cultural science

A CCi Research Agenda from the Perspective of Economic Theory

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Abstract

The cultural and creative industries have very distinct features. From the supplier's perspective, inherent uncertainty and lack of predictability combined with high failure rates. On the demand side, consumers are not autonomous but are directly affected by the behaviour of others. Further, an individual's demand for a product may either rise the more other people buy it (bandwagon effect), fall (snob effect) or rise with price (Veblen effect). In consequence, markets will typically exhibit multiple equilibria and demand curves will be non-monotonic with respect to price.

The paper sets out ideas for a research strategy to explore these features.

1. Introduction

Sassoon[1], in a book of well over 1,000 pages, describes in great detail many aspects of European culture over the past 200 years. The work is not intended to be analytical, but in the preface he sets out key features of cultural markets:

'Culture proceeds incrementally, building on whatever was available before, sometimes using a well-tried and established formula, other times innovating radically. No-one is sure what is going to "work", the failure rate is high…….Culture creates its own markets, the pleasure of consumption is also the pleasure of possession because the consumer never faces the object of consumption as an isolated individual. We want some things few people have, but we also want things everyone has. Being in a market is a social activity' (page xvi).

[1] D Sassoon , *The Culture of the Europeans from 1800 to the Present*, Harper Collins, 2006

These half-dozen lines summarise many of the distinguishing features of cultural and creative industries. For example, we have on the supply-side:

- Constant tension between conformity and innovation
- Inherent uncertainty and lack of predictability of outcomes
- High failure rates

And on the demand side:

- For some products, demand rises as more people have them
- For others, demand falls as more people have them
- Non-autonomous nature of the consumer: consumers operate on networks

2 Consumer demand

In the economic theory of consumer demand, the standard model assumes atomised individuals exercise choice in an attempt to maximise utility subject to a budget constraint. In this approach, given an individual's tastes and preferences, decisions are taken on the basis of the attributes of the various products, such as price and quality.

In recent decades, the conventional theory has been extended to allow for factors such as the cost of gathering information[2], imperfections in the perception of information and limitations to consumers' cognitive powers in gathering and processing information[3]. So decisions are not necessarily made in a fully rational way, but are nevertheless based on the (perceived) attributes of the products, without direct reference to the choices of others (Of course, the latter can affect choice indirectly by their effect on relative prices).

In general, however, economists have paid little attention to markets in which fashion is important[4]; i.e. markets in which the decisions of others can affect directly the choices made by an individual. Social influences are generally only invoked for cases considered exceptional, such as 'irrational' stock market bubbles or real estate crises.

Yet 50 to 60 years ago, there were several very promising attempts to construct a more general theory of consumer demand which incorporated the concept that individual consumption might depend directly on the consumption of others. In 1948, Duesenberry[5] introduced an aggregate consumption function of which a key element was: 'The strength of any individual's desire to increase his consumption expenditure is a function of the ratio of his expenditure to some weighted average of the expenditures of others with whom he comes into contact'.

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[2] G J Stigler, 'The Economics of Information', *Journal of Political Economy*, 69, 213-225, 1961

[3] HA Simon, 'A Behavioral Model of Rational Choice', *Quarterly Journal of Economics*, 59, 99-118, 1955

[4] See, for example, A Chai, PE Earl and J Potts, 'Fashion, Growth and Welfare: an Evolutionary Approach', *Advances in Austrian Economics*, 10, 187-207, 2007

[5] JS Duesenberry, 'Income - Consumption Relations and Their Implications', in Lloyd Metzler et al., *Income, Employment and Public Policy*, New York: WW Norton, 1948.

This theory has stood the test of time much better than mainstream rivals such as Milton Friedman's permanent income hypothesis. At any point in time, the rich save a higher proportion of their income than the poor. But over time, everyone gets richer. However, we do not observe a trend rise in the savings ratio. Duesenberry's hypothesis helps understands this, for the poor always have aspirations and so continue to spend most of their income even though in absolute terms they become richer.

Just two years later, Leibenstein[6] developed the individual theory of consumer demand to take into account explicitly 'bandwagon, snob and Veblen effects'. The bandwagon effect means that individual utility derived from a product or service is increased the more people buy it; the snob effect leads utility to fall as more purchase it; the Veblen effect causes demand to rise as the price rises. Tintner[7] in 1960 derived a formal system of equations in which individual utility depended not merely on an individual's consumption, but on the consumption patterns of other people.

These developments simply fell by the wayside and were effectively purged from the canon of mainstream economics. I think an important reason for this was that they introduced explicitly the concept of non-additivity into consumer demand theory. 'Non-additivity' means that market demand curves are not simply the summation of individual demand curves. In turn, this introduces considerable indeterminacy into the shape of market demand functions. Economists want to be able to make generalisations, which is a wholly admirable scientific aim, and in the context of consumer demand theory they want to be able to make statements about the welfare implications of taxes and subsidies.

Non-additivity introduces much greater indeterminacy into the shape of market demand curves than economists feel comfortable with. As it happens, a later set of powerful general theorems[8] (the Sonnenschein-Debreu-Mantel theorems) showed that in general, even if consumers are autonomous individuals with 'well-behaved' downward sloping demand curves, no a priori restrictions can be placed upon the shape of market demand curves. In other words, in principle, market demand curves even with autonomous individuals can take *any* shape. The same applies to supply curves. Indeed, both Leibenstein and Morgenstern[9] argued long ago that 'since virtually all collective supply curves are non-additive it follows that the demand of the firms for their labor, raw materials, etc. is also non-additive'.

In so far as students ever encounter the Sonnenschein-Debreu-Mantel theorems – and usually only the very brightest will be expected to master them - they tend to be parcelled into a box labelled 'theoretical curiosity', since empirical demand curves surely

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[6] H Leibenstein, 'Bandwagon, Snob, and Veblen Effects in the Theory of Consumers' Demand', *Quarterly Journal of Economics*, 64, 183-207, 1950

[7] G Tintner, 'External Economies in Consumption', in RW Pfouts, ed., *Essays in Economics and Econometrics: A Volume in Honor of Harold Hotelling*, Chapel Hill, University of North Carolina Press, 1960

[8] For example, H Sonnenschein, 'Market Excess Demand Functions', *Econometrica*, 40, 549-63, 1972

[9] O Morgenstern, 'Demand Theory Reconsidered', *Quarterly Journal of Economics*, 62, 162-205, 1948

slope downwards and supply curves upwards, regardless of theoretical possibilities. As it happens, I have either estimated myself or seen many estimated demand curves using high quality electronic point of sale data for fast moving consumer goods at the brand and even the stock unit level, the pack size level at which retailers themselves re-order. They do indeed slope downwards. But these are in general in mature markets such as baked beans where consumer preferences are both already formed and essentially not influenced directly by the preferences of others.

But the same cannot be said of cultural and creative industries, whether through bandwagon, snob or Veblen effects. An important research task is to see how far we can classify the likely shape of market demand/supply curves, the possibility of multiple equilibria and so forth, when consumers are connected on a variety of different networks under different assumptions about the nature of the non-additivity.

It is essential that 'well-behaved' individual demand functions be incorporated as a special case, so that in the absence of social influence as price rises, demand falls for each individual. An interesting paper in this are is Gordon et. al[10], who essentially consider what is described here as 'bandwagon' markets. They find both multiple equilibria and regions in which the market demand function is non-monotonic i.e. takes non-conventional shapes.

A more systematic approach is required in which we initially analyse permutations of networks and non-additive effects for various mixtures of the relative weights of price and networks in the demand functions:

Networks	*Non-Additive Effect*
Random	Bandwagon
Small world	Snob
Scale free	Veblen

So six permutations are possible.

It may seem odd to include random networks, because human interaction usually involves some sort of structure. However, in fashion markets, random interactions may be very important. An obvious recent example, using purely casual empiricism on adoption by people on my own social network, is the footwear 'crocks'. Hahn and Bentley[11], for example, provide more formal evidence for this, and Bentley discusses this thoroughly in his contribution to this conference. A word on the Veblen effect may also be appropriate. It might be thought that this could be represented as a pure price effect,

[10] MB Gordon, J-P Nadal, D Phan and V Semeshenko, 'Discrete Choices under Social Influences: Generic Properties', *Proceedings 1st International conference on Economic Sciences with Heterogeneous Interacting Agents,* Bologna, 2006

[11] M.W. Hahn and R.A. Bentley, 'Drift as a mechanism for cultural change: An example from baby names.' Proceedings of the Royal Society B 270, S1-S4, 2003.

as indeed it could, but one possibility is to make the demand a function of the price at which specified percentages of other agents are not willing/unable to afford the product.

The aim would be to see to what extent we could see patterns across the range of results as a potential guide to policy making. Suppose, for illustration, we find that particular combinations of assumptions typically lead to two equilibria, one at a low level of demand and one at a much higher one. If we believe empirically that the assumptions are reasonable approximations to a particular industry but we are not in the area in which the high equilibrium is the attractor, our policy attitude will be governed by how far away we think we are from this region. This may seem to place formidable requirements on policy makers and their advisors in determining both the nature of the market and the existing situation, but certainly in terms of network structure, a great deal of information can be obtained from small amounts of information[12].

3 Supply

The supply-side phenomena of unpredictability of outcome and high failure rates have already been addressed in a much more systematic way[13]. Almost all of this literature assumes networks whose topology – the structure of connections – is fixed. By 'fixed' I mean that it is either set up in the model fully formed, or it a pre-determined structure is generated within the model itself.

An important extension of the research agenda on networks in general and not just to creative and cultural industries is to consider the properties of networks whose structure evolves over time. The topology may vary substantially due to the self-interested decisions of agents within the network.

An example is Ormerod and Colbaugh[14] who examine the failure and extinction patterns in a model of agents subject to shocks which have both size and spatial dimensions. The patterns which arise in a model of purely autonomous agents are compared with those in which self-interested but myopic agents can build up fitness by forming alliance. We found, consistent with evidence from a wide range of complex systems, that as the connectivity of the system increases, overall fitness rises, but at the cost of becoming more vulnerable to failure/extinction on a near-global scale. This model was not developed with creative and cultural industries in mind, but it suggests that there may be downsides for policy makers of trying to foster too dense a network of co-operation between suppliers in a cultural or creative industry.

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[12] P Ormerod, 'Extracting deep knowledge from limited information on an evolved social network', *Physica A*, 378, 48-52, 2007

[13] Purely by way of example, W B Arthur, 'Competing technologies, increasing Returns, and lock-in by historical events', *Economic Journal*, 99, 116-131, 1989; MJ Salganik, PS Dodds and DJ Watts, 'Experimental study of inequality and unpredictability in an artificial cultural market', *Science*, 10 February 2006; P Ormerod, *Why Most Things Fail*, Faber and Faber, 2005

[14] P Ormerod and R Colbaugh, 'Cascades of failure and extinction in evolving complex systems', *Journal of Artificial Societies and Social Simulation*, 9(4), 2006

A further general point to consider is to what extent an agent equipped with superior cognitive abilities, in particular superior foresight, compared to other agents can generate either (or both) superior fitness for itself or a longer life-span. This has implications for the ability of policy makers to 'pick winners', an almost irresistible temptation for many.

It is easy to think of examples where superior ability may actually prove a handicap. Consider, for example, the Beauty Contest game[15] in which a group of individuals is asked to select a number between (and including) 0 and 100. The winner is the person whose guess is nearest to a specified fraction of the average of all the guesses. If all players practice a 'high degree' of reasoning, the winning number will be close to the Nash equilibrium of 0.

But experiments designed to elicit the degree of reasoning which agents use all show that it is low, typically between 1 and 3. For example, Duffy and Nagel[16] set up a game in which the winner is the person(s) whose guess was closest to half of either the median, the mean, or the maximum number chosen by all players. They found that players used a very low order degree of reasoning when forming expectations on other players' expectations. If the winning number were announced and the game repeated with the same players, they found that the winning number did approach zero, but even after repeated plays of the game the degree of reasoning remained low.

Knowledge of the Nash equilibrium solution would, except possibly in the final stages of successive plays of the game by the same set of players, be of no use to an individual. Indeed, anyone using this as his or her rule would in general lose. The key to success is not knowledge of the emergent equilibrium, but guessing the degree of reasoning which is being used by other players. An analogous situation is faced by policy makers in cultural and creative industries. Traditional strategies suggest careful evaluations of alternatives to try to select what is thought to be in some objective sense 'best'. But this does not apply in a cultural and creative context.

We need to consider more generally systems in which the null model, as it were, of agent cognition is closer to that of random behaviour than the fully rational behaviour of conventional economic theory. We can then gradually increase the cognitive ability of one or more of the agents and examine the consequences.

4. Brief Discussion

- the cultural and creative industries raise issues which are at the forefront of both economic theory and, more generally, complex systems research

[15] Named after Keynes' famous likening of the stock market to a beauty contest in which agents win not by selecting the objectively prettiest contender, but by choosing the contestant who is chosen by the highest number of other participants in the game

[16] J Duffy and R Nagel, 'On the robustness of behaviour in experimental "Beauty contest" games', *Economic Journal*, 107, 1684-1700, 1997

- the pervasiveness of network effects amongst consumers means that multiple equilibria and non-monotonic market demand curves will also be pervasive
- we need a systematic investigation to see if patterns of demand curves can be seen under permutations of the different possible 'fashion' effects and of the different possible networks on which consumers are connected
- on the supply side, we need to extend the literature by examining both evolving networks and the ability of agents with superior cognition to have superior outcomes in systems in which uncertainty is high and failure endemic