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**Fabio Ancarani**

SDA Bocconi Graduate School of Management  
Università Commerciale Luigi Bocconi, Milan, Italy

**Venkatesh Shankar**

R.H. Smith School of Business  
University of Maryland

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eBusiness Research Center  
401 Business Administration Building  
University Park, PA 16802  
Phone: 814.861.7575  
Fax: 814.863.0413  
Web: [www.ebrc.psu.edu](http://www.ebrc.psu.edu)

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**Fabio Ancarani<sup>1</sup>**

SDA Bocconi Graduate School of Management  
Università Commerciale Luigi Bocconi, Milan, Italy

**Venkatesh Shankar<sup>2</sup>**

R.H. Smith School of Business  
University of Maryland

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<sup>1</sup> Assistant Professor in Marketing, SDA Bocconi Graduate School of Management, Via Bocconi 8, 20136 Milano, Italy, tel +39258366510, fax +39258366888, email: [fabio.ancarani@sdabocconi.it](mailto:fabio.ancarani@sdabocconi.it)

<sup>2</sup> Ralph J. Tyser Fellow and Associate Professor of Marketing and Entrepreneurship, Robert H. Smith School of Business, University of Maryland, College Park, MD 20742, Tel: 301-405-2175, Fax: 301-405-0146, email: [vshankar@rhsmith.umd.edu](mailto:vshankar@rhsmith.umd.edu)

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***Abstract***

Price levels and price dispersion on the Internet have attracted a lot of research and managerial attention. Contrary to initial predictions that the Internet would lead to the emergence of a frictionless economy, empirical research shows that online price dispersion is persistent and is no lower than offline price dispersion. There have been a few studies comparing price levels at online and offline retailers, but not much is known about how prices compare among three types of retailers, namely, pure play, bricks-and-mortar (traditional), and bricks-and-clicks (multichannel) retailers. We address this important issue in this paper through an empirical analysis of price levels and price dispersion in the book and compact disc (CD) categories among the three types of retailers in Italy during early 2002. Our results, based on an analysis of 13720 price quotes, show that when list prices are considered, traditional retailers have the highest prices, followed by multichannel and pure play e-tailers, in that order. However, when shipping costs are included, multichannel retailers have the highest prices, followed by pure play e-tailers and traditional retailers, in that order. With regard to price dispersion, pure play e-tailers have the highest range of prices, but the lowest variability (standard deviation). Multichannel retailers have the highest standard deviation in prices with or without shipping costs. These findings suggest that online markets are still inefficient and online pricing is complex, offering opportunities for different types of e-tailers to differentiate themselves from one another.

Keywords: Pricing, Digital economy, e-commerce, Information economics, Internet marketing

## **Introduction**

Pricing has been one of the most frequently researched areas in marketing (Rao 1984). Research in Internet marketing has increasingly focused on the issue of pricing (Wind and Mahajan 2001). In the initial years of the Internet, it was widely predicted that it would lead to a frictionless economy in which prices continually decrease and converge to perfect competition levels (e.g., Bakos 1997). However, a growing number of theoretical and empirical studies question the frictionless economy concept. Price dispersion is persistent among e-tailers and is no lower online than offline (e.g., Brynjolfsson and Smith 2000; Pan, Ratchford and Shankar 2001). Customers not only have lower search costs for information about prices, but also have lower search costs for non-price information (Degeratu et al. 2000). Furthermore, manufacturers, retailers and service providers have lower search costs for information about their customers (Pitt, Berthon, Watson, and Ewing 2001). What is the net direction of these effects on prices on the Internet? Managers are extremely interested in the answer to this question as they confront a world of increasing competition and transparency.

With the emergence of the Internet as an important channel, we find three types of retailers, pure play Internet e-tailers, bricks -and-mortar or traditional or offline retailers, and bricks -and-clicks or multichannel retailers. These different types of retailers seem to coexist well for most product categories (Zettelmeyer 2000). Are there any differences in their price levels? Is there significant price dispersion within each type of retailer? Are the levels of price dispersions different across these types of retailers? The answers to these questions have important implications for price competition and pricing strategies of these retailers. For example, if price levels at pure play e-tailers are lower than those at multichannel retailers, then it may suggest that multichannel retailers can effectively compete by differentiating themselves through the benefits of physical inspection, pick-up and return of merchandise. Similarly, if price dispersion is larger for pure play e-tailers than it is for traditional retailers, it might imply that pure play e-tailers can effectively differentiate themselves from one another on non-price dimensions.

Prior research on price levels has examined price differences between either pure play Internet e-tailers and bricks -and-mortar retailers or between pure play e-tailers and bricks -and-clicks e-tailers

(e.g., Pan, Ratchford and Shankar 2002; Pan, Shankar and Ratchford 2002; Tang and Xing 2001).

They have not compared all the three types of retailers. Past research on price dispersion has investigated differences between online and offline retailers, but not across all the three types of retailers (e.g., Brynjolfsson and Smith 2000; Tang and Xing 2001). By knowing the relative levels of prices and price dispersions across these types of retailers, we can gain insights into the nature of within- and across-retailer type competition. Do pure play e-tailers compete more with bricks-and-clicks e-tailers than they do with bricks-and-mortar retailers? Can a multichannel retailer differentiate itself from other multichannel retailers on non-price dimensions?

Prior research on price levels and price dispersion has examined prices with and without shipping costs, only to a limited extent. Understanding the differences in these prices is managerially important. For example, a pure play e-tailer could have a lower list price than a multichannel retailer, but a higher price when shipping costs are included. If this is the case, then a multichannel retailer can compete more effectively by highlighting its lower full price in its communications. Brynjolfsson and Smith (2000) and Tang and Xing (2001) do examine prices with and without shipping costs. But they do not compare these prices across the three types of retailers that we examine in this study.

In this paper, we address the above questions and gaps in prior research. We review the research on price levels and price dispersion in the online and offline environments and empirically analyze the differences in price levels and price dispersion among pure play e-tailers, bricks-and-mortar retailers, and multichannel retailers. Our empirical analysis is based on data from two product categories, books and compact discs (CDs), among traditional, online, and multichannel retailers in Italy over a five-week period during March-April 2002, comprising 13,720 price quotes.

The results show that when list prices are considered, traditional retailers have the highest prices, followed by multichannel and pure play e-tailers, in that order. However, when shipping costs are included, multichannel retailers have the highest prices, followed by pure play e-tailers and traditional retailers, in that order. With regard to price dispersion, pure play e-tailers have the highest range of prices, but the lowest variability (standard deviation). Multichannel retailers have the highest

standard deviation in prices with or without shipping costs. We offer important managerial implications based on these results.

### **Literature Review**

There are two schools of thought on the levels of prices and price dispersion online versus offline. On the one hand, some studies point to the emergence of a world of “frictionless commerce” in which prices decrease to a perfect competition level (Alba et al. 1997; Bakos 1997; Sahlman 1999). The fundamental argument in these studies is that the Internet decreases search and transaction costs and enable customers to compare prices of different offerings more easily than otherwise by using shopbots and smart agents (Maes 1999). Firms are also threatened by cost transparency (Sinha 2000) and competitors are only “a click away.” All these should lead to lower prices towards a perfect competition level<sup>1</sup>.

On the other hand, a growing number of studies question the “frictionless commerce” concept at both conceptual and empirical levels. At a conceptual level, some studies have turned the assumptions and logic of lower search costs on their head (Degeratu et al. 2000; Lal and Sarvary 1999; Lynch and Ariely 2000; Shankar, Rangaswamy and Pusateri 2001). These studies point out that the Internet lowers search costs for both price information and non-price information such as product and quality information. While lower search costs on price information may lead to lower prices, lower search costs on non price information could lead to lower price sensitivity and consequently, to higher prices<sup>2</sup>. Furthermore, the Internet may enhance loyalty, making price less salient (Shankar, Smith and Rangaswamy 2002). According to Reicheld and Schefter (2000), “price does not rule the web, loyalty does” and the Internet is not a frictionless environment, but a very “sticky” place.<sup>3</sup>

At an empirical level, there is a growing body of literature that tests whether the “frictionless world” hypothesis can be empirically confirmed. Consistent with Smith, Bailey and Brynjolfsson (2000), we examine two kinds of studies in this literature: studies that compare a) price levels and b) price dispersion in the online and offline environments. Tables 1 and 2 offer summaries of the different studies on price levels and price dispersion.

< Tables 1-2 about here >

### ***Price Levels***

There have been a few empirical studies comparing price levels online and offline. Lee (1997) compared the prices of automobiles in traditional and digital auctions between 1986 and 1995 and found that in digital markets, prices were not only higher, but also continually increased. We, however, note that the auction market is very different from the retail market. Bailey (1998) compared the prices of books, CDs and software sold online with those sold through traditional channels between 1996 and 1997 and found higher prices online for all the product categories. This finding might have been influenced by the fact that the research was conducted when e-commerce was just starting to develop. During that time, innovator and early adopters of e-commerce had low price sensitivity, so the higher prices could have been caused by market immaturity. In fact, during the last few years, researchers have reported a downward trend in price levels, though the results are mixed. Clay et al. (1999) did not find any relevant differences in the two channels for books. Brynjolfsson and Smith (2000) found that prices of CDs and books sold online are much lower than those sold through traditional channels, thus supporting the hypothesis that Internet markets became more efficient between 1996 and 1999. Brown and Goolsbee (2000) found decreasing price levels in the life insurance industry due to the impact of the Internet. Morton, Zettelmeyer and Risso (2001) studied dealer pricing of automobiles in California and found that prices are lower online, although the difference was only 2%. Erevelles, Rolland and Srinivasan (2000), however, found higher levels of prices of vitamins for Internet retailers than for traditional retailers.

A few studies have compared prices at pure play e-tailers and multichannel retailers. A study by Tang and Xing (2001) compared the price levels at pure play e-tailers and multichannel retailers for the DVD category. They found that the prices of pure play Internet retailers are significantly (about 14%) lower than those of online multichannel retailers. Pan, Ratchford, and Shankar (2002) found that prices are lower for pure play e-tailers than they are for bricks-and-clicks e-tailers for CDs, DVDs, desktop and laptop computers; they are similar for PDAs and electronics and higher for pure play e-tailers for books and software. Pan, Shankar, and Ratchford (2002) analytically and empirically show that prices at pure play e-tailers are lower than those at multichannel retailers in

eight categories, apparel, gifts and flowers, health and beauty, home and garden, sports and outdoors, computer hardware, consumer electronics, and office supply.

Some conceptual and measurement problems related to research on price levels may explain some of the mixed results. One general problem concerns the calculation of shipping and handling costs related to online shopping and the “leather shoe costs” related to offline shopping. In the above studies, prices are often lower in the online channels when shipping and handling costs are not included. They are higher when such costs are included and charged on a single purchase, but the results are mixed when shipping and transportation costs are divided by the average size of an online order.<sup>4</sup>

The evidence on price levels in online and offline environments is therefore mixed: problems of market immaturity and computation of shipping costs may require deeper examination. Considering the impact of the Internet on online and offline prices, it is necessary to compare not only e-tailers and traditional retailers, but also to compare them together with multichannel retailers.

Price levels are typically related to price sensitivity. Research on price online sensitivity shows somewhat different results. Degeratu et al. (2000) demonstrated that online consumers are not more sensitive to prices than offline consumers. They analyzed groceries sold by offline and online retailers and found that price sensitivity was lower online than offline. Lynch and Ariely (2000) reached the same conclusion through an experimental study with two online stores selling wine. By observing customer reactions to changes in the site structure, they found that price sensitivity declined as customers received more information. Therefore, an increase in search costs for quality information can lead to lower price sensitivity. Shankar, Rangaswamy and Pusateri (2001) introduced an important distinction between price search (the customer’s proclivity to undertake a search for better prices) and price importance (that is the weight a customer attaches to price in relation to other attributes). Their results from the hotel industry show that the online medium increases price search, but not price importance, that is, online price sensitivity was lower, even if the price search was higher than offline.<sup>5</sup> Baker, Marn and Zawada (2001) conducted a study on purchasing managers in the B2B context and found that only 30% of the sample focused on price as the most relevant benefit



in online purchasing; in the remaining 70% of the sample, the reduction in transaction and search costs was considered more important than lower prices. To summarize, the empirical evidence on online price sensitivity suggests that it is lower than offline, suggesting higher prices online than offline.

### ***Price Dispersion***

According to the frictionless commerce hypothesis, price dispersion should be much lower in online than in traditional markets. Results of empirical research are mixed. Bailey (1998) found that online price dispersion in the book and CD markets is the same or even higher than offline price dispersion. The result is consistent with Clemons et al. (1998) in the online travel industry and with Erevlles, Rolland, and Srinivasan (2000) in the vitamin industry. Brynjolfsson and Smith (2000) found that online price dispersion is equal or even higher than in the traditional economy. However, after weighting the prices by proxies of market share, they found price dispersion to be lower online than in conventional stores. Brown and Goolsbee (2000) and Morton, Zettelmeyer and Risso (2001) also found lower levels of online price dispersion in the life insurance and Internet car retailing industries, respectively. Tang and Xing (2001) found that price dispersion was lower for pure play e-tailers than multichannel retailers. Ratchford, Pan and Shankar (2002) did not compare price dispersion levels online and offline, but they found that online price dispersion is persistent although it generally declined from November 2000 to November 2001 for eight categories, books, CDs, DVDs, desktop and laptop computers, software, PDAs and consumer electronics.

The emergence of price dispersion is very important for marketing researchers and practitioners. The high levels of online dispersion are a strong empirical disconfirmation of the frictionless commerce hypothesis and a sign that it might be possible to design and implement customer value-based pricing strategies by different types of retailers (Dolan and Moon 2000; Wind and Mahajan 2001; Simon and Schumann 2001).<sup>6</sup> It is important to understand if price dispersion is different for pure play, traditional and multichannel retailers.

### **Data, Measures and Method**

We conduct an empirical analysis of price levels and price dispersion in the online (pure play e-tailers and multichannel retailers) and offline (traditional retailers) environments in the Italian market. We subsequently compare prices at pure play, multichannel and traditional retailers.

We chose books and CDs as the two product categories for our empirical analysis because these categories have also been widely studied by other researchers and we were able to compare completely homogeneous products by checking the ISBN code for books and the title and main features for CDs. We collected daily price quotes on a sample of books titles and CDs from a sample of traditional retailers and e-tailers in Milan, Italy over a period of five weeks during March-April 2002. The information was collected directly by checking the point of sale and the Web sites of e-tailers.

We selected 21 titles of books from a mixed sample of best sellers according to the ranking of the *Corriere della Sera*<sup>7</sup> in six categories (Italian and foreign fiction, essays, paperbooks, books for children and various) and a group of other randomly selected books. We compared their prices among 11 retailers (four pure play, two multichannel, that is, six online and five traditional) and obtained 8,085 price quotes. With regard to CDs, we selected 23 titles from a mixed sample of the best selling CDs and a group of other randomly selected CDs. We compared their prices among seven retailers (four traditional retailers and three pure play e-tailers). Among the online retailers for CDs, we had only pure play e-tailers, but no multichannel retailers. Traditional retailers accounted for about 70% of the market for books and CDs in Italy and pure play e-tailers and multichannel retailers split the rest of the market. The prices for some multichannel retailers were different in their bricks-and-mortar and Internet stores for a few items. However, the average prices across items and across retailers were not statistically different ( $p < 0.001$ ) across the two channels of multichannel retailers, so we use the prices at their Internet stores for our analysis. We collected 5,635 price quotes. Thus, our data set comprised 13,720 price quotes of books or CDs.<sup>8</sup>

We measured price levels by the means of the price quotes in the respective samples (online or offline, pure play vs. traditional vs. multichannel). We measured the level of price dispersion using

price range and standard deviation consistent with prior studies (e.g., Brynjolfsson and Smith 2000; Pan, Ratchford and Shankar 2001).

We first compared price levels and dispersion for online and traditional retailers using t-tests, consistent with Brynjolfsson and Smith (2000) and Tang and Xing (2001). We next compared price levels and price dispersion among pure play retailers, traditional, and multichannel retailers, using the same tests. We ran non-parametric tests (median tests) to check for consistency. The results were similar, so we report the results of the t-tests in the results section below.

## **Results**

### ***Online vs. Offline***

The results of comparison of price levels and price dispersion for online and offline retailers appear in Table 3. All the significant results are significant at the 0.001 level.

#### **Price Levels**

We first present the results for books and then for CDs. With regard to books, the mean list prices are 6% lower online than that offline. When shipping and handling costs are completely included in a single purchase, however, online prices are 10% higher than offline prices. When shipping and handling costs are divided on an average purchase of three items, as in Brynjolfsson and Smith (2000), online and offline price levels are not statistically different.<sup>9</sup>

< Table 3 about here >

With regard to CDs, the list prices are 4% lower online than offline. If shipping and handling costs are fully charged on a single purchase, price levels are 12% higher online than offline. If shipping costs are divided among three items, price levels are 2% higher online than offline. These results are consistent with those for books. Taken together, the results for books and CDs show that only list prices are lower online than offline, but when shipping costs are included, price levels are generally higher online than offline.

#### **Price Dispersion**

For books, when only list prices are considered, comparison of price dispersion online and offline provides mixed results. The standard deviation measure is 5% lower, but the price range

measure is 4% higher online than offline. When shipping and handling costs are considered and completely charged on a single purchase, prices dispersion, as measured by standard deviation, is not statistically different online and offline. With respect to price range, however, it is 13% higher online than offline. When shipping and handling costs are divided on an average purchase of three items, price dispersion levels online is 4% lower than that offline for standard deviation, but is 6% higher than offline for range. Thus, in general, for books in this data set, standard deviation is lower online than offline, but price range is higher online than offline. This finding implies that there are greater extremes, but lower variability of prices online than offline.

For CDs, when list prices are considered, price dispersion is slightly lower (3%) online than offline when measured by standard deviation, but higher online than offline (20%) when measured by the range of prices. When shipping and handling costs are fully charged on a single purchase, price dispersion as measured by standard deviation (price range) is 5% (20%) higher online than offline. If shipping costs are divided among three items, price dispersion is the same online and offline for standard deviation, but is higher online than offline (20%) for price range.<sup>10</sup> These findings are generally similar to those from books. Combined, the results from the two categories suggests that online prices may have greater extreme values than offline prices, but have lower variation than those offline. This conclusion is fairly robust to the calculation of prices, that is, whether the price measured is a list price or a price that includes shipping costs, this insight is the same.

### ***Pure Play vs. Bricks-and-Mortar vs. Multichannel Retailers***

We now analyze the differences in price levels and price dispersion among the different types of retailers, pure play, traditional, and multichannel retailers for the books category. The results of the three-way tests of differences, that is, multichannel vs. pure play, multichannel vs. traditional and pure play vs. traditional, are shown in Table 4. All statistically significant results are significant at the 0.001 level except in the comparison of prices with shipping costs divided among three items for multichannel and traditional retailers, where it is at the 0.005 level.

< Table 4 about here >

### **Price Levels**

Price levels of traditional retailers are 2% higher than those at multichannel retailers, which in turn, are 6% higher than those for pure players. However, the picture changes when shipping costs are considered. When shipping costs are completely charged to a single purchase, multichannel retailers' price levels are 3% higher than those of pure play e-tailers, which in turn, are 9% higher than those for traditional retailers. When shipping costs are divided among three items, multichannel retailers still have the highest price levels. Only now, the price levels at traditional retailers are higher (2%) than those at pure play e-tailers, unlike the situation when shipping costs are fully charged to a single purchase. These findings reveal that pure play e-tailers have the lowest list prices and traditional retailers have the highest list prices; multichannel retailers have the highest prices if shipping charges are included; pure play e-tailers may do have the lowest prices if shipping costs are included. The results on pure play e-tailer price levels are consistent with those from the previous section on online vs. offline differences. The multichannel retailers list lower prices than those at traditional retailers, but effectively charge higher prices when shipping costs are included.

#### Price Dispersion

Price dispersion, as measured by the standard deviation of list prices, is higher (2%) for multichannel retailers than it is for traditional retailers, whose price dispersion is also higher (10%) than that for pure play e-tailers. When price range of list price is the measure of price dispersion, the order is reversed. Pure play e-tailers have a wider dispersion (4%) than both traditional and multichannel retailers, whose price dispersions are not statistically different from each other. When shipping costs are completely charged to a single purchase, there are similar differences between standard deviation and price range measures of price dispersion. For standard deviation, price dispersion is still highest at multichannel retailers followed by traditional retailers and pure play e-tailers, whose dispersions are not significantly different. For price range, however, pure play e-tailers have wider price dispersion than multichannel and traditional retailers, both of whom have similar price dispersions. When shipping costs are divided among three items, the pattern is similar to that when shipping costs are fully charged to one purchase. Thus, the results on price dispersion comparison seem to be invariant to how price is computed, but are systematically different for

standard deviation and price range. Pure play e-tailers have the widest range of prices, but the lowest variability. Multichannel retailers have the highest variability in prices.

### **Discussion**

From the results of price levels and price dispersion, we can discuss the relative positions of the three types of retailers with respect to one another on the two measures of price level (list price, price including shipping costs) and the two measures of dispersion (standard deviation and range). Figures 1-4 show approximate positions of the three types of retailers on the two dimensions with price dispersion as the X-axis and price level as the Y-axis. The scales of the axes are not absolute, but are chosen so as to illustrate the relative positions of the e-tailers.

< Figures 1 to 4 about here >

Figure 1 is a map of list price vs. standard deviation for the three types of retailers. The multichannel retailer has higher price dispersion, but is in between traditional (high) and pure play (low) e-tailers on price levels. Traditional and pure play e-tailers are not very different on price dispersion. This picture changes quite a bit if we look at list price vs. price range (Figure 2). While the relative position of the traditional retailer does not change much with respect to Figure 1, the multichannel retailer now is closer to the origin, but the pure play e-tailer is now at the right lower part of the map. This is because pure play e-tailers have more extremes, but have lower variability in prices than multichannel retailers. In the price with shipping costs vs. standard deviation graph (Figure 3), the relative positions are different from those in Figure 1. The multichannel retailer is at the top right corner and the traditional retailer and the pure play e-tailer are close to the origin. Finally, Figure 4 (price with shipping costs vs. range) is still different from the other three figures-- multichannel, traditional and pure play e-tailers forming a triangle with multichannel at the apex and traditional and pure play forming the base vertices. These figures underscore the point that the positions of the types of retailers depend on the measures of price level and dispersion and are inconclusive. Importantly, they also imply that a retailer has room for differentiating itself from other types of retailers and from other retailers within its own type.

When comparing the price levels online and offline, our results show that although list prices are lower online than offline, the difference between online and offline list prices is very small. Importantly, when shipping costs are included, we obtain the opposite result --prices are higher online than offline. The lower online list prices may be due to increasing product (books and CDs) maturity online and growing Internet efficiency. Books and CDs prices, which in Bailey's research (1998) were higher on the Internet than offline during 1996 and 1997, were much lower online in the Brynjolfsson and Smith (2000) analysis. In our analysis, we found online levels to be marginally lower than the offline levels. Our results are consistent with Pan, Ratchford and Shankar (2002), Pan, Ratchford and Shankar (2002) and Tang and Xing (2001) in that prices at pure play e-tailers are lower than they at multichannel retailers. This result is invariant to the computation of prices (with or without shipping costs). The interesting additional insight from our analysis is that multichannel retailers list lower prices than do traditional retailers, but effectively charge higher prices when shipping costs are factored.

With regard to price dispersion, results from the two categories suggests that online prices may have greater extreme values than offline prices, but have lower variation than those offline. When list prices are considered, standard deviation is slightly lower online than offline; it is higher when shipping costs are added. This means that dispersion increases online merely by bundling a completely homogeneous product with a reasonably homogeneous service. Moreover, regardless of whether price dispersion is higher online or vice versa, it seems to be persistent online, and this is a strong empirical disconfirmation of the frictionless commerce hypothesis. Pure play e-tailers have the widest range of prices, but the lowest variability. Multichannel retailers have the highest variability in prices. Thus, there are more opportunities for differentiation for this type of retailer than for others. We conclude that although the Internet has an efficiency effect on price levels and dispersion over time, the results do not confirm the frictionless commerce hypothesis.

Our results support the hypothesis of Tang and Xing (2001) that multichannel retailers have higher price and dispersion levels than do pure play e-tailers. It is consistent with Ratchford, Pan and Shankar (2002) in that Internet markets are not as efficient as predicted by Bakos (1997). Even after

many years of diffusion of the Internet, online prices are only slightly lower than offline prices and online dispersion is still persistent. Firms that can compete on multiple channels have opportunities to differentiate themselves, thereby keeping price dispersion and price levels high on the Internet.

### **Managerial Implications**

If the Internet is similar to a “frictionless world,” as originally hypothesized by initial work on the digital economy, firms will be under pressure due to increased customer bargaining power, reverse marketing and pricing processes and cost transparency (Sawhney and Kotler 2001; Sinha 2000). Commoditization of products and services and related price wars seem to be the most important threat to firms competing in digital environments. Firms run the risk of competing only on prices for products that are perceived as commodities.<sup>11</sup> A critical managerial issue for firms pricing on the Internet is therefore to avoid the “commodity trap” and take advantage of the “other side” of information transparency, which is available not only to customers but also to firms that can track and profile their customers better.

Based on the results of our empirical analysis, we offer some managerial implications. Because our results point out significant differences in price levels and price dispersion among the three types of retailers, but since the differences may be declining over time, we suggest that retailers should rely more on finer segmentation of their markets than they do now and think about dynamic and smart pricing, product and price versioning, and price bundling.

Online price levels have shown a general downward trend over time, especially for product categories like books and CDs, which were the first categories to be sold online. It is likely that online prices are higher than offline prices during the early stages of the life cycle of online product markets, but are equal to or lower than offline prices when these markets are mature. Thus, price levels may show a downward trend when Internet markets mature over time, signaling increasing efficiency of online markets. Under these conditions, managers have opportunities to price differentially in the initial stages of the online product life cycle.

Some recent research offers suggestions in this direction. Wind and Mahajan (2001) and Simon and Schumann (2001) suggest that finer customer segmentation is the main issue in digital



marketing strategies. Sinha (2000) suggests that firms pricing on the web can implement dynamic and smart pricing by charging customers different prices, according to their different value perceptions and resort to bundling and versioning strategies in order to avoid “pure” price and product comparison on each single item sold online and to meet different value perceptions of customers <sup>12</sup>.

Online price discrimination and price customization may be good strategies for firms pricing in digital economy. Online price discrimination is easier because menu costs are lower online than offline and because retailers can gather information about customers at low costs (Barua, Deasai and Srivastava 2001). More generally, there are three ways retailers can improve their pricing strategies in the digital economy:

- **Branding and trust.** This suggestion is consistent with the studies by Reicheld and Schefter (2000), Urban, Sultan and Qualls (2000) and Shankar, Smith and Rangaswamy (2002).
- **Shopping experience.** Retailers can increase the shopping experience of their sites offering superior product information, extensive product reviews from experts and other customers, product samples and other services. This suggestion is consistent with the studies of Lynch and Ariely (2000) and of Shankar, Rangaswamy, and Pusateri (2001) that indicate lower price sensitivity when more information is offered online.
- **Lock-in effects.** Retailers can increase customers’ switching costs, thus lowering price competition. This suggestion is consistent with the study by Shapiro and Varian (1998) on the pricing of information goods.

In implementing dynamic and smart pricing, price versioning and bundling strategies, firms will take advantage of the increasing flexibility of the different price mechanism available online. Firms can use the fixed price mechanism, the negotiated price mechanism, auctions and marketplaces or a combination of them (Dolan and Moon 2000; Simon and Schumann 2001).

### **Conclusion**

In conclusion, we compared the price levels and price dispersion for books and CDs in the Italian market among pure play (online), traditional (offline) and multichannel (online and offline) retailers. Our results show that online prices are only slightly lower than offline prices. When shipping

costs are included, however, price levels are generally higher online than offline. Online price dispersion is lower than offline when list prices are considered, but higher than offline when shipping and handling costs are included. When list prices are considered, traditional retailers have the highest prices, followed by multichannel and pure play e-tailers, in that order. However, when shipping costs are included, multichannel retailers have the highest prices, followed by pure play e-tailers and traditional retailers, in that order. With regard to price dispersion, pure play e-tailers have the highest range of prices, but the lowest variability (standard deviation). Multichannel retailers have the highest standard deviation in prices with or without shipping costs. These findings suggest that online markets are still not efficient and online pricing is complex, offering opportunities for different types of e-tailers to differentiate themselves from one another.

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<sup>1</sup> The prediction made by Bakos (1997, p. 40) is clear: “lower buyer search costs in electronic marketplaces promote price competition among sellers. This effect will be most dramatic in commodity markets, where intensive price competition can eliminate all seller profits.” Sahlman (1999, p. 101) argues “the new economy has created such downward pressure on pricing that it is safe to say inflation is dead-dead as doornail”.

<sup>2</sup> Lal and Sarvary (1999) introduce the important distinction between digital and non-digital attributes. In their study they argue that digital attributes can be “explored” by customers through Internet search processes whereas non-digital attributes can be “explored” by customers only by “physical inspection” in a retail store. The distinction between digital and non-digital attributes is consistent with Nelson’s (1970, 1974) distinction between search and experience goods, even if it does not require, as in Nelson’s distinction, the consumption of the product. Thus, the Internet can lower customer search costs only for digital attributes; for non-digital attributes physical inspection in retail stores is still necessary. In the model proposed by Lal and Sarvary, under certain conditions: a) when a product is made up by digital and non digital attributes; b) when the quantity of non-digital attributes is not overwhelming and c) when customers have a positive attitude towards the brand, the Internet is likely to decrease price sensitivity and not to increase it.

<sup>3</sup> Similar conclusions regarding the increasing role of customer loyalty in digital environments are drawn by Urban, Sultan and Qualls (2000), who suggest it is necessary to place trust at the centre of Internet strategy and by Shankar, Smith and Rangaswamy (2002).

<sup>4</sup> This question obviously poses other problems of measurement. Another problem is related to the composition of the sample. If we include independent retailers, prices might be higher.

<sup>5</sup> Choudhury, Hartzel and Konsynsky (1998) studied an electronic marketplace for aeroplane spare parts (ILS, Inventory Locatory System) and found no empirical evidence to support the hypothesis that price sensitivity is higher in the digital marketplace.

<sup>6</sup> Some recent papers therefore try to investigate the sources of price dispersion. Smith, Bailey and Brynjolfsson (2000) adopt an economic perspective and argue that potential sources for price dispersion are product heterogeneity, convenience and shopping experience, customer awareness, retailer branding and trust, lock-in effects, retailers’ discrimination strategies. Pan, Ratchford and Shankar (2001, 2002) explain the degree of price dispersion in online environments through empirical analyses. Using regression models, they identify the drivers of price dispersion as a) market characteristics, b) e-tailer characteristics and c) product category differences. The results of their study show that price dispersion is persistent even after controlling for e-tailer heterogeneity. They conclude that the proportion of price dispersion explained by e-tailer characteristics is small and that market characteristics explain a substantial portion of online price dispersion. This evidence conflicts with the traditional wisdom that search costs in online markets are low and that online markets are highly competitive.

<sup>7</sup> Corriere Della Sera is the leading daily newspaper in Italy with the largest circulation.

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<sup>8</sup> Our data set seems to be consistent with that of Brynjolfsson and Smith (2000). In their study, these authors selected 20 titles of books and 20 titles of CDs from a sample of eight retailers. The retailers they studied are national whereas the retailers in our study are regional, as in Bailey (1998) and in Morton, Zettelmeyer and Risso (2001). The data set also seems to be consistent with that of Tang and Xing (2001) consisting of 4896 price quotes of 50 DVD titles from 14 retailers and e-tailers.

<sup>9</sup> When we consider shipping costs for e-tailers, we compare the full price at e-tailers with the nominal price at brick-and-mortar retailers. Strictly speaking, consumers incur the cost of transportation to the brick-and-mortar stores. We do not consider this cost because it is difficult to obtain an estimate of it across consumers.

<sup>10</sup> This occurs because we chose completely homogenous shipping services. Therefore, by adding the cost of shipping to the maximum and minimum price levels, the price range remains unchanged.

<sup>11</sup> As Simon and Schumann (2001, p. 382) put it, the paradox of pricing in digital economy is that “Pricing is an increasingly powerful weapon....yet pricing is becoming an increasingly useless weapon.” Dolan and Moon (2000, p. 73) put it in other words: “The Internet is a disaster for those with a commodity selling mentality.” Commoditization of products and services is a risk also pointed out by De Figueiredo (2000) in his search for the roots of sustainable profitability for firms competing on the Web.

<sup>12</sup> Similar suggestions are made by Bakos and Brynjolfsson (2000) and by Shapiro and Varian (1998).

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**Table 1: Summary of Selected Research on Price Levels in Online and Offline Environments**

<i>Empirical analysis</i>	<i>Subject of analysis</i>	<i>Results</i>
Lee (1997)	Prices of used cars in traditional and digital auctions, 1986-1995	Prices higher in digital auctions
Bailey (1998)	Prices of books, CDs and software sold through Internet and traditional channels, 1996-1997	Prices higher on the Internet
Clay et al. (1999)	Prices of books sold online and offline	Prices similar on and offline
Brynjolfsson and Smith (2000)	Prices of books and CDs sold through Internet and traditional channels, 1998-1999	Prices lower online
Brown and Goolsbee (2000)	Prices of insurance services	Prices lower online
Morton, Zettelmeyer and Risso (2000)	Prices of cars	Prices lower online
Erevelles, Rolland and Srinivasan (2000)	Prices of vitamins	Prices higher online
Tang and Xing (2001)	Prices of DVDs	Prices lower for online e-tailers than multichannel retailers
Pan, Ratchford, and Shankar (2002)	Prices of books, CDs, DVDs, desktop, laptop, software, electronics, PDAs	Prices lower for pure play e-tailers than bricks-and-clicks e-tailers for CDs, DVDs, desktop and laptop computers. Similar for PDAs and electronics. Higher for pure play e-tailers for books and software.
Pan, Shankar, and Ratchford (2002)	Perceived price levels of apparel, gifts and flowers, health and beauty, home and garden, sports and outdoors, computer hardware, consumer electronics, and office supply	Perceived price levels lower for pure play e-tailers than for bricks-and-clicks e-tailers

**Table 2: Summary of Selected Research on Price Dispersion in Offline and Online Environments**

<i>Study</i>	<i>Subject of analysis</i>	<i>Results</i>
Bailey (1998)	Prices for books, CDs and software sold through Internet or traditional channels, 1996-1997	Price dispersion not lower online
Clemons et al. (1998)	Prices for airline tickets sold online	Price dispersion higher online
Clay et al. (1999)	Prices for books sold online and offline	Price dispersion higher online
Brown and Goolsbee (2000)	Prices of insurance services	Price dispersion lower online
Brynjolfsson and Smith (2000)	Price of books and CDs sold through Internet and traditional channels, 1998-1999	Price dispersion higher online; but lower after weighting the prices by market share
Erevelles, Rolland and Srinivasan (2000)	Prices of vitamins	Price dispersion higher online
Morton, Zettelmeyer and Risso (2001)	Prices of cars	Price dispersion lower online
Tang and Xing (2001)	Prices of DVDs	Price dispersion lower for pure play e-tailers than for multichannel retailers



**Table 3: Price Levels and Price Dispersion for Books and CDs**

	<i>Books</i>				<i>CDs</i>			
	<i>Online</i>	<i>Offline</i>	<i>(Online-Offline)</i>	<i>P value</i>	<i>Online</i>	<i>Offline</i>	<i>(Online-Offline)</i>	<i>P value</i>
<b><i>Price Levels</i></b>								
List price levels	14.79	15.67	-6%	0.001	18.89	19.64	- 4%	0.001
With shipping costs completely charged	17.35	15.67	+10%	0.001	22.43	19.64	+12%	0.001
With shipping costs divided among 3 items	15.67	15.67	0%	NS	20.07	19.64	+2%	0.001
<b><i>Price Dispersion</i></b>								
Standard deviation of list prices	4.50	4.73	-5%	0.001	2.59	2.67	-3%	0.001
Standard deviation of prices with shipping costs completely charged	4.78	4.73	+1%	NS	2.79	2.67	+5%	0.001
Standard deviation of prices with shipping costs divided among 3 items	4.54	4.73	-4%	0.001	2.61	2.67	-2%	NS
Range of list prices	20.90	20.00	+4%	0.001	14.75	11.82	+20%	0.001
Range with shipping costs completely charged	23.04	20.00	+13%	0.001	14.75	11.82	+20%	0.001
Range with shipping costs divided among 3 items	21.41	20.00	+6%	0.001	14.75	11.82	+20%	0.001

NS: Not Significant at  $p < 0.05$ .

All price levels, range and deviation are in Euros.

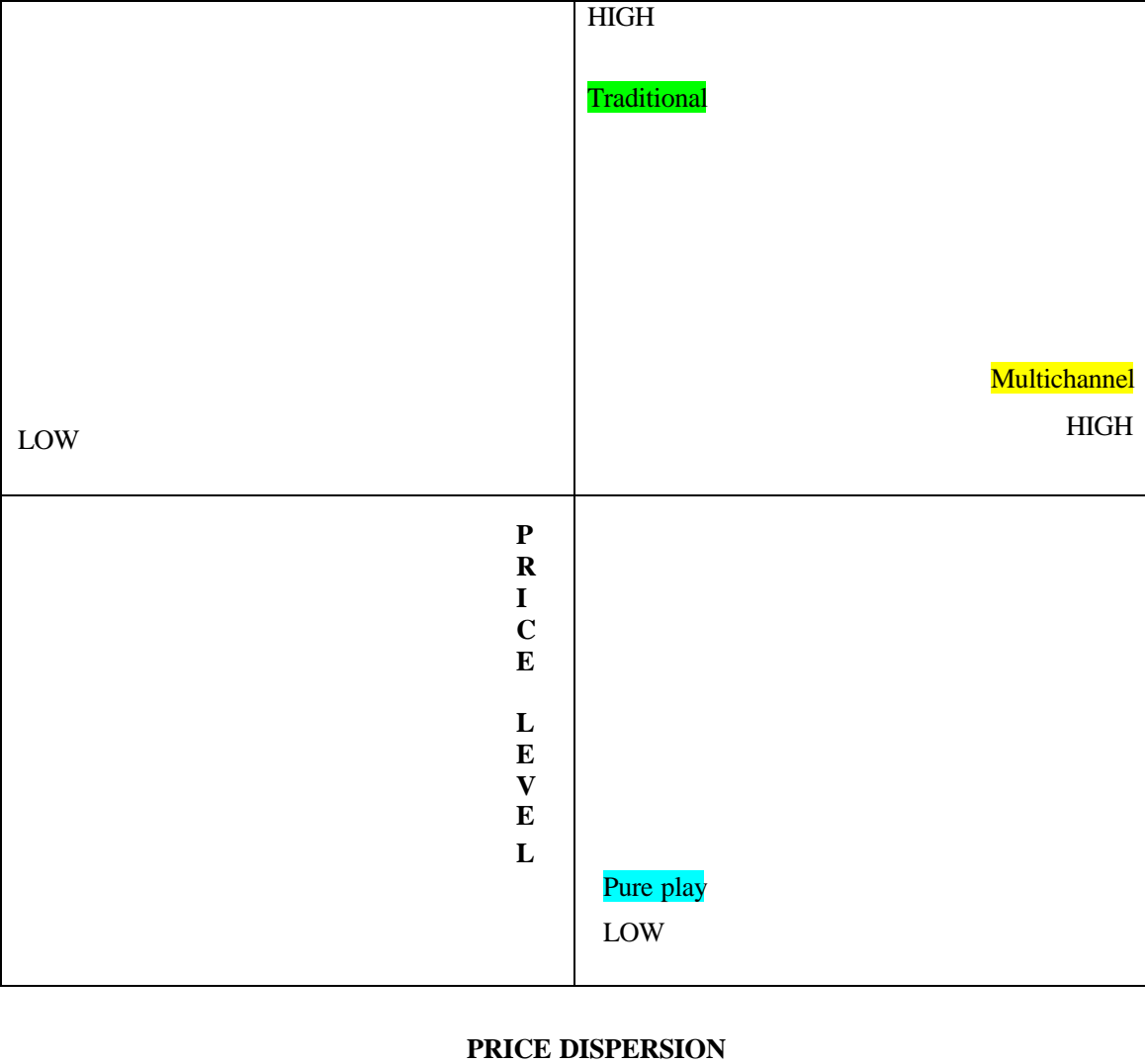
**Table 4: Price Levels and Price Dispersion among Pure Play, Traditional, and Multichannel Retailers for Books**

	<i>Multichannel</i>	<i>Pure play</i>	<i>(Multichannel- Pure play)</i>	<i>P Value</i>	<i>Multichannel</i>	<i>Traditional</i>	<i>(Multichannel- Traditional)</i>	<i>P Value</i>	<i>Pure play</i>	<i>Traditional</i>	<i>(Pure play- Traditional)</i>	<i>P Value</i>
<b><i>Price Levels</i></b>												
List price levels	15.40	14.43	+6%	0.001	15.40	15.67	-2%	0.001	14.43	15.67	-8%	0.001
With shipping costs completely charged	17.68	17.17	+3%	0.001	17.68	15.67	+12%	0.001	17.17	15.67	+9%	0.001
With shipping costs divided among 3 items	16.15	15.39	+5%	0.001	16.15	15.67	+3%	0.005	15.39	15.67	-2%	0.001
<b><i>Price Dispersion</i></b>												
Standard deviation of list prices	4.83	4.26	+13%	0.001	4.83	4.73	+2%	0.001	4.26	4.73	-10%	0.001
Standard deviation of prices with shipping costs completely charged	4.84	4.73	+2%	0.001	4.84	4.73	+2%	0.001	4.73	4.73	0 %	NS
Standard deviation of prices with shipping costs divided among 3 items	4.80	4.35	+10%	0.001	4.80	4.73	+1%	0.001	4.35	4.73	-8%	0.001
Range of list prices	20.00	20.90	-4%	0.001	20.00	20.00	0%		20.90	20	+4%	0.001
Range with shipping costs completely charged	20.43	22.88	-12%	0.001	20.43	20.00	+2%	NS	22.88	20	+14%	0.001
Range with shipping costs divided among 3 items	20.14	21.42	-6%	0.001	20.14	20.00	+1%	NS	21.42	20	+7%	0.001

NS- not significant

All price levels, range and deviation are in Euros.

Figure 1: List Price vs. Standard Deviation



**Figure 2: List Price vs. Price Range**

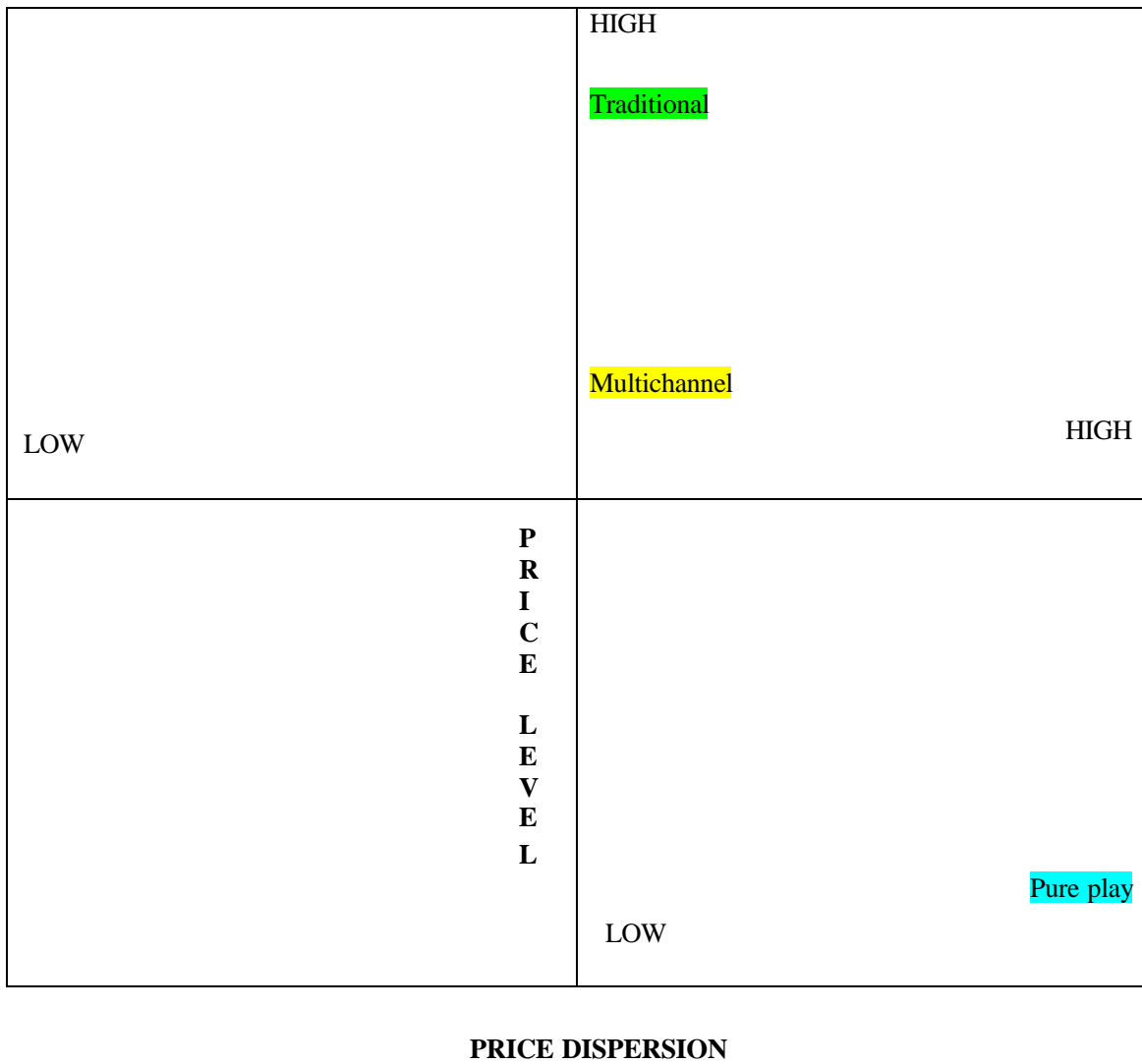


Figure 3: Price with Shipping Costs vs. Standard Deviation

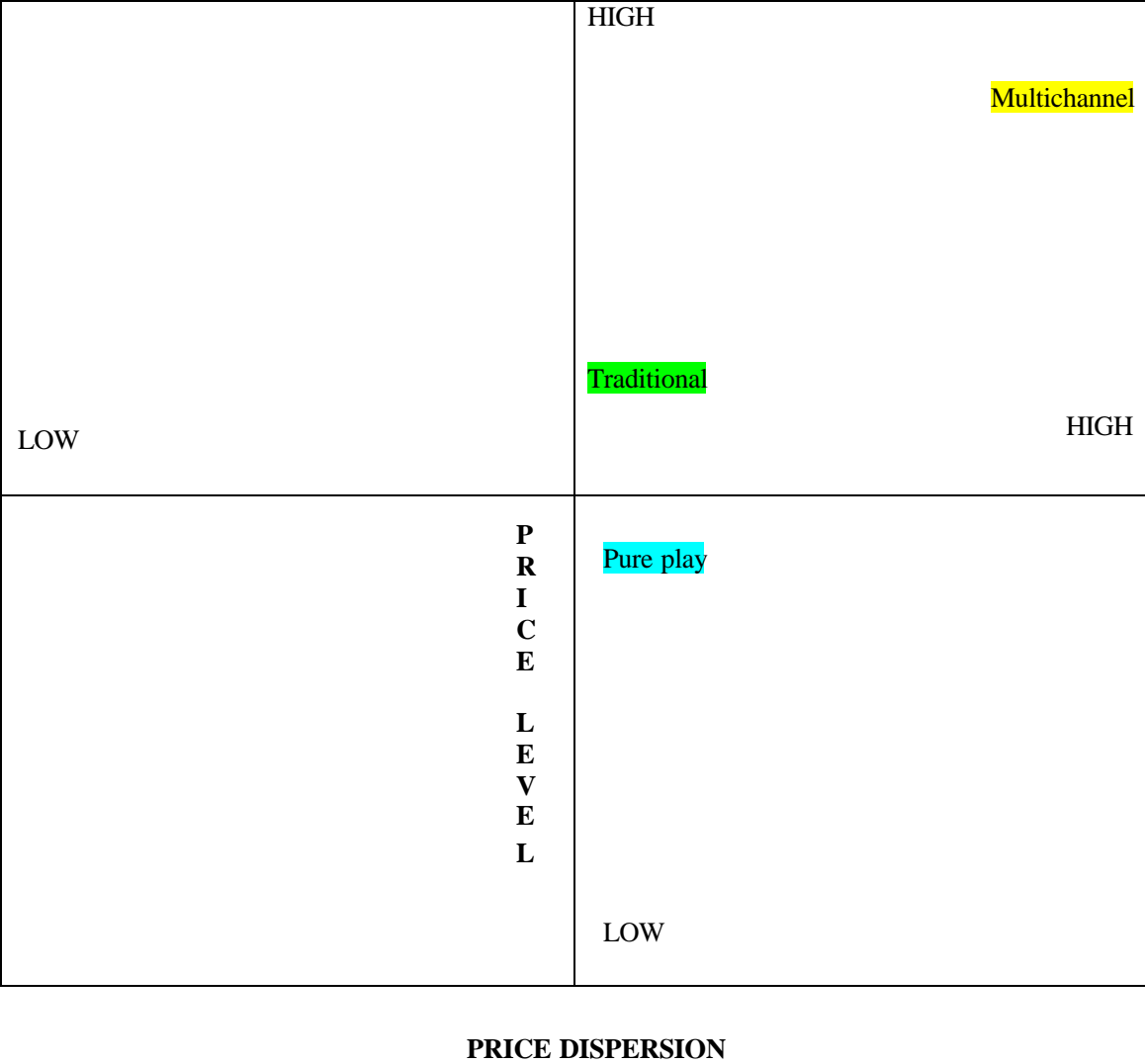


Figure 4: Price with Shipping Costs vs. Price Range

