Competition in B2C eCommerce: Analytical Issues and Empirical Evidence

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Abstract

This paper questions the widely held view that B2C eCommerce markets are characterised by a high intensity of competition, using a mixture of theoretical arguments and empirical evidence. We discuss two hypothesis and survey empirical studies which test them. We argue that the goods sold in B2C eCommerce have to be interpreted as heterogeneous "composite goods", that market transparency in B2C eCommerce is lower than widely assumed, and that high endogenous sunk costs limit the intensity of competition in B2C eCommerce.

Keywords

B2C eCommerce; Competition; Market Transparency; Endogenous Sunk Costs; Network Effects

Introduction

We will start with a summary of common arguments for a high intensity of competition. In section 2 we formulate testable hypothesis about the competitiveness of B2C eCommerce. We also discuss three limitations of these tests. In section 3 we present and interpret results of a large number of empirical studies on prices and price dispersion in B2C eCommerce. In section 4 we discuss the explanations for the findings of these empirical studies offered in the literature. In section 5 we emphasise additional arguments against a high intensity of competition. In the final section we draw our conclusions.

Arguments for a High Intensity of Competition in B2C eCommerce

"One of the major features of the Internet revolution is its potential to make the whole economic system, nationally and internationally, more competitive by bringing markets closer to the economists' textbook model of perfect competition, characterized by large numbers of buyers and sellers bidding in a market with perfect information." (Litan/Rivlin 2001, 315).

"Lower search costs in digital markets will make it easier for buyers to find low-cost sellers, and thus will promote price competition among sellers." (Bakos 2001, 71).

The widely held view that the degree of competition in B2C eCommerce markets is, or at least tends to be high, rests upon the following arguments in essence:

- Goods sold in B2C eCommerce are essentially homogenous. Hence transaction costs are low and market transparency is high.
- The abundance of information results in low search and information costs, so that the price can be compared virtually at no cost. The rising use of search engines and electronic price comparisons further decreases transaction costs and increases market transparency.
- High transparency of B2C eCommerce markets leads to a high intensity of competition and high contestability of B2C eCommerce markets: Technological barriers to entry are low; access to production and distribution capacities is fast and inexpensive; possibilities of "boundary crossing" for large companies are high.

Hypothesis to Evaluate these Arguments

In order to analyse and challenge the arguments listed above, we formulate and discuss two testable hypothesis. The literature focuses on two criteria to test the high intensity of competition in B2C eCommerce: *price level* and *price dispersion.*

Hypothesis (A) regards the argument that the intensity of competition is higher in B2C eCommerce and costs are lower than in traditional retailing so that prices should be lower in B2C eCommerce. It is a joint hypothesis so that a

rejection cannot be interpreted as a rejection of a high intensity of competition alone, but only as a rejection of the joint hypothesis of a high intensity of competition and lower or equal marginal costs.

(A) *If* the intensity of competition in B2C eCommerce is higher than in traditional retailing and marginal costs are equal or lower at the relevant level of output, *then* prices must be lower in B2C eCommerce.

Hypothesis (B) is based on the "Law of one price" and regards the argument argues that the price dispersion should be low in B2C eCommerce:

(B) *If* B2C eCommerce markets approach the ideal of a frictionless market (high market transparency, low transaction costs, homogenous goods), *then* the dispersion of prices is low in B2C eCommerce.

A rejection of this hypothesis is consistent with a number of potential explanations, e.g. lack of market transparency, high transaction costs and heterogeneity of goods.

Three major limitations have to be considered when testing these hypothesis empirically.

(1) The "disequilibrium critique" stresses that the hypothesis are theoretically valid in market equilibrium only.[1] B2C eCommerce markets are not in equilibrium: The high losses of many B2C eCommerce companies cannot be sustained in a long-term equilibrium. Some of them might still struggle to reach the highest possible level of efficiency with respect to the optimal organisational, technological, and economic business models and strategies. Brown and Goolsbee (2000, 16 ff.) argue that B2C eCommerce tends to increase the price dispersion initially, as B2C eCommerce companies offer low prices to attract customers. But the low number of customers does not lead to pressure on prices in the offline market, initially. Tests of the hypothesis (A) and (B) can involve a type 1 (rejection of a true hypothesis) and a type 2 (failure to reject a false hypothesis) error. The "disequilibrium critique" does not only entail arguments for type 1, but also for type 2 errors, e.g. prices might be lower in B2C eCommerce due to large temporary discounts to attract new online customers.

(2) The hypothesis presuppose data sets which are very hard to collect – e.g. data on marginal costs – so that they have to be considered as ideal formulations. If the reduction of marginal costs exceeds that of prices, lower prices will be consistent with a lower intensity of competition (type 2 error). The hypothesis assume that the goods in the samples are homogenous. This depends on the subjective marginal rates of substitution of consumers, which are not directly observable. The interpretation of goods as homogenous when they are, in fact, not homogenous, might lead to a type 1 error, as higher prices might reflect the marginal costs of additional services (e.g. home delivery).

(3) The interpretation of lower prices in B2C eCommerce and/or a low price dispersion as evidence of a high intensity of competition is a logical fallacy – "fallacy of affirming the consequent".[2] Lower prices can be consistent with a lower intensity of competition, if companies do not cover costs, or if marginal costs are further reduced than the prices.[3] A low price dispersion can be consistent with a low intensity of competition, if B2C eCommerce companies collude.

Empirical Tests of the Two Hypothesis

A number of empirical studies analyse the intensity of competition in B2C eCommerce based on the criteria of price level and/or price dispersion. The studies cover different markets (books, CDs, antiquarian books etc.), mostly in the US, but also in Austria, Germany, Sweden and in the UK. Table 1 offers an overview of their results with respect to the price level and classifies the studies in three categories: Higher or lower prices in B2C eCommerce (relative to the comparable offline market) or inconclusive results.

Table 1: Empirical studies on price comparisons between B2C eCommerce and the comparable offline market

Higher prices in B2C eCommerce	Inconclusive results	Lower prices in B2C eCommerce
Arbeiterkammer Wien (1999), Bailey (1998), Clay et al. (2000), Frank/ Hepperle (2001), Goldman Sachs (1997)[4]	Repl/Huber (2001)	Bakos et al. (2000), Brynjolfsson/ Smith (2000a), Friberg/Ganslandt/ Sandström (2001), Lee (2000), Scott Morton/Zettel-meyer/Risso (2001)

The findings summarised in table 1 do not justify a clear cut rejection of the joint hypothesis that the intensity of competition in B2C eCommerce is higher than in traditional retailing and marginal costs are equal or lower at the relevant level of output. Five of the studies present evidence of higher, and five of lower prices in B2C eCommerce than in the comparable offline market.

Table 2 presents a summary of the findings of the studies focusing on price dispersion and classifies them in three categories: Large or small price dispersion in B2C eCommerce or inconclusive results.

Of the ten studies included in table 2, nine report findings of a large price dispersion in B2C eCommerce and only one yields inconclusive results. Consequently, the hypothesis that B2C eCommerce markets approach the ideal of a frictionless market (high market transparency, low transaction costs, homogenous goods) has to be rejected.

[1] See Borenstein/Saloner 2001, 9.

[2] See Barker 1989, 69.

[3] See Schmitz 2000, 203, FN 246 and Png/Lee/Yan 2000, 3.

[4] Data reprinted in Bailey 1998, Appendix 2.

Table 2: Empirical studies on price dispersion in B2C eCommerce

Large price dispersion in B2C eCommerce	**Inconclusive results**	**Small price dispersion in B2C eCommerce**
Bailey (1998), Baylis/Perloff (2001), Bakos et al. (2000), Brynjolfsson/Smith (2000a,b), Clay et al. (2000), Clay/Tay (2001), Clemons/ Hann/Hitt (2000), Frank/Hepperle (2001)	Lee (2000)	

Note: There is no clear cut-off point to classify price dispersion as large or low in the literature. We base our classification on the judgement of the authors as expressed in the papers cited.

Brown/Goolsbee (2000) analyse the effects of internet based price comparison sites on the prices of life insurances in the US. They estimate that the introduction of online price comparison sites reduced prices in the life insurances market by 8-15%. If the share of individuals in a certain market segment increased by 10%, the price in the segment dropped by 5%. But they also show, that the dispersion of prices in each segment increases initially. The pressure on offline prices only increased, after about 5% of the individuals in a market segment used internet based price comparison sites. Beyond that threshold the price dispersion decreased relative to the one prevailing before internet based price comparison sites had become popular within the respective market segment.

Goolsbee (2000) analyses the price sensitivity of consumer choice with respect to the distribution channel (online or offline) in the US market for computer hardware. He finds that an increase in the retail price of computers relative to the online price by 1% increases the conditional probability of buying online by 1,45%. In a study of the German market for used cars, Fabel/Lehmann (2000) find that the prices for used cars are lower online, but that the quality is also lower online so that the results are not conclusive.

Baylis/Perloff (2001) show that the ranking of the B2C eCommerce companies in their sample, according to prices (for scanners and for digital cameras, respectively), is very stable over time. The probability that a company moves by one rank or more within a week was 57% (for scanners) and 75% (for digital cameras). They conclude that companies are not attempting to undercut each other. In a recent survey of B2C eCommerce companies in Vienna 92% of the multichannel companies reported that their prices were about the same offline and online (±1,5%) and 8% reported to have lower prices (> -1,5%) online than offline.[5]

[5] Unpublished interim report „Status und Dynamik im B2C eCommerce in Wien“, Research Unit for Institutional Change and European Integration – ICE, June 2001.

Arguments Against a High Intensity of Competition

The majority of the literature which argues that the intensity of competition is lower than expected, refers to (1) price discrimination, (2) lock-in effects and/or (3) bundling.[6] We will shortly review their major arguments. Our main focus, however, is to draw attention to additional concepts which might explain the lower than expected intensity of competition: (4) heterogeneity of “composite goods” in B2C eCommerce, (5) limited market transparency, (6) high endogenous costs, and (7) network effects, increasing returns to scale and positive feedback-loops.

Price discrimination, Lock-in Effects and Bundling

Price Discrimination

A number of studies argue that price discrimination is the explanation for the larger than expected price dispersion in B2C eCommerce, because the informational prerequisites can be obtained more easily in B2C eCommerce than in the traditional retail market. The argument is unsatisfactory, as it already presupposes that B2C eCommerce companies are not pure price takers – i.e. they must have some market power – and that arbitrage is not possible between different segments of the market. The segmentation of the market is achieved by product differentiation. It is inexpensive to produce multiple versions of a digital good.

Price discrimination effects the intensity of competition *(i)* by reducing the transparency of the market and *(ii)* by reducing the number of buyers and sellers in each segment relative to the non-segmented relevant market.

The diffusion of online price comparison sites and shopbots is assumed to increase the intensity of competition. But the use of shopbots and online price comparisons takes time and reveals particular time preferences of users. The information gathered can be used to discriminate between patient and impatient consumers. Varian (1999) shows that online price comparisons can also decrease the intensity of competition. It pays to undercut other market participants if the lower price attracts new customers. If the other market participants react before consumers choose to switch, they have no more incentive to do so. Online price comparisons increase the transparency of the pricing strategies of the market participants. Thus they can contribute to the stability of tacit collusion amongst B2C eCommerce companies. Kauffman/Wood (2001) cannot reject the hypothesis of tacit collusion in their sample of B2C eCommerce companies. Since not all consumers engage in a costly search, B2C eCommerce may randomise prices to increase revenues without losing all the price sensitive customers.[7]

[6] See literature cited in tables 1 & 2.

[7] See Varian 2001. For an overview of different price discrimination strategies relevant for B2C eCommerce see Baylis/Perloff 2001.

Lock-in Effects and Switching Costs

Lock-in effects and switching costs are the result of a previous investment that, if compatible with a current purchase, reduces the costs of (or increases the utility derived from) that purchase. The investment depreciates rapidly, if the consumer switches suppliers, unless it is perfectly compatible with the new supplier.

The B2C eCommerce market, however, is certainly not a mature market, but a market growing rapidly in terms of both volume and customers. In terms of a two-period model[8], we are still in the first period, in which companies charge lower prices in markets with switching costs than in markets without them. Once market shares are determined and the profits generated from new customers are only of minor importance relative to that on existing customers, companies tend to charge higher prices in markets with switching costs than in markets without them.[9] In the second period, companies with smaller market shares will charge lower prices than those with large ones. If consumers anticipate the negative effects of lock-in and switching costs, market demand will be less price elastic in the first period. Firms can develop commitment strategies in order to reassure consumers that the costs of lock-in and switching will not be excessive.

This has a few interesting consequences for B2C eCommerce companies:

(i) Marketing and advertising expenditure might be higher in B2C markets than in comparable offline markets. The existence of lock-in effects and switching costs makes market shares more valuable in the future. Furthermore, the effects of marketing and advertising expenditure are longer lived when customers face switching costs.

(ii) Many B2C eCommerce companies offer some of their goods at huge discounts relative to traditional retailers, despite losses. These discounts are interpreted as investments in market share that is particularely valuable in the B2C market characterised by lock-in effects and switching costs.

(iii) Theoretical models of lock-in effects do not yield conclusive results with respect to the level of prices in B2C eCommerce as the market is in a very early stage of development.

(iv) Lock-in Effects may have provided incentives for B2C eCommerce firms to expand their selection considerably in the past years (e.g. amazon.com: books, CDs, DVDs, toys etc.).

(*v*) B2C eCommerce companies attempt to create a number of artificial lock-in effects and switching costs.

Loyalty programs, customisation that allows easy repeat purchases, recommendations based on past shopping behaviour, and lower per item shipping costs are incentives for consumers to purchase a set of goods at a single B2C eCommerce company even if some of the goods are cheaper at different other stores.[10] Furthermore, buying each item of basket seperately at a different online store increases the time consumers would have to spend in online stores. Consumers might be more confident with entrusting personal information to companies when they can keep track of the data and its potential misuse that hence they can demand it to be erased. Spreading personal data and payment transaction details over a large number of online shopping sites could result in considerable monitoring costs, too. In addition, sending the data via the internet entails some risk of interception so that consumers might prefer to interact with those sites that have already stored (parts of) the relevant information in their database alongside other details of the personal profile. In short, bundling purchases at a single online store reduce non-pecuniary transaction costs associated with online shopping.

The composite good purchased in an online store is an experience good (and with respect to some complementary services even a reputation good, i.e. data protection). To find out about its quality is an informational investment under uncertainty. The subjective switching costs are equal to the maximum insurance premium the consumer is willing to pay, to be guaranteed a composite good that provides (at least) the same level of utility to him.[11]

Brynjolfsson/Smith (2000b) and Chen/Hitt (2001) present evidence of the significant role of lock-in effects and switching costs due to positive experience with the quality of composite goods. Johnson et al. (2000) find evidence for the role of cognitive switching costs in B2C eCommerce.

Bundling

Bakos/Brynjolfsson (1997, 1999a,b) argue that bundling reduces the intensity of competition.[12] Bundling is a strategy that focuses on aggregation of large numbers of information goods so that the entire set (or bundle) of goods can be sold at a single price.[13] The list of examples comprises online newspaper articles, music and software

[8] Two period models are appropriate to model lock-in effects and switching costs, if companies can discriminate between old and new customers, or if the market has an "early" and a "later" period due to patterns of growth exogenous to the model.

[9] See Klemperer 1987. Klemperer (1995) expects the incentives to increase prices to old customers, to outweigh the incentives offering attractive prices to new customers. Some B2C eCommerce companies attempt to solve the problem by price discriminating between old and new customers.

[10] See Bakos 2001, Borenstein/Saloner 2001, Chen/Hitt 2001, Smith/Bailey/Brynjolfsson 1999, Varian 1999.

[11] See Klemperer 1995, 517.

[12] However, one has to bear in mind that the problem is structured as bundling versus selling all goods separately, i.e. mixed bundling is ruled out. Consequently, Bakos and Brynjolfsson cannot derive marginal conditions for the optimality of including an additional good in a bundle or selling it separately.

[13] Bundling has similar effects as price discrimination. As compared to first degree price discrimination the bundling strategy reduces the number of different prices to a uniform price for all consumers and greatly reduces the information requirements and transaction costs while maximising seller's profits.

downloads, photographs, and video clips.[14]

Bakos/Brynjolfsson (1999a,b) show that:

- The seller of the larger bundle will always be willing to spend more for an additional good to add to the bundle. Thus the larger bundler will grow larger relative to the smaller one.
- In a slightly adapted model the bundler can attract more consumers, charge a higher price and achieve higher revenues from a single, specific good than the seller distributing the good's imperfect substitute on its own.
- A bundling strategy can make market entry unattractive for potential entrants if their goods cannot be bundled.[15]

Heterogeneity, asymmetric information and endogenous sunk costs

In addition to points made above, we emphasise further explanations of a lower than expected intensity of competition in B2C eCommerce: heterogeneity of composite goods, limited market transparency, endogenous sunk costs, and network effects, increasing returns to scale and positive feedback-loops.

Heterogeneity of composite goods and asymmetric information

The utility derived from the purchase in B2C eCommerce depends on the quality attributes of the composite good, consisting of the product (e.g. book, CD) and of various complementary goods including:

- correct details of physical presence, contact address, relevant jurisdiction,
- convenience of navigating a web shop,
- transparency of information (on prices, taxes, handling & shipment, quality attributes), of the process of making and confirming a purchase,
- delivery services (safe and timely delivery, reliability of delivery service, expected costs of complaints over delivery problems, expected costs of enforcement in case of delivery problems),
- payment procedure (clear and safe payment procedure, expected costs of payment fraud and complaints),
- consumer rights and data protection,
- after sales service (expected costs of returning goods after a cooling-off period and obtaining a refund, expected costs of complaints).

While quality attributes of a particular book and CD can be assumed to be homogenous across B2C eCommerce companies, there is considerable heterogeneity with respect to the quality attributes of the complementary goods.[16] Furthermore, while the quality/price ratio of the underlying good purchased is usually contractible and enforceable, (albeit at high costs), the quality/price ratio of some of the complementary goods is hardly contractible.[17] Even if the goods purchased in B2C eCommerce are standardised search goods (e.g. computer hardware), the complementary goods often are experience or reputation goods.

By reducing the degree of homogeneity of composite goods purchased in B2C eCommerce, the heterogeneity of complementary goods increases search and information costs. Asymmetric information prevails in the B2C eCommerce market.[18] The lack of standardisation renders comparisons expensive. A first time purchase at a hitherto unknown online-store can be interpreted as an investment under uncertainty. A positive shopping experience with regard to the price/quality ratio of the composite good will reduce the inclination of an individual to risk the investment of a first time purchase at another store, unless the expected price/quality differential compensates at least for the additional uncertainty involved in the margin.

There are a number of options for the seller of an experience good to overcome the related informational problems: Previews, reviews, and reputation.

Establishing a reputation for selling high quality products can be interpreted as an investment decision and is, therefore, nonsensical if there are no future customers, or if the discount factor of the seller is very low ($<< 1$).[19]

B2C eCommerce companies transacting very frequently with the same customers have an incentive to establish a reputation. The incentive is even more pronounced, if negative experience can be communicated amongst buyers. If the market leaders conduct a higher number of transactions and have larger expected discounted future profits and higher marketing and advertising expenditure which are endogenous sunk costs, the amount at stake is higher for them than for smaller market players.[20] Furthermore, the fact that they are larger is a signal that other shoppers have experienced a satisfactory quality/price ratio to return to their sites. Thus, the commitment to high quality of larger B2C eCommerce companies is more credible.

Based on the arguments presented above, we interpret asymmetric information as reducing the high intensity of competition vis-à-vis the ideal of a frictionless market.

Market transparency

In the following section we present evidence that the

[14] See Bakos et al. (2000) for different bundling strategies in the online brokerage market.
[15] See also Nalebuff 2000.
[16] See Borenstein/Saloner 2001, Smith/Bailey/Brynjolfsson 1999.
[17] We borrow the terminology from Brynjolfsson/Smith 2000b.
[18] See Bakos 1997, 1998. Fabel/Lehmann (2000) present empirical evidence of quality differences between used cars sold on- and offline.
[19] Noisy variables and fixed, finite horizons can complicate matters (see Kreps 1990, 531) but are not discussed here any further.
[20] See Spulber 1999, 171 ff.

amount of information provided on the web is huge, while consumers' resources to handle it are limited. Online consumers respond to abundance of information by restricting their attention to a very limited fraction of online shops. B2C eCommerce companies respond with high marketing and advertising expenditures and high customer acquisition costs.

Bergman (2000) estimates that there are 550 billion documents in the Deep Web, which includes traditional surface web sites plus web pages in databases that are generated upon request. Furthermore, he reports that search engines have stored some 0,03% of these web sites. Lawrence and Gilles (1999) argue that, since conventional search engines crawl the web from one site to the next via links, old web sites and those with a high number of links connecting other sites to them, have a larger probability to be found. The costs of updating the data base of a conventional search engine are increasing with the number of sites. While the marginal return from indexing a site is decreasing as the data base grows, the sites since added are more likely to be less popular.[21] Sullivan (2001) presents evidence that search engines offer banner ads, content deals, paid placement and/or inclusion and/or submission. Even though these features are separated from the editorial listings, they offer a way to be present on search result pages and consequently reduce the transparency of the market and highlight the role of marketing and advertising expenditures in the customer acquisition processes.

Adamic and Huberman (1999) studied the distribution of users among different web sites on December 1, 1997 based on data covering 60,000 users and 120,000 sites. According to their survey, the top 0.1% of all sites attracted 32.36% of volume, for the top 1% the corresponding value was 55.63% and for the top 10% it was 82.26%. The top 50% covered 94.92% of all visits.

The analysis of the top 100 US-based B2C eCommerce sites in the fourth quarter of the year 2000 yields interesting insights concerning the distribution of page views among B2C eCommerce sites.[22] About 50% of the total page views on the sites of the top 100 are concentrated on the sites of 11 companies, about 75% of the page views on the sites of 38 companies. Amazon.com holds a share of 21%, the shares of all other companies are below 5%. In these calculations, we excluded auction sites as they also cover C2C eCommerce. Nevertheless, the biggest auction site ebay.com would have a share of 35% among the top 100 companies in the end of 2000. Altogether, these data indicate a low market transparency, as users spend most of their online time on a few leading online web shops.

Johnson et al. (2000) analyse the consumer shopping behaviour of a panel of 10,000 households over the period July 1997 to June 1998 in the categories books, CDs, and online travel agencies. The average number of CD shops searched by each household increased from 1.23 in the first month of online experience to 2.23 from the seventh month onwards. The average number of book shops searched by each household increased from 1.1 to 1.34, and the average number of online travel agencies from 1.8 to 2.8. Over the entire period, 70% of CD and of book shoppers, and 36% of online travel shoppers were loyal to one online store. Furthermore, they find that the probability of a continuing search after the first visit of a site in a given month is quite low (21.2% CDs, 12.8% books, 46.8% travel). Most individuals in the sample had some inclination to search, but rarely did so.

In a consumer survey[23] conducted in January and February 2000 in Austria the most important criterion for consumer choice, however, was the brand name of the seller (B2C eCommerce retailer), (very important/important for 49%), followed by the trade mark of the good under consideration, (very important/important for 40%). Classical internet based sources of information were ranked on places 3 to 5: search engines, (very important/important for 33%), portals, (very important/important for 31%), and recommendations on the internet, (very important/important for 30%). Finally, also advertising and recommendations in traditional media, (very important/important for 25%), had some influence on consumer choice.

Brynjolfsson/Smith (2000b) analyse shopbot data on 1,513,439 book offerings generated by 39,654 searches conducted between August and November 1999. A total of 20,227 distinct consumers used the shopbot in this period including 7,478 repeat visitors. The data set does not include data actual purchases, but approximates them by "last-click" data. Instead of observing an actual purchase at one of the stores, the analysis of final decisions is based on the final choice of online shop among the shops in the listing. They report that 51% of consumers choose an offer that is not the lowest priced one. While the branded retailers (amazon.com, barnesandnoble.com, borders.com) offer the lowest price in 15% of all searches, they are the final choice in 27% of them. The three largest unbranded retailers (A1books, Kingsbooks, 1Bookstreet.com) have the lowest price in 36%, and they are considered as final choice in 26% of all searches. The results are confirmed by the analysis of the price premium – between the lowest price offered and the one actually chosen – consumers are willing to pay when choosing an offer other than the lowest priced one. For branded retailers that premium is 10.8%, while for unbranded ones it is only 7% (relative to the average total price of the books chosen in the sample). Furthermore, Brynjolfsson/Smith (2000b) estimated that consumers are indifferent to an offer from an unbranded and from a branded retailer, if the unbranded one offered a discount of 3.1-6.8% (of the average total price of the books chosen in the sample).

According to Clay et al. (2000), amazon.com charges significantly more than other B2C eCommerce companies with a brand name (+5% vis-à-vis barnesandnoble.com and +11% vis-à-vis Borders.com). Ward/Lee (1999) report results of a survey of consumers in B2C eCommerce that emphasise the importance of brand names as a determinant

[21] See Lawrence/Gilles 1999.

[22] Data source: Alexa Research 2001.

[23] For details see Latzer/Schmitz 2000.

of consumer choice. Degeratu/Rangswamy/Wu (1999) present evidence based on consumer choice data of online and offline retailers. They conclude that product brand names are more important in B2C eCommerce when information on fewer quality attributes is available online.

Endogenous sunk costs

To some extent sunk costs associated with market entry in B2C eCommerce are lower than in conventional retail markets, as the demand for the inputs personnel and outlet space is lower in online than in offline retail operations. The evidence presented above shows that brand names play a crucial role in B2C eCommerce so that marketing and advertising expenditures are expected to be high.[24] These endogenous sunk costs affect market structure. The concentration ratio in markets characterised by sunk costs does not converge to zero as the market size grows.[25] By limiting the number of competitors and the intensity of competition in the market, even in the presence of free entry, the long run average prices can be sustained above marginal costs to recoup sunk costs.

Due to the asymmetric information with respect to the price/quality attributes and limited market transparency, i.e. in particular with respect to non-contractible characteristics of the composite goods, and due to the prominent role of reputation, marketing and advertising expenditures play a crucial role in B2C eCommerce. B2C eCommerce is characterised by network effects, increasing returns to scale, and positive feedback loops. Consequently, history matters in industries that are characterised by network effects, increasing returns to scale, and positive feedback-loops.[26] Therefore, marketing and advertising expenditures have a longer lasting impact on these industries. Endogenous sunk costs are barriers to entry, eventually prices have to be above marginal costs to recoup endogenous sunk costs, and the intensity of competition is lower than in the absence of endogenous sunk costs, ceteris paribus. Furthermore, even if the B2C eCommerce market expands, there exists a positive lower limit for the concentration ratio even under free entry.

Network effects, increasing returns to scale and positive feedback-loops

B2C eCommerce is often interpreted as exhibiting network effects.[27] The individual pay-off for buying online depends on the number of other online shoppers. The literature on networks distinguishes between direct and indirect network effects.[28]

Direct network effects arise as the marginal participant increases the value of the network for all other current and prospective participants as the number of individuals to communicate with increases. Direct network effects are mostly taken into account by network sponsors. They play an empirically minor but not insignificant role in B2C eCommerce. A larger number of other shoppers does not enhance the shopping experience, apart from a larger selection of online reviews and the social aspect of chat rooms and discussion fora that are sometimes incorporated in shopping sites.

Indirect network effects are the result of market interaction. The more individuals buy online, the more information is available about B2C eCommerce in general and about the most popular sites, specifically. Individuals feel more confident about shopping at a site they know more about, especially concerning the quality of the complementary goods.

The social experience of visiting a certain shopping site, e.g. chat rooms, is often positively correlated to the size of the B2C eCommerce company. Finally, network effects are important in the distribution of physical goods.

Increasing returns play a major role in inventory management and in procurement of the goods and services offered, as producers grant bulk discounts to large retailers with substantial bargaining power.[29] The technological infrastructure might require lower fixed costs than the infrastructure of a brick and mortar store, but it still requires a non-negligible investment (sophisticated web site and fulfillment technology and organisation, order tracking, product design and bundling, customisation, timely information about inventory positions etc.). These fixed costs are an additional source of increasing returns to scale.

Does that imply that the B2C eCommerce has a tendency towards natural monopoly? No, because of the heterogeneity of consumer preferences it is unlikely that network size is the only relevant factor in network choice. Particularly with regard to the social aspect of B2C shopping is likely that the characteristics of other participants are an important factor. The fact that increasing returns to scale play a prominent role in B2C eCommerce does not imply that this necessarily be true for an output level equal to or larger than market volume. So that marginal costs will increase with network size after a certain threshold. If the production function of B2C eCommerce companies exhibits diminishing marginal productivity at output levels well below market volume, more than one network can exist in equilibrium. Limitation of organisational and informational capacity are of special importance in B2C eCommerce.

The existence of network effects, increasing returns to scale, and positive feedback loops implies that larger B2C eCommerce companies will either sell at lower prices or have larger margins which enable them to invest more in non-price competition or simply generate higher profits. Minimum efficient scale is larger in the presence of positive feedback-loops than in their absence so that the intensity of competition is likely to be lower.

[24] Pure player in B2C eCommerce reported advertising and marketing costs of 76% of revenues in 1999 (Shop.org 1999). In the Austrian retail market SME spend less than 2% of revenues on marketing and advertising activities on average in the same year (Austrian Chamber of Commerce).

[25] See Sutton 1991.

[26] See Shapiro/Varian 1999.

[27] See Borenstein/Saloner 2001.

[28] See e.g. Katz/Shapiro 1985, Liebowitz/Margolis 1994, 1998.

[29] See Borenstein/Saloner 2001.

Conclusions

This paper highlights potential problems related to hypothesis testing of the intensity of competition in B2C eCommerce and warns of premature conclusions. Type 1 and type 2 errors in testing the hypotheses can occur due to the "disequilibrium critique". The hypothesis are ideal-type formulations and one has to be aware of the "fallacy of affirming the consequent".

The empirical studies on prices in B2C eCommerce relative to traditional retail are inconclusive, while those on the dispersion of prices in B2C eCommerce lead to the rejection of the hypothesis of high intensity of competition in B2C eCommerce.

The literature concentrates on the following explanations of these findings: price discrimination, lock-in effects and bundling. Our analysis shows that additional explanations have to be considered as well: Heterogeneity of composite goods, limitations to market transparency, high endogenous sunk costs and network effets combined with increasing returns to scale.

The consideration of these additional arguments might change the net-effect of the arguments for and against high intensity of competition in B2C eCommerce.

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