Cultural capital and demand

Victoria Ateca - Amestoy

UPV, University of the Basque Country

Abstract

In this paper we develop a theoretical model that investigates the demand for cultural goods under the assumption of cultural capital and rational addiction. We also consider the effect of a policy intervention in order to raise the initial stock of cultural capital of a given individual, both on individual demand and on supply. Finally, we discuss on the effectiveness of such policies by translating our model to a dynamic framework.

1 Introduction

In this paper, we address the influence of cultural policies on the demand of private cultural goods. We are interested in determining the effect of the public provision of cultural goods on the private demand of cultural goods on different life periods. We start by proposing an static two-period model that investigates the effect of different variables on the demand of market goods and then discuss the effectiveness of a given cultural policy in the light of the private demand pattern. One of the most relevant specific characteristic of cultural goods is derived from a temporal effect in their consumption, since past levels of consumption have an effect on subsequent ones: those individuals who have consumed more cultural goods in the past are more likely to consume a large quantity today. Economic analysis has proposed alternative ways of overcoming arguments such as changes in tastes or increasing marginal utility. We will shortly discuss two of them.

Rational addiction models -as per Stigler and Becker (1977) and Becker and Murphy (1988)- explain the positive effect of past consumption of cultural goods on present consumption by means of the accumulation of past cultural experiences that are transformed into *culture consumption capital*, which increases the productivity of current consumption of cultural goods when fulfilling cultural needs. This skill is accumulative, agents are expected to improve their technology as they consume more and more. These models have been shown to be useful in explaining culture demand behavior since the seminal papers by Becker. In fact, one of the examples addressed by Stigler and Becker (1977) is a model for music demand.

Derived "learning-by-consuming" models, take into account the experience good characteristic exhibited by cultural goods. Lévy-Garboua and Montmarquette (1996) study consumer behavior in regard to the arts in a very broad sense. There is a commodity that performs as an argument of the utility function that is called *cultural appreciation* (we will build upon this concept and refer to it or to *cultural experience*), which is produced by purchasing *cultural goods* in the market. The productivity of these market cultural goods in producing cultural appreciation depends on a variety of factors, for instance, on individual skills (in the sense of the presence of some sensitivity and cultural keys that are needed to recognize some cultural value in the cultural good, so that it may be enjoyable). They focus their analysis on demand for cultural appreciation (since they concentrate on the argument of the utility function) and derive its main properties, without determining the demand for the cultural market goods.

Our proposed model depart from Lévy-Garboua and Montmaquette and differs in two key aspects: (i) we are interested in the analysis of the demand for cultural goods, since cultural appreciation is an intangible construction while the behavior of the individual in the market in terms of his/her demand for cultural goods is observable, and (ii) it allows us to study the possibilities for public intervention in a overlapping-generations framework.

We draw up a model to study the consumption of cultural goods and then use it to analyze to which extend can public intervention take place. The main assumptions of the model are the following: (i) tastes are invariant over time, and (ii) the arguments of the utility function are a limited set of objects -commodities- that are produced and consumed by individuals.

We present a model of cultural appreciation and solve it. Then, we analyze the determinants of the demand for cultural goods and the effects for different periods. Sections 3 and 4 deal with the influence of initial consumption on subsequent demand and the optimal intertemporal consumption path. Section 5 discusses the role of cultural policies in our static framework and extends it to a simple dynamic setting. Section 6 presents a discusion and summarizes our conclusions.

2   The model

The theoretical model makes some simplifications in order to focus interest on the market behavior of the individual regarding cultural goods. First, we consider only two needs: cultural appreciation (X) and a non-cultural need (Y). We consider only two consumption market goods: a cultural good (x), and a numeraire (y). Third, we restrict our attention to the case of two time periods, we consider the intertemporal cultural goods choice decision in *youth* and *adulthood*.

Let us define the following utility function

$$U_1\left(X_1,Y_1\right)+\beta U_2\left(X_2,Y_2\right) \tag{1}$$
$$U_t\left(X_t,Y_t\right) = \alpha\ln X_t+(1-\alpha)\ln Y_t \tag{2}$$

There is a market for each good and the budget constraint is represented by

$$px_1+y_1+\rho\left(px_2+y_2\right)=w \tag{3}$$

We have to specify the relationship between basic needs and market goods. Both needs are fulfilled by the production and consumption of their respective commodities using market goods. For the non-cultural good we assume that there is an identity production function

$$Y_t=y_t \text{ for } t=1,2 \tag{4}$$

Cultural appreciation is produced by the use of two production factors: the cultural good x_t, and cultural capital s_t that enables the good to be enjoyed. The cultural capital measure captures the *ability to interpret and enjoy* cultural goods purchased. In our model, this is a part of personal human capital. A positive quantity of cultural capital is needed for any appreciation to be produced. We postulate the same production function as Lévy-Garboua and Montmarquette:[1]

$$X_t=x_ts_t \text{ for } t=1,2 \tag{5}$$

The available amount of cultural capital for a consumer in period t is determined by preceding levels of cultural good consumption. Let: $s_t = rs_{t-1} + x_{t-1}$, with s_1 being the *initial cultural capital stock*, exogenously determined, and $r \in [0,1]$ the cultural capital survival rate, interpreted as the "*memory*" of our consumer. The cultural goods consumed in the previous period are also the net investment that increases the available cultural capital stock

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[1]They interpret it in terms of the transformation of cultural goods into appreciation on the basis of the quality of the good

for the current period. We will use the accumulation law: $s_2 = rs + x_1$. The parameter s is of particular interest for cultural policies, since it can be partially controlled by policy makers. We write our consumer problem as follows:

$$\underset{\{x_1,x_2,y_1,y_2\}}{Max} \quad \alpha \ln X_1 + (1-\alpha)\ln Y_1 + \beta\left(\alpha \ln X_2 + (1-\alpha)\ln Y_2\right)$$

$$\text{s.t.} \quad \begin{cases} X_t = x_t s_t \text{ for } t = 1,2 \\ Y_t = y_t \\ s_2 = rs + x_1 \\ px_1 + y_1 + \rho\left(px_2 + y_2\right) \leq w \end{cases} \tag{6}$$

Optimal demands are:

$$x_1^* = \frac{(1+\beta)(\alpha w - prs) + \sqrt{4\alpha prsw(1+\beta+\alpha\beta) + (1+\beta)^2(\alpha w - prs)^2}}{2p(1+\beta+\alpha\beta)}; \quad x_2^* = \frac{\beta}{\rho}\left(\frac{rs+x_1^*}{rs+(1+\beta)x_1^*}\right)x_1^*;$$

$$y_1^* = \frac{1-\alpha}{\alpha}p\left(\frac{rs+x_1^*}{rs+(1+\beta)x_1^*}\right)x_1^*; \quad y_2^* = \frac{\beta}{\rho}\frac{1-\alpha}{\alpha}p\left(\frac{rs+x_1^*}{rs+(1+\beta)x_1^*}\right)x_1^*$$

3 The determinants of the demand for cultural goods

The following table summarizes the effect of the determinants of cultural good consumption in each period and for the aggregate in terms of lifetime optimal demand.

	FIRST PERIOD	SECOND PERIOD	LIFETIME
INITIAL STOCK (s)	-	+	-
SURVIVAL (r)	-	+	-
INCOME (w)	+	+	+
PREFERENCES (α)	+	+	+
DISCOUNT $\left(\frac{\beta}{\rho}\right)$	-	+	
PRICE (p)	-	-	-

Nearly all the derivatives with respect to each parameter have the expected signs. Higher income and greater taste for cultural appreciation have a positive effect on the demand for cultural goods, whereas a higher price (p) leads to lower demand. However, the specific determinants of cultural addiction - initial endowment (s) and survival rate(r) - have opposite effects for each period, so the rest of the section is given over to analyzing the roles of these parameters. In what follows, we will focus on the role of the initial endowment of cultural capital s.[2]

Lemma 1 *Cultural demand in the **first period** is decreasing in the initial endowment of cultural capital.*

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[2]It is important to remark that the optimal demand for cultural goods in each period is symmetric with respect to parameters s and r. We can thus, extend the conclusions derived for any of them. This is obvious, since the term rs appears in the capital law of motion. This means that the solution to the maximization problem is also symmetric.

Any change in s has two effects on the demand for cultural goods in period 2: a direct effect and an indirect one through cultural goods consumption in period 1 to be integrated into the consumption capital for the next period: $\frac{dx_2^*}{ds} = \frac{\partial x_2^*}{\partial s} + \frac{\partial x_2^*}{\partial x_1^*}\frac{\partial x_1^*}{\partial s}$. The direct effect turns out to be positive and the indirect effect is negative. We concentrate on low values of s, since we analyze the total impact evaluated at $s = 0$, and perform numeric simulations.

Lemma 2 *The demand for cultural goods in the* **second period** *is increasing in the initial endowment of cultural capital for low values of it.*

Once we know how the demand varies in each period as a reaction to changes in the initial cultural capital stock, we must analyze what happens with lifetime demand, i.e. the sum of demand for the first and second periods. It depends on cultural preferences, (α), temporal discount (β) and interest rate (ρ).

Lemma 3 **Lifetime demand** *is decreasing in the initial cultural capital for low values of s if and only if $\alpha < \frac{\rho(1+\beta)}{(\rho+\beta)}$.*

4 Past and current consumption

We now verify that a rational addiction model does in fact generate the empirical regularity that people who consumed a lot of cultural goods in the past also consume a lot in the present. We can conclude that our model predicts the empirical regularity; actually, we can analyze the influence of the parameters on the extent of the influence of past consumption on current consumption.

Lemma 4 *The bigger r, s and $\frac{\beta}{\rho}$, the greater the influence of early consumption on adult consumption.*

Since consumption in the first period has a temporal effect by making the agent more productive for the second, it is no longer true that the consumption path only depends on the relationship between β and ρ, as is the case for a standard economic intertemporal maximization problem. The optimallity conditions that arises from first order conditions are
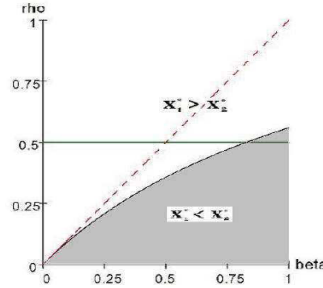
Intratemporal Optimality	*Intertemporal Optimality*
Cultural good: $\quad \beta\frac{x_1^*}{x_2^*}\frac{rs+x_1^*}{rs+(1+\beta)x_1^*} = \rho$	Period 1: $\quad \frac{\alpha}{1-\alpha}\frac{y_1^*}{x_1^*}\frac{rs+(1+\beta)x_1^*}{rs+x_1^*} = p$
Numeraire: $\qquad\beta\frac{y_1^*}{y_2^*} = \rho$	Period 2: $\quad \frac{\alpha}{1-\alpha}\frac{y_2^*}{x_2^*} = p$

Since we get $\frac{x_1^*}{x_2^*} > \frac{\rho}{\beta}$, we can conclude that for the case $\frac{\rho}{\beta} = 1$, the optimal consumption path is decreasing. The constant consumption path, $x_1^* = x_2^*$, is defined by the following relationship between the model parameters: $1 = \frac{rs+x_1^*+x_1^*\beta}{rs+x_1^*}\frac{\rho}{\beta}$.Solving for the value of ρ in this inequality, we obtain a function $\rho^*(\cdot)$ that represents the constant cultural consumption path

$$\rho^* = \beta\frac{rs + x_1^*}{rs + (1 + \beta)x_1^*} \tag{7}$$

The area that represents the pairs (ρ, β) for which the optimal consumption path is decreasing, is bigger than the area under the standard model. That is, cultural addiction leads to more likely decreasing paths.

The figure below represents the $\alpha = .2, w = 100, p = 5, s = 1, r = .9$ case.

Trends over time of the demand for cultural goods

Could the effect that incentivates cultural capital accumulation be so strong that it eliminates increasing cultural consumption paths? From the following lemma, we can conclude that capital accumulation is never so attractive as to make increasing paths disappear. For some combinations of the parameters α, p, r, s and w, there will always be increasing cultural consumption paths.

Lemma 5 *For our model, (i) the function $\rho^* (\cdot)$ is increasing and concave on β, and (ii) $\lim_{\beta \to 1} \rho^* (\cdot) > \frac{1}{2}$.*

5   On the role of cultural policies

To analyze the impact of culture policies oriented towards increasing the endowment of cultural capital, we consider two different scenarios: (i) the two-period individual decision model discussed above, and (ii) a derived overlapping generations model.

Since lifetime demand is decreasing on the initial conditions of cultural capital, any increase in the initial endowment due to an active culture policy will induce a drop in individual lifetime demand. This result is bad news for the culture supply sector, which will thus face lower demand. However, we have to take into consideration the instrument of cultural policy to be used. Let us consider that the government wants to increase the initial stock of cultural goods by means of a transfer of goods [3]. The government assumes an active role as a demander of cultural goods for transfer to consumers. The effect of such a policy on the culture sector is ambiguous, since there will be two effects on opposite directions: a drop in lifetime demand and an increase in demand due to public purchasing.

To determine the total effect for low initial cultural capital endowments, we evaluate the expression of lifetime demand at a zero level of initial endowment, $\left. \frac{\partial x_1^*}{\partial s} \right|_{s=0} + \left. \frac{\partial x_2^*}{\partial s} \right|_{s=0} = \frac{\alpha(\rho+\beta)-\rho(1+\beta)}{(1+\beta+\alpha\beta)(1+\beta)\rho}$. The absolute value of this derivative is lower than one. For low initial endowments of cultural capital an increase due to active culture policies that transfer goods

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[3]Think of a unique cultural good called "theater performances". Then consider the instrument of active culture policy as free tickets for schools.

is beneficial for the culture supply sector, since it increases the total demand for cultural goods.[4]

To study the long term effectiveness of policies of this type, we now extend our model to a dynamic framework of **overlapping generations**. We characterize individual behavior by means of individuals that solve system (6), and take into account the inherited nature of part of the initial stock of cultural capital. We consider that an individual's cultural consumption for the second period will be transmitted to his or her offspring as their initial cultural capital endowment.

The dynamics of cultural consumption derived from these assumptions has a steady state point s^* that acts as an overall attractor of the dynamic system. It is defined by the capital stock that makes demand for culture in the second period equal to the capital stock. Graphically, this is represented by the intersection of the culture demand curve for the second period and the 45 degrees line.

Lemma 6 *The dynamic system converges to a steady state point s^*.*

The sketch of the proof goes as follows. We prove first that the demand for cultural goods in the second period will cross the main diagonal from left to right. We will use results derived from the algebraic results for $s = 0$, together with numerical simulations. The demand for cultural goods in the second period is positive for $s = 0$, $x_2^*|_{s=0} = \frac{\beta}{\rho(1+\beta+\alpha\beta)} \frac{\alpha w}{p} > 0$. Further, the slope of the demand curve is lower than one (which is the slope of the main diagonal) for $s = 0$. As $\frac{dx_2^*}{ds}\Big|_{s=0} - 1 = \frac{\beta^2 r}{(1+\beta)^2 \rho}\left(1 - \frac{1+\beta-\alpha}{1+\beta+\alpha\beta}\right) - 1$. For realistic values of the parameters, particularly for small values of α, this expression is negative. So we can conclude that the slope at the origin is indeed lower than one. Finally, numerical simulations show that demand for culture in the second period is concave, so the culture demand curve becomes flatter. These three steps guarantee the existence of an overall attractor.

A culture policy implemented at a single moment in time has no effect on cultural goods consumption in the long run. The short-run effect will depend on the quantity of cultural capital available at a given time: for initial endowments below the steady state point s^*, the transfer of cultural goods accelerates convergence to the steady state point. However, for higher initial endowments, such public intervention delays the fall of the capital stock to the steady state point. The government may manipulate the level of the steady state point by controlling for two parameters: the price of cultural goods (by price subsidies), and individual incomes (by means of money transfers).

6   Conclusions

The effect of a change in some of the determinants of demand, such as price, income, and cultural preference, operates in the same direction as a model of optimal intertemporal choice of non-addictive goods. They all have monotonic effects on both periods, leading to a positive change in lifetime demand (negative in the case of price). However, the parameters that

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[4]This conclusion also extends to high values of cultural capital since numerical simulations prove that lifetime demand is decreasing on s.

characterize the composition of the cultural capital available in each period (an exogenously given cultural capital endowment and a survival capital rate) have different effects: they have a negative effect in the first period and a positive one in the second. A change in either of these parameters causes a fall in lifetime demand. We argue that this result is explained by the double nature of cultural goods consumption in the first period: on the one hand they are demanded as a consumption good to be used for the fulfillment of that period's cultural needs; on the other they are demanded because they are a capital good that is integrated as a net investment into the cultural capital stock.

We also examine the effect of cultural goods consumption in early years on demand for cultural goods in adulthood, and draw two main conclusions: The demand for cultural goods in adulthood increases from the initial demand, so our theoretical model predicts the empirical finding that individuals who consume more cultural goods as children also consume more as adults. Regarding the variation of consumption paths over time, our model establishes that for two periods, although some combinations of the parameters lead to an increasing path, combinations for decreasing paths are more frequent. West and McKee (1983), empirically compare the alternative arguments of rational addiction and merit goods to study the case of education in Great Britain. One of the results concerning variations over time in their paper (which is discussed in Lévy-Garboua and Montmarquette) is that under rational addiction there may be a threshold for demand for this type of goods, so consumption has a slight initial increase that undergoes a strong acceleration as soon as the effect on taste formation becomes stronger. From our model, unfortunately, we cannot generalize to many periods to check whether this effect is also present for cultural goods.

Lastly, we have obtained some results from the discussion on the effects of an active culture policy in terms of transfer of cultural goods to individuals, so their initial endowment of cultural capital increases. From our analysis we draw these conclusions:

(a) **From the static model**: An active cultural policy can be justified since it will be beneficial for cultural goods suppliers.

(b) **From the overlapping generation model**: This policy is only effective in the short run, since the dynamics of cultural capital lead to a steady state point. This steady state point depends however on other variables that can be modified by the government (price and income), so other types of public intervention may take place.

One of the arguments invoked by Musgrave (1987) in his characterization of merit goods is the possibility of "paternalist" behavior on redistribution policies by the government: for such cases, the donor imposes his own preferences to the receiver. This way, the government does not decide how much income to transfer, but what kind of goods are transferred to force their consumption on the basis of their meritorious nature. Starting from this argument, we discuss the effects of different policy actions from a consumer's point of view.

We can speculate on the effectiveness of a public-sector culture policy oriented towards an increase in demand for cultural goods by means of three alternative instruments. The first possibility is that the government will transfer free cultural goods to children; the second one is an income transfer, and the third one a subsidy for cultural goods producers to bring

prices down. As we know from our intratemporal optimality conditions, under the second and the third alternatives not all extra real income will be dedicated to demanding extra units of cultural goods. For the second alternative, only the budget constraint will change (expenditure proportions will remain fixed), and for the third the effect on optimal decisions will depend on the magnitudes of income and substitution effects. In any case, the consumer sovereign norm that is derived from methodological individualism (a basic assumption of our consumer choice framework) determines that for the two above possibilities not all individual demand will translate to cultural goods. Regarding the first possibility, our analysis of the theoretical model under a static framework has determined that for any level of initial cultural capital endowment the effect of public policy will be beneficial for the supply side, since the sum of the new individual demand plus the quantity demanded by the government will exceed the initial demand.

But we can also think of an argument that is outside our model: the role of the cultural capital stock that is aggregated in a society jointly with physical cultural assets and used as production factor (in the sense of Throsby, 1999). We have considered this only as a personal resource that can be used only for the fulfillment of cultural appreciation needs. However, we know that at a macro level this kind of human capital is integrated into the overall human capital stock. On this basis there could be an additional argument for public intervention.

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