constant \$)	78.224	85.337	-	-
Goods	X	X	X	X
Services		X		X
Importer FE	X	X	X	X
Year FE	X	X	X	X

Clustered robust standard errors in parentheses. The Theil index is computed for the imports of audiovisual goods and services differentiated by their country of origin. GDP per capita is measured in 2011 constant thousand dollars and in PPP.

***, ** and * denoting significance at the 1%, 5% and 10% level

Results in Table 1 confirm the existence of the nonlinear impact of income on the number of geographical sources of audiovisual imports: income is first correlated with a diversification and then with a reduction in the number of origins. In the audiovisual sector, one unit increase in income (reported in thousands dollars) leads to a decrease in the between group component of the Theil component of 0.02 points (column 1) for the audiovisual goods and of 0.04 points (column II) for both audiovisual goods and services. In terms of economic significance, a one standard deviation increase in income is correlated with 1.2 standard deviation decrease in the Theil-between for the audiovisual goods and services. In other words, these results confirm the Prediction 1 made in section 2: an increase in income is (first) correlated with a rise in the number of foreign varieties consumed, here approximated by the number of origins. Furthermore, the nonlinear impact of income on the Theil between is also confirmed: a one standard deviation increase in the squared GDP per capita is correlated with a 0.7 standard deviation increase in the between component of the Theil (column 2). The LMS test confirms the existence of the nonlinear relationship. The threshold value for the overall sample is relatively high, around 78,224 US constant dollars (base 2011, PPP), implying that Luxembourg, Koweit, the United Arab Emirates and Qatar have crossed the threshold. However, if we exclude from the sample the oil-producing countries, which is a common practice in applied economics as the GDP of these countries reflects the extraction of existing resources instead of the creation of value added (Mankiw et al, 1992), the nonlinear impact of income holds and the threshold value is much lower (around 57,866). Furthermore, if we concentrate

exclusively on developing countries (and excluding oil producing countries), the nonlinear impact is significant and the threshold value is estimated at 14,066 US constant dollars (base 2011, PPP) implying that during the sample Bulgaria, Brazil, Turkey, etc. have crossed the threshold.

The existence of the nonlinear impact of income on the extensive margin can also be reinforced by three different phenomenons in conjunction with income. First, the existence of an addictive process, evidenced in the literature (Stigler and Becker, 1977; Masood, 2015a) or of consumption externalities (Rauch and Trindade, 2009, Masood, 2015a), shows that the higher the level of consumption of a given variety, the higher the level of utility yielded from consuming this variety. This process implies then a decrease in the cultural discount affecting that variety and therefore a discriminatory decrease in bilateral trade costs, thus reinforcing the competition pressure at the expense of marginal varieties. Second, the existence of an endogenous protectionism phenomenon can also reinforce the nonlinear impact of income. Indeed, rising purchasing power leads to an increase in cultural imports, especially from the dominant origins, that in turn is correlated with an increase in the probability that the destination country implements protectionist measures. Hence, in countries where the level of consumption of foreign varieties has reached an importance such that it is perceived as a threat to the local culture, or industry, it leads to a reaction from local producers or governments in favor of raising barriers in the audiovisual sector as shown by Marvasti and Canterbury (2005). Accordingly, one should observe at some point a decrease in the number of varieties imported (11). Lastly, a third likely hypothesis to explain the nonlinear impact of income on the diversity of cultural imports refers to the strategy of majors to enter markets representing a valuable economic opportunity. As an illustration, through the powerful MPAA (the Motion Pictures Association of America, a lobby representing the six Hollywood majors), the United States have developed a comprehensive strategy of conquest of overseas audiovisual markets. Every year, the MPAA submits a report to the United States trade representative where it identifies both online and physical notorious markets that offer a significant volume of infringing film and television content (MPAA, 2014). The establishment of production and distribution structures in emerging countries also reflects this strategy. Within the model, this process can be represented through the endogenization of the bilateral fixed cost for exporting f_{ij} . If j invests in i , because Y_i increases, then f_{ij} falls, leading to an increase in the share of its products as the competition tightens.

4.2 Results for prediction 2: the intensive margin

I now perform the same approach for assessing the impact of income on the concentration of trade flows across origins, measured through the within group component of the Theil. Figure 2 tends to confirm the positive correlation between income and an increasing concentration of imports share among origins predicted in section 2. Again, the estimated curve seems to suggest the existence of a nonlinear impact of income.

I now turn to the estimation of this relationship based on the following equation (the corresponding results are provided in Table 1):

$$TW_{it} = \beta_1 GDP_{c_{it}} + \beta_2 GDP_{c_{it}}^2 + \delta_i + \gamma_t + \epsilon_{it} \quad (20)$$

Where TW_{it} is the within group component of the Theil for country i at time t .

Table 1 reveals the existence of a negative influence of income on the concentration of audiovisual good imports across origins and therefore confirms Prediction 2¹². For instance, Lebanon (whose income corresponds to the average income in the sample) faced an increase of approximately one standard deviation (i.e. 1230 dollars) in its GDP per capita between 2008 and 2009 and its Theil within increased from 1.13 to 1.42 (that corresponds to a 1.2 standard deviation increase¹³). However, this positive correlation does not appear on the restricted sample of audiovisual goods and services imports. This feature might be explained by the “Long tail” hypothesis (Anderson, 2004) describing the fact that digitization renders the distribution of consumption across varieties less concentrated allowing a longer tail in the distribution of sales, hence benefiting smaller, or “niche”, productions. This hypothesis has been confirmed in the data and explained through a larger product selection into exports and an easier information access (Brynjolfsson et al., 2011). An increase in income could magnify this effect by allowing consumers to expand their consumption basket toward more niche products.

The existence of the turning point that appeared in Figure 2 is not confirmed in the case of the within group component of the Theil. According to Prediction 2, this significant impact of income on the concentration of audiovisual goods imports can be interpreted as an increasing importance of already dominant exporters which is confirmed in Table 3.

I perform in appendix the same regression for the years before and after the crisis in order to verify that the results are not driven by short term economic conjuncture (Section 6.2 - Table 6). And I also replicate the same estimation strategy for the music sector, using a novel dataset developed by the International Federation of the Phonographic Industry that yields the same results (Section 6.3 - Table 7). Using alternative measure of income (GNI per capita) also yields similar results (Section 6.4 - Table 8). In addition, from (11), I could worry about the existence of an omitted variable bias, as trade costs could be correlated with per capita income and impact the diversity of cultural imports. To assess this potential threat, I perform in appendix (section 6.5 - Table 9) the same regressions including a trade costs proxy that eventually confirms the robustness of our results in that regard.

¹² One should be careful in concluding about the homogenization of cultural consumption, as our analysis integrated neither the content of traded cultural goods, that relies on the accumulation of a globalized stock of ideas (Cowen, 2009), nor the perception of consumers who, according to cultural studies approach, appropriate the content of what they consume according to their own cultural experiences.

¹³ Indeed, the standard deviation of the Lebanese Theil within is 0.24. Hence, $0.24 \times 1.2 = 0.288$ which corresponds to the increase in the Theil within.

4.3 Further results on the concentration

According to the model, the increase in income should benefit in priority to the most efficient origins, that are those for which c_j and bilateral costs τ_{ij} and f_{ij} are the lowest. Therefore, increasing concentration at the intensive margin is explained by the increasing importance of imports from countries that are more efficient, or less costly. In the case of cultural goods trade, bilateral costs are likely correlated with distance as the costs of advertising, setting a marketing campaign, editing content for a foreign public are intrinsically dependent on cultural proximity. I investigate this assumption through the computation of the impact of income on the share of imports from:

- countries that are geographically close; for which the distance to the destination market is inferior to 2000 km;
- countries that share the same language, I define the same language as the fact of sharing the same official language or having at least 20% of the population speaking the same language;
- countries that were ranked first, second and third at the beginning of the period in terms of bilateral trade flows (I compute an average of the bilateral trade flows over the year 1998-2000 to avoid short-term fluctuations) and could be thus considered as the most efficient origins as well as the most culturally close partners.

From Table 2, on average the origins that are located less than 2000 km away from the destination countries account for 25% of total imports of audiovisual goods, while linguistic partners represent on average 41% of total imports. Finally, the origins that were the 3 most important partners at the beginning of the sample represent more than 50% of total audiovisual imports over the period 1998-2012.

Table 2: The average share of each category in total audiovisual good imports

Import share of	< 2000km origins	Linguistic origins	3 main partners
Mean	24.89	41.23	52.31
Sd. Deviation	32.02	35.81	26.49
Minimum	0	0	0
Maximum	100	100	100

The descriptive statistics have been computed on the total imports of audiovisual goods of 175 countries between 1998 and 2012.

As the existence of a positive relationship between income and the concentration of import flows has been confirmed empirically only for the goods sub-sample (see section 4.2), I analyze further this concentration process focusing exclusively on the imports of audiovisual goods. Corresponding results are reported in Table 3, and confirms the predictions of the model: an increase in income is correlated with an increase in the share of less costly origins (i.e. closer countries in terms of geographical or linguistic proximity).

Indeed, a one standard deviation increase in income is correlated with a 2.6 (5.1) percentage point increase in the share of origins that are less than 2000 km distant (that share the same language). Table 3 also shows that rising income favors even more the imports from the already dominant partners, as a one standard deviation increase in GDP per capita is correlated with a 6.5 percentage point increase in the share of imports from the origins that were already among the three most important origins at the beginning of the period, hence justifying the fears of cultural homogenization with increasing purchasing power.

Table 3: Impact of income per capita on the concentration of imports

Dependent variable: Import share of	< 2000km origins		Linguistic origins		3 main partners	
Estimation technique	Fixed Effect regression					
	(I)	(II)	(III)	(IV)	(V)	(VI)
GDP _{cit}	0.00126* (0.000733)	0.00127* (0.000742)	0.00248* (0.00136)	0.00233 (0.00145)	0.00316** (0.00152)	0.00317** (0.00153)
RTA _{distance,it}		-0.000436 (0.00183)				
RTA _{language,it}				-0.00331* (0.00192)		
RTA _{dominant,it}						-0.0238 (0.0276)
Constant	0.232*** (0.0141)	0.235*** (0.0183)	0.410*** (0.0222)	0.430*** (0.0254)	0.633*** (0.0240)	0.640*** (0.0246)
Observations	2,574	2,574	2,574	2,574	2,574	2,574
R-squared	0.019	0.019	0.076	0.079	0.216	0.216
Goods	X	X	X	X	X	X
Importer FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X

Clustered robust standard errors (at the country level) in parentheses. GDP per capita is measured in 2011 constant thousand dollars and in PPP.

***, ** and * denoting significance at the 1%, 5% and 10% level

However, because the concentration on closer partners might also be explained by the creation of trade agreements with these countries during the sample period, I incorporate in column (II) a variable indicating the evolution of RTA with countries situated less than 2000 km away; in column (IV) a variable indicating the evolution of the number of RTA with countries sharing the same language; and in column (VI) a variable about the number of RTA existing with the three more important origins identified at the beginning of the period; as follows:

$$RTA_{i,t}^X = \sum_j RTA_{ijt} \mathbb{1}_{X=1}$$

The data about RTA have been computed from the World Trade Organization website¹⁴. The results shows that the impact of income on the concentration of geographically close partners and already dominant suppliers can not be explained by the creation of new RTAs.

¹⁴Link: <http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>. Last accessed: July 2015.

5 Concluding remarks

Relying on an heterogenous firms framework using a bounded Pareto distribution, I derive and test predictions about the impact of income on the geographical diversity of audiovisual imports. For that purpose, I combine data about both audiovisual goods and services, a premiere in the study of cultural trade. The results obtained show that an increase in income is positively correlated with the extensive margin, tested here at the country level, that is theoretically explained by a decrease in the productivity threshold required for foreign firms to export to the market. Yet, the analysis also reveals the existence of a nonlinear relationship between per capita income and the number of origins: passed a certain threshold, countries restrict their cultural imports on a smaller number of exporting countries. This result is robust to the use of alternative income measures, to the inclusion of a trade cost indicator specific to the audiovisual sector and to the testing of an alternative dataset for music trade flows. In addition, the study evidences the correlation of per capita income and the concentration of audiovisual imports across origins. These results provide both theoretical and empirical evidence that increasing purchasing power may harm the diversity of cultural consumption by increasing the share of the already dominant exporters and would tend to confirm existing fears about cultural homogeneization.

6 Appendix

6.1 Definition of variables and sample

6.1.1 Decomposition of the Theil index

The Theil index is a convenient tool to measure concentration of trade flows across origins as it facilitates the distinction between the intensive and the extensive margins. Concentration at the intensive margin implies a more unequal distribution of shares among the origins and concentration at the extensive margin can be interpreted as a decrease of active origins. This can be depicted through the partition of our sample into two sub-groups n^g : active ($g = 1$) and inactive cultural trade relationship ($g = 0$) (per year and cultural good) that are considered respectively as within and between group. I show that the evolution in the within group (active bilateral trade flows) reflects changes at the intensive margin and evolution in the between group (inactive bilateral trade flows) signifies changes at the extensive margin.

The between-group component of the Theil index is calculated as follows:

$$T_i^B = \sum_{g=0}^1 \frac{n_i^g}{n} \frac{z_i^g}{z_i} \ln \frac{z_i^g}{z_i}$$

Where z_i is the average import value, z_i^g the average import value in group g . With some simplification the Theil-between component can be written as:

$$T_i^B = \ln\left(\frac{n}{n_i^1}\right)$$

And as n is time invariant, the evolution of the Theil-between reduces to the percentage change in the number of origins across periods:

$$T_{i,t}^B - T_{i,t-1}^B = -\ln\left(\frac{n_{i,t}^1}{n_{i,t-1}^1}\right)$$

The within-group component of the Theil index is calculated as follows:

$$T_i^W = \sum_{g=0}^1 \frac{n_i^g z_i^g}{n} T_i^g$$

As the Theil index is equal to zero when all countries have the same share, then the Theil index for the inactive group ($g = 0$) is equal to 0, and the Theil index for the active group is given by :

$$T_i^1 = \frac{1}{n^1} \sum_{j \in G1} \frac{x_{ij}^g}{z_i^1} \ln\left(\frac{x_{ij}^g}{z_i^1}\right)$$

Therefore the within component of the Theil can be written:

$$T_i^W = \frac{n_i^1 z_i^1}{n} T_i^1$$

Replacing T_i^1 in this expression shows that the within component of the Theil reduces to a concentration index among the active origin group

$$T_i^W = \frac{1}{n} \sum_{j \in G1} \frac{x_{ij}}{z_i} \ln \frac{x_{ij}}{z_i}$$

With this partition, the between and within components add up to the total Theil index.

6.1.2 The audiovisual services dataset

Data about trade in audiovisual services has been collected by Hellmanzik and Schmitz (2015) relying on various sources (the OECD, Eurostat and the UN) that provide detailed geographical information about the payments made, or received, for audiovisual services trade flows. The classification used for identifying audiovisual trade flows is drawn from the Extended Balance of Payments Services Classification.

These data have been collected for the period 2000-2012 and cover different sample of countries across the years (the main reason why I use this dataset as a complement since the sample of countries is largely reduced, essentially on richer countries). In order to maximize the number of observations, the mirror data approach has been applied (just as the BACI dataset used for trade in audiovisual goods), for instance when a partner did not report the existence of a trade flows while the reporter did, the declaration of the former was used to fill the gaps. As an illustration, the sample for 2009, the year for which data about trade in services is the most complete, gathers the following 59 reporting countries:

Table 4: Sample of countries for AV services in 2009

Argentina	France	Luxembourg	Singapore
Australia	Germany	Malaysia	Slovakia
Austria	Greece	Malta	Slovenia
Belgium	Hong Kong	Mexico	SouthAfrica
Brazil	Hungary	Moldova	SouthKorea
Bulgaria	Iceland	Netherlands	Spain
Canada	India	NewZealand	Sweden
China	Indonesia	Nigeria	Switzerland
Croatia	Iran	Norway	Taiwan
Cyprus	Ireland	Panama	Thailand
Czech Republic	Israel	Poland	Turkey
Denmark	Italy	Portugal	United Arab Emirates
Egypt	Japan	Romania	United Kingdom
Estonia	Latvia	Russia	United States
Finland	Lithuania	Serbia	

Based on the data collected by Hellmanzik and Schmitz (2015)

This dataset has two main caveats: the underestimation of total services flows as not all countries reported and a resulting risk of sample selection bias as the countries that reported services trade flows over this period are richer on average (see Table 5). The other limitation of this dataset is also encountered with the goods database: the underestimation of trade due to piracy. Yet, this limitation should affect mainly the intensive margin (the total amount of trade flows) but there is little reason to believe that the effect of piracy differs across exporters. Hence, we consider here that this caveat is a minor threat as it should not significantly influence the *distribution* of import flows across origins.

6.1.3 Descriptive statistics

Table 5: Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Minimum	Maximum	Obs.	Mean	Std. Dev.	Minimum	Maximum
	Goods					Goods and Services				
Theil within	2640	1.345	0.631	0	3.871	507	1.784	0.553	0.670	3.699
Theil between	2640	2.130	0.968	0.403	5.226	507	0.383	0.314	0	1.872
GDP per capita	2604	16.421	20.713	0.346	137.820	507	32.320	20.602	2.548	137.820
GNI per capita	1866	15.654	17.218	0.112	123.282	479	30.017	14.181	2.522	101.404
STRI Overall	585	0.208	0.101	0.06	0.52	507	0.208	0.101	0.06	0.52

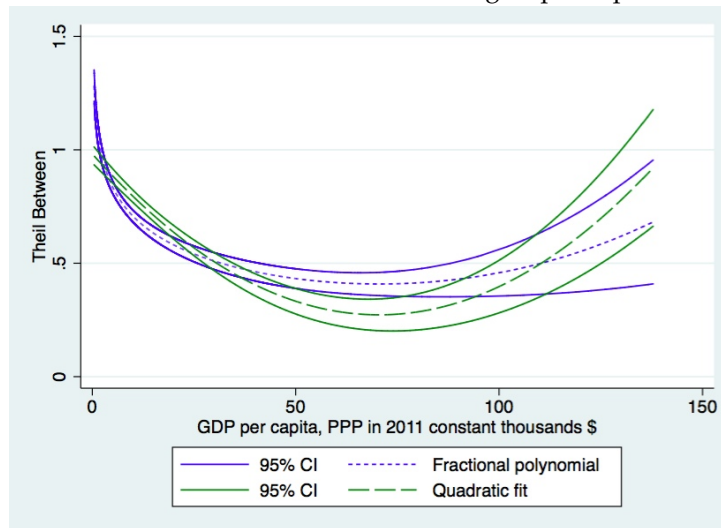
Note: Author's calculations. Variables are averaged over years. GDP and GNI per capita are represented in purchasing power parity and in thousand of constant (base 2011) US dollars.

From Table 5, it is interesting to note that there exists a great heterogeneity in terms of GDP, or even GNI, per capita across countries in the sample as indicated by the minimum, maximum and standard deviations values. Another relevant information in Table 5 is about the concentration level of audiovisual trade: the concentration of audiovisual *goods* imports across origins is mainly driven by the extensive margin, i.e. the number of origins, as opposed to both audiovisual *goods and services* imports of the restricted sample where concentration is mainly explained by the intensive margin. This feature of the data is not surprising as the restricted sample is composed of countries that are richer and import

from a larger set of origins as opposed to less rich countries.

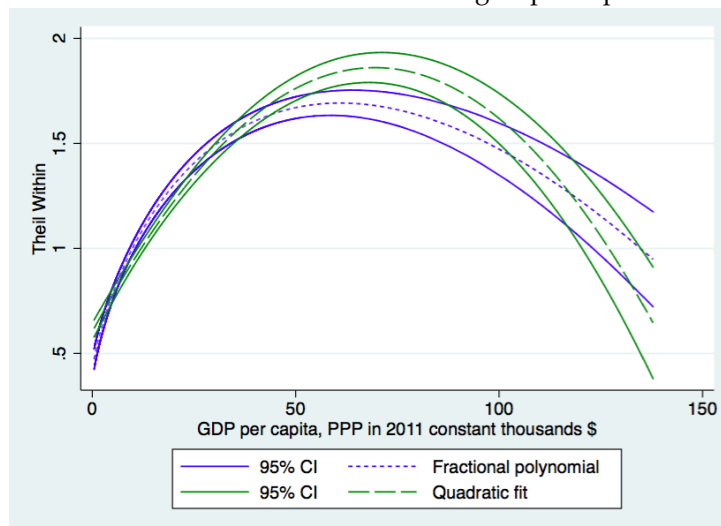
I report in Figure 3 and in Figure 4, a first approximation of the relationship between income and the two components of the Theil for the restricted sample of both audiovisual goods and services imports that indicate the existence of similar correlation among the two variables as in Figure 1 and in Figure 2.

Figure 3: Correlation of Income and the Between-group component of the Theil



The between component of the Theil is computed on the imports of audiovisual goods and services over the period 2000-2012.

Figure 4: Correlation of Income and the Within-group component of the Theil



The within component of the Theil is computed on the imports of audiovisual goods and services over the period 2000-2012.

6.2 Estimation on the years without the economic crisis

The last years of the sample have witnessed an important economic crisis that has significantly affected trade flows (Eichengreen and O'Rourke, 2012). It is reasonable to assume that cultural trade flows are particularly vulnerable to changing economic conditions. Therefore, I perform in Table 6 the same previous regression analysis excluding the years of the economic crisis (i.e. 2007-2010).

Table 6: Impact of income on the decomposition of the Theil index excluding the crisis period

Dependent variable: Decomposition of the Theil index				
Estimation technique	Fixed Effect regression			
	Prediction 1 - Theil Between		Prediction 2 - Theil Within	
	(I)	(II)	(III)	(IV)
GDP_{it}	-0.0184*** (0.00697)	-0.0370*** (0.0130)	0.0123** (0.00595)	-0.0202 (0.0123)
GDP_{it}^2	0.000123*** (4.10e-05)	0.000216** (0.000104)	-5.64e-05* (3.28e-05)	0.000106 (8.82e-05)
Constant	2.396*** (0.0762)	0.812*** (0.143)	1.143*** (0.0687)	0.912*** (0.144)
Observations	1,877	1,348	1,877	1,348
R-squared	0.499	0.540	0.248	0.242
Goods	X	X	X	X
Services		X		X
Importer FE	X	X	X	X
Year FE	X	X	X	X

Clustered robust standard errors in parentheses. The Theil index is computed for the imports of audiovisual goods and services differentiated by their country of origin. GDP per capita is measured in 2011 constant thousand dollars and in PPP.

***, ** and * denoting significance at the 1%, 5% and 10% level

The results obtained suggests that the crisis did not drive the conclusion derived from Table 1 as the coefficients are identical.

6.3 Estimation with an alternative dataset for music sector

In order to check the robustness of our conclusions in the music sector, I perform the main regression using an alternative dataset. Relying on data provided by the International Federation of the Phonographic Industry (IFPI) and its national branches, Ranaivoson (2010) computed Shannon concentration index (also an entropic index as the Theil) for the origin of music imports for 72 countries from 1992 to 2005.

The results obtained with this alternative dataset are consistent with the previous ones (obtained with the BACI database): an increase in income (in purchasing power parity) first leads to a diversification of import sources and then to a concentration phase.

Table 7: Robustness check: using an alternative dataset for the music sector

Dependent variable : Shannon index for import sources	
Estimation technique	Fixed Effect regression
Sector	Music
GDP _{cit}	0.238** (0.0096)
GDP _{cit} ²	-0.00034* (0.0001)
Constant	0.4403 (0.1198)
Observations	535
R-squared	0.075
Number of importers	71
LMS test	2.36**
Country FE	X
Year FE	X

Clustered robust standard errors (at the country level) in parentheses
 ***, ** and * denoting significance at the 1%, 5% and 10% level

6.4 Estimation with an alternative measure of income

In this subsection, I confront the robustness of my results to the use of an alternative measure of income, namely GNI per capita in PPP 2011 constant US dollars (GNIc PPP) provided by the World Bank (WDI, 2014).

Results obtained in Table 8 corroborate the results obtained in Table 1 and confirm the existence of a nonlinear relationship between income and the extensive margin of cultural imports. However, the impact of income on the intensive margin is no more significant.

Table 8: Impact of GNI per capita on the decomposition of the Theil index

Dependent variable: Decomposition of the Theil index				
Estimation technique	Fixed Effect regression			
	Prediction 1 - Theil Between		Prediction 2 - Theil Within	
	(I)	(II)	(III)	(IV)
GNIc _{it}	-0.0210** (0.00822)	-0.0609*** (0.0127)	0.00820 (0.00924)	-0.0172 (0.0169)
GNIc _{it} ²	0.000142** (5.71e-05)	0.000414*** (8.47e-05)	-3.56e-05 (6.29e-05)	9.30e-05 (0.000109)
Constant	2.179*** (0.0859)	1.022*** (0.144)	1.325*** (0.100)	0.991*** (0.193)
Observations	1,853	1,537	1,853	1,537
R-squared	0.482	0.477	0.179	0.177
Goods	X	X	X	X
Services	X	X	X	X
Importer FE	X	X	X	X
Year FE	X	X	X	X

Clustered robust standard errors in parentheses. The Theil index is computed for the imports of audiovisual goods and services differentiated by their country of origin. GNI per capita is measured in 2011 constant thousand dollars and in PPP.
 ***, ** and * denoting significance at the 1%, 5% and 10% level

6.5 Are we mistakenly measuring the impact of trade costs?

So far, I have assumed that other importing country-specific parameters, such as protectionist measures, were not correlated with per capita income. Yet, if this assumption is not satisfied, our results might capture not only the impact of income but also the impact of trade barriers. Therefore, I test in this section whether my results are robust to the inclusion of a trade cost variable specific to the audiovisual sector. Yet, these data are very difficult to gather for a large sample of countries and years as cultural items are often excluded from trade agreement and benefit from specific treatment (Hanani Richieri, 2009). In 2014, the OECD published a new set of indices named “Services Trade Restrictiveness Index” (STRI) (Nordas and al, 2014) that reflects the level of limitations imposed in services trade flows including the audiovisual sector. It is, to my knowledge, the most comprehensive existing database about the barriers imposed in the audiovisual sector. Therefore, I use these information to test whether the results obtained are robust to the inclusion of these trade costs variable.

These datasets are constructed based on the law and regulations that were in force in each OECD country plus 6 non-OECD countries (Brazil, China, India, Indonesia, Russia and South Africa) in 2013. For the audiovisual sector, the overall index is composed of 5 components that is computed for each sub-products (namely broadcasting, sound recording and motion pictures):

- Limitations on foreign market entry (foreign ownership and entry of foreign suppliers);
- Limitations on the movement of people;
- Other discriminatory measures such as compulsory local processing of subtitling;
- Barriers to competition that discourage foreign participation in the market;
- Regulatory transparency.

An index comprised between 0 (totally open) and 1 (closed sector) is computed for each component, the average of all the sub-index for all the sub-products provides the overall audiovisual services trade restrictiveness index (hereafter *STRI*). In Table 9, I check the robustness of the results to the inclusion of the overall *STRI* and to the inclusion of the average index for each sub-products for the year 2012 (since the data were collected for the year 2013). As these data are about the limitations imposed on trade in services, the regression concentrates on the import of services solely.

The results obtained in Table 9 show that the impact of income on the two components of the Theil is robust to the inclusion of the *STRI* and furthermore, the coefficients obtained are remarkably similar to those obtained in Table 1 though the sample is restricted in terms of country and in terms of years. Interestingly, from column (I) it appears that the higher the level of (overall) restriction in services imports, the lower the level of diversification in the number of partners. This unexpected impact of protectionism has been explored in Masood (2015b) and explained by the existence of a survival of the fittest mechanism since the toughening of entry in the domestic market lead to the concentration of distributors on the most profitable varieties, hence reinforcing concentration. Furthermore, it is inter-

Table 9: Impact of STRI on the decomposition of the Theil index

Dependent variable: Decomposition of the Theil index				
Estimation technique	Ordinary Least Squares			
	Prediction 1 - Theil Between		Prediction 2 - Theil Within	
	(I)	(II)	(III)	(IV)
GDP per capita, PPP _{<i>i</i>}	-0.0320** (0.0134)	-0.0311** (0.0141)	0.0252** (0.0123)	0.0255** (0.0123)
GDPc _{<i>i</i>} ²	0.000185** (7.90e-05)	0.000185** (8.28e-05)	-0.000149* (7.65e-05)	-0.000151* (7.62e-05)
STRI _{<i>i</i>}	1.821* (1.073)		-0.0938 (0.871)	
Motion Picture STRI _{<i>i</i>}		0.965 (1.602)		0.676 (1.282)
Broadcasting STRI _{<i>i</i>}		1.648 (1.171)		-0.244 (0.909)
Sound Recording STRI _{<i>i</i>}		-1.989 (3.283)		-0.737 (2.953)
Constant	2.069*** (0.541)	2.095*** (0.564)	0.703 (0.443)	0.742* (0.437)
Observations	39	39	39	39
R-squared	0.260	0.285	0.167	0.175
Services	X	X	X	X

Clustered robust standard-errors (at the country level) in parentheses. The Theil index is computed for the imports of audiovisual services differentiated by their country of origin for the year 2012. GDP per capita is measured in 2011 constant thousand dollars and in PPP.

***, ** and * denoting significance at the 1%, 5% and 10% level

esting to note that the effect of trade barriers is significant only for the extensive margins as opposed to the intensive margins, implying that these barriers influence essentially the selection of firms into exports.

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