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Handbook of the
ECONOMICS OF ART AND CULTURE

VOLUME 2

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Kenneth J. Arrow and Michael D. Intriligator

Handbook of the
ECONOMICS OF ART AND CULTURE

VOLUME 2

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CHAPTER 17

Trade and Cultural Diversity

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Contents

Abstract

This chapter surveys the recent economic literature on the relationships between globalization and cultural diversity. We first review the different channels through which international integration interacts with cultural diversity across individuals, communities, and nations. We then present some recent formal economic models of cultural transmission and cultural evolution, and show how these models can be embedded into standard economic frameworks to analyze the links between globalization and cultural diversity. The chapter then presents various applications from trade in cultural goods, foreign direct investment in tourism to cultural integration of foreign migrants. Finally, normative implications and the relationships between cultural policy and international policies are also discussed.

Keywords

Cultural diversity, Cultural transmission, Trade, Globalization

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17.1. INTRODUCTION

Globalization and revolutionary developments in information and transport technology are changing the current world (Cowen, 2002). Our daily lives are increasingly governed by products and images originating from other countries and other cultures. Political, religious, cultural, or economic trends emerging in a particular region, group, or time period are now being echoed in large parts of the world. Countries and regions are getting interconnected through various socioeconomic (real or virtual) networks that span over the entire globe (Nederveen Pieterse, 2004).

This process of international integration[1] and globalization can generate efficiency gains in production and consumption through access to an increased variety of goods and services. The emergence of a global consumer market has arguably induced rapid changes in consumption patterns, from toothpaste to refrigerators, and led to the spread of global 'brand-name' goods (UN Development Programme, 1998, p. 46). On the other hand, the mass consumption of standardized goods, eased by international trade and foreign direct investments, might crowd out self-produced, traditional, and locally manufactured goods in cultural and other related sectors, inducing in turn a loss of cultural identity.

Some striking evidence about the fears associated to globalization comes from France: more than 60% of Frenchmen agree that globalization represents the greatest threat to the French way of life (SOFRES, 1999; Meunier, 2000), and 19% of respondents in a 2005 *TF1* poll said that they voted against the European constitution because Europe is perceived as a threat to the French cultural identity. However, the French fear of cultural erosion is not unique in Europe as documented, for example, by the collection of newspaper articles at the website of Global Policy Forum.[2,3] The fear of cultural erosion and loss of cultural diversity is also suggested by some formal empirical studies like, for instance, Mayda and Rodrik (2005). Using a unique dataset from the International Social Survey Programme covering over 20 000 individuals located in 23 countries they find that attitudes toward trade are significantly correlated with levels of human capital; more interestingly, however, they also find that non-economic determinants, in the forms of values and identities, play an important role in explaining the variations of preferences over trade integration. In particular, high

[1] To simplify, we will essentially use the terms 'international integration' and 'international trade', but our discussion may also cover regional issues in a given country.

[2] At www.globalpolicy.org/globaliz/cultural/index.htm.

[3] A manifestation of such fears appears in the attacks against American fast-food chains. Several McDonald's restaurants have been subject to violent attacks (including bombing) in Rome, Macao, Rio de Janeiro, Prague, London, Karachi, Jakarta, Mexico City, Beirut and Beijing. Also, an international network of anti-McDonald's activists emerged in the late 1990s to coordinate simultaneous protests at McDonald's restaurants around the world on a designated date in mid-October every year (Ritzer, 1996).

degrees of neighborhood attachment and nationalism/patriotism seem to be strongly associated with protectionist attitudes.

The idea that trade integration can substantially affect patterns of cross-national cultural diversity applies as well within countries at the regional level. Cross-regional trade and economic activities are important determinants of economic development, and consequently interact with local cultural specificities and attachments. This is, for instance, exemplified by strong linguistic cleavages in bilingual countries such as Belgium or Canada. It may even be more relevant for multiethnic African countries such as Cameroon with 279 languages, the Democratic Republic of Congo with 217 languages, or Nigeria with 521 languages, where each language tends to represent one tribe with its specific cultural meanings and mechanisms of cultural transmission.

Beyond case studies, the empirical literature on trade, globalization, economic integration, and culture is yet inconclusive.[4] On the one hand, the idea that trade and globalization are associated with reduced cultural diversity is consistent with some evidence suggesting convergence of consumption patterns across countries. For instance, looking specifically at consumption of wine relative to beer in a dataset of 38 countries from 1963 to 2000, Aizenman and Brooks (2008) find a clear convergence effect on consumption patterns, occurring more quickly within groups of countries that have a higher degree of integration. Gracia and Albisu (2001) also find homogenization effects of food consumption patterns across EU countries in recent years. Kónya and Ohashi (2007) consider the effect of economic integration on product-level consumption patterns across the Organization for Economic Cooperation and Development in the decade 1990–2000 and also document evidence of strong convergence in cross-country consumption patterns with substantial heterogeneity across product types.

On the other hand, other studies suggest that the fear of loss of local cultural diversity may be exaggerated. For instance, Disdier et al. (2010) use a long panel of French birth registries to assess the media-culture link using name frequencies as a measure of tastes. Controlling for unobserved name effects, their analysis indicates that foreign media do influence name choices, but only modestly: absent their existence, fewer than 5% of French babies would have been named differently. Moreover, their welfare simulations point to welfare gains due to exposure to both domestic and foreign media, enlarging the set choice of names for parents.

While there has been much discussion in the public debate on the interdependence of globalization and culture, it is only recently that international economists have started to formally discuss these issues and include them in their models. The purpose of this chapter is to provide a first overview of this emerging economic literature and to present an approach that integrates recent cultural evolutionary models into standard

[4] For a consideration of these issues from the viewpoint of international law, see Chapter 15 by Iapadre and Chapter 16 by Macmillan in this volume.

economic supply-side trade models. We hope that such a perspective may be useful to provide formal analytical and empirical economic analyses of the links between economic integration, trade, globalization, and the dynamics of cultural diversity.

The chapter is organized as follows. In Section 17.2, we start with a discussion of recent theoretical economic perspectives on the impact of international integration on cultural evolution. In Section 17.3, we expand a simple economic approach of cultural transmission and socialization that we have been developing in the last decade or so to analyze dynamic changes in preferences and their interactions with socioeconomic activities (Bisin and Verdier, 2001, 2010). This approach is then integrated in Section 17.4 into several standard models of international trade. Such a perspective allows us to focus on the central question we aim at addressing, namely the relationship between trade and cultural diversity across countries. In particular, we discuss how trade flows may lead to convergence of cultural values towards common patterns over the world. Section 17.5 finally concludes with areas for future research on this topic.

17.2. THEORETICAL PERSPECTIVES ON INTERNATIONAL TRADE AND CULTURAL DIVERSITY

Traditional economic theory assumes that individuals have well-defined and fixed preferences over material goods, and that economic transactions are frictionless. In such a world, economic interactions are perfectly orthogonal to cultural issues. In order to understand the debate around trade, globalization, economic integration, and cultural diversity, however, one has to depart from these basic assumptions.

17.2.1 Static Models of Supply-Side Externalities

17.2.1.1 Transaction Costs

Cultural factors may constitute a source of transaction costs (e.g. by inducing communication costs and coordination difficulties due to differences in cultural meanings and languages). On the contrary, cultural factors may also provide mechanisms that facilitate imperfect economic transactions (e.g. in the case of social capital and trust supported by specific cultural ties and networks). These issues have been intensively investigated by economists and social scientists; see, for instance, reviews in Dasgupta and Ismail (2000), Glaeser et al. (2002), Durlauf and Fafchamps (2005), Putnam (2007), and Guiso et al. (2008). More specifically, an interesting literature in trade has investigated the effects of social, ethnic, and cultural networks on the pattern and structure of international flows of goods and services across countries; see, for instance, Rauch (1999), Casella and Rauch (2002), Rauch and Casella (2003), and Rauch and Trindade (2002), as well as the empirical study in Guiso et al. (2009).

While this literature focuses on the consequences of cultural affinities or differences in economic integration and trade, it is also the case that economic integration and trade

affect cultural practices and cultural assimilation. Lazear (2003), for instance, studies language adoption by ethnic immigrants. The basic idea is that a common culture facilitates trade across individuals. The incentives for a minority individual to adopt the culture of the majority group relates directly to the expected gains from trade that such a strategy provides. Cultural integration, however, is costly and resources must be spent to acquire new cultural traits (or to learn a new language). Three simple insights come from this model. (i) Cultural integration is a decreasing function of the size of a cultural group. Hence, the smaller and the more dispersed a cultural group, the more likely we should expect cultural integration of that group. (ii) The larger the economic prospects from cultural integration, the larger the incentives to do so. In particular, the more important the sharing of a common culture to enjoy socioeconomic interactions, the larger again the incentives to integrate for the minority group. (iii) From a normative perspective, there is a fundamental externality associated with the adoption of a common culture. Indeed, integration on the part of minority individuals increases the value of the gains from trade for all members of society, of the minority and the majority alike.

In the context of international trade, this framework has been extended by Kónya (2006), in a simple model that incorporates cultural costs of international trade in addition to geographical costs. In a two-country setting, Kónya (2006) derives the equilibrium conditions that determine the equilibrium amount of cultural integration in both countries. Not surprisingly, he finds that citizens in the larger country tend to have lower incentives to learn foreign languages. More interestingly, he also investigates the effects of globalization on cultural integration and shows that they depend crucially on the form globalization takes. Specifically, a decrease in physical transportation costs is likely to facilitate cultural integration, while cultural standardization, modeled as a reduction of cultural transaction costs, has the opposite effect. Finally, as in Lazear (2003), the decentralized equilibrium is generally inefficient as individuals do not take into account the positive external effect of their integration decision on citizens of the other country.

Gabszewicz et al. (2011) present also an interesting model of foreign language acquisition in a framework with two languages and heterogenous populations in two countries or regions. Specifically, agents are differentiated according to their degree of language aptitude and individual learning costs. Each individual then maximizes the difference between some communicative benefit and the cost of acquiring a new language. The structure of linguistic equilibria can be fully characterized as a function of two main parameters: the size of each population and the unit cost of learning in each country. In this framework, both corner equilibria (where either all the residents of a country study the foreign language or none of them does), and interior equilibria (where some, but not all, residents of each country learn the foreign language) may exist. From a welfare point of view and in contrast with the previous literature, public intervention by each government separately leads to the same outcome as the equilibrium

outcome. However, joint maximization by both governments may yield more learning in the two regions. This raises the possibility that public policies could encourage learning of foreign languages in both regions.

17.2.1.2 Cultural Goods

Individual preferences may be socially interdependent. In this respect, cultural goods are typically akin to generate demand-driven externalities than generic goods. In this context, international integration affects demand not only via relative price effects and scale effects, but also by affecting cultural identity. Building on insights from socio-psychology and sociology, Akerlof and Kranton (2000) define cultural identity as a self-image based on assigned social categories and behavioral prescriptions associated with these categories. Identity is acquired by individuals through a process of association with others that abide by the same behavioral prescriptions (i.e. in the same cultural group). Formally, cultural identity can be modeled as a positive group externality among agents who share the same culture and who adopt similar consumption patterns for specific types of goods (e.g. cultural goods or artifacts). Along this line of thinking, the specificity of cultural goods comes from the fact that, in addition to their intrinsic economic value, consumption of such goods confers also symbolic and non-pecuniary value, and reinforces the sense of cultural identity.

In an international trade context, a first interesting model following this line of research is Janeba (2007). The author studies the impact of cultural identity on the nature of the economic equilibrium under free trade, highlighting non-trivial effects of trade openness on welfare for a given and *exogenous* cultural group. More specifically, cultural goods are described as network goods, whose consumption utility depends positively on the number of individuals who consume them. Different cultural groups therefore reflect different networks. This structure of consumption externalities is then embedded into a standard three-good, two-country competitive Ricardian model of international trade. As well as consuming a composite good, individuals must choose between consuming either one of two network or cultural goods. Individual behavior depends on the difference in prices of the cultural goods as well as the utility loss relative to the maximal network size when networks coexist. Trade liberalization changes the relative price of the cultural goods, which in turn drives social consumption behavior and therefore indirectly also the utility losses and gains of being in a particular cultural network. Janeba (2007) discusses then the condition for free trade regimes to generate dominant outcomes compared to autarky. A first result is the fact that trade is not necessarily Pareto superior to autarky when both countries remain culturally diverse under free trade (e.g. a situation where both types of cultural goods are consumed in each country). Indeed, some people may lose even under the classical assumptions of constant or decreasing returns to scale, perfect competition, symmetric country size, and one factor of production. Intuitively, cultural diversity is a double-edged sword.

On the one hand, it indicates that the distribution of tastes for different cultural goods is sufficiently wide relative to the price difference. On the other hand, the diversity in consumption choices implies a utility loss. Under free trade the loss may become more salient for individuals who keep on consuming the same cultural good after trade liberalization. When, however, both countries end up culturally homogenous in the same network under free trade, then one returns to the traditional result that trade liberalization dominates autarky. Such situations indeed do not suffer from the losses associated to cultural network competition within each country. Interestingly, this result appears in contrast to positions of current globalization critics: it is precisely the lack of diversity in consumption patterns that creates the possibility of Pareto superiority of trade liberalization in this framework.

Suranovic and Winthrop (2005) also present trade models with a cultural component on the demand side in two distinct ways. In a first model, called a *cultural affinity from work* model, it is assumed that workers receive a non-pecuniary benefit from working in a particular sector. Building on work in sociology by Keat (2000) and MacIntyre (1984), the authors assume that work may provide direct psychic benefits associated with the opportunity for self-accomplishment in culturally salient activities such as arts, music, sports, etc. Alternatively, as is argued to be the case for farmers or rural workers, these non-pecuniary benefits are derived from the intrinsic satisfaction of living and identifying oneself to *environmentally friendly* or *Mother Nature connected* types of communities (Brown, 1995). Such sector-specific cultural benefits are likely to impede the process of cross-sectoral resource reallocation that is usually observed after trade integration, reducing therefore the gains from trade that can be captured through this process. Suranovic and Winthrop's second model is closer to Janeba's network consumption framework. Consumption of a particular cultural good is subject to a local positive consumption externality. As can be expected, a competitive trade equilibrium has no reason to be efficient in such circumstances, justifying therefore the use of some public intervention (through a consumption subsidy) in the cultural sector.

17.2.1.3 Imperfect Competition

Cultural goods such as movies, media, and entertainment are often dominated by increasing returns to scale, innovations, technological change, and imperfect competition. Several papers have included some of these features, while still including agent heterogeneity within countries as a key ingredient of the analysis.

For instance, François and van Ypersele (2002) and Ramezzana (2003) study the optimal degree of trade protection in the presence of heterogenous preferences over differentiated goods in a context of non-competitive or monopolistic markets. In particular, taking as a motivating example the case of trade in motion pictures, François and van Ypersele (2002) show that protection of cultural goods can be Pareto-improving. In their model, consumers have identical valuations for blockbuster movies that can

be upgraded by specific technological investments in special effects. At the same time, consumers are horizontally differentiated in their valuations for local, non-standardized movies and interested only in the local movies produced in their own country. In each country the industry is characterized by duopoly competition between a blockbuster producer and a local movie producer owing to of increasing returns to scale in producing movies, larger market size may induce blockbuster movies to undertake technological investments that drive out local movies of their market. As such, cultural diversity in the supply of movies is reduced within countries. A free trade regime may be Pareto-dominated by some optimal tariff on blockbuster movies, allowing local movies to be viable in both markets.

Alternatively, Ramezzana (2003) considers a model of monopolistic competition where varieties may be valued with different weights depending on the country. Trade integration and market size effects again play a role to favor the entry of cultural varieties favored by consumers of the bigger country, at the expense of the varieties favored by the smaller country.

17.2.2 Dynamic Models of Trade Integration and Cultural Diversity

While the previous approaches enlightened demand- and supply-driven effects of trade in cultural goods in a static framework, a dynamic perspective is useful to understand the current debate on globalization and the evolution of cultural diversity across the world. This line of research therefore explicitly recognizes the endogeneity of preferences, and investigates how they might be affected by economic interactions and international integration.

A first theoretical model that tackles explicitly the dynamic externalities associated to cultural sectors in an international context is Rauch and Trindade (2009). This analysis extends Janeba's (2007) cultural networking goods setup by allowing both monopolistic competition and dynamic cultural effects. On the demand side, the analysis develops a two-country model of international trade with differentiated cultural products subject to static consumption cultural network externalities. It is assumed that the externality for any variety depends not only on consumption of that individual variety, but also on consumption of all 'compatible' varieties (i.e. varieties produced within the same culture). Cultural goods are costlessly transportable, but foreign cultural varieties are subject to a 'cultural discount cost' by domestic consumers.

A second element of the setup is the fact that the utility from consumption of cultural goods is also augmented by the quality of the cultural goods, which in turn is dynamically influenced by past cultural goods. The idea here is that on the supply side, production of past cultural goods generates creative ideas that can be used in future cultural production. Cultural industries are therefore characterized by dynamic spillover effects. Moreover, these spillover effects are assumed to be the same for both home and foreign producers, making past cultural creativity a global public good (think, for

instance, about the case where producers attend the same international film and music festivals).

The model shows, as usual with trade monopolistic competitive models, that increased relative home country size and increased globalization (increased international networking and social interaction effects) both reduce demand for the cultural goods of the foreign (smaller) country relative to the home country. In the limit there is a threshold relative home country size such that foreign cultural goods production is eliminated. The stronger the international networking effect, the smaller this threshold.

More interestingly, the welfare effects of increased globalization are ambiguous. Higher consumption network externalities due to increased social interactions across the world unambiguously increase consumer utility in the current period. However, they also reduce the ratio of relatively scarce foreign varieties to relatively abundant home varieties of cultural goods. As foreign varieties are relatively scarce, worldwide cultural creativity decreases and the quality of future cultural goods will tend to fall. Consequently, the welfare of the representative consumer in both countries could decrease if the rate of time discount is sufficiently small. This last result suggests an interesting intertemporal tradeoff associated with globalization in cultural contexts. While, in the short term, globalization provides utility benefits from increased social interactivity, international competition with strong market size effects may lead to reduced cultural diversity, less cultural creativity, and lower quality in cultural goods in the future.

Bala and Van Long (2005) also provide an analysis of the dynamic effects of trade on cultural diversity. In their models, individuals are differentiated according to their preferences for different types of private goods. Preferences are endogenous over time. More precisely, using a replicator dynamics approach, Bala and Van Long (2005) assume that the number of individuals preferring one type of good over another depends on the fraction of people having the same preference in the previous period as well as the relative price of the two goods. Trade affects relative good prices while in turn the distribution of preferences impacts the structure of equilibrium prices on international markets. The analysis shows that trade may lead to the extinction of one preference type, depending on the structure of endowments and country size.

Finally, Belloc and Bowles (2009) also provide a trade model with the evolution of endogenous preferences, although taking a different perspective. Their focus is on the issue of the persistence of cultural and institutional diversity in the presence of international trade or factor mobility. To illustrate their point, they consider a two-country/two-good model in which countries may differ in their institutions and cultures. Production and distribution are governed by employers' choice between two types of contracts, either joint residual claimancy under partnerships or a fixed wage and monitoring contract with the employer as the sole residual claimant. Agents may have two different types of preferences: employees may be *reciprocal* (i.e. responding positively to

employers' trust in them and *vice versa*) or *self-regarding* (i.e. simply maximizing their material payoffs). Finally, goods differ in the extent to which their production depends on the quality of labor effort and therefore needs a contract requiring monitoring of an explicit level of labor input. As a consequence, where non-verifiable aspects of work are important to production, social norms such as reciprocity or a positive work ethic may be required for high levels of productivity.

The authors use an evolutionary game-theoretical approach to model the interacting dynamics between contract choices (institutions) and individual preferences related to work ethics (culture). In such a setting, the type of contract that maximizes employers' profits depends on the preferences that prevail in a given country. Partnership contracts are, for instance, more profitable where social preferences like the work ethic or reciprocity are common. The distribution of preferences in turn is based on a cultural updating process in which the payoffs associated with different preferences (and the behaviors they support) depend on the distribution of contracts in the economy. The implied complementarity between distinct preferences and contracts generates the possibility of distinct stable steady-state distributions of preferences and contracts (so-called *cultural–institutional conventions*).

Three key results are derived:

i. The existence of multiple autarkic cultural–institutional conventions naturally generates cross-country differences in the institutional and cultural environment that, independently from differences in technologies or factor endowments, are a source of comparative advantage.

ii. Economic integration may reinforce rather than destabilize institutional and cultural diversity, and may actually impede transitions, even to Pareto-improving conventions. International trade allows countries to specialize in the goods that are relatively more advantaged (or less disadvantaged) given their institutions and culture. The associated gains from trade increase the returns available to employers and employees, and, hence, raise the cost of a mismatch that is likely to occur as the result of deviations from the prevalent preferences and contracts. Making institutional experimentation more costly, the gains from trade thus increase the impediments to cultural–institutional transitions. Thus, in an open-economy setting a nation's cultural institutional convention may persist over very long periods, even when a Pareto-superior convention exists and when the *status quo* convention confers absolute disadvantage with respect to other countries in all goods.

iii. In contrast to trade, factor market integration facilitates convergence between cultural–institutional conventions. The reason is that factor mobility, by changing the local social matching conditions between preferences and contracts, lowers the expected costs of deviating from the autarkic cultural institutional *status quo*, increasing therefore the likelihood for a cultural evolutionary path towards a superior cultural–institutional convention.

17.3. DYNAMIC CULTURAL TRANSMISSION MODELS

In Rauch and Trindade (2009), Bala and Van Long (2005), and Belloc and Bowles (2011), the cultural dynamics are driven by an exogenous process directly imported from the Darwinian literature in biology. This replicator dynamics approach describes selection mechanisms on preferences in an essentially black-box way. While useful as a first step, however, this approach leaves open the precise mechanisms through which international integration actually affects cultural diversity. It also makes it difficult to provide cultural policy implications about the costs and benefits of cultural diversity in a globalized context. To have insights on such questions, it seems useful to construct models that provide precise micro-foundations for the evolutionary processes that affect cultural change and how these interact with international integration. In the recent decade, building on models of cultural transmission originating from evolutionary anthropology and population dynamics literature (Cavalli-Sforza and Feldman, 1981; Boyd and Richerson, 1985), economists have started to develop formal frameworks of cultural evolution in contexts where socioeconomic activities are likely to interact with preference changes. In this section, we review these perspectives.

17.3.1 Models of Cultural Transmission with Exogenous Transmission Rules

The models of Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1985) consider stylized frameworks of cultural transmission with simple exogenous transmission rules that also provide a clear terminology, which will be extensively adopted by most of the subsequent literature.

For simplicity, consider a *dichotomous cultural trait* in the population, $\{A,B\}$. Let the fraction of individuals with trait $i \in \{A,B\}$ be q^i. Individuals live for two periods: as a child in their first period and as an adult in their second period. Assume that each adult parent has one child, so that the full population remains stationary at a level L, which is conveniently normalized to 1. Cultural transmission is the result of *direct vertical* (parental) socialization and *horizontal/oblique socialization* in society at large. *Horizontal* socialization refers to socialization resulting from interactions between members of the child population, while *oblique* socialization is due to interactions between children and members of their parents' population. The precise mechanism of socialization is described in Fig. 17.1.

Specifically, for an individual in the first period of his or her life (as a child) we have the following:

i. Direct vertical socialization to the parent's trait, say i, occurs with probability d^i.

ii. If the child from a family with trait i is not directly socialized, which occurs with probability $1-d^i$, he or she is horizontally/obliquely socialized by picking the trait of a role model chosen randomly in the population (i.e. he or she picks trait i with probability q^i and trait $j \neq i$ with probability $q^j = 1-q^i$.

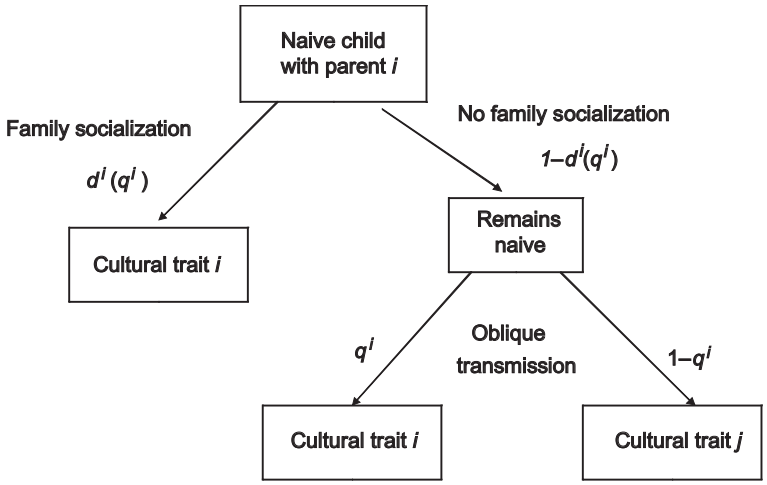

Figure 17.1 Cultural transmission.

The cultural transmission mechanism introduced by Cavalli-Sforza and Feldman (1981) is then summarily represented by the following system of equations for P^{ij}, the probability that a child from a family with trait i is socialized to trait j:

$$\begin{aligned} P^{ii} &= d^i + (1 - d^i)q^i \\ P^{ij} &= (1 - d^i)(1 - q^i). \end{aligned} \tag{17.1}$$

The system of Eq. (17.1) implies the following dynamics of the fraction of the population with trait i, in the continuous time limit:

$$\frac{dq^i}{dt} = q^i(1 - q^i)\left(d^i - d^j\right). \tag{17.2}$$

Again, Eq. (17.2) is a simple version of the replicator dynamics in evolutionary biology for a two-trait population dynamic model. If $(d^i - d^j) > 0$ cultural transmission represents a selection mechanism in favor of trait i, due to its differential vertical socialization. This selective mechanism is all the more powerful (i.e. the speed of selection is higher) when there is enough variation in the population, which is captured by the term $q^i(1-q^i)$, reflecting the variance of types in the population. A stationary state of the population dynamics q^{i*} is *culturally homogeneous* if either $q^{i*}=0$ or $q^{i*}=1$. Instead, the state q^{i*} is said to be *culturally heterogeneous* if $0<q^{i*}<1$. The solution path of the differential equation that describes the population dynamics can be denoted as $q^i(t, q^i_0)$, where $q^i(t, q^i_0)$ is the value of q^i at time t when, at time $t=0$, q^i takes the value q^i_0.

Simple inspection of (17.2) reveals the following result, first expressed by Cavalli-Sforza and Feldman:

> *Suppose (d^i,d^j) are exogenous and $d^i > d^j$.*[5] *In this case, the stationary states of the population dynamics are culturally homogeneous. Moreover, the dynamics of the system converges monotonically to $q^* = 1$ for any initial condition $q_0^i > 0$. If instead $d^i = d^j$, then $q^i(t, q_0^i) = q_0^i$, for any $t \geq 0$.*

In other words, the selective mechanism of cultural transmission, as modeled by Cavalli-Sforza and Feldman, provides cultural homogenization in the long run. The cultural trait that has the highest probability to be vertically transmitted will prevail in the long run in the population. Obviously, such a framework can hardly explain the observed resilience of cultural traits that is observed in the world (Bisin and Verdier, 2010), except in the knife-edge non-generic case in which $d^i = d^j$.

More interestingly, the previous framework can be extended to allow for frequency-dependent direct socialization probabilities:

$$d^i = d(q^i), d^j = d(1 - q^i),$$

generating more interesting and complex population dynamics. A crucial question though is what determines the exact shape of such socialization probabilities. In Boyd and Richerson (1985), the mechanism that allows for frequency-dependent direct socialization probabilities is exogenous and not specifically modeled. It cannot, therefore, tell us much about the way socioeconomic interactions, in particular globalization, affect the process of cultural change.

In the following we discuss a simple economic framework that provides some micro-foundations for frequency-dependent socialization rates. As we will see, such an approach is flexible enough to be usefully applied to understand how international integration may interact with the process of cultural change.

17.3.2 A Simple Economic Model of Cultural Transmission

Building on Cavalli-Sforza and Feldman, Bisin and Verdier (2000a,b, 2001) introduce parental purposeful socialization choices in the transmission of cultural traits,[6] endogenizing therefore the direct socialization probabilities, d^i,d^j. The central idea is the fact that parental socialization choice is motivated by *imperfect empathy* or *paternalism*, which is a form of altruism biased towards the parents' own cultural traits: parents care about their children's choices, but they evaluate them using their own (the parents, not the children's) preferences.

To illustrate this formally, consider X an abstract choice set, comprising all choices relevant to an individual's economic and social life. Cultural traits are then represented

[5] Obviously, the case $d^j > d^i$ is symmetric, as i and j are arbitrary.

[6] See also Bisin et al. (2004) for an empirical investigation in the context of marriages and transmission of ethnic and religious traits.

by preferences on elements of that set. More specifically, each individual (parent or child) chooses $x \in X$ to maximize $u^i : X \to \Re$, for cultural trait $i \in \{A,B\}$. Let V^{ij} denote the utility to a cultural trait i parent of a type j child, $i,j \in \{A,B\}$. The assumption of *imperfect empathy* is then formulated as follows:

Preferences are characterized by imperfect empathy if, for all i,j, $V^{ij} = u^i(x^j)$, *where* $x^j = \text{argmax}_{x \in X} u^j(x)$.[7]

As long as V^{ii}, V^{ij} are independent of q^i, imperfect empathy implies $V^{ii} \geq V^{ij}$, with strict inequality for generic preferences $u^i(x)$, $u^j(x)$. Importantly, however, when individuals interact socially, V^{ii}, V^{ij} will be a function of q^i. In such cases, the condition for imperfect empathy will not necessarily hold under all circumstances. As a matter of fact, it may be endogenously determined by the nature of the socioeconomic interactions across individuals. This feature will be particularly important in the case of globalization and international integration, as we discuss later.

When $V^{ii} \geq V^{ij}$ parents have an incentive to socialize their children to their own cultural trait. Socialization, however, is costly and requires parental resources, (e.g. time spent with children, private school tuition, church contribution, etc.) Denote by $C(d^i)$ such socialization costs, with d^i the probability of direct socialization of parents with trait i to one's own trait. The value of parental socialization choice is then represented by[8]:

$$W^i(q^i) = \max_{d^i \in [0,1]} -C(d^i) + P^{ii} V^{ii}(q^i) + P^{ij} V^{ij}(q^i), \text{ subject to (17.1) and (17.2)},$$

we obtain the optimal socialization effort $d(q^i, \Delta V^i)$ as the solution of the first order conditions:

$$C'(d^i) = (1 - q^i)\Delta V^i, \tag{17.3}$$

where $\Delta V^i = V^{ii} - V^{ij}$ measures the relative value of a child with the same cultural trait as his parents; we refer to ΔV^i as the *cultural intolerance* of trait i.

The population dynamics for the fraction of agents with trait i is now determined by Eq. (17.2), evaluated at $d^i = d(q^i, \Delta V^i)$, $d^j = d(1 - q^i, \Delta V^j)$ as in (17.3). Bisin and Verdier (2001) prove the following result:

Suppose (d^i, d^j) *are endogenously determined as in Eq. (17.3). There are three possible stationary states of the population dynamics:* $q^{i*} = 0$ *or* $q^{i*} = 1$ *(cultural homogenous stationary states) and* $q^{i*} \in (0,1)$ *(cultural heterogenous state). Moreover, for any* $q_0^i \in (0,1)$, *the cultural homogenous stationary states are unstable while the cultural heterogeneous stationary state is globally stable.*

[7] To avoid trivial cases, we assume $x^A \neq x^B$.

[8] The socialization choice of parents is independent of their choice of $x \in X$. This is due to preference separability.

This specific economic model of cultural transmission predicts therefore cultural heterogeneity. More generally, Bisin and Verdier (2001) provide explicit conditions on the socialization mechanisms to generate cultural heterogeneity or homogeneity in the long run. Intuitively, cultural heterogeneity might obtain when parents belonging to a cultural minority face relatively higher incentives to socialize their children to their own trait. Formally, this is the case when socialization mechanisms satisfy the following property:

Cultural substitution: for any $\Delta V^i > 0$, $d^i(q^i,\Delta V^i)$ is a continuous, strictly decreasing function in q^i and, moreover, $d^i(1,\Delta V^i) = 0$.

When direct vertical transmission acts as a *cultural substitute* to oblique transmission, parents have less incentive to socialize their children the more widely dominant are their values in the population. In the limit of a perfectly homogenous population of type i, parents of type i do not directly socialize their children. They prefer to free-ride completely on society to do it for them. On the opposite, individuals from a tiny minority group i (with a population frequency close to $q^i = 0$) have strong incentives to socialize their children through vertical socialization, as this is the only way through which their children can actually acquire this trait. As a consequence the socialization pattern moves the system away from full homogeneity: $q^i = 0$ and $q^i = 1$ are locally unstable stationary states of (17.2), and the basis of attraction of the unique steady state associated to the heterogeneous population, q^{i*}, is the full interval (0,1). Bisin and Verdier (2001) then show that cultural heterogeneity obtains whenever direct vertical socialization is a substitute for oblique/horizontal socialization.

The opposite case is the case of *cultural complementarity* when $d^i(q^i,\Delta V^i)$ is instead increasing in q^i. In such a case, socialization efforts of parents of type i are typically larger the more frequent their trait in the population. Direct vertical and oblique transmissions are linked in some degree by complementarity. This can be the case when, for instance, socialization to a particular trait i requires exposure to a minimum number of role models of that same type i in the social environment of the child. In such a case, the cultural socialization technology to trait i exhibits increasing returns to scale with respect to frequency of the trait. This creates scale effects that can counteract the cultural substitutability force previously identified. As again shown in Bisin and Verdier (2001), strong enough forms of cultural complementarity can then drive the dynamics of the distribution of the traits in the population towards homogeneity.

The role of cultural substitution versus complementarity in the population dynamics of cultural traits can be graphically illustrated in Figs. 17.2a and 17.2b.[9]

In Fig. 17.2a, with cultural substitutability, the intergenerational cultural transmission rates of agents of type i is decreasing in their own fraction q^i. This leads to dynamics that move the system away from the corners $q^i = 0,1$ and towards the interior steady state $q^{i*} \in (0,1)$, with a long-run heterogenous cultural population. Figure 17.2b illustrates

[9] Bisin and Verdier (2001) provide explicit micro-foundations for the two possible technologies of cultural socialization.

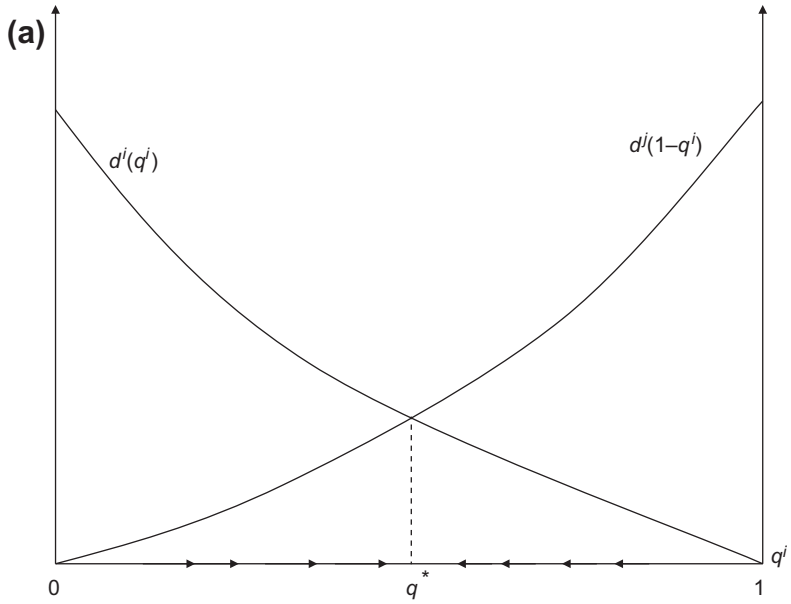

Figure 17.2a Cultural substitutability.

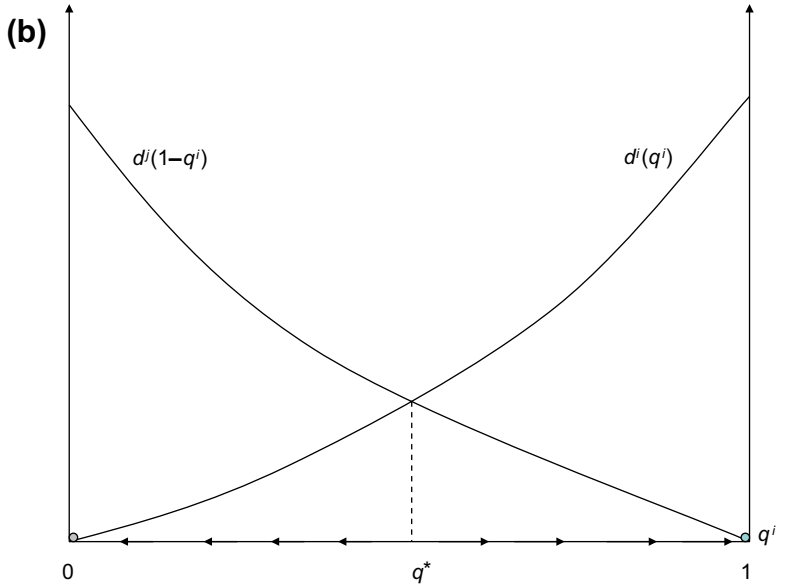

Figure 17.2b Cultural complementarity.

the case of cultural complementarity whereby cultural transmission rates of agents of type i are increasing in their own fraction q^i. In such a case, cultural dynamics are driven towards the corner steady states $q^i = 0,1$. Depending on the initial conditions, the system converges towards a population fully made of individuals of type a or of type b. In this sense, history matters: societies starting with initial conditions $q_0^i < q^{i*}$ (respectively, $q_0^i > q^{i*}$) will end up with culturally homogenous populations with $q^i = 0$ (respectively, $q^i = 1$).

In the cultural transmission models we described so far, parental socialization depends on the parents' relative value of child with the same cultural trait as theirs, ΔV^i, which we referred to as the *cultural intolerance* of trait i. Up to now, the ΔV^is have been treated as exogenous preference parameters. In many contexts of interest, however, this is too restrictive an assumption. The endogeneity of ΔV^i can exist for various reasons. For instance, when individuals interact on markets, their indirect utility may depend on economic variables such as prices and incomes or policy outcomes that depend on the type of society and therefore the distribution of cultural traits that prevail in such society. Similarly, in strategic and matching interactions contexts, the payoffs that an individual may obtain are likely to be influenced by the distribution of cultural traits in the population. In all these situations, it is reasonable to expect cultural intolerance, ΔV^i, to be endogenous. While the implications of the endogeneity of ΔV^i for socialization and population dynamics need to be derived case-by-case, a reduced-form analysis is, however, useful, to clarify what to look for in the examples.

For instance, suppose now that each individual (parent or child) chooses $x \in X$ to maximize $u^i(x, q^i)$, for $i \in \{A,B\}$ so that, under *imperfect empathy*, direct parental socialization for types i depends on $\Delta V^i(q^i) = u^i(x^i, q^i) - u^i(x^j, q^i)$. A first fundamental implication of the endogeneity of ΔV^i is the fact that when cultural intolerance ΔV^i depends on q^i, imperfect empathy does not necessarily imply that $\Delta V^i(q^i) \geq 0$. In fact, socialization to the parents' trait might put the children at a disadvantage in the child social environment, represented by q^i. While *imperfect empathy* is manifested as a preference on the part of parents for sharing their cultural traits with their children, such a preference depends on the economic and social conditions that parents expect for their children. Different economic and social conditions could, in principle, lead parents to socialize their children to a trait different than their own.

Furthermore, with endogenous values of $\Delta V^i(q^i)$, the dynamic system for the evolution of cultural traits can be written as:

$$\dot{q}^i = q^i(1 - q^i)\left[d(q^i, \Delta V^i(q^i)) - d(q^j, \Delta V^j(q^j))\right].$$

While *cultural substitution* is still sufficient to guarantee population dynamics that converge to cultural heterogeneity, an additional assumption on $\Delta V^i(q^i)$ is necessary to

produce direct socialization maps $d^i(q^i)$ satisfying cultural substitution. More specifically, we define *social strategic substitution* and *complementarity* as follows.

The social environment is characterized by social strategic substitution if,

$$\frac{\partial}{\partial q^i}\Delta V^i(q^i) < 0.$$

The social environment is instead characterized by social strategic complementarity if:

$$\frac{\partial}{\partial q^i}\Delta V^i(q^i) > 0.$$

It is easy to see that, if direct and oblique socialization mechanisms are cultural substitutes, *social strategic substitution* ensures that the derivative of the direct socialization map $d^i(q^i)$ is negative. Indeed we have:

$$d^{i'}(q^i) = \frac{\partial d(q^i, \Delta V^i(q^i))}{\partial q^i} + \frac{\partial d(q^i, \Delta V^i(q^i))}{\partial \Delta V^i}\left[\frac{\partial}{\partial q^i}\Delta V^i(q^i)\right] < 0. \qquad (17.4)$$

The first term of the right-hand side of (17.4) is negative because direct and oblique socialization are cultural substitutes. The second term is also negative. Indeed, $\partial d(q^i,\Delta V^i)/\partial \Delta V^i$ is positive (as a larger value of cultural intolerance ΔV^i induces more socialization, everything else being equal) and $\partial \Delta V^i(q^i)/\partial q^i$ is negative because of the *social strategic substitution* assumption. The following result is then straightforward.

In a social environment characterized by social strategic substitution, the stationary states of the population dynamics are $q^{i*} = 0$ *or* $q^{i*} = 1$ *(cultural homogenous stationary states) and* $q^{i*} \in (0,1)$ *(cultural heterogenous state). Moreover,* $q^i(t, q_0^i) \to q^{i*} \in (0,1)$*, globally, for any* $q_0^i \in (0,1)$.

Social strategic substitution ensures that cultural minorities will face relatively larger gains from socialization, independently of the socialization mechanism. In such cases, the motivation for cultural transmission within social interaction contexts reinforces the cultural substitutability force directly embedded in the socialization mechanism. Diversity is then preserved in the long-run population of cultural traits.

In the case of *social strategic complementarity*, on the contrary, cultural minorities face smaller (even possibly negative) socialization gains as the frequency of the group decreases. Depending on the strength of cultural substitution, in this case minorities might or might not assimilate culturally to the majority. In particular, when *social strategic complementarity* is strong enough, the full socialization map curve $d^i(q^i)$ may now be increasing in q^i even when vertical and oblique role models are cultural substitutes

in the socialization process. In such a case, the cultural dynamics will lead to cultural homogenization of the long-run population.

Several papers explore the transmission of various distinct cultural traits along the lines of this section: developing a model of the specific socioeconomic interaction of interest, obtaining a reduced form for $\Delta V^i(q^i)$, and applying the cultural transmission model to study the population dynamics.[10] In the following, we apply this methodology to discuss the channels through which international trade integration may interact with the dynamics of cultural diversity in the world economy.

17.4. CULTURAL TRANSMISSION AND COMPETITIVE ECONOMIC EXCHANGE

A first natural way to investigate how globalization (and more specifically trade) interacts with cultural diversity is to consider how individual preferences may evolve when economic agents interact and exchange in the standard general equilibrium framework of competitive markets. In trade theory such models provide the usual supply-side comparative advantage explanations for patterns of production and exchange between communities or countries. Importantly, when preferences are endogenous and can be transmitted over generations, such contexts also give rise to social strategic substitution effects in cultural transmission, due to the standard *Walrasian price effects* that obtain on demand.

The following simple exchange economy with two goods, $l=1,2$, illustrates the argument. The economy has a population of individuals whose size is normalized to $L=1$. Agents have all the same individual endowment vector $\omega=(\omega_l)_{l=1,2}$ but they may differ in their preferences over the two goods: agents of type $i=$A do prefer good 1 (respectively, good 2) more (less) than agents of type $i=$B. To fix ideas consider simply that preferences are given by:[11]

$$u^{\mathrm{A}}(x_1,x_2)=x_1 \quad \text{and} \quad u^{\mathrm{B}}(x_1,x_2)=x_2.$$

Hence, individuals of type A (respectively, of type B) only care about good 1 (respectively, good 2). The price vector of the two goods is $(p_l)_{l=1,2}$. Without loss of generality we can fix

[10] A non-exhaustive list includes Olcina and Penarrubia (2004) for other-regarding preferences in hold-up contexts; François (2002) and François and Zabojnik (2005) for social capital; Sáez-Martí and Zenou (2012) and Senik and Verdier (2011) for work values and ethnic labor market discrimination; Bidner and Francois (2011) for the evolution of informal institutions; Hiller (2008), for pro-social preferences and corporate culture; and Frot (2009) and Michaud (2009) for work values and social/unemployment insurance.

[11] The following results hold for more general preference structures $u^{\mathrm{A}}(x_1,x_2)$ and $u^{\mathrm{B}}(x_1,x_2)$ such that, $\forall x_1,x_2$:

$$\frac{\partial u^{\mathrm{A}}(x_1,x_2)}{\partial x_1}>\frac{\partial u^{\mathrm{B}}(x_1,x_2)}{dx_1},\ \frac{\partial u^{\mathrm{B}}(x_1,x_2)}{\partial x_2}>\frac{\partial u^{\mathrm{A}}(x_1,x_2)}{dx_2}.$$

good 1 as the numéraire and denote $p=p_2/p_1$ the relative of good 2 relative to good 1. The Walrasian demand functions for the two types of consumers are immediate and given by:

$$x_1^{\mathrm{A}}(p) = \omega_1 + p\omega_2, x_2^{\mathrm{A}}(p) = 0$$
$$x_1^{\mathrm{B}}(p) = 0, x_2^{\mathrm{A}}(p) = \frac{\omega_1}{p} + \omega_2.$$

In a given generation period t, let the fraction of individuals of type A and type B be, respectively, $q_t^{\mathrm{A}} = q_t$ and $q_t^{\mathrm{B}} = 1 - q_t$. Then the market clearing relative price of good 2, p, will be determined by the market clearing condition:

$$q_t x_1^{\mathrm{A}}(p) + (1 - q_t)x_1^{\mathrm{B}}(p) - \omega_1 = 0, \tag{17.5}$$

which gives:

$$p(q_t) = \frac{1 - q_t}{q_t}\frac{\omega_1}{\omega_2}.$$

It is clear that $p(q_t)$, the equilibrium relative price of good 2, is a decreasing function of q_t as individuals of type A prefer good 1.

The cultural intolerance parameters for cultural transmission by a parent of type i living in period t, ΔV_t^i, for $i=\mathrm{A}, \mathrm{B}$ can also be obtained immediately:

$$\Delta V_t^{\mathrm{A}} = u^{\mathrm{A}}(x_{t+1}^{\mathrm{Ae}}) - u^{\mathrm{A}}(x_{t+1}^{\mathrm{B}^{\mathrm{e}}}) = \frac{\omega_1}{q_{t+1}^{\mathrm{e}}}$$
$$\Delta V_t^{\mathrm{B}} = u^{\mathrm{B}}(x_{t+1}^{\mathrm{Be}}) - u^{\mathrm{B}}(x_{t+1}^{\mathrm{A}^{\mathrm{e}}}) = \frac{\omega_2}{1 - q_{t+1}^{\mathrm{e}}},$$

where $x_{t+1}^{i\mathrm{e}}$ is the parent's expected equilibrium consumption pattern of a child of type i in his/her adult life (i.e. in period $t+1$); and q_{t+1}^{e} is the expectation that parents of time t have on the fraction of individuals prevailing in period $t+1$ when their children will be grown up. Various assumptions may be made on how parents form expectations about the society in which their children will live. To make things simple, assume that those expectations are myopic in the sense that $q_{t+1}^{e} = q_t$.[12] Hence:

$$\Delta V_t^{\mathrm{A}} = \Delta V^{\mathrm{A}}(q_t) = \frac{\omega_1}{q_t} \quad \text{and} \quad \Delta V_t^{\mathrm{B}} = \Delta V^{\mathrm{B}}(1 - q_t) = \frac{\omega_2}{1 - q_t}.$$

[12] An obvious alternative would be to assume that parents have rational expectations (i.e. $q_{t+1}^{\mathrm{e}} = q_{t+1}$). This will bring some element of forward-lookingness and possibilities of multiple rational equilibrium paths for $[q(t, q_0)]_{t\geq 0}$; see Bisin and Verdier (2001) and Bisin and Verdier (2005) for more discussions on this.

Simple inspection shows that $\Delta V^i(q^i)$ is decreasing in q^i and therefore *social strategic substitution* obtains. The reason is simply that the larger the fraction of a specific preference structure biased towards a given good in the population, the larger the aggregate demand for that good and, consequently, the higher the relative price of that good in the Walrasian competitive equilibrium. This price effect in turn makes it less beneficial for parents to transmit such preference profiles to their children, leading therefore to *social strategic substitution*.

Following this, the dynamic equation driving the evolution of preferences in the community is given by:

$$q_{t+1} - q_t = q_t(1 - q_t)\left[\mathrm{d}^{\mathrm{A}}(q_t) - \mathrm{d}^{\mathrm{B}}(q_t)\right],$$

with:

$$C'(d^{\mathrm{A}}(q_t)) = (1 - q_t)\Delta V^{\mathrm{A}}(q_t) = \frac{(1 - q_t)}{q_t}\omega_1$$
$$C'(d^{\mathrm{B}}(q_t)) = q_t\Delta V^{\mathrm{B}}(1 - q_t) = \frac{q_t}{1 - q_t}\omega_2.$$

It follows immediately that cultural heterogeneity will be preserved. As a matter of fact, the interior stable steady state fraction $q^* \in (0,1)$ of individuals of type A in the population is given by the condition $\mathrm{d}^{\mathrm{A}}(q^*) = \mathrm{d}^{\mathrm{B}}(q^*)$, giving therefore:

$$q^* = \frac{\sqrt{\omega_1}}{\sqrt{\omega_1} + \sqrt{\omega_2}}.$$

Two features are worth noting. First, because of cultural transmission, the steady-state distribution of preferences in the population depends on supply-side elements of the economy, here the initial endowment vector (ω_1, ω_2) of each individual. Hence, the demand side of the economy in the long run is affected by supply-side fundamentals. This dimension is therefore reminiscent of *Marxist materialism*, and the idea that tastes and preferences are affected by the materialistic components of the environment in which such preferences evolve.

Second, note that $q^* = q^*(\omega_1/\omega_2)$ depends only on relative endowments and is increasing in ω_1/ω_2. This last feature provides a rationale for the existence of the so-called home-bias effect on preferences whereby *preferences will be biased towards the goods that the economy produces in abundance*. In the present context of our simple exchange economy, the more abundant the relative endowment of good 1, the more abundant will be the long-run fraction of individuals of type A with strong preferences for good 1. The intuition for this result is simple. Owing to the standard Walrasian price effects, the

more abundant the endowments and supply of good 1 in the economy, the smaller its equilibrium relative price in competitive markets. This in turn increases the perceived benefit for parents of type A to transmit their trait (biased towards the consumption of the cheaper good 1) to their children compared with parents of type B. This differential effect of the relative price of good 1 on cultural transmission efforts leads to a higher transmission rate of trait A compared to trait B, leading in the end to a larger steady-state proportion of individuals with preferences for good 1 in the population.

This model can then be easily extended to a two-country exchange economy model in which there is international trade and preferences for the two goods 1,2 are again transmitted across generations along the previous processes. Denote, for instance, the two countries as H and F for home and foreign. Within each country $h = \mathrm{H,F}$, there is a population of size L^h such that all agents have again in their adult life the same individual endowment vector $\omega^h = (\omega_l^h)_{l=1,2}$ over the two goods 1 and 2. Denote then q_t^h the fraction at time t of adult agents of type $i = \mathrm{A}$ in country h. The Walrasian demand functions $\left(x_i^{\mathrm{A}h}(p)\right)_{i=1,2}$ $\left(x_1^{\mathrm{B}h}(p)\right)_{i=1,2}$ for each type of consumer (A and B) in each country h is immediate. Under free trade across countries, the market clearing relative price of good 2, p, can be computed to satisfy:

$$p = p\left(q_t^{\mathrm{H}}, q_t^{\mathrm{F}}\right) = \frac{L^{\mathrm{H}}\left(1 - q_t^{\mathrm{H}}\right)\omega_1^{\mathrm{H}} + L^{\mathrm{F}}\left(1 - q_t^{\mathrm{F}}\right)\omega_1^{\mathrm{F}}}{L^{\mathrm{H}} q_t^{\mathrm{H}}\omega_2^{\mathrm{H}} + L^{\mathrm{F}} q_t^{\mathrm{F}}\omega_2^{\mathrm{F}}}.$$

The cultural intolerance parameters will then be written as:

$$\Delta V_t^{\mathrm{A},h} = \Delta V_t^{\mathrm{A},h}\left(q_t^{\mathrm{H}}, q_t^{\mathrm{F}}\right) = \omega_1^h + p\left(q_t^{\mathrm{H}}, q_t^{\mathrm{F}}\right)\omega_2^h$$

$$\Delta V_t^{\mathrm{B},h} = \Delta V_t^{\mathrm{B},h}\left(q_t^{\mathrm{H}}, q_t^{\mathrm{F}}\right) = \frac{\omega_1^h}{p\left(q_t^{\mathrm{H}}, q_t^{\mathrm{F}}\right)} + \omega_2^h.$$

Studying the resulting dynamic equations of cultural transmission in the two countries, we obtain that steady states must satisfy:

$$\frac{1 - q^h}{q^h} = \frac{\frac{\omega_1^h}{p(q^{\mathrm{H}}, q^{\mathrm{F}})} + \omega_2^h}{\omega_1^h + p(q^{\mathrm{H}}, q^{\mathrm{F}})\omega_2^h} = \frac{1}{p(q^{\mathrm{H}}, q^{\mathrm{F}})} \quad \text{for } h = \mathrm{H,F}.$$

It follows immediately that the interior steady state is symmetric across countries $q^{\mathrm{H}} = q^{\mathrm{F}} = q^{\mathrm{T}*}$ with $q^{\mathrm{T}*}$ given by:

$$q^{\mathrm{T}*} = \frac{\sqrt{\omega_1^w}}{\sqrt{\omega_1^w} + \sqrt{\omega_2^w}},$$

where $\omega_1^w = L^{\mathrm{H}}\omega_1^{\mathrm{H}} + L^{\mathrm{F}}\omega_1^{\mathrm{F}}$ and $\omega_2^w = L^{\mathrm{H}}\omega_2^{\mathrm{H}} + L^{\mathrm{F}}\omega_2^{\mathrm{F}}$ are the aggregate endowments of good 1 and 2 in the aggregate economy. Note again that the long-run steady-state fraction q_{T}^* of individuals of type A that prevails in both economies H and F is positively related on the relative world aggregate value of endowments ω_1^w/ω_2^w. From this we derive two interesting features. Assume that before trade integration, each economy $h = \mathrm{H,F}$ had settled on its autarkic long-run cultural steady state:

$$q_{\mathrm{autarky}}^h = \frac{\sqrt{\omega_1^h}}{\sqrt{\omega_1^h} + \sqrt{\omega_2^h}}.$$

Then trade integration leads to cultural convergence in terms of preference profiles across the two economies. Indeed, suppose to fix ideas that:

$$\frac{\omega_1^{\mathrm{H}}}{\omega_2^{\mathrm{H}}} > \frac{\omega_1^{\mathrm{F}}}{\omega_2^{\mathrm{F}}},$$

namely that country H has a comparative advantage in good 1 (and conversely country F has a comparative advantage in good 2). Note that this translates immediately in $q_{\mathrm{autarky}}^{\mathrm{H}} > q_{\mathrm{autarky}}^{\mathrm{F}}$, namely that *each country has a home-bias consumption profile in the good in which it has a comparative advantage*. It follows then that $\omega_1^w/\omega_2^w \in \left[\frac{\omega_1^{\mathrm{F}}}{\omega_2^{\mathrm{F}}}, \frac{\omega_1^{\mathrm{H}}}{\omega_2^{\mathrm{H}}}\right]$ and therefore that:

$$q_{\mathrm{autarky}}^{\mathrm{H}} > q^{\mathrm{T}*} > q_{\mathrm{autarky}}^{\mathrm{F}}.$$

In other words, after trade integration and convergence towards the same global pattern of preferences, each country has preferences less biased towards its comparative advantage good. Country H has a lower fraction of individuals that prefer good 1 than under autarky, while country F has fewer individuals that prefer good 2. In this simple setting, international trade leads to cultural convergence across countries and simultaneously reduces endogenously the *home-bias effect* of preferences in the two countries.

17.5. FACTOR ENDOWMENTS, TRADE, AND CULTURAL CONVERGENCE

While the details of the previous results are obviously dependent on the specificity of our exchange economy example, the qualitative result that trade under competitive conditions tends to preserve within-country cultural diversity and is potentially an important driver of cultural convergence across countries should be more general. In particular, the previous logic applies equally to production economies with increasing marginal costs.

An interesting case is, for instance, the standard Heckscher–Ohlin model where the source of competitive international trade across countries comes from differences in factor endowments. More precisely, assume a two-country world with countries $h=\mathrm{H,F}$, two goods $i=1,2$, and two factors of production capital K and labor L. In each country h, production is obtained under competitive conditions, using standard constant return to scale convex technologies. To fix ideas, good 1 is assumed to be more capital intensive than good 2. Take good 1 as the numéraire and denote p the relative price of good 2. Denote also by w and r the factor prices associated to labor and capital.

In each country h, the population of size L^h is composed of individuals, each endowed with one unit of labor and K^h/L^h units of capital. Again they may differ in the terms of their preferences over the two goods: agents of type $i=\mathrm{A}$ prefer good 1 (respectively, good 2) more (respectively, less) than agents of type $i=\mathrm{B}$. We assume that preferences are homothetic:

$$u^i(x_1,x_2)=\varphi^i\left(\frac{x_1}{x_2}\right)x_2,\quad i=\mathrm{A,B},$$

where $\varphi^i\left(\frac{x_1}{x_2}\right)$ is an increasing strictly concave function satisfying the appropriate Inada conditions. Also we assume that:

$$\frac{\varphi'_{\mathrm{A}}(z)}{\varphi^{\mathrm{A}}(z)}>\frac{\varphi'_{\mathrm{B}}(z)}{\varphi^{\mathrm{B}}(z)},$$

so that the marginal rate of substitution between good 1 and 2 is higher for consumers of type A than of type B.

Marshallian demands are given by:

$$x_1^i(p,I^h)=\frac{\theta^i(p)}{p+\theta^i(p)}I^h, x_2^i(p,I^h)=\frac{1}{p+\theta^i(p)}I^h,$$

where $I^h=rK^h/L^h+1$ is individual income in country h and $\theta^i(p)=x_1^i/x_2^i$ is the solution of $p=\frac{\varphi^i(\theta^i)}{\varphi'^i(\theta^i)}-\theta^i$.

In the Appendix Proposition A1 we show the following result:

Under standard assumptions, at an autarchic equilibrium in country h, the relative price of good 2 at equilibrium, $p=p(q_t^h/1-q_t^h,K^h/L^h)$, is unique, decreasing in q_t^h, and increasing in K^h/L^h.

Furthermore, the cultural intolerance parameters for cultural transmission by a parent of type i living in period t in country h, $\Delta V_t^{i,h}$, for $i=\mathrm{A,B}$ and $h=\mathrm{H,F}$, are:

$$\Delta V_t^{i,h}(p_{t+1}^{\mathrm{e}})=\left[\frac{\varphi^i\left(\theta^i(p_{t+1}^{\mathrm{e}})\right)}{p_{t+1}^{\mathrm{e}}+\theta^i(p_{t+1}^{\mathrm{e}})}-\frac{\varphi^i\left(\theta^j(p_{t+1}^{\mathrm{e}})\right)}{p_{t+1}^{\mathrm{e}}+\theta^j(p_{t+1}^{\mathrm{e}})}\right]I^h,\quad i\neq j.$$

Again one may look for the transmission of preferences under autarky in each country h. It will be again given by the dynamic equation:

$$q_{t+1}^h - q_t^h = q_t^h(1 - q_t^h)\left[d_t^{A,h} - d_t^{B,h}\right] \tag{17.6}$$

evaluated at optimal direct socialization levels in country h at time t, $d_t^{A,h}$, $d_t^{B,h}$.[13]

The steady-state distribution of preferences under autarky is given by the condition $d^A = d^B$:

$$\frac{1-q^h}{q^h} = \frac{\Delta V^{B,h}\left(p\left(\frac{q^h}{1-q^h}, K^h/L^h\right)\right)}{\Delta V^{A,h}\left(p\left(\frac{q^h}{1-q^h}, K^h/L^h\right)\right)}. \tag{17.7}$$

Note that the cultural intolerance parameters depend on q^h only through the effect of q^h on good 2 equilibrium price $p = p(q^h/1 - q^h, K^h/L^h)$. Obviously, the nature of the cultural steady states as characterized by (17.7) depends on whether *social strategic substitutability* or *social strategic complementarity* prevails.

In general, the sign of $\partial \Delta V_t^{i,h}/\partial p$ is indeterminate. Indeed, the two effects are going in opposite directions. To see that, consider, for instance, the individuals of type A. As such agents have an optimal pattern of consumption biased towards good 1, an increase in the relative price of good 2 makes it better for such individuals to see their children adopting also a profile of consumption biased towards good 1 rather than good 2. This effect tends to increase therefore their paternalistic gain of transmitting their trait $\Delta V^{A,h}$. On the other hand, as p increases, even agents of type B tend to substitute their consumption away from good 2 and to adopt a profile of consumption that is biased towards good 1 and therefore closer to the optimal profile of agents of type A. This effect tends to decrease the cost to parents of type A to expect their child to be of the other type B, which in turn implies a reduced value of $\Delta V^{A,h}$. When the substitution possibilities across goods are not too large and agents of type B cannot adjust too much their behavior in response to a change in p, the second negative effect is outweighed by the first positive effect and $\partial \Delta V^{A,h}/\partial p > 0$.[14] Given that the equilibrium price $p = p(q^h, K^h/L^h)$ is a decreasing function of q^h, it follows that $\partial \Delta V^{A,h}/\partial q^h < 0$ and *social strategic substitutability* prevails for group A.

[13] The optimal direct socialization levels, $d_t^{A,h}$, $d_t^{B,h}$, depend on p_{t+1}^{he}, the expected equilibrium relative price of good 2 to prevail in the next generation, which in turn depends on the expectations parents of generation t hold about the fraction of individuals of type A in the next period, (i.e. on $q_{t+1}^{h,e}$). Again we assume for simplicity myopic expectations (i.e. $q_{t+1}^{h,e} = q_t^h$ and hence $p_{t+1}^{h,e} = p_t^h$). Note as well that Eq. (17.6) is the discrete-time equivalent of Eq. (17.2).

[14] This happens when the function $\varphi^B(z)$ is concave enough. See Appendix Proposition A3 for details.

A symmetric argument implies that, when the substitution possibilities across goods are not too large and agents of type A cannot adjust too much their behavior in response to a change in p, $\partial \Delta V^{B,h}/\partial p < 0$. As the equilibrium price $p = p(q^h, K^h/L^h)$ is a decreasing function of q^h, it follows that $\partial \Delta V^{B,h}/\partial q^h = -\partial \Delta V^{B,h}/\partial (1-q^h) > 0$ and again *social strategic substitutability* prevails for group B. In the Appendix Proposition A3, we provide more details on these effects.

When *social strategic substitutability* prevails for both groups, the right-hand side of (17.7) is an increasing function of q^h. Given that the left-hand side is decreasing in q^h and taking value 0 at $q^h = 0$ and ∞ at $q^h = 1$, Eq. (17.7) defines a unique solution:

$$q^h_{\text{autarky}} = \widetilde{q}(K^h/L^h).$$

As $p(q^h_t, K^h/L^h)$ is increasing in K^h/L^h, it follows that q^h_{autarky} is an increasing function of the relative factor endowments K^h/L^h. The profile of the demand side at the cultural steady state depends on fundamentals from the supply side. Typically, in this Heckscher–Ohlin model context, one gets the equivalent of a Rybczynski theorem on cultural profiles:

> *Rybczynski theorem on cultural patterns: when social strategic substitutability prevails in cultural transmission, an increase in a given factor endowment leads to an increase in the long-run fraction of individuals that have preferences biased towards the good using relatively intensively that factor of production.*

In other words, a country that is relatively well endowed with capital K^h/L^h tends to have a larger long-run fraction of individuals that have a preference structure biased towards the good using relatively intensively capital. As we assume that good 1 is more capital intensive than good 2, this means that preferences of type A are going to be in higher frequency in the cultural steady state (i.e. q^h_{autarky} is increasing in K^h/L^h). Again, this result also suggests that there will be a natural home bias in preferences towards goods that can be produced relatively cheaply locally and therefore in which the country is likely to have a comparative advantage.

Consider now the effect of international trade between the two countries. To fix ideas, suppose that factor endowments are such that:

$$\frac{K^{\text{H}}}{L^{\text{H}}} > \frac{K^{\text{F}}}{L^{\text{F}}}.$$

Hence, country H has a comparative advantage in good 1 and conversely country F has a comparative advantage in good 2. Also from the previous discussion, assuming again that *social strategic substitutability* prevails, we get that:

$$q^{\text{H}}_{\text{autarky}} > q^{\text{F}}_{\text{autarky}}.$$

We assume that preferences have converged to such values in each country before opening the economies to free trade. Moreover, consider the traditional case where factor endowments are such that factor price equalization prevails under free trade. In each period the international relative price of good 2 is such that the world relative aggregate demand for good 2 equals world relative aggregate supply. It turns out that the world equilibrium price p_t^{f} satisfies:

$$p_t^{\mathrm{f}} = p\left(\frac{\sum_{\mathrm{H,F}} q_t^h L^h}{\sum_{\mathrm{H,F}} \left(1 - q_t^h\right) L^h}, \frac{K^{\mathrm{W}}}{L^{\mathrm{W}}}\right)$$

which is decreasing in the first argument (as $\theta^{\mathrm{A}}(p) > \theta^{\mathrm{B}}(p)$) and decreasing in the second argument because good 1 is capital intensive and good 2 is labor intensive.

The analytical representation of the cultural dynamics is rather involved, but the interior steady-state distribution of preferences under free trade is easy to characterize. It is given by the condition $d^{\mathrm{A},h} = d^{\mathrm{B},h}$ in each country h. Hence:

$$\frac{1 - q_{\mathrm{Trade}}^h}{q_{\mathrm{Trade}}^h} = \frac{\Delta V^{\mathrm{B}}(p^{\mathrm{f}})}{\Delta V^{\mathrm{A}}(p^{\mathrm{f}})}, \tag{17.8}$$

which implies a symmetric interior steady state $q_{\mathrm{Trade}}^{\mathrm{H}} = q_{\mathrm{Trade}}^{\mathrm{F}} = q^{\mathrm{T}*}$ such that:

$$\frac{1 - q^{\mathrm{T}*}}{q^{\mathrm{T}*}} = \frac{\Delta V^{\mathrm{B}}(p^{\mathrm{f}})}{\Delta V^{\mathrm{A}}(p^{\mathrm{f}})},$$

and[15]:

$$p^{\mathrm{f}} = p\left(\frac{q^{\mathrm{T}*}}{1 - q^{\mathrm{T}*}}, \frac{K^{\mathrm{W}}}{L^{\mathrm{W}}}\right).$$

Comparing (17.7) and (17.8), it follows that

$$q_{\mathrm{autarky}}^{\mathrm{H}} > q^{\mathrm{T}*} > q_{\mathrm{autarky}}^{\mathrm{F}}.$$

It can be shown that under *social strategic substitutability*, this symmetric interior steady state q^{T*} is locally stable (see Appendix Proposition A4 for a proof). Hence, in the long run, there is convergence of preference profiles after free trade integration between the

[15] Note that the fact that the interior steady state is necessarily symmetric does not depend on the fact that trade leads to factor price equalization. It only comes from the fact that the two economies H and F are facing the same long-run free-trade relative price p^{f}.

two regions. In agreement with the Heckscher–Ohlin trade theory, country H, which is relatively well endowed with capital, exports the capital-intensive good. Moreover, after trade integration it has a lower long-run fraction of individuals with preferences biased towards the good that it is exporting (i.e. the capital-intensive good). Conversely, the other country F has a higher fraction of agents with preferences biased towards the capital-intensive good that it is importing. In a sense, through exports of the good in which it has a comparative advantage (and a preference bias), a given country tends to export its preference bias to the other country. Free trade integration leads through this process to preference convergence. The following propositions parallel the standard trade theorems of the Heckscher–Ohlin theory and summarize how international integration driven by factor endowments differences generate cross-country cultural convergence forces.

Heckscher–Ohlin theorem on cultural patterns: when social strategic substitutability prevails in cultural transmission and there is factor price equalization, free trade integration leads a country to transfer to the other country a preference bias towards the good that is using intensively the factor of production it is well endowed with (i.e. the good for which it has a preference bias under autarky).

Cultural patterns equalization theorem: when social strategic substitutability prevails in cultural transmission and there is factor price equalization, free trade integration leads to preference profile equalization across the two trading economies.

Interestingly, the result that all countries converge to the same interior cultural profile $q^{T*} \in (0,1)$ is consistent both with the view that international trade integration leads to cross-country uniformity (all countries look the same in terms of their preference profiles) and with the view that trade preserves intra-country cultural diversity of tastes. As we will see, however, the conditions for such a result (social strategic substitutability in cultural dynamics) may be impaired once one allows for group size externality effects on the demand side and/or increasing returns on the supply side of the economy. We now turn to these possibilities.

17.6. GROUP CONSUMPTION EXTERNALITIES AND CULTURAL DIVERGENCE

In the previous models we introduced, there is no externality connecting individual preferences. In the case of cultural goods, it is, however, reasonable to assume the existence of such network preference externalities across agents. Olivier et al. (2008) consider these issues in a model of trade and culture that builds on the previous framework of cultural evolution. In their model, preferences allow for cultural externalities in the sense of Akerlof and Kranton (2000): agents who share a common cultural identity benefit from a positive group externality when they engage in actions deemed appropriate by their culture and socially interact.

More precisely, in Olivier et al.'s (2008) model, two cultural goods are produced with labor L and some culture-specific factor, mixing geographical, climatic, historical, and

human capital characteristics; (i.e. a 'cultural capital') K^i, where i=A,B then indexes the cultural good. The production function for each good is Cobb–Douglas: $x^i = \hat{\beta} L^{1-\beta}(K^i)^{\beta}$ with $\beta \in (0,1)$ and $\hat{\beta} = \beta^{-\beta}(1-\beta)^{-(1-\beta)}$. Factors of production are assumed internationally immobile and in fixed supply. An important feature of the production structure above is that when the relative demand for a good x^i increases, the relative price of that good increases as well.[16]

Olivier et al. (2008) introduce then cultural identity within agents' preferences. Each agent belongs to one of the two cultural groups associated to the cultural goods; we let i then index the cultural group as well as the cultural goods. Nonetheless, each agent can consume either of the cultural goods. However, if an agent chooses to consume good x_A, he or she cannot consume good x_B and vice versa. Agents derive utility from individual consumption and, possibly, from social exchange with other agents. Each period, a random matching process takes place and social exchange occurs only if the two agents matched share the same cultural identity, (i.e. consume the same cultural good).

Formally, at time t an agent of culture i who consumes a cultural good $i \neq j$, different from their own cultural group, cannot benefit from social exchange and gets a utility level given by:

$$U^i(x_t^i) = x_t^i. \tag{17.9}$$

The expected utility of an agent of culture i who consumes his or her own cultural good is given by:

- x_t^i if no social exchange occurs (i.e. if he or she is matched with an agent of culture $j \neq i$), which in turn happens with probability $(1 - q_t^i)$.
- $SE^i \cdot x_t^i$, for given social exchange multiplier $SE^i \geq 1$, if social exchange does occur; (i.e. if he or she is matched with an agent of his or her own culture i), which in turn happens with probability q_t^i.

In summary, $U^i(x_t^i) = (1 - q_t^i)x_t^i + q_t^i SE^i \cdot x_t^i$. Letting:

$$I^i(q_t^i) \equiv (1 + q_t^i(SE^i - 1)), \tag{17.10}$$

we have:

$$U^i(x_t^i) = \left(I^i(q_t^i)\right) x_t^i, \tag{17.11}$$

[16] Obviously this feature may not be appropriate for some cultural industries (e.g. the movie industry), where increasing returns prevail, at least at the distribution stage. We discuss the case with production characterized by increasing returns in Section 17.7.

and $I^i(q_t^i)$ can be interpreted as the cultural externality associated at date t with the consumption of the good i. Note that the function $I^i(q_t^i)$ is increasing, bounded below by 1, and takes value 1 if either the mass of agents of culture i falls to 0 or if $SE^i = 1$.

Finally, preferences evolve through time along a version of a cultural transmission process *à la* Bisin and Verdier (2001) in continuous time, where the dynamics of q_t^i are driven by the relative resources spent by parents of different cultures in order to transmit their preferences to their offspring. Denoting by ΔV_t^i the cultural intolerance for cultural group i, therefore, the cultural transmission dynamics have the following general properties, for $i \neq j$:

$$\frac{\mathrm{d}q_t^i}{\mathrm{d}t} > 0 \text{ iff } \Delta V_t^i > \Delta V_t^j \text{ and } q_t^i \in (0,1), \tag{17.12}$$

$$\frac{\mathrm{d}q_t^i}{\mathrm{d}t} = 0 \text{ iff } \Delta V_t^i = \Delta V_t^j \text{ or } q_t^i \in \{0,1\}. \tag{17.13}$$

A steady state is reached when subjective utility costs and thus socialization efforts are equalized across parents of different cultures.

It is useful to consider first the cultural dynamics under autarky in a given country. It is straightforward to see that an agent of culture i strictly prefers to consume good i if and only if $p_t^i < I^i(q_t^i)p_t^j$, where p_t^i and p_t^j are, respectively, the prices of goods i and $j \neq i$. This in turn implies that three different equilibrium regimes can exist, depending on the value of the state variable $q_{\mathrm{i,t}}$:

- A pooling regime, where $p_t^{\mathrm{A}} = I^{\mathrm{A}}(q_t^{\mathrm{A}})p_t^{\mathrm{B}}$ and agents of culture A are indifferent between consuming goods A and B, while agents of culture B strictly prefer good B to A.
- A symmetric second pooling regime, where $p_t^{\mathrm{B}} = I^{\mathrm{B}}(1 - q_t^{\mathrm{A}})p_t^{\mathrm{A}}$[17] and agents of culture B are indifferent between the two goods while agents of culture A strictly prefer good A.
- An interior regime where $\frac{1}{I^{\mathrm{B}}(1-q_t^{\mathrm{A}})} < \frac{p_t^{\mathrm{A}}}{p_t^{\mathrm{B}}} < I^{\mathrm{A}}(q_t^{\mathrm{A}})$, where each agent strictly prefers to consume her own cultural good.

Olivier et al. (2008) show that the two pooling regimes are incompatible with the long-run dynamics of q_t^i. Moreover, market clearing equilibrium prices in the interior regime (where both goods are produced and consumed) satisfy the following key equation:

$$\frac{p_t^{\mathrm{A}}}{p_t^{\mathrm{B}}} = \left(\frac{K^{\mathrm{B}}}{K^{\mathrm{A}}}\right)^{\beta} \left(\frac{q_t^{\mathrm{A}}}{1 - q_t^{\mathrm{A}}}\right)^{\beta}. \tag{17.14}$$

[17] Note that $q_t^{\mathrm{B}} = 1 - q_t^{\mathrm{A}}$.

The relative price of a cultural good is then an increasing function of the mass of agents of the corresponding culture.

To solve for the dynamics of q_t^{A}, the first step is to derive cultural intolerancies ΔV_t^i as a function of q^i. In the interior regime, the subjective utility costs can be shown to be given by the following expressions, for $i \neq j$:

$$\Delta V_t^i = \left(\frac{I^i(q_t^i)}{p_t^i}\right) - \left(\frac{1}{p_t^j}\right). \tag{17.15}$$

These expressions reflect the two forces that affect cultural transmission. On the one hand, the relative price effect p_t^i/p_t^j represents a Walrasian price adjustment mechanism that generates a *social strategic substitutability effect* on the cultural intolerance parameter ΔV_t^i. On the contrary, the cultural externality effect based on social interaction, $I^i(q_t^i)$ induces a *social strategic complementarity effect* on cultural transmission. To see that more precisely, take for instance agents with culture A and take good A as the numéraire (i.e. $p_t^{\mathrm{A}} = 1$). Then it is easy to see that:

$$\Delta V_t^{\mathrm{A}} = I^{\mathrm{A}}\left(q_t^{\mathrm{A}}\right) - \left(\frac{K^{\mathrm{B}}}{K^{\mathrm{A}}}\right)^{\beta}\left(\frac{q_t^{\mathrm{A}}}{1-q_t^{\mathrm{A}}}\right),$$

and hence:

$$\frac{\partial \Delta V^{\mathrm{A}}}{\partial q^{\mathrm{A}}} = \underbrace{SE^{\mathrm{A}} - 1}_{+} \underbrace{- \left(\frac{K^{\mathrm{B}}}{K^{\mathrm{A}}}\right)^{\beta} \frac{1}{\left(1-q_t^{\mathrm{A}}\right)^2}}_{-}.$$

The first positive term on the left-hand side relates to the cultural externality and contributes to the *social strategic complementarity effect*, while the second negative term reflects the relative price effect and contributes to the *social strategic substitutability effect*. If the cultural externalities (SE^{A},SE^{B}) are not too large, so that under autarky the cultural dynamics are again mainly driven by *social strategic substitutability,* a unique steady state exists that must be in the interior regime. More precisely, in this case it can be shown that:

$$\frac{\Delta V_t^{\mathrm{A}}}{\Delta V_t^{\mathrm{B}}} = \frac{\left(I^{\mathrm{A}}\left(q_t^{\mathrm{A}}\right)\right) p_t^{\mathrm{B}} - p_t^{\mathrm{A}}}{\left(I^{\mathrm{B}}\left(1-q_t^{\mathrm{A}}\right)\right) p_t^{\mathrm{A}} - p_t^{\mathrm{B}}},$$

and:

$$\frac{\mathrm{d}q_t^{\mathrm{A}}}{\mathrm{d}t} \geq 0 \Leftrightarrow \frac{1 + I^{\mathrm{A}}(q_t^{\mathrm{A}})}{1 + I^{\mathrm{B}}\left(1-q_t^{\mathrm{A}}\right)} \geq \frac{p_t^{\mathrm{A}}}{p_t^{\mathrm{B}}}, \tag{17.16}$$

or, equivalently, at equilibrium:

$$\frac{\mathrm{d}q_t^{\mathrm{A}}}{\mathrm{d}t} \geq 0 \Leftrightarrow \frac{1+I^{\mathrm{A}}\left(q_t^{\mathrm{A}}\right)}{1+I^{\mathrm{B}}\left(1-q_t^{\mathrm{A}}\right)} \geq \left(\frac{K^{\mathrm{B}}}{K^{\mathrm{A}}}\right)^{\beta}\left(\frac{q_t^{\mathrm{A}}}{1-q_t^{\mathrm{A}}}\right)^{\beta}, \tag{17.17}$$

which shows how the dynamics of culture result from the two previous effects going in opposite directions. The first effect, captured in the left-hand side of (17.17), is a *cultural externality effect*: the larger the size of a given culture, the larger the cultural externality and the more parents of that culture have incentives to socialize their children. The second effect, captured in the right-hand side of (17.17), is the *relative price effect:* the larger the size of a given culture, the larger the demand for the corresponding cultural good, the larger the relative price of that good, and the less parents of that culture have incentives to socialize their children. The relative price effect tends to promote cultural heterogeneity within the society while the cultural externality effect tends to promote homogeneity.

At a cultural steady state, the two effects exactly compensate one another and one gets the long-run equilibrium fraction q^{1*} of individuals with type 1 solution of the equation:

$$\frac{1+I^{\mathrm{A}}(q^{\mathrm{A}*})}{1+I^{\mathrm{B}}(1-q^{\mathrm{A}*})} = \left(\frac{K^{\mathrm{B}}}{K^{\mathrm{A}}}\right)^{\beta}\left(\frac{q^{\mathrm{A}*}}{1-q^{\mathrm{A}*}}\right)^{\beta}. \tag{17.18}$$

The long-run profile of preferences depends on supply-side fundamentals such as the two cultural capital stocks K_1 and K_2. Typically, domestic preferences will be (endogenously) biased towards the cultural good produced in relative abundance in the economy. Furthermore, the preference profile will also depend on the shape of the cultural externalities and social interactions between individuals (i.e. the shape of the social matching functions $I^{\mathrm{A}}(.)$ and $I^{\mathrm{B}}(.)$). Also, these two dimensions will act as complements on the preference bias.

More importantly, these two supply-side fundamentals, when affected by international integration, may have different implications for the cultural dynamics in the world economy. Specifically, Olivier et al. (2008) consider two globalization mechanisms: international trade in cultural goods driven by differences in factor endowments and international social integration generated by international social matching across borders.

17.6.1 Trade Integration

Consider the case of international trade based on differences in factor endowments. Olivier et al. (2008) discuss the impact of the integration of goods markets on the dynamics of cultural identities, looking at different contexts. The simplest setting is

that of a small open economy where the two cultural goods are traded and the local economy has a comparative advantage in good B, (i.e. $\left(p^{\mathrm{A}}/p^{\mathrm{B}}\right)^{\text{autarky}} > \left(p^{\mathrm{A}}/p^{\mathrm{B}}\right)^{\text{world}}$). In such a context, it is easy to see that trade integration leads to a loss of cultural diversity inside the economy.

More specifically, when the small economy opens to trade, prices shift to world prices and the economy starts to import good A. Given that good A is cheaper compared to the autarkic cultural externalities it generates, cultural transmission of preferences for such a good is favored, implying that as $\mathrm{d}q_t^{\mathrm{A}}/\mathrm{d}t > 0$. As q_t^{A} increases, the cultural externalities of good A are strengthened, amplifying the initial effect of trade integration. Unlike, however, the autarkic situation, the small open economy context implies that the change in local demand does not translate into a change of the relative goods price as this remains fixed at its world price level. As a result of this, the *social strategic substitutability effect* that was ensuring an interior cultural steady state under autarky is inhibited. Therefore, there is no force preventing q_t^{A} from increasing further and the economy converges to a long-run equilibrium where $q^{\mathrm{A}} = 1$. One of the two cultures in the long run disappears and is no longer represented in the population of agents.

Moreover, there is *cultural divergence* in the sense that the economy is driven away from the preference profile of the rest of the world. To see this, note that the small economy has a comparative advantage in good B if and only if it starts with a larger fraction of agents of culture A under autarky than the fraction of agents of culture A in the rest of the world. Thus, opening to trade exacerbates the differences that exist under autarky in terms of distribution of cultures between the small economy and the rest of the world.

The two results (*cultural divergence* and *disappearance* of one of the two cultures in the long run) can be shown to extend to the case of a symmetric two-country general equilibrium framework. The intuition is that prices in an integrated world depend only on world demand and not on local demands. In a perfectly symmetric world, an increase of the local demand for one good is compensated by a decrease of the foreign demand for that good and international equilibrium goods prices do not change. More generally, along the transition path, cultural evolution is driven by the same two opposite forces as under autarky: the *cultural externality effect* and the *relative price effect*. Trade integration reduces the sensitivity of goods' relative demand on local cultural characteristics and therefore dampens the *relative price effect* in the process of cultural evolution in each country. As the *relative price effect* is weaker, the *cultural externality effect* tends to dominate, which leads to cultural homogeneity within country and cultural divergence across countries.

17.6.2 Social Integration

Integration of goods markets is only one of many aspects of globalization. Technological developments in information and transport technologies lead to rising opportunities for social exchange with people living in far-away regions or countries. In such a context,

international social integration can be viewed as the fact that agents of different countries may meet and have social interactions with one another, be it through migration, student exchanges, Internet chat rooms, or tourism. In the context of Olivier et al.'s (2008) framework, international social interactions basically affect the shape of the social interaction functions $I^{A}(.)$ and $I^{B}(.)$.

More specifically, let international social integration be characterized by the social exchange matching of any agent occurring with either an agent of his or her own country or with an agent of a different country with same probabilities. This implies in a symmetric two-country case that the cultural externalities, which were formerly given by Eq. (17.10), now become:

$$I^{i}_{\text{word}}\left(q_t^{i\text{H}} + q_t^{i\text{F}}\right) \equiv \left(1 + \frac{q_t^{i\text{H}} + q_t^{i\text{F}}}{2}\left(SE^{i} - 1\right)\right), \tag{17.19}$$

where $q_t^{i\text{H}}$ and $q_t^{i\text{F}}$ are, respectively, the fractions of individuals with culture i in country H and country F.

With no international trade in the cultural goods, but with the two countries socially integrated, in sharp contrast with goods market integration, social integration causes cultural convergence with the distribution of cultures to become more similar across countries over time. The intuition for this result is that social integration provides a *dilution of the cultural externalities*. Whenever a culture is stronger in one country than in the rest of the world, it provides stronger externalities under social autarky than under social integration. This is because under social integration, agents get increasingly matched with agents from other countries where that culture is less prevalent. Thus, social integration tends to weaken the stronger cultures in all countries. This generates cultural heterogeneity within countries and cultural convergence across countries.

The analysis suggests therefore that the form of international integration could significantly matter with respect to its impact on cultural diversity or homogenization. Two forms of globalization (international trade and international social matching) may have opposite effects on cultural dynamics across integrating countries or regions.

17.7. INCREASING RETURNS, MARKET SIZE EFFECTS, AND CULTURAL DYNAMICS

The previous analysis highlights the importance of *social strategic complementarity effects* on cultural transmission through the channel cultural consumption externalities and social interactions. As discussed, this provides a channel through which international trade integration leads to cultural homogenization within and across countries. *Social strategic complementarities* and cultural homogeneity in trade economies also typically hold when there are increasing returns in production and market power (something that seems to

be particularly prevalent in cultural industries such as the media, TV, and other movie entertainment industries).

Maystre et al. (2009) provide a simple framework illustrating these issues. They analyze the transmission of a preference for specific differentiated goods whose varieties are produced under monopolistic competition. In this context, the larger the size of the group with a preference for a specific good, the larger the market size and the entry of firms producing differentiated varieties of that good. Increased varieties in turn make it relatively more attractive to acquire and transmit preferences for this good, leading once again to *social strategic complementarity* in cultural transmission.

Specifically, the theoretical framework has three building blocks. The first block corresponds to a standard economic model *à la* Krugman (1979) where firms produce differentiated products under monopolistic competition. Assume, for instance, that there are again two cultural types, A and B. Associated to these cultural types are two types of goods and two types of individuals, A and B. At a date t, type i agents represent a share q_t^i of the population, for i=A,B. Agents have the following preferences:

$$U^{\mathrm{A}}(x^{\mathrm{A}}, x^{\mathrm{B}}) = x^{\mathrm{A}}; \quad U^{\mathrm{B}}(x^{\mathrm{A}}, x^{\mathrm{B}}) = x^{\mathrm{B}}. \tag{17.20}$$

Composite goods A and B are differentiated into, respectively, a number N^{A} and N^{B} of varieties $\{c_k^{\mathrm{A}}\}$ and $\{c_k^{\mathrm{B}}\}$ in a Dixit–Stiglitz way: $x^{\mathrm{A}} = \left(\int_0^{N^{\mathrm{A}}} \left(c_k^{\mathrm{A}}\right)^{(\sigma-1)/\sigma} \mathrm{d}k\right)^{\sigma/(\sigma-1)}$ and $x^{\mathrm{B}} = \left(\int_0^{N^{\mathrm{B}}} \left(c_k^{\mathrm{B}}\right)^{(\sigma-1)/\sigma} \mathrm{d}k\right)^{\sigma/(\sigma-1)}$, where $\sigma > 1$ is the elasticity of substitution. Each agent supplies one unit of labor in a competitive labor market at a wage rate normalized to w=1. Given symmetric variety prices p_k^i associated to the same cultural type i=A,B, standard computation yields aggregate demands for the different varieties:

$$D_k^{\mathrm{A}} = q_t^{\mathrm{A}} P_{\mathrm{A}}^{(\sigma-1)} \left(p_k^{\mathrm{A}}\right)^{-\sigma} \text{ and } D_k^{\mathrm{B}} = (1 - q_t^{\mathrm{A}}) P_{\mathrm{B}}^{(\sigma-1)} \left(p_k^{\mathrm{B}}\right)^{-\sigma}, \tag{17.21}$$

where $P_i = \left(\int_0^{N^i} \left(p_k^i\right)^{1-\sigma} \mathrm{d}k\right)^{1/(1-\sigma)}$ is the aggregate price index for each composite good i=A,B.

The second building block ties products to culture. Building on a large marketing and consumer research literature, Maystre et al. (2009) assume that individuals are endowed with different clusters of cultural values and that these cultural values can be tied to consumption varieties. Typically, upon entry, firms anchor their product to a cultural type, A or B, and a fixed labor cost F must be paid to start production. Then the production of one unit of product requires one unit of labor. Monopolistic competition prevails on the product market. Entry and exit (and therefore the number of varieties N^{A} and N^{B} that are tied to a particular cultural type) adjust instantaneously within each

period t, so that profits are equal to 0. This captures in a stylized way the idea that cultural transmission and evolution of preferences across generations takes more time than market structure adjustment.

Finally, the last block of the framework is a micro-founded model of cultural transmission *à la* Bisin and Verdier (2001) where the dynamics of cultural traits derive from parental socialization efforts driven by the relative importance of the cultural subjective utility costs ΔV^{A} and ΔV^{B}.

As usual, the model is solved in two stages. In a first stage, Maystre et al. (2009) derive the product market equilibrium with free entry for a given distribution of preferences (i.e. for a given q_t^i). This provides the equilibrium number of varieties at each date. As usual in monopolistic competition frameworks, there is a market size effect: a larger fraction of individuals of culture A (respectively, B) implies a larger market size for good A (respectively, B), which in turn promotes entry of type A varieties (respectively, B).

The equilibrium dynamics of q_t^i are then analyzed with the characterization of the utility cost functions ΔV^i, for $i=$A,B. *Social strategic complementarity effects* are shown to prevail. Indeed, because of the taste for variety embodied in the Dixit–Stiglitz preference structure, it is easy to see that for both cultures $i=$A,B the cultural intolerance parameter ΔV^i is an increasing function of the number of produced varieties N^i associated to that cultural good i (i.e. the cultural good preferred by agents of culture i). Owing to the market size effect, this in turn is an increasing function of the fraction q_t^i of individuals of culture i implying that:

$$\frac{\partial \Delta V^i}{\partial q^i} > 0 \quad \text{for } i = \mathrm{A}, \mathrm{B}.$$

As such, this effect generates a force for cultural homogenization inside the society.

Maystre et al. (2009) then consider trade integration between two identical economies. They assume that there are two idiosyncratic cultural types, A and A*, which are specific to the domestic and the foreign country, and a cultural type, B, which is *common to both countries*. Correspondingly, the economy has three goods, A, A*, and B. At equilibrium, type A goods are consumed only in the domestic country, type A* goods are consumed only in the foreign country, and type B goods are consumed everywhere.

Again, because of market size effects, the relative number of type B varieties is larger under trade integration than under autarky. Now interestingly, this effect is reinforced by a feedback effect from the cultural dynamics on aggregate demand. Indeed, in each country, a higher value of N^{B} implies a higher relative intolerance ΔV^{B} compared to the idiosyncratic cultural types, A and A*. This in turn induces a shift in cultural transmission: more socialization effort for parents with the common cultural type B, less effort for parents with the idiosyncratic cultural types A or A*. This brings down the

steady-state value of the fraction of idiosyncratic types A and A^* in the domestic and the foreign country.

As a result, Maystre et al. (2009) conclude that product market integration may lead to a decrease in their *bilateral cultural distance*, defined as the probability that two randomly picked up individuals in the two different countries do not share the same cultural types.[18] The removal of trade barriers increases the incentives of firms to anchor their products to cultural types common to the two countries. This effect triggers a process of cultural homogenization towards the commonly traded good.

The paper also discusses two other interesting observations. (i) The effect of trade on bilateral cultural distance is larger when the traded goods are more differentiated (i.e. smaller values of σ), as product differentiation drives the strength of the feedback effect. (ii) Owing to the existence of the *social strategic complementarity effects* on cultural transmission and the fact that cultural dynamics may exhibit multiple long-run equilibria, the impact of trade openness on bilateral cultural distance is characterized by path-dependency. A temporary increase in trade openness may have a permanent effect on the distribution of cultural types in the economy.

17.8. CONCLUSIONS

In this chapter we provided a focused overview of the economic literature on the effects of trade, globalization, and international integration on the dynamics of cultural diversity. We concentrated especially on those contributions that allow us to delineate a common analytical framework interacting trade and cultural evolution models. This framework appears successful in that it identifies several fundamental factors that affect the relation between economic integration and the dynamics of cultural diversity, such as the nature of transaction costs, the strength of group and network effects characterizing cultural goods, and increasing or decreasing returns to scale in production.

Various aspects of the analytical framework we introduced can be improved and many extensions are possible. Future research, however, will have a large pay-off when this framework will be put to data and it will start providing empirical answers to the question of the effects of trade, globalization, and international integration on the dynamics of cultural diversity.

[18] In the model there are indeed three different cultural types: the country-specific types A and A^*, and the common type B. A random pair of individuals belonging to the domestic and the foreign country do share the same cultural type if and only if they are both of type B. Due to symmetry, this event has a probability $\left(1-q_t^{\mathrm{A}}\right)\left(1-q_t^{\mathrm{A}^*}\right)=\left(1-q_t^{\mathrm{A}}\right)^2$. As a consequence bilateral cultural distance D_t is equal to $D_t=1-\left(1-q_t^{\mathrm{A}}\right)^2$.

APPENDIX: PROOFS OF PROPOSITIONS

Proposition A1. Under standard assumptions, at an autarchic equilibrium in country h, the relative price of good 2 at equilibrium, $p = p(q_t^h/1 - q_t^h, K^h/L^h)$, is unique, decreasing in q_t^h, and increasing in K^h/L^h.

Proof: Recall that Marshallian demands are given by:

$$x_1^i(p, I^h) = \frac{\theta^i(p)}{p + \theta^i(p)} I^h, x_2^i(p, I^h) = \frac{1}{p + \theta^i(p)} I^h,$$

where $I^h = rK^h/L^h + 1$ is individual income in country h and $\theta^i(p) = x_1^i/x_2^i$ is the solution of $p = \frac{\varphi^i(\theta^i)}{\varphi'^i(\theta^i)} - \theta^i$.

Simple inspection shows that $\theta^i(p)$ is an increasing function of p and that $\theta^A(p) > \theta^B(p)$ for all $p \geq 0$.

Consider now the determination of the relative price of good 2, p, in a particular country $h = H, F$. At each point of time, given a fraction q_t^h of individuals of type A in the economy, one may compute the relative aggregate demand for good 2:

$$\frac{D_2^h\left(p, q_t^h\right)}{D_1^h\left(p, q_t^h\right)} = \frac{\frac{q_t^h}{p+\theta^A(p)} + \frac{1-q_t^h}{p+\theta^B(p)}}{\frac{q_t^h\theta^A(p)}{p+\theta^A(p)} + \frac{\left(1-q_t^h\right)\theta^B(p)}{p+\theta^B(p)}}.$$

Clearly $D_2^h(p, q_t^h)/D_1^h(p, q_t^h)$ is decreasing in p. Moreover, given that $\theta^A(p) > \theta^B(p)$, it is also decreasing in q_t^h (see Proposition A2).

Now, in the Heckscher–Ohlin model of trade, it is well known that the aggregate relative supply of good 2 is a function:

$$\frac{Q_2(p, L^h, K^h)}{Q_1(p, L^h, K^h)} = \frac{Q_2}{Q_1}\left(p, \frac{K^h}{L^h}\right),$$

that is increasing in p and only related to relative aggregate factor endowments K^h/L^h. Also, because good 2 is less capital intensive than good 1, the Rybszinsky theorem tells us that Q_2/Q_1 is a decreasing function of K^h/L^h.

The autarkic equilibrium relative price p of good 2 is then characterized by the following market clearing condition:

$$\frac{D_2^h(p, q_t^h)}{D_1^h(p, q_t^h)} = \frac{\frac{q_t^h}{p+\theta^A(p)} + \frac{1-q_t^h}{p+\theta^B(p)}}{\frac{q_t^h\theta^A(p)}{p+\theta^A(p)} + \frac{(1-q_t^h)\theta^B(p)}{p+\theta^B(p)}} = \frac{Q_2(p, L^h, K^h)}{Q_1(p, L^h, K^h)} = \frac{Q_2}{Q_1}\left(p, \frac{K^h}{L^h}\right),$$

where aggregate relative demand for good 2 equals its relative supply. Under standard assumptions, this equation provides a unique solution $p(q_t^h/1-q_t^h, K^h/L^h)$, which is clearly decreasing in q_t^h and increasing in K^h/L^h. **QED.**

Proposition A2. The aggregate relative demand function $D_2^h(p,q_t^h)/D_1^h(p,q_t^h)$ is decreasing in q_t^h.
Proof: Indeed the aggregate demands for good 1 and 2 write as:

$$D_1^h\left(p,q_t^h\right) = \left[\frac{q_t^h\theta^{\mathrm{A}}(p)}{p+\theta^{\mathrm{A}}(p)} + \frac{\left(1-q_t^h\right)\theta^{\mathrm{B}}(p)}{p+\theta^{\mathrm{B}}(p)}\right] I^h$$

$$D_2^h\left(p,q_t^h\right) = \left[\frac{q_t^h}{p+\theta^{\mathrm{A}}(p)} + \frac{1-q_t^h}{p+\theta^{\mathrm{B}}(p)}\right] I^h,$$

and correspondingly:

$$\frac{D_2^h\left(p,q_t^h\right)}{D_1^h\left(p,q_t^h\right)} = \frac{p+q_t^h\theta^{\mathrm{B}}(p)+\left(1-q_t^h\right)\theta^{\mathrm{A}}(p)}{\left[q_t^h\theta^{\mathrm{A}}(p)+\left(1-q_t^h\right)\theta^{\mathrm{B}}(p)\right]p+\theta^{\mathrm{B}}(p)\theta^{\mathrm{A}}(p)}.$$

Therefore:

$$\operatorname{sign}\left[\frac{\partial D_2^h/D_1^h}{\partial q_t^h}\right] = \operatorname{sign}\left\{\begin{array}{c}\left(\theta^{\mathrm{B}}-\theta^{\mathrm{A}}\right)\left\{\left[q_t^h\theta^{\mathrm{A}}+\left(1-q_t^h\right)\theta^{\mathrm{B}}\right]p+\theta^{\mathrm{B}}\theta^{\mathrm{A}}\right\}\\ -(\theta^{\mathrm{A}}-\theta^{\mathrm{B}})\left\{p+q_t^h\theta^{\mathrm{B}}+\left(1-q_t^h\right)\theta^{\mathrm{A}}\right\}\end{array}\right\}$$

$$= \operatorname{sign}\left\{\left(\theta^{\mathrm{B}}-\theta^{\mathrm{A}}\right)\left[\begin{array}{c}\left[q_t^h\theta^{\mathrm{A}}+\left(1-q_t^h\right)\theta^{\mathrm{B}}\right]p+\theta^{\mathrm{B}}\theta^{\mathrm{A}}\\ +p+q_t^h\theta^{\mathrm{B}}+\left(1-q_t^h\right)\theta^{\mathrm{A}}\end{array}\right]\right\} < 0.$$

QED.

Proposition A3. Social strategic substitution in cultural transmission in the Heckscher–Ohlin trade model.

Consider the following property:

$$\textit{Property ZZ}: \frac{\varphi'^{\mathrm{A}}(z)}{\varphi^{\mathrm{A}}(z)} > \frac{\varphi'^{\mathrm{B}}(z)}{\varphi^{\mathrm{B}}(z)} > \frac{1}{2}\frac{\varphi'^{\mathrm{A}}(z)}{\varphi^{\mathrm{A}}(z)}.$$

Then social strategic substitution obtains when $\varphi^h(z)$ is concave enough and property ZZ is satisfied, namely:

$$\frac{1}{I}\frac{\partial\Delta V_t^{\mathrm{A}}}{\partial q_t^h} < 0 \quad \textit{and} \quad \frac{1}{I}\frac{\partial\Delta V_t^{\mathrm{B}}}{\partial q_t^h} > 0,$$

and:

$$\frac{1}{I}\frac{\partial \Delta V_t^{\mathrm{A}}}{\partial q_t^h} < 0 \quad \text{and} \quad \frac{1}{I}\frac{\partial \Delta V_t^{\mathrm{B}}}{\partial q_t^h} > 0.$$

Proof: Differentiating ΔV_t^{A} and ΔV_t^{B} with respect to p_{t+1}^{e} provides:

$$\frac{1}{I}\frac{\partial \Delta V_t^{\mathrm{A}}}{\partial p_{t+1}^{\mathrm{e}}} = \left[\frac{\varphi^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}}+\theta^{\mathrm{B}}\right]^2} - \frac{\varphi^{\mathrm{A}}\left(\theta^{\mathrm{A}}\right)}{\left[p_{t+1}^{\mathrm{e}}+(\theta^{\mathrm{A}})\right]^2}\right] - \left[\frac{\varphi'^{A}\left(\theta^{\mathrm{B}}\right)\left(p_{t+1}^{\mathrm{e}}+\theta^{\mathrm{B}}\right)-\varphi^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}}+(\theta^{\mathrm{B}})\right]^2}\right]\frac{\mathrm{d}\theta^{\mathrm{B}}}{\mathrm{d}p_{t+1}^{\mathrm{e}}}, \tag{17.22}$$

and:

$$\frac{1}{I}\frac{\partial \Delta V_t^{\mathrm{B}}}{\partial p_{t+1}^{\mathrm{e}}} = \left[\frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{A}}\right)}{\left[p_{t+1}^{\mathrm{e}}+\theta^{\mathrm{A}}\right]^2} - \frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}}+(\theta^{\mathrm{A}})\right]^2}\right] - \left[\frac{\varphi'^{B}\left(\theta^{\mathrm{A}}\right)\left(p_{t+1}^{\mathrm{e}}+\theta^{\mathrm{A}}\right)-\varphi^{\mathrm{B}}\left(\theta^{\mathrm{A}}\right)}{\left[p_{t+1}^{\mathrm{e}}+(\theta^{\mathrm{B}})\right]^2}\right]\frac{\mathrm{d}\theta^{\mathrm{A}}}{\mathrm{d}p_{t+1}^{\mathrm{e}}}. \tag{17.23}$$

The first term of (17.22) is:

$$H^{\mathrm{A}}\left(p_{t+1}^{\mathrm{e}}\right) = \frac{\varphi^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}}+\theta^{\mathrm{B}}\right]^2} - \frac{\varphi^{\mathrm{A}}\left(\theta^{\mathrm{A}}\right)}{\left[p_{t+1}^{\mathrm{e}}+(\theta^{\mathrm{A}})\right]^2}.$$

Consider then the function:

$$\Omega^{\mathrm{A}}(z) = \frac{\varphi^{\mathrm{A}}(z)}{[p+z]^2}.$$

This function reaches its maximum in $z=\theta^{\mathrm{A}}$ and is such that:

$$\mathrm{sign}\Omega^{\mathrm{A}'}(z) = \mathrm{sign}\left[\varphi'^{\mathrm{A}}(z)\,[p+z] - 2\varphi^{\mathrm{A}}(z)\right],$$

and $\varphi'^{\mathrm{A}}(z)\,[p+z] - 2\varphi^{\mathrm{A}}(z)$ is a decreasing function of z. Observing that for all p,

$$p+\theta^{\mathrm{B}}(p) = \frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{B}}(p)\right)}{\varphi'^{\mathrm{B}}\left(\theta^{\mathrm{B}}(p)\right)},$$

property ZZ implies that

$$\varphi'^{\mathrm{A}}(\theta^{\mathrm{B}}(p))\left[p+\theta^{\mathrm{B}}(p)\right] - 2\varphi^{\mathrm{A}}(\theta^{\mathrm{B}}(p)) < 0.$$

Hence, for all $z \in \left[\theta^{\mathrm{B}}(p), \theta^{\mathrm{A}}(p)\right]$ the function $\varphi'^{\mathrm{A}}(z)[p+z] - 2\varphi^{\mathrm{A}}(z)$ takes negative values. Therefore, $\Omega^{\mathrm{A}}(z)$ is decreasing in $z \in \left[\theta^{\mathrm{B}}(p), \theta^{\mathrm{A}}(p)\right]$. Hence:

$$H^{\mathrm{A}}\left(p_{t+1}^{\mathrm{e}}\right) = \frac{\varphi^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}} + \theta^{\mathrm{B}}\right]^2} - \frac{\varphi^{\mathrm{A}}\left(\theta^{\mathrm{A}}\right)}{\left[p_{t+1}^{\mathrm{e}} + (\theta^{\mathrm{A}})\right]^2} > 0.$$

On the other hand the second term of (17.22) is:

$$K^{\mathrm{A}}(p_{t+1}^{\mathrm{e}}) = \left[\frac{\varphi'^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)\left(p_{t+1}^{\mathrm{e}} + \theta^{\mathrm{B}}\right) - \varphi^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}} + (\theta^{\mathrm{B}})\right]^2}\right] \frac{\mathrm{d}\theta^{\mathrm{B}}}{\mathrm{d}p_{t+1}^{\mathrm{e}}}.$$

Given that $\theta^{\mathrm{A}}(p) > \theta^{\mathrm{B}}(p)$, it is easy to see that $\varphi'^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right)\left(p_{t+1}^{\mathrm{e}} + \theta^{\mathrm{B}}\right) - \varphi^{\mathrm{A}}\left(\theta^{\mathrm{B}}\right) > 0$. As $\mathrm{d}\theta^{\mathrm{B}}/\mathrm{d}p_{t+1}^{\mathrm{e}}$ is positive, it follows immediately that $K^{\mathrm{A}}(p_{t+1}^{\mathrm{e}}) > 0$. Now when $\varphi^{\mathrm{B}}(z)$ is concave enough, simple inspection shows that the term $K^{\mathrm{A}}(p_{t+1}^{\mathrm{e}})$ is smaller than $H^{\mathrm{A}}\left(p_{t+1}^{\mathrm{e}}\right)$. Therefore, one has:

$$\frac{1}{I}\frac{\partial \Delta V_t^{\mathrm{A}}}{\partial p_{t+1}^{\mathrm{e}}} > 0. \tag{17.24}$$

Similarly, one can see that the first term of (17.23):

$$H^{\mathrm{B}}\left(p_{t+1}^{\mathrm{e}}\right) = \frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{A}}\right)}{\left[p_{t+1}^{\mathrm{e}} + \theta^{\mathrm{A}}\right]^2} - \frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{B}}\right)}{\left[p_{t+1}^{\mathrm{e}} + (\theta^{\mathrm{B}})\right]^2},$$

is negative. Indeed, consider the function:

$$\Omega^{\mathrm{B}}(z) = \frac{\varphi^{\mathrm{B}}(z)}{[p+z]^2}.$$

This function reaches its maximum in $z = \theta^{\mathrm{B}}$ and is such that sign $\Omega^{\mathrm{B}\prime}(z) = \mathrm{sign}\left[\varphi'^{\mathrm{B}}(z)\,[p+z] - 2\varphi^{\mathrm{B}}(z)\right]$. The function $\varphi'^{\mathrm{B}}(z)\,[p+z] - 2\varphi^{\mathrm{B}}(z)$ is decreasing in z. One can also see that for all p:

$$\varphi'^{\mathrm{B}}(\theta^{\mathrm{B}}(p))\left[p + \theta^{\mathrm{B}}(p)\right] - 2\varphi^{\mathrm{B}}(\theta^{\mathrm{B}}(p)) = -\varphi^{\mathrm{B}}(\theta^{\mathrm{B}}(p)) < 0.$$

Hence, for all $z \in \left[\theta^{\mathrm{B}}(p), \theta^{\mathrm{A}}(p)\right]$ the function $\varphi'^{\mathrm{B}}(z)\,[p+z] - 2\varphi^{\mathrm{B}}(z)$ takes negative values and $\Omega^{\mathrm{B}}(z)$ is decreasing in $z \in \left[\theta^{\mathrm{B}}(p), \theta^{\mathrm{A}}(p)\right]$. Hence:

$$H^{\mathrm{B}}\left(p^{\mathrm{e}}_{t+1}\right) = \frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{A}}\right)}{\left[p^{\mathrm{e}}_{t+1} + \theta^{\mathrm{A}}\right]^2} - \frac{\varphi^{\mathrm{B}}\left(\theta^{\mathrm{B}}\right)}{\left[p^{\mathrm{e}}_{t+1} + (\theta^{\mathrm{B}})\right]^2} < 0.$$

On the other hand, the second term of (17.23) is:

$$K^{\mathrm{B}}(p^{\mathrm{e}}_{t+1}) = \left[\frac{\varphi'^{\mathrm{B}}\left(\theta^{\mathrm{A}}\right)\left(p^{\mathrm{e}}_{t+1} + \theta^{\mathrm{A}}\right) - \varphi^{\mathrm{B}}\left(\theta^{\mathrm{A}}\right)}{\left[p^{\mathrm{e}}_{t+1} + (\theta^{\mathrm{A}})\right]^2}\right] \frac{\mathrm{d}\theta^{\mathrm{A}}}{\mathrm{d}p^{\mathrm{e}}_{t+1}}.$$

Given that $\theta^{\mathrm{A}}(p) > \theta^{\mathrm{B}}(p)$, it is easy to see that $\varphi'^{\mathrm{B}}(\theta^{\mathrm{A}})\left(p^{\mathrm{e}}_{t+1} + \theta^{\mathrm{A}}\right) - \varphi^{\mathrm{B}}(\theta^{\mathrm{A}}) < 0$. As $\mathrm{d}\theta^{\mathrm{A}}/\mathrm{d}p^{\mathrm{e}}_{t+1}$ is positive, it follows immediately that $K^{\mathrm{B}}(p^{\mathrm{e}}_{t+1}) < 0$. Now when $\varphi^{\mathrm{A}}(z)$ is concave enough, it is easy to see that $\mathrm{d}\theta^{\mathrm{A}}/\mathrm{d}p^{\mathrm{e}}_{t+1}$ is small enough that the term $K^{\mathrm{B}}(p^{\mathrm{e}}_{t+1})$ is smaller in absolute value than $H^{\mathrm{B}}\left(p^{\mathrm{e}}_{t+1}\right)$ and therefore that:

$$\frac{1}{I}\frac{\partial \Delta V^{\mathrm{B}}_t}{\partial p^{\mathrm{e}}_{t+1}} < 0. \tag{17.25}$$

In a given country $h = \mathrm{H,F}$, the expected equilibrium price p^{e}_{t+1} in the next generation as perceived by (myopic) parents is simply the current equilibrium price $p_t = p(q^h_t, K^h/L^h)$ which is a decreasing function of q^h_t, the fraction of A individuals in country h. It follows immediately from (17.24) and (17.25) that:

$$\frac{1}{I}\frac{\partial \Delta V^{\mathrm{A}}_t}{\partial q^h_t} < 0 \quad \text{and} \quad \frac{1}{I}\frac{\partial \Delta V^{\mathrm{B}}_t}{\partial q^h_t} > 0,$$

and *social strategic substitution* obtains when $\varphi^h(z)$ is concave enough and property ZZ is satisfied.

QED.

Proposition A4. The free trade cultural steady state $q^{\mathrm{H}}_{\mathrm{Trade}} = q^{\mathrm{F}}_{\mathrm{Trade}} = q^{\mathrm{T*}}$ *is locally stable.*

Proof: Cultural evolution under free trade is determined by the following dynamic equations (in continuous time approximation):

$$\frac{\mathrm{d}q^h_t}{\mathrm{d}t} = q^h_t\left(1 - q^h_t\right)\left[d^{hA}_t - d^{hB}_t\right] \quad \text{for } h = \mathrm{H, F} \tag{17.26}$$

with:

$$C'\left(d_t^{h\mathrm{A}}\right) = \left(1 - q_t^h\right) \Delta V^{\mathrm{A}}\left(p_t^{\mathrm{f}}\right)$$
$$C'\left(d_t^{h\mathrm{B}}\right) = q_t^h \Delta V^{\mathrm{B}}\left(p_t^{\mathrm{f}}\right)$$

and:

$$p_t^{\mathrm{f}} = p\left(\frac{\sum_{\mathrm{H,F}} q_t^h L^h}{\sum_{\mathrm{H,F}}\left(1 - q_t^h\right) L^h}, \frac{K^W}{L^W}\right).$$

Note that:

$$\frac{\partial p}{\partial q_t^h} = p_1{}' \cdot \frac{L^h}{\left(\sum_{\mathrm{H,F}}\left(1 - q_t^h\right) L^h\right)^2} < 0, \tag{17.27}$$

and under *social strategic substitutability* for cultural transmission :

$$\frac{\partial \Delta V^{\mathrm{A}}}{\partial p^{\mathrm{f}}} > 0 \quad \text{and} \quad \frac{\partial \Delta V^{\mathrm{B}}}{\partial p^{\mathrm{f}}} < 0. \tag{17.28}$$

We may then pose $v_t^{\mathrm{H}} = q_t^{\mathrm{H}} - q^{\mathrm{T}*}$ and $v_t^{\mathrm{F}} = q_t^{\mathrm{F}} - q^{\mathrm{T}*}$, and linearize the system (17.26). Note that at the interior steady state: $d^{h\mathrm{A}} = d^{h\mathrm{B}} = d^{\mathrm{T}*}$ with $C'(\mathrm{d}^{\mathrm{T}*})) = (1 - q^{\mathrm{T}*})$ $\Delta V^{\mathrm{A}}(p^{\mathrm{f}}) = q^{\mathrm{T}*} \Delta V^{\mathrm{B}}(p^{\mathrm{f}})$ and $p^{\mathrm{f}} = p\left(\frac{q^{\mathrm{T}*}}{1-q^{\mathrm{T}*}}, \frac{K^W}{L^W}\right)$. Simple but tedious computation provides that:

$$\begin{pmatrix} \dot{v}^{\mathrm{H}} \\ \dot{v}^{\mathrm{F}} \end{pmatrix} = [Q] \begin{pmatrix} v^{\mathrm{H}} \\ v^{\mathrm{F}} \end{pmatrix},$$

with Q a 2×2 matrix such that:

$$Q = \begin{pmatrix} -\Theta\left[Z + WL^{\mathrm{H}}\right] & -\Theta\left[WL^{\mathrm{F}}\right] \\ -\Theta\left[WL^{\mathrm{H}}\right] & -\Theta\left[Z + WL^{\mathrm{F}}\right] \end{pmatrix}$$

with:

$$\Theta = \frac{q^{\mathrm{T}*}(1 - q^{\mathrm{T}*})}{C''(d^{\mathrm{T}*})} > 0; Z = \Delta V^{\mathrm{A}}(p^{\mathrm{f}}) + \Delta V^{\mathrm{B}}(p^{\mathrm{f}}) > 0$$

$$W = \left[(1 - q^{\mathrm{T}*})\frac{\partial \Delta V^{\mathrm{A}}}{\partial p^{\mathrm{f}}} - q^{\mathrm{T}*}\frac{\partial \Delta V^{\mathrm{B}}}{\partial p^{\mathrm{f}}}\right] \frac{p_1{}'\left(\frac{q^{\mathrm{T}*}}{1-q^{\mathrm{T}*}}, \frac{K^W}{L^W}\right)}{\left(1 - q^{\mathrm{T}*}\right)^2\left(L^{\mathrm{H}} + L^{\mathrm{F}}\right)} > 0.$$

The sign of W follows from (17.27) and (17.28). This matrix Q has a negative trace $\mathrm{Tr}(Q)$ and a positive determinant $\det(Q)$:

$$\mathrm{Tr}(Q) = -2Z - W(L^{\mathrm{H}} + L^{\mathrm{F}}) < 0$$

$$\begin{aligned}\det(Q) &= \left[Z + WL^{\mathrm{H}}\right]\left[Z + WL^{\mathrm{F}}\right] - W^2 L^{\mathrm{H}} L^{\mathrm{F}} \\ &= Z^2 + ZW(L^{\mathrm{H}} + L^{\mathrm{F}}) > 0.\end{aligned}$$

Hence, its eigenvalues are real negative numbers. This implies that the stationary long-run cultural equilibrium under free trade $\left(q^{\mathrm{H}} = q^{\mathrm{F}} = q^{\mathrm{T}*}\right)$ is locally stable when *social strategic substitutability* in cultural transmission prevails.
QED.

REFERENCES

Aizenman, J., Brooks, E., 2008. Globalization and taste convergence: the cases of wine and beer. Review of International Economics 16, 217–233.

Akerlof, G., Kranton, R., 2000. Economics and identity. Quarterly Journal of Economics 115, 715–753.

Bala, V., Van Long, N., 2005. International trade and cultural diversity: a model of preference selection. European Journal of Political Economy 21, 143–162.

Belloc, M., Bowles, S., 2011. International trade, factor mobility and the persistence of cultural-institutional diversity. SSRN Working Paper 1368300.

Bidner, C., Francois, P., 2011. Cultivating trust: norms, institutions and the implications of scale. The Economic Journal 121, 1097–1129.

Bisin, A., Verdier, T., 2000a. A model of cultural transmission, voting and political ideology. European Journal of Political Economy 16, 5–29.

Bisin, A., Verdier, T., 2000b. Beyond the melting pot: cultural transmission, marriage and the evolution of ethnic and religious traits. Quarterly Journal of Economics 115, 955–988.

Bisin, A., Verdier, T., 2001. The economics of cultural transmission and the dynamics of preferences. Journal of Economic Theory 97, 298–319.

Bisin, A., Verdier, T., 2005. Work ethic and redistribution: a cultural transmission model of the welfare state. New York University, Mimeo.

Bisin, A., Verdier, T., 2010. The economics of cultural transmission and socialization. In: Benhabib, J., Bisin, A., Jackson, M. (Eds.), The Handbook of Social Economics. Elsevier, New York.

Bisin, A., Topa, G., Verdier, T., 2004. Religious intermarriage and socialization in the United States. Journal of Political Economy 112, 615–665.

Boyd, R., Richerson, P., 1985. Culture and the Evolutionary Process. University of Chicago Press, Chicago IL.

Brown, B.A., 1995. Timber Country: Working People's Stories of Environmental Conflict and Urban Flight. Temple University, Philadelphia, PA.

Casella, A., Rauch, J., 2002. Anonymous market and group ties in international trade. Journal of International Economics 58, 19–47.

Cavalli-Sforza, L., Feldman, M., 1981. Cultural Transmission and Evolution: A Quantitative Approach. Princeton University Press, Princeton, NJ.

Cowen, T., 2002. Creative Destruction: How Globalization is Changing the World's Cultures. Princeton University Press, Princeton NJ, and Oxford.

Dasgupta, P., Ismail, S. (Eds.), 2000. Social Capital: A Multifaceted Perspective. World Bank, Washington, DC.

Disdier, A.C., Head, K., Mayer, T., 2010. Exposure to foreign media and changes in cultural traits: evidence from naming patterns in France. Journal of International Economics 80, 226–238.

Durlauf, S.N., Fafchamps, M., 2005. Social capital. In: Aghion, P., Durlauf, S. (Eds.), Handbook of Economic Growth, vol. 1. Elsevier, New York.
François, P., 2002. Social Capital and Economic Development. Routledge, New York and London.
François, P., van Ypersele, T., 2002. On the protection of cultural goods. Journal of International Economics 56, 359–369.
François, P., Zabojnik, J., 2005. Trust, social capital and the process of economic development. Journal of the European Economics Association 3, 51–94.
Frot, E., 2009. The rise and fall of social insurance. Mimeo, SSRN: <http://ssrn.com/abstract=1517343>.
Gabszewicz, J., Ginsburgh, V., Weber, S., 2011. Bilingualism and communicative benefits. Annals of Economics and Statistics 101 (102), 271–286.
Glaeser, E.L., Laibson, D., Sacerdote, B., 2002. An economic approach to social capital. The Economic Journal 112, 437–458.
Gracia, A., Albisu, L.M., 2001. Food consumption in the European Union: main determinants and country differences. Agribusiness 17, 469–488.
Guiso, L., Sapienza, P., Zingales, L., 2008. Social capital and good culture. Journal of the European Economic Association 6, 295–320.
Guiso, L., Sapienza, P., Zingales, L., 2009. Cultural biases in economic exchange. Quarterly Journal of Economics 124, 1095–1131.
Hiller, V., 2008. Work Organization and Preferences Dynamics. Mimeo, Paris School of Economics–Université Paris I–Panthéon Sorbonne, Paris.
Janeba, E., 2007. International trade and consumption network externalities. European Economic Review 51, 781–803.
Keat, R., 2000. Cultural Goods and the Limits of the Market. St Martin's Press, New York.
Kónya, I., 2006. Modeling cultural barriers in international trade. Review of International Economics 14, 494–507.
Kónya, I., Ohashi, H., 2007. International consumption patterns among high-income countries: evidence from the OECD data. Review of International Economics 15, 744–757.
Krugman, P., 1979. Increasing returns, monopolistic competition, and international trade. Journal of International Economics 9, 469–479.
Lazear, E., 2003. Culture and language. Journal of Political Economy (Suppl.), 95–125.
MacIntyre, A., 1984. After Virtue: a Study in Moral Theory. University of Notre Dame Press, Notre Dame, IN.
Mayda, A.M., Rodrik, D., 2005. Why are some people (and countries) more protectionist than others? European Economic Review 49, 1393–1691.
Maystre, A., Olivier, J., Thoenig, M., Verdier, T., 2009. Product-based cultural change: is the village global? CEPR Working Paper 7438, CEPR, London.
Meunier, S., 2000. The French exception. Foreign Affairs 79, 104–116.
Michaud, J.B., 2009. Unemployment insurance and cultural transmission: theory and application to European unemployment. CEP Discussion Paper 936, CEP, London.
Nederveen Pieterse, J.N., 2004. Globalization and Culture: Global Melange. Rowman & Little, Oxford.
Olcina, G., Penarrubia, C., 2004. Hold-up and intergenerational transmission of preferences. Journal of Economic Behavior and Organization 54, 111–132.
Olivier, J., Thoenig, M., Verdier, T., 2008. Globalization and the dynamics of cultural identity. Journal of International Economics 76, 356–370.
Putnam, R.D., 2007. E pluribus unum: diversity and community in the twenty-first century. Scandinavian Political Studies 30, 137–174.
Ramezzana, P., 2003. Globalization and Cultural Diversity: the Economics of the Cultural Exception. University of Virginia, Mimeo.
Rauch, J., 1999. Networks versus markets in international trade. Journal of International Economics 48, 7–35.
Rauch, J., Casella, A., 2003. Overcoming informational barriers to international resource allocation: prices and ties. The Economic Journal 113, 21–42.
Rauch, J., Trindade, V., 2002. Ethnic Chinese networks in international trade. The Review of Economics and Statistics 84, 116–130.

Rauch, J., Trindade, V., 2009. Neckties in the tropics: a model of international trade and cultural diversity. Canadian Journal of Economics 42, 809–843.
Ritzer, G., 1996. The McDonaldization of Society. Pine Forge Press, Thousand Oaks, CA.
Sáez-Martí, M., Zenou, Y., 2012. Cultural transmission and discrimination. Journal of Urban Economics 72 (2), 137–146. <http://ideas.repec.org/a/eee/juecon/v72y2012i2p137-146.html>, <http://ideas.repec.org/s/eee/juecon.html>.
Senik, C., Verdier, T., 2011. Segregation, entrepreneurship and work values: the case of France. Journal of Population Economics 24, 1207–1234.
SOFRES, 1999. Poll politique et opinion: Les valeurs et les attentes des jeunes. <www.sofres.fr>.
Suranovic, S., Winthrop, R., 2005. Cultural Effects of Trade Liberalization. Mimeo. George Washington University. <http://ideas.repec.org/p/wpa/wuwpit/0511003.html>, <http://ideas.repec.org/s/wpa/wuwpit.html>.
UN Development Programme, 1998. Human Development Report – Consumption: Patterns and their Implications for Human Development. Oxford University Press, New York.