J Consum Policy
DOI 10.1007/s10603-010-9138-1

ORIGINAL PAPER

# Price and its Relation to Objective and Subjective Product Quality: Evidence from the Austrian Market

**Erich Kirchler · Florian Fischer · Erik Hölzl**

Received: 20 May 2008 / Accepted: 12 May 2010


**Abstract** The correlation between price and product quality is usually found to be low, but still, consumers use a rule of thumb that higher prices indicate higher quality. In the present study, data from the Austrian consumer magazine *Konsument* from 2004 to 2007 were analysed, and price–quality correlations were computed. Results confirm former studies as the overall price–quality relation was positive and statistically significant but small ($r$=.30). It was especially small in the food and beverages sector as well as for cosmetics and for inexpensive products generally. Consumers' subjective beliefs about a price–quality link and product complexity were also analysed. Results show that consumers believe that a high price signals high quality, but that these beliefs are not well calibrated, i.e., not corresponding to the product categories where actually higher price–quality correlations can be found. In sum, the results confirm for the Austrian market that price is a poor signal of quality, and that consumers are hardly aware of the particular product sectors where this signal is more valid.

**Keywords** Price–quality relation · Consumer information · Product information · Product complexity

## Introduction

Consumers are confronted with a wide variety of product information, supplied through advertising and branding, packing and characteristics of the point of sale, the price, and other cues, which enable the formation of preferences and purchase decisions. Consumers are usually seeking high-quality products at reasonable prices and look for information about the quality. Quality is not easy to assess, and in the case of high product complexity

E. Kirchler (✉) · F. Fischer
Faculty of Psychology, University of Vienna, Universitaetsstrasse 7, 1010 Vienna, Austria
e-mail: erich.kirchler@univie.ac.at

E. Hölzl
Department of Economic and Social Psychology, University of Cologne, Cologne, Germany

Published online: 08 June 2010

and the absence of other information, the price is often used as a signal of quality. However, research has shown that the correlation between price and quality as measured in consumer tests is often very low, making price a poor signal to infer quality from. In the present paper, data from Austrian consumer magazines for price–quality correlations were analysed and compared with earlier findings. The consumer perspective by eliciting subjective beliefs about a price–quality link and product complexity was also examined, and these beliefs were compared with objective price–quality correlations.

## Price and Product Quality in Consumer Tests

In many countries, consumer magazines are available that publish product tests. These tests usually cover a set of comparable products from different brands, and they provide information on the market price as well as on the product quality as assessed by a group of experts. The correlation between price and expert-judged quality can be used as an indicator of the relation between price and "objective" product quality. Empirically, these correlations are often found to be low.

Among the first studies, Oxenfeldt (1950) computed rank correlations between price and quality of products tested in Consumer Union reports and found a median positive correlation of $r$=.35; however, correlations varied widely between $r$=−.81 and $r$=.82. Later reviews of the literature confirmed that the average price–quality correlations are positive but rather weak, ranging between $r$=.01 and $r$=.68 (Ratchford et al. 1996). A meta-analysis over nine studies published between 1950 and 1980 found an average correlation of $r$=.31, with no change over time (Tellis and Wernerfelt 1987). Another meta-analysis found an average correlation of $r$=.16 (Hanf and von Wersebe 1994). Overall, these studies show that the correlation between price and "objective" product quality is very weak: High-priced products are not necessarily those that also receive the highest rankings in independent consumer tests, and conversely, there are high-quality products available for low prices.

This overall picture was found in several countries (Imkamp 2004). As one example for the USA, Gerstner (1985) reported correlations of $r$=.19 for non-frequently bought products and $r$=.01 for frequently bought products. Bodell et al. (1986) reported an average of $r$=.17 for Canada and highlighted the similarities with the US market. For Japan, an average correlation of $r$=−.06 was reported (Yamada and Ackerman 1984). For the Netherlands, an average price–quality correlation of $r$=.29 was found (Steenkamp 1988). For Germany, Fürst et al. (2004) found a correlation of $r$=.13, which is on a similar level as the correlations of $r$=.19 and $r$=.22 reported in earlier work for Germany.[1] For Austria, Kollmann (1985) reported a median correlation of $r$=.38. Although in none of these countries the correlation is particularly strong, some degree of variation is observable.

Besides the rather low average price–quality correlation, there is also large variation across product categories. For example, in the German food sector, correlations were found to be even negative, i.e., more expensive products showing on average a lower quality (Schulze et al. 2008). Several moderating factors have been identified. For example, Gerstner (1985) found the price–quality correlation to be stronger for more expensive products; Steenkamp (1988) found it stronger for durables and for products with a larger price range. Meta-analyses showed that the correlation between price and

[1] Note that some studies (Fürst et al. 2004; Schulze et al. 2008) use negative correlation signs as indicating that high price corresponds to high quality; the signs have been adapted here for comparability.

quality is stronger for products where consumers have more information, e.g., when products induce more search behaviour because the price range is larger, or when products can be easily inspected because they are unpackaged, or when product experience is extended over time because products are durable (Tellis and Wernerfelt 1987). Similarly, the correlation was found to be stronger for products where consumers can recognize quality more easily (Hanf and von Wersebe 1994); in particular, it increases with visibility, search costs, and prestige. For more complex products, therefore, it can be assumed that the correlation is weaker.

Several interpretations have been offered for the weak relation between price and "objective" quality. One line of argument sees the weak price–quality correlations as an indicator of imperfect markets, stating that in perfect markets, competition and consumer learning should eradicate high-price/low-quality products; the other line asks whether prices are valid cues for consumers to judge quality. The first view, low correlations indicating market failure, was put forward by several authors (e.g., Morris and Bronson 1969). It has been criticized, however, that market efficiency should be judged on occurring losses, and it was shown that the price–quality correlation is not a measure of losses (Ratchford et al. 1996), and other measures may be more appropriate. In particular, it has been criticized that studies on the price–quality correlation do not consider the number of transactions that occur (Imkamp 2003; Ratchford et al. 1996; Yamada and Ackerman 1984). If more transactions occur for products that offer a fit between price and quality, outliers (e.g., a high-price/low-quality product) are less influential; therefore, transaction-weighted correlations should be considered. Recently, the market failure argument was also criticized on a fundamental point, i.e., that prices are in the first place indicators of scarcity, not quality, and that therefore, from a consumer perspective, low correlations can be seen as favourable (Imkamp 2008).

The second view is less controversial: The low correlations imply that consumers using price as a cue to product quality are likely to err. In addition, it has been shown that choosing a high-price product also does not reduce the *risk* of getting a low-quality product (Hjorth-Andersen 1992). However, product quality is not a unidimensional concept, and consumers may use price as a cue for specific facets of quality (Brucks et al. 2000). It has been noted (Hjorth-Andersen 1992; Imkamp 2004) that consumer tests usually focus on measurable, objective characteristics and are therefore only an indicator for some aspects of product quality. More subjective aspects, such as prestige or design, are not contained. In addition, studies on the correlation between price and quality usually do not consider selling success of brands or search costs. Because search costs may be higher for particularly good offers, because brands with solid value-for-money may be more successful, and because products may also profit from image, the correlation between price and *subjective* quality may be considerably higher than suggested by these studies (Imkamp 2003, 2004). Still, if consumers want to receive good product quality as it is conceptualized by consumer reports, price remains a weak cue on which they should not rely.

From a consumer policy perspective, it would be reassuring if price would be a better cue at least for expensive product categories; however, previous research has shown that the price–quality correlation is only weakly related to price level (Hanf and von Wersebe 1994). It would also be reassuring if consumers would be aware that price and quality do not necessarily correspond and if they were able to correctly identify those product categories where the correlation between price and objective product quality is higher. It is therefore relevant to explore consumers' beliefs about the link between product quality and price.

## Price and Product Quality from the Consumers' Perspective

Consumers often use price as a cue to judge product quality. In a classical study, Leavitt (1954) showed that price is used to infer quality if a variation in quality was assumed for that product. This is reflected in folk wisdom like "you get what you pay for" or in the use of a "expensive=good heuristic" (Cialdini 2001). In a meta-analysis of 36 studies, a positive relation between price and perceived quality was confirmed (Rao and Monroe 1989). This relation was moderately large ($r$=.34, $\eta^2$=.12); it was stronger for within-subjects designs and when the price range of products was larger, i.e., when comparability was easier. Interestingly, no effect of price level was found. A more recent meta-analysis (Völckner and Hofmann 2007) confirmed a positive, moderately strong relation ($r$=.27) between price and perceived quality. It was stronger for within-subjects designs, for durable goods, and for more expensive goods and weaker for goods consumers were familiar with. It was also stronger for European countries than for North American countries. In surveys, consumers also directly express the belief that the price of a product is positively linked to its quality, and more so for durable goods (Boyle and Lathrop 2009; Lichtenstein and Burton 1989). It has been suggested that using price to judge quality can be a time-saving heuristic, and that consumers apply this heuristic especially if product complexity is high, as is the case for pharmaceuticals or cosmetics (Kirchler 2003). Product complexity here refers to the fact that components or ingredients and their working mechanisms are difficult to understand and intransparent for laypersons; obtaining understanding would entail disproportionate effort. Product complexity seems particularly relevant considering the current markets where products become equipped with more and more functions, or new technologies like genetic engineering, make it more difficult for consumers to understand production. The assumption of consumers relying more on price for more complex products is in line with the findings that the link between price and perceived quality is weaker for familiar products (Völckner and Hofmann 2007). Consumers should therefore express a greater belief in a price–quality link for complex products.

If consumers believe that price is a cue for quality in certain domains, and if the validity of this cue for objective product quality varies across domains, the crucial question is whether consumers are well calibrated, i.e., whether they believe in this relation in the correct product categories. Studies on this calibration found that on average, correspondence between the price–quality correlation in product tests and the subjective beliefs of respondents is positive, but not particularly strong; it also differs between durable and non-durable goods (Boyle and Lathrop 2009; Lichtenstein and Burton 1989). This indicates that consumers have difficulties to identify those product categories where they could use the price of a product as a cue to its quality.

In the present study, two main research questions, one more economic and one more psychological, were examined. First, given the variation in price–quality correlations across countries, this issue for the Austrian market was re-examined. Data on prices and product quality were used, judged by experts and published in the Austrian consumer magazine *Konsument*; the correlations for different product categories and for different price levels were examined; and the results were compared with previous findings presented in the literature. Second, consumers' beliefs about the link between price and quality for different products and their beliefs about the complexity of these products were examined. These data were used to examine whether consumers believe that complex products show a higher price–quality link and to compare these beliefs with the results from the consumer tests where more complex products are expected to show a lower price–quality correlation. Finally, calibration was examined, i.e., the correspon-

dence between consumers' beliefs about the price–quality link and the consumer tests' price–quality correlations.

## Price–Quality Relations in Consumer Tests in the Austrian Market

### Method

Data were taken from 37 issues of the consumer magazine *Konsument* (www.konsument.at) in the period from November 2004 to November 2007. In these product tests, for each brand, the average price indicated in various stores (per unit or quantity, e.g., 1 kg, 1 L, or 100 ml) and overall objective quality, defined as average judgment of experts, were indicated. Quality was measured in various product attributes and finally summarized in ratings ranging from 1 (very good) to 5 (not satisfactory) and in a percentage rating (0% to 100%=excellent). Products within each test were ranked according to their overall quality.

The data set consisted of 210 product tests, involving 2,277 brands. The product tests were categorised in eight categories by the editors of the consumer magazine: (a) cars and transport, (b) construction and energy, (c) photography and music, (d) computers and telephone, (e) food and beverages, (f) leisure time and family, (g) health and cosmetics, and (h) home and garden.

Owing to the fact that in the 37 issues of the magazine *Konsument* for some product categories fewer than ten tests were available, tests were added from issues published before November 2004 in order to have at least ten product tests for each product category. Moreover, product tests involving fewer than four brands and tests on products without indication of prices or total quality were excluded.

The price–quality correlation was computed as Spearman rho correlation between the reported price and the expert-judged quality expressed as the rank of each brand within a product test. First, the correlations between price and quality within all 210 product tests were computed. Second, the average correlation within the eight product categories was computed, and third, the average correlation of all product categories was calculated. In each case, correlations were Fisher's $z$-transformed, averaged, and back-transformed, as suggested by Bortz (1999).[2]

### Results

Correlations of prices and quality of brands varied considerably, from $r=-.89$ to $r=1.00$. Only 40 correlations (i.e., 19%) were positive and statistically significant at level $p=.05$; seven correlations (3%) were significant but negative. Figure 1 shows the frequency distribution of categorized correlations; it is skewed to the positive side.

Average correlations within product categories are presented in Table 1. Correlations vary considerably from $r=.06$ for health products and cosmetics and $r=.07$ for food and beverages to $r=.58$ for products in the computer and telephone sector. Figure 2 shows the correlations of product tests by product category and the average correlation for each of the eight product categories.

On average, the correlation of all eight product categories amounts to $r=.30$, which indicates a significant but moderate relation between price and quality. As analyses on the level of product tests and product categories show, however, correlations vary from

[2] Due to Fishers's $z$-transformation, two product tests had to be excluded.

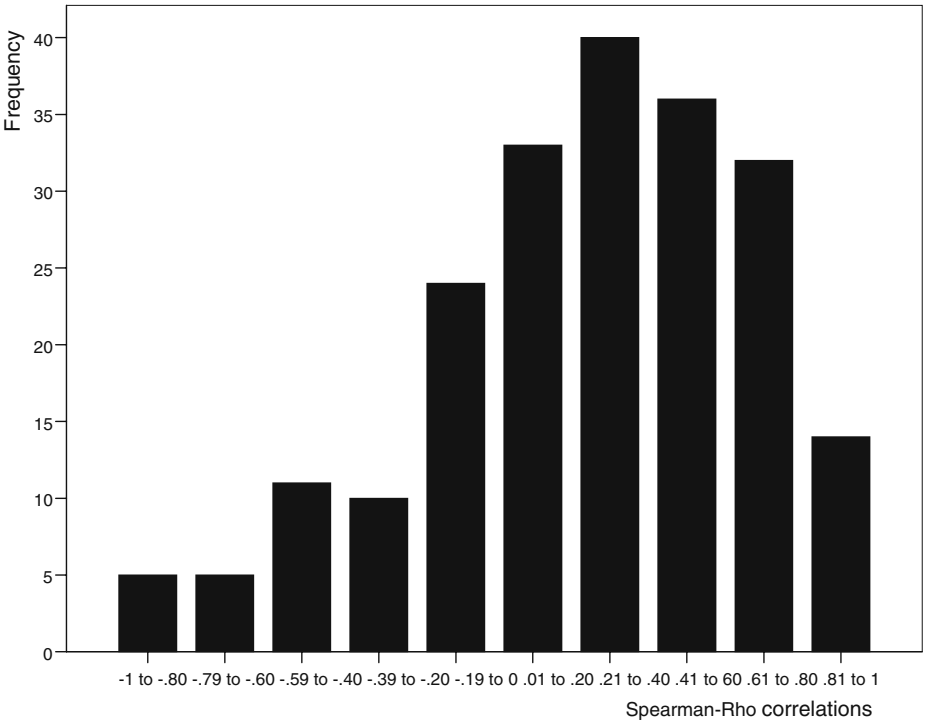


**Fig. 1** Distribution of price–quality correlations in the Austrian market

significantly negative to significantly positive, and they are predominantly insignificant, so that the average correlation of $r$=.30 cannot be considered representative for all products.

Comparing these results with earlier results from Austria, the overall price–quality correlation seems to have declined slightly. Kollmann (1985) found 26 out of 60 (43%) product tests to show a significantly positive correlation, compared with 40 out of 210 (19%) in the present study. Also, the overall correlation of $r$=.38 (Kollmann 1985) was higher than the $r$=.30 in the present study. Regarding product categories, there are

**Table 1** Price–quality correlations in the Austrian market, by product category

| Product category | *n* brands | *n* product tests | *r* | *p* |
|---|---|---|---|---|
| (a) Car and transport | 257 | 19 | .34 | <.01 |
| (b) Construction and energy | 174 | 16 | .13 | .09 |
| (c) Video, camera, music | 269 | 19 | .42 | <.01 |
| (d) Computer and telephone | 218 | 15 | .58 | <.01 |
| (e) Food and beverages | 272 | 25 | .07 | .24 |
| (f) Leisure and family | 408 | 40 | .24 | <.01 |
| (g) Health and cosmetics | 320 | 38 | .06 | .25 |
| (h) Home and garden | 351 | 36 | .42 | <.01 |
| Overall | 2,269 | 208 | .30 | <.01 |

*r* Spearman rho correlation

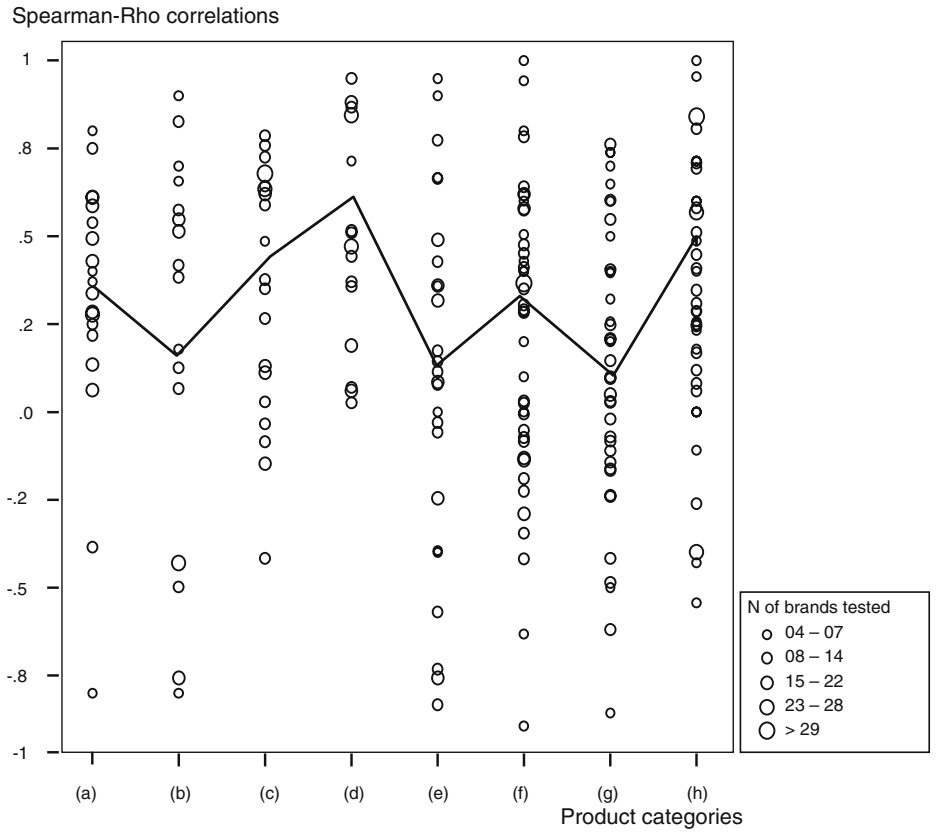


**Fig. 2** Price–quality correlations in the Austrian market, by product category. Note: The *solid line* represents average correlations in the eight product categories: (*a*) car and transport, (*b*) construction and energy, (*c*) video, camera, and music, (*d*) computer and telephone, (*e*) food and beverages, (*f*) leisure and family, (*g*) health and cosmetics, and (*h*) home and garden

important caveats: Products are difficult to compare over a 20-year period (e.g., computers and mobile phones), some categories were not represented in Kollmann (1985; e.g., food and beverages or health and cosmetics), and category results also depend on the particular product tests conducted in the period under examination. A cautious interpretation would be that in both studies, the correlation in high-tech categories was stronger than in other categories, e.g., $r$=.55 for entertainment electronics (Kollmann 1985) versus $r$=.42 for video, camera, and music and $r$=.58 for computer and telephone in the present study.

Comparing these results with recent studies in Germany—being the largest trading partner for Austria—it is noteworthy that the average correlation in Austria seems to be stronger. Both the present $r$=.30 and the past $r$=.38 (Kollmann 1985) are higher than the $r$=.13, $r$=.22, and $r$=.19 reported by Fürst et al. (2004). Similarities between the German and the Austrian market can be seen in the low correlations for the food and beverages sector, $r$=.02 (Fürst et al. 2004) and $r$=−.12 (Schulze et al. 2008) versus $r$=.07 in the present study, and for the health and cosmetics sector, $r$=−.04 (Fürst et al. 2004) versus $r$=.06 in the present study. In both countries, comparatively strong correlations were found

in the category home and garden, $r$=.26 (Fürst et al. 2004) versus $r$=.42 in the present study.

One research question related to price level of products, i.e., whether the price–quality correlation is stronger when the costs for a product are higher. For instance, for food and beverages, neither our study nor other studies showed a strong price–quality correlation, and food is usually on a low-cost level. Hanf and von Wersebe (1994)) found stronger correlations for more expensive products, and Tellis and Wernerfelt (1987) found stronger correlations for durables with a higher price range. For the present study, product tests involving products which cost 10€ or less were separated from product tests involving products which cost 10.1 to 100€, 100.1 to 500€, 500.1 to 1,000€, and 1,000.1€ or more, and the average price–quality correlations were computed separately for each cost category. As shown in Table 2, correlations are different depending on the cost category: The higher the costs, the higher the correlation between price and objective quality. The increasing pattern, however, discontinued for products costing more than 1,000€. These findings are in line with previous findings (Gerstner 1985; Hanf and von Wersebe 1994), but also suggest a curvilinear relation.

## Consumers' Subjective Beliefs about Product Complexity and Price–Quality Links

### Method

Overall, 41 consumers completed a questionnaire on their beliefs about the link between price and product quality and about product complexity, covering the 136 products contained in the 208 product tests analysed above. Average age of respondents was 32.6 years (SD=14.4); 56% were male, and 44% were female.

For assessing *subjective product complexity*, respondents had to rate each product on a five-point scale ranging from "The product is very easy/transparent" to "The product is very complex/intransparent." For assessing the *subjective price–quality link*, respondents had to rate each product on a five-point scale ranging from "A high price indicates very poor quality" to "A high price indicates very good quality;" the midpoint of this scale was explained as "Price is unrelated to quality." It should be noted that responses from the questionnaire were only used on the aggregate level, i.e., as indicating an average belief

**Table 2** Price–quality correlations, by price category

| Price category | $n$ brands | $n$ product tests | Percent of brands tested | $r$ | $p$ |
|---|---|---|---|---|---|
| <10€ | 618 | 59 | 28.4 | −.01 | .75 |
| 10.1–100€ | 625 | 62 | 29.8 | .31 | <.01 |
| 100.1–500€ | 658 | 54 | 26.0 | .47 | <.01 |
| 500.1–1,000€ | 196 | 18 | 8.7 | .53 | <.01 |
| >1,000€ | 172 | 15 | 7.2 | .25 | <.01 |

$r$ Spearman rho correlation

about a specific product, and therefore, the number of respondents was considered sufficient to provide a stable estimate.

## Results

In a first step, the subjective beliefs about product complexity and the price–quality link (Table 3) were analysed. Regarding subjective product complexity, respondents judged the products as moderately easy and transparent ($M$=2.59, SD=0.38 on a five-point scale). Complexity judgments differed across product categories: The most complex products were assumed to be video and photo cameras and music items ($M$=3.06, SD=0.30), whereas food and beverages were judged to be the least complex ($M$=2.19, SD=0.24). The subjective price–quality link, on average, was moderately strong ($M$=3.67, SD=0.29 on a five-point scale), i.e., on average, respondents expressed the belief that a high price indicates good quality. Variation across product categories was small: While the strongest link was assumed to be in the car and transport sector ($M$=3.87, SD=0.40), the weakest link was assumed in the food and beverages sector ($M$=3.52, SD=0.27). Beliefs about product complexity and price–quality link were, on average, positively correlated (Spearman $r$=.22): On average, respondents therefore stated that more complex products also show a stronger link between price and quality. However, this pattern was very heterogeneous across product categories. Whereas the correlation was positive for the food and beverages sector and the home and garden sector ($r$=.51 and $r$=.50), it was negative for the car and transport and the computer and telephone sector ($r$=−.57 and $r$=−.43). This indicates that consumers' beliefs are not generalized.

In a second step, the correspondence between these subjective beliefs and the results from the consumer tests (Table 4) were analysed. On average, the correlation between consumers' beliefs about product complexity and consumer test results on the price–quality correlation was positive ($r$=.14, $p$=.04). More complex products therefore seem to exhibit a slightly stronger price–quality correlation, but this needs to be qualified by the large variation across product categories ($r$=−.38 in construction and energy to $r$=.32 in food and beverages).

**Table 3** Subjective beliefs about product complexity and price–quality link

| Category | $n$ | Subjective product complexity | | Subjective price–quality link | | $r$ | $p$ |
|---|---|---|---|---|---|---|---|
| | | $M$ | SD | $M$ | SD | | |
| (a) Car and transport | 19 | 2.76 | 0.37 | 3.87 | 0.40 | −.57 | .01 |
| (b) Construction and energy | 16 | 2.99 | 0.39 | 3.56 | 0.25 | −.18 | .50 |
| (c) Video, camera, music | 19 | 3.06 | 0.30 | 3.74 | 0.24 | .33 | .17 |
| (d) Computer and telephone | 15 | 2.98 | 0.21 | 3.79 | 0.21 | −.43 | .11 |
| (e) Food and beverages | 25 | 2.19 | 0.24 | 3.52 | 0.27 | .51 | .01 |
| (f) Leisure and family | 41 | 2.44 | 0.15 | 3.78 | 0.28 | .05 | .75 |
| (g) Health and cosmetics | 37 | 2.45 | 0.26 | 3.54 | 0.20 | −.03 | .87 |
| (h) Home and garden | 36 | 2.50 | 0.25 | 3.63 | 0.24 | .50 | <.01 |
| Overall | 208 | 2.59 | 0.38 | 3.67 | 0.29 | .22 | <.01 |

Estimates for each product are based on responses by 41 consumers

$n$ product tests, $r$ Spearman rho correlation

**Table 4** Correspondence between price–quality correlations in consumer test results and subjective beliefs

| Category | *n* | Subjective product complexity | | Subjective price–quality link | |
|---|---|---|---|---|---|
| | | *r* | *p* | *r* | *p* |
| (a) Car and transport | 19 | .01 | .98 | .24 | .32 |
| (b) Construction and energy | 16 | −.38 | .15 | .30 | .26 |
| (c) Video, camera, music | 19 | .26 | .29 | .21 | .40 |
| (d) Computer and telephone | 15 | .17 | .54 | .05 | .85 |
| (e) Food and beverages | 25 | .32 | .11 | .57 | .00 |
| (f) Leisure and family | 41 | −.20 | .21 | −.10 | .52 |
| (g) Health and cosmetics | 37 | −.33 | .05 | −.13 | .45 |
| (h) Home and garden | 36 | .19 | .26 | .33 | .05 |
| Overall | 208 | .14 | .04 | .23 | <.01 |

Estimates for each product are based on responses by 41 consumers

*n* number of products, *r* Spearman rho correlations

Finally, calibration of consumers, i.e., the correlation between subjective beliefs about the price–quality link and consumer test results on the price–quality correlation, was positive ($r$=.23, $p$<.01). On average, consumers seem, to some extent, to recognize those products where consumer tests verify a positive relation between price and quality. To embed our findings with previous research, the data from five studies presented in related articles (Boyle and Lathrop 2009; Lichtenstein and Burton 1989) were reanalyzed to make them comparable.[3] In these studies, 15 to 18 product tests were used and examined for correspondence between objective and perceived price–quality relations. Our reanalysis yielded correlations of $r$=.15, $r$=.20, $r$=.25, $r$=.30, and $r$=.30. Overall, these levels of calibration are similar to the overall level found in the present study.

However, when broken down in product categories, again large variation can be found, and the only large correlation occurs in the food and beverages sector. Also, the overall correlation of $r$=.23 would translate in only 4% explained variance. These results indicate that consumers are not able to correctly identify those products where consumer tests indicate a positive price–quality relation.

## Discussion

The results of the present study suggest that for Austrian markets, price is not a reliable signal of quality which consumers should use. Our results are in line with previous findings from the beginning of price–quality correlation studies (e.g., Morris and Bronson 1969; Oxenfeldt 1950) until the present (Fürst et al. 2004; Schulze et al. 2008); in most of these studies, correlations are positive but low and most frequently occur between $r$=.20 and $r$=.30 (Hjorth-Andersen 1992). In the present study, for the Austrian market, the average correlation between price and quality was moderately positive ($r$=.30), ranging from highly negative to highly positive across different product tests. It was especially small in the food

[3] Lichtenstein and Burton (1989) used classified values of price–quality relations (positive, near-zero, and negative) for their calculations; our reanalysis used the precise values.

and beverages sector as well as for cosmetics and inexpensive products. For more expensive products, the correlation increased. The average correlation in the present study was lower than in an earlier study in Austria (Kollmann 1985), but higher than in Germany (Fürst et al. 2004). Given the average correlation of $r$=.30, only 9% of quality variance can be explained by price variance. Consumers using price as an indicator for product quality, as measured in consumer tests, are therefore likely to make mistakes.

From a consumer perspective, subjective beliefs about price–quality relations are more positive. The results of the present study, in line with earlier research (e.g., Lichtenstein and Burton 1989), show that consumers believe that a high price usually indicates high quality, with little variation across product categories. Consumers also believe that, on average, for more complex products, the price–quality link is slightly stronger ($r$=.22), although the results are heterogeneous across product categories. Bringing these beliefs into connection with the results on the correlation between price and objective product quality, more complex products on average show a slightly larger price–quality correlation, but this correspondence ($r$=.14) again is heterogeneous across product categories. Finally, calibration of consumers, i.e., the correspondence between subjective beliefs about a price–quality link and the price–quality correlations from the consumer tests, on average was positive ($r$=.23), but varied widely across product categories. To summarize, consumers do believe that price signals quality but do not to have a correct understanding about when and for what particular product categories the price could—to some extent—be used as a signal of quality. Consumers seem to be aware of considerable product-to-product variation in price–quality relations, but they fail to indicate the particular product sectors for which prices are positively related to quality. Consumers' rule of thumb "price indicates quality" is likely to lead to suboptimal purchase decisions.

There are several problems with respect to measurement of price–quality relations which limit the conclusions drawn from former as well as the present studies. The first problem is the definition of quality (e.g., Hjorth-Andersen 1992; Imkamp 2004). Testing agencies examine only product characteristics that are amenable to quality measurement. While this may be adequate for some commodities, there are serious shortcomings when consumers' decisions depend on their taste in style and design, image of the company, and other subjective aspects (Imkamp 2008). For some commodities, especially prestige products, the price itself even may become a property to be demanded. The second problem is with international comparisons. Due to differences in the product portfolio, comparisons of product categories are difficult, even within the same country over time (Fürst et al. 2004). Results on the price–quality correlation are to some degree heterogeneous across countries, and the reasons for this variation still need to be explored. The third problem is the measurement of consumers' beliefs. When surveyed whether price indicates quality, consumers may become aware that this is not always the case and qualify their responses. However, in a purchasing situation, this rule of thumb may become more influential because it is time saving and socially accepted.

Implications for consumer policy can be seen as twofold. On one hand, consumer protection agencies might think about ways of making it easier for consumers to identify those products with good value-for-money, i.e., those products that contribute to a stronger correlation. However, as Imkamp (2008) points out, a stronger correlation may not be desirable if higher prices signal scarcity. On the other hand, consumers may be educated in the sense of being made aware of the rules of thumb they use in purchase decisions and the limits of these heuristics. In particular, they may be made aware that price is not a good signal for "objective" product quality. Testing agencies and consumer magazines could contribute to this goal by including correlation results in their reports.

## References


Bodell, R. W., Kerton, R. R., & Schuster, R. W. (1986). Price as a signal of quality—Canada in the international context. *Journal of Consumer Policy, 9*(4), 431–444.

Bortz, J. (1999). *Statistik für Sozialwissenschaftler* (5th ed.). Berlin: Springer.

Boyle, P.-J., & Lathrop, E.-S. (2009). Are consumers' perceptions of price-quality relationships well calibrated? *International Journal of Consumer Studies, 33*(1), 58–63.

Brucks, M., Zeithaml, V. A., & Naylor, G. (2000). Price and brand name as indicators of quality dimensions for consumer durables. *Journal of the Academy of Marketing Science, 28*(3), 359–374.

Cialdini, R. B. (2001). *Influence. Science and practice* (4th ed.). Boston: Allyn & Bacon.

Fürst, R. A., Heil, O. P., & Daniel, J. F. (2004). Die Preis-Qualitäts-Relation von deutschen Konsumgütern im Vergleich eines Vierteljahrhunderts. *Die Betriebswirtschaft, 64*(5), 538–549.

Gerstner, E. (1985). Do higher prices signal higher quality? *Journal of Marketing Research, 22*(2), 209–215.

Hanf, C.-H., & von Wersebe, B. (1994). Price, quality, and consumers' behaviour. *Journal of Consumer Policy, 17*(3), 335–348.

Hjorth-Andersen, C. (1992). Alternative interpretations of price-quality-relations. *Journal of Consumer Policy, 15*(1), 71–82.

Imkamp, H. (2003). Der Preis - ein schlechter Qualitätsindikator? Ältere Befunde aus heutiger Sicht neu bewertet. *Die Betriebswirtschaft, 63*(4), 378–384.

Imkamp, H. (2004). Mangelnde Funktionsfähigkeit von Konsumgütermärkten? *Jahrbuch für Wirtschaftswissenschaften, 55*(1), 106–125.

Imkamp, H. (2008). A new look at old coefficients. The price-quality relationship re-evaluated. *Journal of Consumer Policy, 31*(2), 139–145.

Kirchler, E. (2003). *Wirtschaftspsychologie* (Economic Psychology, 3rd edition). Göttingen: Hogrefe.

Kollmann, K. (1985). Funktionieren die Konsumgütermärkte in Österreich? *Jahrbuch der Absatz- und Verbrauchsforschung, 3*, 252–261.

Leavitt, H. J. (1954). A note on some experimental findings about the meanings of price. *The Journal of Business, 27*(3), 205–210.

Lichtenstein, D. R., & Burton, S. (1989). The relationship between perceived and objective price-quality. *Journal of Marketing Research, 26*(4), 429–443.

Morris, R. T., & Bronson, C. S. (1969). The chaos of competition indicated by consumer reports. *The Journal of Marketing, 33*(3), 26–34.

Oxenfeldt, A. R. (1950). Consumer knowledge: Its measurement and extent. *The Review of Economics and Statistics, 32*(4), 300–314.

Rao, A. R., & Monroe, K. B. (1989). The effect of price, brand name, and store name on buyers perceptions of product quality—an integrative review. *Journal of Marketing Research, 26*(3), 351–357.

Ratchford, B. T., Agrawal, J., Grimm, P. E., & Srinivasan, N. (1996). Toward understanding the measurement of market efficiency. *Journal of Public Policy & Marketing, 15*(2), 167–184.

Schulze, H., Spiller, A., Böhm, J., & de Witte, T. (2008). Ist Geiz wirklich geil? Preis-Qualitäts-Relationen von Hersteller- und Handelsmarken im Lebensmittelmarkt. *Agrarwirtschaft, 57*(6), 299–310.

Steenkamp, J.-B. E. M. (1988). The relationship between price and quality in the marketplace. *De Economist, 136*(4), 491–507.

Tellis, G. J., & Wernerfelt, B. (1987). Competitive price and quality under asymmetric information. *Marketing Science, 6*(3), 240–253.

Völckner, F., & Hofmann, J. (2007). The price-perceived quality relationship: A meta-analytic review and assessment of its determinants. *Marketing Letters, 18*(3), 181–196.

Yamada, Y., & Ackerman, N. (1984). Price-quality correlations in the Japanese market. *Journal of Consumer Affairs, 18*(2), 251–265.