

Artfilms, handicrafts and other cultural goods: the case for subsidy

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Abstract

Though widespread, the practice of public subsidies for cultural activity lacks a rigorous and consistent economic rationale. We analyze a canonical market structure that characterizes much cultural activity: the competition of *mass-produced goods* with heterogeneous *non-standardized goods* that are imperfect substitutes. We analyze several types of market failure: uncertainty about preferences (we don't know what we like, and we don't know what we might like in the future); endogeneity of preferences (we like what our neighbors talk about, and we like what we're accustomed to); and externalities associated with production (future production costs are determined by current production). The model provides a basis for cultural subsidies to promote social welfare and economic development.

keywords: cultural goods, subsidy, externalities

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1 Introduction

Public subsidy to cultural activity — ranging from the fine and performing arts, to preservation and promotion of traditional handicrafts and other forms of heritage, to cultural industries like music and film — is widespread in rich and poor countries alike. There is nevertheless little explicit economic rationale for this feature of many countries' public finance. To be sure, there is general acknowledgment among economists who have addressed the issue that there are likely to be positive externalities generated by cultural production and consumption (Peacock 1969; Blaug 2001; Throsby 2001). This would serve as the justification for subsidy, but there is little analysis of the nature of these externalities.⁴ Indeed, some have argued that their magnitude is probably small (Fullerton 1991). Moreover, to the extent that such externalities are merely pecuniary — such as added profits for cafés and restaurants in the proximity of theaters and cinemas — there is little welfare-based justification for subsidizing cultural activity. We will argue in this paper that there *is* in fact a strong theoretical case to be made for a cultural subsidy.

In this paper we provide a canonical model that characterizes some of the most salient features of the market for various cultural goods and services: competition of *mass-produced goods* (like Hollywood movies or the large-scale manufacture of textiles) with a wide array of heterogeneous *non-standardized goods* (like *auteur* cinema or traditional handweaving). We use the model to analyze a series of externalities and market imperfections. We consider the case for subsidy of non-standardized goods that arises from three broad categories of market failure.

First, there is *uncertainty of preferences*. Consumers do not necessarily know which variety

⁴Economic and political rationales for public support of cultural activity are reviewed usefully by a number of authors, among them Benhamou (2001, ch. 5); Dapporto and Sagot-Duvaurox (2000, 257-265); Farchy (1999, ch. 6); Farchy and Sagot-Duvaurox (1994, ch. 1); Heilbrun and Gray (2001, ch. 11). On the relationship between culture and economic development, less has been written from an economic perspective, but see Throsby (2001, ch. 4) and Rao and Walton (forthcoming). Various issues related to cultural economics, but not necessarily closely related to the issue of the cultural subsidy that we analyze here, are considered in the Symposium on cultural economics in the Spring 2003 number of *Journal of Economic Perspectives*.

of non-standardized good they like most. In our model, the probability that a consumer will find her most preferred variety increases with the level of production, and therefore the availability, of the non-standardized varieties; this is an externality that firms do not internalize. In addition, consumers are uncertain about what varieties of non-standardized goods will be most preferred in the future (by themselves or their heirs). Cultural production then has a value as a stock, and preserving some or all varieties can increase welfare — an option-value argument. Firms do not internalize this intertemporal externality.

Second, *preferences are endogenous* in a very precise sense. Consumers like to consume what their neighbors consume, in part because part of the value of cultural consumption lies in the sharing of the experience; this refers to the case of network externalities. Preferences are endogenous, then, in the sense that the level of utility associated with consumption of a particular product is determined by the consumption choices of others. Preferences are also endogenous to the extent that they are shaped by habit formation (or what some have called an “addictive-good” aspect) and by expectations about future availability. Both types of endogeneity can be influenced by aggressive marketing (which has economies of scale), and so the larger producer (or the “sponsor”) may be able to lock-in our preferences. Finally, addictive tastes of this sort may engender spill-over effects, as when experience with one good (e.g., the blockbuster movie *Titanic*), enhances the enjoyment of another, related good (e.g., the Maritime Museum of the Atlantic in Halifax, Canada).

Third, there are *externalities associated with production*. Many cultural practices are subject to the mirror image of learning by doing: to wit, “forgetting by not doing”. More generally, future production costs may be a function of current production levels; this is an intertemporal production externality an individual firm may not internalize. Finally, some producers may have “deep pockets”: this is the case of asymmetric fixed costs (which may be particularly related to marketing). Some of the small producers may face credit-market imperfections and may not be able to cover the fixed cost. This in turn may lead to the disappearance of some varieties of goods, with welfare consequences for many consumers.

There are other arguments related to market failure and cultural goods. For example, arguments about the *existence value* of the cultural stock are left out here. A rationale for

my wanting some museum to be there, even though I (or anyone I care about) will never visit it, must have something to do with a kind of cultural pride in its sheer existence. If such a value exists, it provides a pretty straightforward argument for protection. We will nevertheless suggest ways to model cultural pride — which is a form of public good — related to self-esteem.

Concerns regarding the preservation of cultural diversity, or fears that globalization will lead to a homogenization of cultural expression⁵ can be addressed with our model as instances of market expansion. Roughly speaking, many apparently alarming scenarios have to do with situations in which non-standardized goods production is suddenly exposed to competition with mass-produced goods. It has been shown in the research on international trade that there are situations where such competition might reduce social welfare (Dixit and Norman, 1980, 273-281; Francois and van Ypersele 2002); our paper complements these earlier results. Our arguments for a cultural subsidy are equivalent to arguments for some form of protection for certain non-standardized goods.

2 We don't know what we like most

2.1 The basic model: mass-produced and non-standardized goods

Consider a market in which two types of imperfect substitutes, a -goods and b -goods, are produced and sold. Each consumer consumes at most one unit of a given good. A consequence of this assumption is that producers cannot practice discriminatory pricing based on quantities. Consumers as a group can nevertheless consume several units of goods of the same general type, a or b . Let b -goods be *mass-produced goods*: they are produced by a monopoly firm and all such b -goods are perfect substitutes for each other. The total

⁵See the remarks made by French President Jacques Chirac in February 2003: “Si nous n’y prenions garde, tout convergerait, faute de garde-fous, vers la règne du plus fort, vers le triomphe de ce qui est formaté à l’avance pour le public le plus large, vers l’accroissement des inégalités, vers l’affrontement entre un modèle dominant et le reste du monde.” “Jacques Chirac célèbre la diversité culturelle,” *Le Monde*, February 4, 2003. Fears of the loss of cultural diversity are situated within a larger (economic) debate on globalization in Bardhan (2003).

quantity of b -goods produced is denoted q^b .

The a -type goods, *non-standardized goods*, are not perfectly substitutable among themselves. By a -goods, we mean a wide variety of cultural products like art films, various handicraft traditions, the services provided by practitioners of particular musical styles: Portuguese *fado* musicians and Moroccan *nûbâ* musicians, for example, both provide musical services, but they have very different characteristics that make those services imperfect substitutes. Each consumer has a preferred variety among the set of all a -goods that can possibly be produced. We consider the problem from the aggregate level and denote the total number of a -goods produced by q^a . The total measure of consumers is normalized to one, and each consumer consumes at most one unit. In our model, the equilibrium will be such that each consumer consumes exactly one unit, so that $q^b = 1 - q^a$.

2.2 Consumer surplus

Consuming one unit of the b -good provides the same utility ν to all consumers. A consumer's most preferred variety of a -good, on the other hand, provides her with utility $\nu + V$. All other varieties of a -goods are assumed to provide to the consumer the same surplus as the mass product, namely ν . Consumers' tastes are therefore heterogeneous in two respects: they prefer different varieties of a -goods, and they differ in the absolute utility derived from their preferred variety, V . V lies in the interval $[0, 1]$ and is distributed across the population according to the cumulative distribution function $\Phi(\cdot)$, with density $\phi(\cdot)$.

In order to find her preferred variety among the a -type goods, the consumer must incur a fixed search cost K ; when she pays the cost K , she finds her preferred variety with probability $G(q^a)$. The search cost K could be readily endogenized; for now, we appeal to the informational value of advertising to justify this asymmetry between a -goods and b -goods. No a -good producer will find it profitable to advertise its own product, since the quantity sold will be too small compared to the fixed cost of advertising. In contrast, the b -good producer can cover this fixed cost with large quantities.⁶ Suppose, for example,

⁶Another approach to thinking about K could be based on learning by consuming over time. Suppose that a -goods are not the same in each period, while the b -good does not vary across time. Consumers who

that the b -good firm produces a widely-distributed mail-order catalogue or maintains an oft-visited Web site, but the a -goods producers do not.

An excellent example of search among the a -goods producers is provided by Baba Kharak Singh Marg, a street in New Delhi (near Connaught Place) that houses a wide range of cottage-industry producers from every state in India. Two features of this shopping experience merit attention: first, centralizing the producers in one spot (a public-sector initiative) lowers the search cost K ; second, and perhaps more important, consumers entering this emporium may have no prior knowledge of their most-preferred variety, but they have a most-preferred variety nevertheless. We feel this second, “horizon-expanding”, feature is a defining characteristic of a wide range of cultural goods.

The probability that the consumer finds her most preferred variety $G(\cdot)$ can thus be interpreted as a cumulative distribution function, with support $[0, 1]$ and density $g(\cdot)$. A key feature of this formulation is that $G(\cdot)$ is strictly increasing in q^a : the larger the quantity of varieties produced, the more likely that the consumer will find her ideal variety. Consumption of a -goods thus generates a positive externality, as a higher level of q^a production increases the probability that a given consumer will find her preferred variety of a -good.

To simplify, assume that $G(\cdot)$ is the uniform distribution on $[0, 1]$, so that the probability of finding one’s preferred variety of a -good when q^a non-standardized goods are produced is $G(q^a) = q^a$. The assumption of uniformity of $G(\cdot)$ involves no loss of generality, given that the results obtained with a more general distribution function $G(\cdot)$, given some distribution of valuations $\Phi(\cdot)$, can be replicated with a uniform $G(\cdot)$ and some appropriate choice of distribution of valuations $\tilde{\Phi}(\cdot)$.⁷ Intuitively, a large number of consumers with a very high valuation translates into higher demand. But a similarly shaped demand curve can also be obtained if the probability of finding one’s perfect match increases quickly with q^a . We will also generally assume that the distribution $\Phi(\cdot)$ of the additional valuation V derived from

have consumed the b -good in the past know its characteristics exactly, but the characteristics of a -goods must be researched anew each period.

⁷Indeed, the demand for a -goods is determined by some composition of $G(\cdot)$ and $\Phi(\cdot)$. If two pairs $(G(\cdot), \Phi(\cdot))$ and $(\tilde{G}(\cdot), \tilde{\Phi}(\cdot))$ generate the same demand when composed in this way, then they are equivalent from the perspective of our model.

non- standardized products is uniformly distributed on $[0, 1]$.

If a consumer incurs the search cost and fails to find her preferred variety, we assume she consumes another variety of a -good. The expected utility of a consumer is therefore

$$q^a(\nu + V) + (1 - q^a)\nu - K - p^a = q^aV + \nu - K - p^a \quad (1)$$

if she chooses to incur the search cost K , and $\nu - p^b$ otherwise, where p^k is the price⁸ of a good of type k , $k = a, b$. All consumers will choose to consume one of the two goods as long as consumption at one of the prices yields a positive utility. Thus $q^a + q^b = 1$.

2.2.1 Technologies

Goods of type b are produced by a monopoly; a -goods are produced by a continuum of symmetric firms. Each firm in the a -continuum can produce at most one unit.

Note that by assuming a monopoly producer of b -goods, we are considering the case *least* favorable to protection of industry a . A monopoly will tend to underproduce relative to the competitive equilibrium, which is a *good* thing in this context (as in the case of a polluting monopoly or of conservation of a resource used by a monopoly as an input to some production technology).

Fixed costs are normalized to zero, and the marginal cost of production is c^a for a -goods and c^b for b -goods. Profits in the two industries are thus

$$\begin{aligned} \pi^a(q^a, p^a, p^b) &= (p^a - c^a)q^a \\ \pi^b(q^b, p^a, p^b) &= (p^b - c^b)q^b, \end{aligned}$$

where $c^a > c^b$. Given our interpretation of quantity q^a , c^a may be seen as a fixed cost incurred by the (atomistic) firm producing a given unit, i.e., a given variety, of a -good. The not-so-realistic assumption that mass production involves no fixed cost is nevertheless the *least* favorable case from the perspective of arguing for protection of industry a . Indeed,

⁸In what follows, we impose a single price for all a -goods; this is not a restrictive assumption in a symmetric setting in which every a -good is similar except for the identity of the consumer who prefers it to all others.

a firm trying to cover its fixed costs would typically increase production. In practice, mass production entails large fixed costs and very small marginal costs. This is the case, for example, of the cultural industries — broadcasting, publishing, music recording, film production — in which the first unit produced is extremely costly, but subsequent units (additional screenings of a film or pressing an additional compact disc) are virtually costless. This feature can easily be incorporated in the model, and would strengthen our results.⁹

2.3 The optimum

Assume that the individuals who consume a -goods are those with the highest valuations for their preferred goods, as would be the case in an efficient outcome. Let $V(q^a)$ denote the lowest additional valuation among consumers who consume a -goods. Then, with reference to (1) above, consumer surplus (gross of expenditures) is given by

$$\widetilde{CS}(q^a, q^b) = \int_0^{V(q^a)} \nu d\Phi(V) + \int_{V(q^a)}^1 (G(q^a)V + \nu - K) d\Phi(V).$$

Given our definition of $V(q^a)$, $q^b = \Phi(V(q^a))$; thus, $q^a = 1 - \Phi(V(q^a))$. Using this relation, gross consumer surplus can be expressed as a function of q^a :

$$\widetilde{CS}(q^a) = \nu - (1 - \Phi(V(q^a)))K + G(q^a) \int_{V(q^a)}^1 V\phi(V)dV.$$

This expression simply says that gross consumer surplus is the basic utility enjoyed by all consumers (ν), less the search costs incurred by consumers of some a -good $((1 - \Phi(V(q^a)))K)$, plus the additional utility of those fortunate a -good consumers who find their most preferred variety $(G(q^a) \int_{V(q^a)}^1 V\phi(V)dV)$. Social welfare, in turn, is given by gross consumer surplus net of production costs. Assuming that a positive quantity of b -goods is produced, this can be written as

$$SW(q^a, q^b) = (\nu - c^b)q^b + q^a ((1 - G(q^a))\nu - K - c^a) + G(q^a) \int_{V(q^a)}^1 (\nu + V)\phi(V)dV$$

⁹A fixed cost F^b would be subtracted from firm b 's profits and from social welfare. It may be the case that production of a positive quantity of b -goods is no longer socially optimal once this cost is taken into account.

The first term is the social welfare associated with b -goods production. The second term is the social welfare associated with a -goods production (accounting for the base utility ν , as well as search and production costs, but not the benefits of finding one's preferred variety). The third term is the consumer surplus enjoyed by those a -goods consumers who find their most-preferred variety. This expression can be further simplified as a function of q^a :

$$SW(q^a) = \nu - c^b(1 - q^a) - q^a(K + c^a) + q^a \int_{V(q^a)}^1 V\phi(V)dV \quad (2)$$

Example: Uniform distributions. If the distribution functions $\Phi(\cdot)$ and $G(\cdot)$ are uniform, then $q^a = 1 - V(q^a)$, and the expression for social welfare given in (2) can be rewritten as

$$SW(q^a) = \nu - c^b(1 - q^a) - q^a(K + c^a) + (q^a)^2 \left(1 - \frac{q^a}{2}\right).$$

In this case, the optimal quantity $q^{a*(1)}$ maximizes SW and (from the first-order condition of the maximization exercise) is characterized by

$$c^b - K - c^a + \int_{V(q^{a*(1)})}^1 V\phi(V)dV + q^{a*(1)}V(q^{a*(1)}) = 0$$

If V is uniformly distributed, this becomes

$$-\frac{3}{2}(q^{a*(1)})^2 + 2q^{a*(1)} - (K + c^a - c^b) = 0,$$

which has two roots: the relevant one is

$$q^{a*(1)} = \frac{1}{3} \left(2 + \sqrt{4 - 6(K + c^a - c^b)}\right),$$

provided that this solution is indeed less than 1, that is, if $4 - 6(K + c^a - c^b) < 1$. Otherwise, the optimal quantity is $q^{a*(1)} = 1$.

2.4 Equilibrium

2.4.1 Consumer demand

Consumers are atomistic; they make choices as though their decisions have a negligible impact on the total amount produced. The total demand for a -goods is thus given by the

measure of individuals whose additional valuation V for their preferred variety is higher than the threshold $\tilde{V}(q^a, p^a, p^b)$, defined by

$$G(q^a)\tilde{V}(q^a, p^a, p^b) = p^a - p^b + K$$

Suppressing the arguments of $\tilde{V}(\cdot, \cdot, \cdot)$ for notational simplicity, net consumer surplus is given by

$$\begin{aligned} CS(q^a) - p^a q^a - p^b(1 - q^a) &= \int_{\tilde{V}}^1 (G(q^a)V + \nu - K - p^a) \phi(V) dV + \int_0^{\tilde{V}} (\nu - p^b) \phi(V) dV \\ &= \nu - \Phi(\tilde{V})p^b - (1 - \Phi(\tilde{V}))(K + p^a) + q^a \int_{\tilde{V}}^1 V \phi(V) dV, \end{aligned}$$

with $q^a = D(q^a, p^a, p^b) \equiv 1 - \Phi(\tilde{V}(q^a, p^a, p^b))$ in equilibrium.

Uniform distributions. If $G(\cdot)$ and V are uniformly distributed, then the marginal consumer is represented by valuation $\tilde{V}(q^a, p^a, p^b) = \frac{1}{q^a}(K - (p^b - p^a))$, when $q^a \neq 0$. Total demand for a -goods is then given by

$$D(q^a, p^a, p^b) = 1 - \frac{1}{q^a} (K - (p^b - p^a)).$$

In equilibrium, assuming that $1 - 4(K - p^b + p^a) \geq 0$, the quantity of a -goods demanded is the solution to a second-degree equation decreasing in p^a and increasing in p^b :

$$q^a = \frac{1}{2} \left(1 + \sqrt{1 - 4(K - p^b + p^a)} \right),$$

when q^a is strictly positive.¹⁰ This expression, in turn, can be solved for p^b to give us the inverse demand function for b -goods (as a function of q^a , which is just $1 - q^b$), taking p^a as given:

$$p^b(q^a) = (q^a)^2 - q^a + (K + p^a). \quad (3)$$

2.4.2 Multiple equilibria and coordination

As is customary in models with strategic complementarities¹¹, there are multiple equilibria.

¹⁰There is another solution for q^a , but it is increasing in p^a and decreasing in p^b , which does not correspond to the specifications of a demand function.

¹¹See, *inter alia*, Rosenstein-Rodan's (1943) classic work on economic development, recently adapted by Rodríguez-Clare (1993), or Cooper and John (1988), Bardhan and Udry (1999, ch. 16), Matsuyama (1993).

Proposition 1 (a) *There always exists an equilibrium in which no non-standardized goods are produced ($q^a = 0$).*

If consumers anticipate no a -goods will be produced, they never incur the search cost K and firms prefer not to produce any a -goods.

Moreover, the equilibria can be Pareto-ranked:

Proposition 2 *An equilibrium in which only mass products are produced in positive quantities is socially inefficient.*

Note that this result holds even if the b -goods equilibrium is unique.

Given that the consequences of multiple equilibria have been extensively explored in the literature, we will focus in what follows on equilibria other than the one in which $q^a = 0$. In effect we implicitly assume that agents are able to coordinate on the socially-efficient equilibrium, and we will not explicitly state for now that we assume that $q^a > 0$. (In later sections of this paper, we will return to the problem of multiple equilibria.)

2.4.3 Competition among firms

The atomistic firms in industry a are price takers. Thus they equate price and marginal cost: $p^a = c^a$.

The monopoly chooses its quantity q^b (or equivalently q^a) taking into account the effect on price p^b . The monopoly's program can be written as follows, with q^a as the choice variable:

$$\max_{q^a} (p^b(q^a) - c^b) (1 - q^a).$$

In the case of uniform distributions, we can use the monopoly's inverse-demand function $p^b(q^a)$ from (3). The first-order condition to this program can be simplified as follows:

$$-3(q^a)^2 + 4q^a - (1 + K + p^a - c^b) = 0,$$

giving the equilibrium quantity (as a function of p^a):

$$\hat{q}^a(p^a) = \frac{1}{3} \left(2 + \sqrt{4 - 3(1 + K + p^a - c^b)} \right), \quad (4)$$

if this quantity lies in the interval $[0, 1]$. If not, equilibrium quantity is equal to the nearest boundary (0 or 1).

Proposition 3 *Let producers in industry a price their goods at marginal cost. If $|K - 1| > |c^a - c^b|$, the equilibrium quantity of a -goods is always weakly lower than the social optimum: $\hat{q}^a(c^a) \leq q^{a(1)}$. This result holds with equality ($\hat{q}^a(c^a) = q^{a(1)}$) if both quantities are corner solutions and equal to one; otherwise, the inequality is strict.*

The meaning of this proposition is that the demand for a -goods is inefficiently low: the social value of an increase in q^a is not internalized by consumers. Moreover, the tendency of a monopoly to underproduce is insufficient to counteract the inefficiently low demand for a -goods as long as $|K - 1| > |c^a - c^b|$.

In order for the best-response of the monopoly to lead to the efficient quantity $q^{a(1)}$, the price of a -goods must be set at the level (call it $p^{a(1)}$) that would induce the monopoly to supply $1 - q^{a(1)}$. This price $p^{a(1)}$ is given by

$$p^{a(1)} = 2c^a - c^b + K - 1.$$

The question is whether $p^{a(1)} = c^a$ or $p^{a(1)} < c^a$. The latter is true if and only if

$$(c^a - c^b) + (K - 1) < 0.$$

Now $(c^a - c^b) > 0$ by assumption, so this requires that $K < 1$, and indeed, that $|K - 1| > |c^a - c^b|$. If this condition is not met, then it is possible that the monopoly's tendency to under-produce b -goods just offsets industry a 's tendency to under-produce a -goods. This becomes less likely the larger is the cost differential between the two sectors of the industry (that is the larger the difference $c^a - c^b$). Alternatively, the larger the search cost K , for a given cost differential, the more likely that a -goods production is optimal. This immediately gives the following result.

Proposition 4 *A subsidy to non-standardized production raises efficiency if $|K - 1| > |c^a - c^b|$.*

2.5 Asymmetric fixed costs

What if we weaken the assumption that there are no fixed costs? Suppose instead that there are two sectors a and b with increasing returns to scale technologies (as is the case in the cultural industries). The fixed costs might particularly be related to marketing, as in the case of films. Then if there is an asymmetry in fixed costs we might observe the disappearance of a -producing firms in some equilibria. The asymmetry might arise if the b firm covers its fixed costs in other markets, for example, or if some a -goods producers face credit-market imperfections and are unable to cover the fixed cost.¹²

3 We don't know what we may like in the future

What if current production creates a stock of “culture” or “crafts-diversity”, for example? Then arguments made regarding the economics of biodiversity conservation (e.g., Heal 1998) apply more or less to cultural goods of the type we are considering here. Uncertainty regarding the future value of goods is without doubt a central characteristic of cultural goods. There is furthermore an enduring sentiment among the cultural cognoscenti that today's consumers are unable to appreciate fully contemporary cultural products. This was recognized by Beethoven, who, when told that audiences didn't like his latest Quartet, said, “Ça leur plaira bien un jour” (Massin and Massin 1976) — roughly, “they'll *learn* to like it”.

Formally, suppose that there are two periods to the model presented above. The quantity consumed in the second period is just the level produced (and consumed) in the first period. (We assume no loss between periods.) There is no production and firms play no role in the second period. Social welfare in period 2 is a function of first-period outputs q^a and q^b

¹²The question of deep pockets and predation is analyzed in a seminal paper by Aghion and Bolton (1987).

only, and, for simplicity, is assumed to be separable in the two quantities: $W(q^a) + H(q^b)$. Moreover, since b -goods are perfect substitutes, it is logical in this context to assume that an additional unit of b -goods yields a negligible stock surplus. As soon as production is greater than zero, future consumers benefit from the existence of the good, and there is no (or nearly no) need for larger quantities. Mathematically, the marginal welfare for b -goods is null for $q^b > 0$:

$$\begin{aligned} H(q^b) &= h, \text{ if } q^b > 0, \\ &= 0, \text{ otherwise.} \end{aligned}$$

$W(q^a)$, on the other hand, is concave in q^a . In practice, of course, not all a -goods will have value for future consumers. Nevertheless, there is sufficient uncertainty regarding which of these products will have value to justify our modeling approach.

3.1 The optimum

The optimal output levels q^{a*} and $q^{b*} = 1 - q^{a*}$, assuming both are strictly positive, solve the following program:

$$\max_{q^a} SW_1(q^a) + \rho(W(q^a) + h),$$

where ρ is the discount factor. The first-order condition to this program yields

$$c^b - K - c^a + \int_{V(q^a)}^1 V\phi(V)dV + q^a V(a^a) + \rho W'(q^a) = 0.$$

When V is uniformly distributed, the optimum is characterized by

$$-\frac{3}{2}(q^a)^2 + 2q^a - (K + c^a - c^b) = \rho W'(q^a).$$

The higher the marginal value of a -goods in the future (that is, the higher is $\rho W'(q^a)$), the larger the optimal level of current production.

3.2 Underproduction of a -goods in equilibrium

Consumers choose current consumption levels q^a and q^b without taking into account the second period because they are atomistic. Their demand function in the second period

is therefore identical to the first-period demand function. Likewise, firms in industry a behave no differently in this two-period model than in the static case analyzed earlier. The monopoly does not internalize any of the value constituted by the stock of a -goods in the second period, and chooses its quantity exactly as in the one-period model.

Proposition 5 *The equilibrium in the first period when cultural goods constitute a stock valued in the second period is identical to the equilibrium derived in the one-period case. As such, the underprovision of a -goods is accentuated in the two-period model by the additional value of these goods in the second period.*

3.3 Sponsorship

In the two-period model considered above, consumers value the continued existence of a -goods independently of whether they consume it today or not. This may be an existence value or an option value. In either case, expectations about the future matter. Now suppose that b -goods production is “sponsored” (in the sense of Katz and Shapiro (1986)): the b -producing monopoly is able to sell at a price below marginal cost in order to drive out competition. We are emphasizing one feature of sponsorship here: namely, that it might influence consumers’ expectations about future availability of the good (or repairs, or software, etc., that are compatible with the good). One question raised by the coordination-game framework is why any population of players would ever play the Pareto-dominated b -goods equilibrium? Perhaps, in a more complicated game, because they do not expect a -goods to be available in the future, and prefer not to make a relationship-specific investment in a -goods today.

This also suggests that one might be able to attribute a sponsorship rationale to aggressive cultural policy-making. (This might include French cultural policy, for example.) Such culture ministries might be influencing consumers’ expectations regarding future availability of domestic cultural goods, and reducing the cost of relationship-specific investments.

Whether or not there are relationship-specific investments or network externalities, sponsorship may play a role in equilibrium selection in any setting where there are potential

coordination failures. If the sponsorship is public (the French cultural policy example), then the role of a cultural subsidy is not the standard Pigovian correction of price signals, but a mechanism for coordinating agents on the Pareto-superior equilibrium.

3.4 Costs of storage and probability of future use

Weitzman (1998) provides a fairly general model for application to the optimal conservation of biological (e.g., species) diversity. The argument is sufficiently abstract that it is readily applicable to the question of conserving cultural diversity (see, e.g., Farchy and Sagot-Duvaurox (1994, 29)). Weitzman provides a rigorous derivation of a simple ranking formula for deciding how to allocate a given conservation budget:

$$R_i = (D_i + U_i) \left(\frac{\Delta P_i}{C_i} \right)$$

Species (i) are given a rank (R_i) according to their expected marginal distinctiveness (D_i), the direct utility they provide (U_i), weighted by the feasible change in survival probability (ΔP_i) per unit of cost (C_i).

In our model, the survival of a particular variety of a -good can be assured by incurring cost c_a in the first period, and by assumption this cost is the same for all varieties. Similarly, the change in survival probability purchased with cost c_a is identical for all varieties. Then the ranking criterion reduces to the first term in brackets above. Weitzman's U captures the direct utility of consuming a given variety, which is equal to $\nu + V$ for those fortunate consumers that value that variety most, plus ν for the frustrated consumers who unsuccessfully sought another type of a -good and settled on this variety: direct utility can be succinctly summarized by the sum of first- and second-period social welfare associated with the consumption of a given variety.

The expected distinctiveness of a given variety is a more complicated concept. In discussions of biological diversity, Weitzman argues that certain species (or habitats) are distinctive because they contain genetic information not available in other species. Diversity is captured by the amount of unique genetic information in a given species, weighted by the probability that the species will not become extinct: the distinctiveness of a species is the marginal

change in diversity achieved by an improvement in the survival probability.

The question is then whether, if the a -goods were ranked according to Weitzman's formula, there would be a longer list of surviving varieties in the second period under the social optimum than there would be under a competitive equilibrium. This is equivalent to showing that marginal diversity is higher for the lowest-ranked variety under the competitive equilibrium.¹³

A further question is the likelihood that a given variety will be useful in the future. For creative endeavors, this is (to put it mildly) difficult to forecast. Critically useful inputs, created in the past, to contemporary creation often come from very unlikely and hard-to-predict sources. A celebrated example is the influence of African ceremonial masks on Picasso (as in the figures of his *Les demoiselles d'Avignon* (1907)). This is even more complex than the "amount of genetic material" present in a species under consideration for conservation.

4 We like what our neighbors talk about

Part of the spillovers from cultural consumption take the form of network externalities. Boardman and Hargreaves Heap (1999) incorporated network externalities into an analysis of access to satellite broadcasting in essentially this sense: people talk about shared experiences. The greater the number of people that share an experience, the more valuable it is. This extends beyond the number of proximate individuals to whom a person can talk about a sports broadcast, for example; if the audience for a given event is sufficiently large, it generates media reviews and other coverage from which the consumer derives a benefit (and she would not benefit if she hadn't shared the experience.) Sable and Kling (2001) model the benefits from shared experience of cultural heritage; they correctly note that many of these benefits are essentially public goods, but not necessarily network effects. The

¹³This would require more structure to be imposed on the problem: namely, we would need to explicitly consider the a -goods continuum as a line (so that a distance metric could be employed to capture the idea of distinctiveness), and we would need to know something about the relative willingness to pay for certain points on the a -goods continuum.

very simple point of this section is that Pareto-dominated collective cultural choices can easily emerge as equilibrium outcomes.

The basic idea can be illustrated with a two-player coordination game. Suppose that each player simultaneously chooses a cultural good — a film, say. Each can choose only one, and there are two choices available: as before, a mass-produced b -good, and a single a -good. As in the basic model, the a -good provides utility $\nu + V$ to each player, and the value of V need not be equal for each player.

Player 1's utility function is given by $u_1(m, k)$, where $k \in \{a, b\}$ is the type of film chosen by player 1, and $m \in \{1, 2\}$ is the number of players who choose k . An intrinsic part of the good's appeal to both players is that it serves as the basis for conversation; it is a shared experience on the basis of which the players can talk about values or gossip or other things. We assume therefore that there are network externalities in consumption, borrowing the definition of network externalities from Farrell and Saloner (1985): $u_j(2, k) > u_j(1, k), \forall j, k$. Both players, independent of the outcome, prefer the a -good: $u_j(m, a) > u_j(m, b), \forall j, m$. Then if $u_j(2, b) > u_j(1, a), \forall j$, there are two pure-strategy equilibria to this simple game: $[a, a]$, which is a Pareto optimum, and $[b, b]$, which is strictly Pareto-dominated by the first equilibrium.

Following the network-externalities model of Katz and Shapiro (1985), for $n > 2$ players preferences can be expressed in terms of the following willingness-to-pay function:

$$\nu + 1(a) \cdot (V + v_a(q^a)) + 1(b) \cdot v_b(q^b)$$

where $1(a)$ is an indicator equal to one if the agent's choice is $k = a$, and similarly for $1(b)$, and the quantities q^a and q^b also serve as the expected size of networks a and b . Then $\nu + V$ is the agent's willingness to pay for the a -good when the a -network size is zero, and ν is her willingness to pay for the b -good when the b -network size is zero.

The v functions capture the idea of network externalities: let $v_k(0) = 0, v'_k > 0, v''_k < 0, \lim_{x \rightarrow \infty} v'_k = 0, k = a, b$. Furthermore, assume that $v_f(x) < v_d(x), \forall x \geq 0$. In the extreme, suppose that $v_b(x) = 0, \forall x \geq 0$.

Then, just as in the two-player illustration, this is a coordination game, and two results can

be derived.

Proposition 6 *When there are network externalities in cultural consumption, (a) there are multiple equilibria; and (b) the equilibria can be Pareto-ranked.*

5 We like what we know

5.1 Addiction

In many cases, the utility derived by consumers of cultural goods exhibits increasing marginal returns. Indeed, consumers learn to appreciate cultural goods when they consume more. They are more likely to pick the “right” good, the one closest to their tastes, when they have a better knowledge, through consumption, of the goods offered. One can therefore see cultural goods as “addictive” goods, and represent the utility they generate by a function that is convex in the quantity of cultural goods consumed (Becker 1996; Becker and Murphy 1988; Pollak 1970; Stigler and Becker 1977).

In this instance of endogenous preferences, as in the case of network externalities analyzed in the previous section, nothing in our model is inconsistent with the position taken by Stigler and Becker (1977) to the effect that preferences are stable and exogenous, but that subtle shadow prices — like the price of music appreciation — change with consumption patterns.¹⁴

¹⁴An account of the evolution of tastes and sensitivities is given by musicologist Barry Kernfeld (1995, 128). Kernfeld reports his experience with John Coltrane’s experimental jazz performance *Ascension* (1965):

Colleagues organizing a freshman music seminar once asked me to suggest a jazz recording that might be played with other types of radical music as a point of departure for asking the questions: What is noise, and what is music? I suggested *Ascension*. Not having listened to the piece for about four years, I cued it up on the record player and found it to be perfectly coherent, emotionally powerful, and in its own way beautiful. In those four years I had gained such a better understanding of jazz that *Ascension* now seemed a poor choice for the seminar, because it was obviously music and hence did not raise significant questions about boundaries between music and noise. That same day, my colleagues came to say that they had decided not to use *Ascension*, because it was clearly noise, not music!

Whether tastes in fact change (i.e., preferences are truly endogenous) or the costs of certain types of consumption change (as Stigler and Becker would have it), the analysis of social welfare in typical comparative-statics exercises is complicated. Nevertheless, some welfare comparisons can be made, and that is what we do in this section.

5.2 “Genre-specific” investments

The addictive aspects of cultural consumption can be understood in another way, one that is related to a second kind of network externality. The network externality described in Section 4 above is basically the communication externality studied by Katz and Shapiro (1985), that exhibited by physical networks like telephone or fax-machine networks. A second kind of network externality (Katz and Shapiro 1994) is exhibited by the hardware-software paradigm. In a more complicated model of cultural consumption, consumers might choose a or b every period for many periods, but the goods are not the same each period. One gets “used to” Hollywood movies, or to auteur cinema: your relationship-specific investment in appreciating one genre is the hardware, the film is the software.¹⁵ Then, even despite the network externalities, a more complicated model could admit lock-in effects with relationship-specific investments. The question then is whether, in any single stage of the repeated game, the unanimous a -consumption outcome ceases to Pareto-dominate the unanimous b -consumption one if the latter is played often enough. As is typical in cases of path-dependency, in an equilibrium in which consumption of b -goods predominates, consumers might acknowledge that the a -goods outcome is Pareto-superior, but no (or few) individual consumers would unilaterally to a -goods because of the switching costs associated with acquiring a taste for the a -goods.

A key feature of this logic is that production of a -goods might inefficiently cease in equi-

The interested reader can consult the recording on Impulse! Records AS-95 (1965), reissued on compact disc in 2000.

¹⁵An old-fashioned book on art criticism (Venturi 1945) is based on the idea that repeated exposure to certain styles of painting reduces the viewer’s objective status as an art critic, as he or she cannot help but respond more enthusiastically to what is familiar. This is just the fine-arts analogue of the case we are making regarding relationship-specific investments in films or music.

librium. The following results can arise as a consequence. (i) There are path-dependent equilibria that can be Pareto-ranked: in a repeated game, all consumers might end up consuming the b -good in equilibrium, even though all would prefer to be consuming their most-preferred a -goods. (ii) If consumers make decisions about relationship-specific investments based on their forecasts of future availability of the goods in question, they might well opt for b -goods even if they can find their most-preferred a -good, if, roughly, they fear that the a -good will not be around long enough for them to amortize their investment. (iii) As noted in Section 3.3, firms (or culture ministries) can “sponsor” particular goods (a -goods or b -goods) in the sense that they (try to) influence consumers’ expectations about the future survival of (and hence the desirability of making relationship-specific investments in) those goods.

5.3 Cross-product externalities

Using a Lancaster(1966)-style “characteristics” approach, consumers’ tastes can be modeled as evolving toward certain clusters of goods: this, too, can be associated with the disappearance of particular varieties of a -goods. Learning to like some genres — investing in appreciation of a style or variety — may spill over into a consumer’s preferences for entirely different kinds of cultural products. When, a few years back, the Hollywood blockbuster *Titanic* was released, hordes of movie-crazed fans descended upon the Maritime Museum of the Atlantic in Halifax, Nova Scotia (which houses, *inter alia*, bona fide deck chairs from the ill-fated vessel). Nothing about the museum’s holdings or its mission toward the public had changed; but the experience of consuming a particular cultural product — the movie — had increased some viewers’ demand for the service provided by the museum. (This is a kind of externality if only because director James Cameron receives no royalty payment from the Museum’s increased revenues; our interest, however, lies in the cross-product spillovers within a given consumer’s preferences.)

5.4 Cultural pride

Akerlof and Kranton's (2000) paper on *identity* draws attention to, among many other things, a peculiar externality of social identities: when one group member deviates from a socially-ordained code of conduct, it reduces the utility of the non-deviating members of the group.¹⁶ Akerlof and Kranton characterize this as a form of anxiety. Certain kinds of cultural activity, we propose, can generate cultural pride as a sort of mirror image of this anxiety. Namely, some cultural activity by one member of a reference group can raise the utility of other members of the group. What else is cultural pride but a sort of self-esteem? Economic research on self-esteem (e.g., Bénabou and Tirole 2000, 2002) has tended to focus on the its instrumental role in enhancing motivation (which may have positive or negative consequences, depending on whether it induces overconfidence). In the case of cultural pride, the more relevant effect is the increase in utility associated with a positive shock to cultural pride.

6 Forgetting by not doing

In Section 3 above, we considered one intertemporal externality of cultural activity: cultural goods produced today may have a stock value in the future. There is a second kind of intertemporal externality, this time a feature of production. For many kinds of cultural production, the concern is not solely one of preserving the stock of production, but also of preserving the *process* of production. It is not enough that there exist compositions for the small accordion from Russia and Ukraine known as the *bayan* (such as those by Russian-German composer Sofia Gubaidulina): it may be desirable to ensure that the whole process of producing the instrument, and the training of new players by current players, is preserved.

¹⁶Of course, much cultural consumption is an exercise in providing visual markers of one's social identity: attending a performance of opera or speed-metal music signals to others something about the reference group to which you wish to belong. This intersection of cultural consumption and identity, however, lies largely outside the scope of this (already too ambitious) paper. In particular, such signaling of identity generates no obvious externality, except in the sense noted in the text, that refusing to abide by the agreed-upon system of signs and consumption can create anxiety among the other members of the reference group.

A stark version of this problem arises if future production is impossible without current production, or to put the matter another way, if future production costs are a function of current production costs. Consider the two-period setting of Section 3. Suppose, however, that firms continue to produce in period 2, and that past output levels affect current output levels through intertemporal economies of scale. More precisely, the production technology for a -goods exhibits some “memory loss”: if a given type of a -good is not produced in the first period, the knowledge of how to produce it are partially lost, and it becomes much more costly to produce it in period 2. For example, perhaps workers are no longer trained in a particular production method and the stock of human capital needed for production decreases. This is formally equivalent to a learning process in which the current cost of producing a good is a decreasing function of past production (see, e.g, Fudenberg and Tirole 1983).

At the same time, the disappearance of a particular variety of a -good reflects a depreciation of human capital; the social stock of human capital may not be replenished. In this sense, understanding much artistic creation is aided by the distinction made in other contexts between codified and tacit knowledge in technological progress. (See for example, the extensive discussion in Evenson and Westphal (1995), who insist upon the importance of the “tacitness and circumstantial sensitivity of technology”.) Production of many cultural goods, including musical performances and handicraft production, relies upon just such circumstantial sensitivity or tacit knowledge. Were this not the case, it would be a simple enough matter to make a tape recording of a master artisan giving instructions that could be played at any point in the future. As with failed instances of technological transfer to developing countries, such codifiable knowledge is insufficient to permit the recipients (those listening to the tape recording, in this case) to replicate the technology in question. This is a market failure because apprenticeship — the training process whereby a *bayán* player becomes a master musician or a weaver becomes a master artisan — cannot be sold or licensed with the ease of a patent or a set of blueprints (or any other form of codifiable knowledge).¹⁷

¹⁷This process bears a strong resemblance to the phenomenon, emphasized long ago by Marx, of “de-skilling” of cottage-industry artisans in the face of industrialization; see, e.g., the discussion of “Replacement

Denote second-period production of k -type goods by x^k , $k = a, b$. We say there are *learning effects* if the cost of second-period production of a -goods is a decreasing function of the first-period level of output: $C(x^a, q^a) \equiv \gamma q^a x^a$, with $\frac{\partial C(x^a, q^a)}{\partial q^a} = \gamma x^a \leq 0$. The assumption of learning effects captures the importance of transmitting skills and educating new workers. To simplify, we assume that the utility of consumers is the same in both periods. When there are learning effects, social welfare in the second period is

$$SW_2(x^a, q^a) = \nu - c^b (1 - x^a) - x^a (K + \gamma q^a x^a) + x^a \int_{V(x^a)}^1 V \phi(V) dV.$$

When V is uniformly distributed, this can be written

$$SW_2(x^a, q^a) = \nu - c^b (1 - x^a) - x^a (K + \gamma q^a x^a) + (x^a)^2 \left(1 - \frac{q^a}{2}\right). \quad (5)$$

6.1 The optimal outcome

The optimal output levels $q^{a*(2)}$, x^{a*} , q^{b*} , and x^{b*} (assuming that production of b -goods is positive in both periods), solve the following program:

$$\max_{q^a, x^a} SW_1(q^a) + \rho SW_2(x^a, q^a)$$

(where the “2” in the superscript denotes that this is a 2-period model, in contrast to the optimal amount $q^{a*(1)}$ in the one-period model of Section 2).

In the case of uniform distributions, and using (5), the first-order conditions yield:

$$\begin{aligned} c^b - (K + c^a) + 2q^{a*} - \frac{3}{2}(q^{a*})^2 - \rho\gamma(x^{a*})^2 &= 0 \\ c^b - 2\gamma x^{a*} q^{a*} - K + 2x^{a*} - \frac{3}{2}(x^{a*})^2 &= 0. \end{aligned}$$

(An explicit solution requires the solution of a polynomial of degree 4.)

6.2 Strategic distortions by the monopoly in equilibrium

When production continues in the second period, strategic distortions might arise as a result of first-period behavior by the monopoly producer of b -goods. Using backward induction,

of Labour by Machinery”, in Marx (1863).

we can first solve the monopoly's second-period problem. The problem is identical to the one-period problem:

$$\max_{x^a} (p^b(x^a) - c^b)(1 - x^a),$$

which yields the following response function:

$$\hat{x}^a(p^a) = \frac{1}{3} \left(2 + \sqrt{4 - 3(1 + K + p^a - c^b)} \right),$$

(This corresponds to (4), the response function derived for the one-period case.) Recall that the cost of producing quantity x^a in the second period depends on q^a . If a -producing firms price their good at their marginal cost, then $p^a = \gamma q^a$. By increasing its first-period output $q^b = 1 - q^a$, the monopoly can therefore affect the second-period output of a -goods, and hence increase the residual demand it faces.

A rational monopoly will choose its first-period price p^b to solve

$$\max_{p^b} \pi^b(1 - D(p^a, p^b)) + \rho \pi^b(1 - \hat{x}^a(\gamma q^a(p^b))),$$

which can be rewritten in terms of quantity, as before:

$$\max_{q^a} (p^b(q^a) - c^b)(1 - q^a) + \rho p^b(\hat{x}^a(\gamma q^a) - c^b)(1 - \hat{x}^a(\gamma q^a)).$$

The first-order condition of the program can be written as:

$$\frac{\partial p^b(q^a)}{\partial q^a} (1 - q^a) - p^b(q^a) + c^b + \rho \frac{d\hat{x}^a}{dq^a} \left(\frac{\partial p^b(\hat{x}^a)}{\partial \hat{x}^a} (1 - \hat{x}^a) - p^b(\hat{x}^a) + c^b \right) = 0$$

If there were no externality of mass production in the first period on second-period costs, the first-order condition would be

$$c^b = p^b(q^a) - \frac{dp^b}{dq^a} (1 - q^a) \quad (6)$$

With an intertemporal externality, however, the equality above becomes

$$c^b + \rho \frac{d\hat{x}^a}{dq^a} \left(\frac{\partial p^b(\hat{x}^a)}{\partial \hat{x}^a} (1 - \hat{x}^a) - p^b(\hat{x}^a) + c^b \right) = p^b(q^a) - \frac{dp^b}{dq^a} (1 - q^a) \quad (7)$$

The term $\rho(d\hat{x}^a/dq^a)(\dots)$ is negative: $d\hat{x}^a/dq^a > 0$, and all of the terms in brackets are negative as long as $p^b > c^b$ in the second period. (This in turn is always the case as long

as mass products are produced in the second period.) Hence the right-hand side of (7) is lower than the right-hand side of (6): $p^b(q^a) - (dp^b/dq^a)(1 - q^a)$ is lower than if there were no externality, implying that q^a is lower. In other words, the b -goods producer strategically distorts its first-period production upwards. This is summarized in the following proposition.

Proposition 7 *When second-period costs of a -goods production are a declining function of first-period levels of a -goods production, the b -good monopoly increases first-period output in order to increase the residual demand it faces in both periods.*

Note that there are two effects at work here: the distortions introduced by monopoly in the b -goods market, and the intertemporal externality whereby current b -goods production negatively affects future a -goods production. It is chiefly the second of these effects that is of interest.

7 Concluding remarks

We have shown that market failures beset production and consumption of cultural products, and under the circumstances, public subsidy could therefore raise efficiency and welfare. We showed this in a canonical market in which a mass-produced good competes with a wide range of imperfectly-substitutable non-standardized goods. In such a setting, there are at least three types of market imperfections. There is *uncertainty of preferences*, as consumers are neither sure *ex ante* of their most-preferred type of non-standardized good, nor of the value such goods might have in the future, to consumers or their heirs, or both. There is *endogeneity* (or at least *path dependence*) of preferences, as both the habit-forming and the essentially social character of cultural consumption can affect outcomes. Third, there are *production externalities*, as future production costs may be a function of current production levels.

Our approach is consistent with the view that culture contributes to economic development, where development is understood in the sense advocated by Sen (1988, 1999), as an

enhancement of people's capabilities. Cultural activity, whether by preserving a diversity of choices, or by forming tastes, broadens people's choice sets as well as their sophistication in making such choices.

Public subsidy can improve efficiency and welfare for at least two reasons: it can provide incentives to increase production of desired goods and services, but it can also serve as a coordinating device in the case of multiple equilibria, leading agents toward a Pareto-superior outcome. Our results speak to two policy arenas in particular: debates surrounding public support for cultural activity at the national, subnational, or local levels; and to international efforts to preserve or promote cultural diversity. (An example of the latter is UNESCO's recently established list of masterpieces oral and intangible heritage, such as the Soso bala music of Guinea or the Korean ancestor ritual known as Jongmyo Jerye; see Nas (2002).) We have said little about the form that public support should take (e.g., grants, tax breaks, regulation, etc.). Many debates about the desirability of public support for the arts and culture ultimately hinges upon political-economy arguments that we do not consider here.¹⁸

Nevertheless, many such public supports for cultural activity, whatever their form, would likely run afoul of a particularly strict reading of World Trade Organization rules on international trade and investment. For this reason, many governments (France and Canada notable among them) have advocated that cultural activity be removed from emerging WTO rules, an initiative that has largely been opposed by the United States and in particular by the US motion-picture industry (Acheson and Maule 2003). Others would argue that even with the market imperfections that characterize cultural activity, free trade is superior to subsidies. In a persuasive book, Cowen (2002) argues that international trade in culture tends to generate more exciting forms of cultural expression, even in poor countries and low-technology environments. His framework is not inconsistent with ours; for Cowen,

¹⁸Nor do we consider the effect, which exercises many commentators, that public support might have on the content of creative expression. This concern, oft-voiced by conservative critics of public support for the arts, is raised by many non-conservative artists and arts administrators regarding the Blair government's attempt to make arts policy a branch of apparently progressive social policy in the 1990s; see the compilation by Wallinger and Warnock (2000).

the increased foreign demand for Haitian paintings or Navajo blankets plays essentially the same role as a subsidy does in our model. Cowen nevertheless acknowledges that once a tradition disappears (like classical Persian carpetmaking), even the presence of potentially lucrative foreign demand cannot bring it back; a subsidy to prevent this forgetting-by-not-doing could raise welfare even in this setting. This suggests that a promising next step in our research would be to explore the particular configuration of parameters under which trade protection would or would not raise welfare.

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