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## **Does the classification of intangibles matter? An equivalence testing**

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### **Abstract**

Many studies confirm that intangibles have future economic benefits included in them. This study examined whether analysts consider intangibles to be similar in economic value, regardless of the accounting treatment assigned to them. It conducted four experiments by providing 26 analysts with future earnings potentials, and asking them to forecast stock prices for three companies over three firms' continuous years. One firm had an internally produced brand, the second company had a bought brand, and the third firm had an internally produced brand and bought brands. These three firms were used in four forecasting environments designed for this study. Each forecasting environment constituted an experiment. Each forecasting environment differed, with capital market information specific to each firm. Provided with this information, the analysts forecast stock prices for the three firms in each of the four experiments. Comparing the forecast stock prices, the study found that the two brand classes had similar influence on analysts' stock pricing forecasts, to infer them as equivalent in economic value, in each of the four forecasting environments.

Keywords: analysts; disclosure; intangibles; transparency.

## **1. Introduction**

Penman (2009) argues that although accounting is criticised for showing some intangibles only on the balance sheet, such criticism has little basis as the income statement can help in ascertaining the value of intangibles. Penman points out that the value of intangibles can be measured directly or indirectly by capitalising the earnings, because the difference between market value and book value is the same across reporting periods. Longren (2009) extends this proposition by proposing top-down residual methodology (TDRM) as a technique to measure the value of intangibles. Beginning with the market value of the firm, the TDRM removes the value of tangibles and measurable intangibles from it to arrive at the value of unmeasurable intangibles. Longren notes that a perceived difficulty is obtaining market value of measurable assets, which can increase the variation in measurement error. Such measurement error can be decreased by ascertaining the discounted cash flows or capitalised earnings. Hunter, Webster, and Wyatt (2012) show that the distinction between measurable and non-measurable intangibles is supportable on the basis of property rights, but not on economic grounds. This raises the question—regardless of the technique used to measure the value of intangibles—of whether analysts will conclude that that intangibles shown on the balance sheet and those not shown on the balance sheet because of accounting rules, but having the same earnings potential, have an equivalent value.

Many research studies show that firms investing in intangibles such as brands and staff increase productivity (OECD, 2011). However, firms often disclose about these intangibles with narratives and visuals in annual reports and other public documents. For instance, a firm can make comments about its brands, and how it serves consumers by consistently meeting their expectations. Brands are a source of competitive advantage to sell products and services across geographies. Many studies have shown that intangibles such as brands contain future

economic benefits (for a review, see Zeghal and Maaloul, 2011). Nevertheless, it is seldom that firms disclose expected earnings arising from such intangibles in annual reports.

If a firm makes a separate acquisition of an intangible (i.e., “bought”), the cost will be capitalised (IAS 38, paras. 25–31) whereas if the cost pertains to an internally produced intangible, the cost is often expensed as incurred (IAS 38, paras. 51–64). However, when an intangible is bought separately, the uncertainty about future economic benefits is generally lower (e.g., an already developed brand) compared to an intangible currently being developed (e.g., brand being developed), which to some extent justifies the different accounting treatments. Luft and Shields (2001) found that intangibles being entirely expensed decreased individuals’ capability in accurate profit predictions as it diminished the self-insight, consistency, and consensus among individuals. Thus, the two classes of intangibles may not be fully comparable in forecasting future economic benefits arising from them, and this needs to be investigated.

The impact of the treatment of intangibles in financial accounting and reporting can lead to a difference in how analysts notice financial performance and economic wealth in firms from annual reports (Demers, 2002). This is because accounting explains that expenses have no separably identifiable future economic benefits, whereas assets do. Empirical evidence, however, shows that intangibles have future economic benefits, whether the cost of an intangible is an expense or an asset (Penman, 2009).

Since expensing intangibles can decrease the accuracy of future predictions of profits (Luft and Shields, 2001), firms can help analysts to overcome this difference in view stemming from the principles of accounting, by disclosing future economic benefits in narrative and visual forms. Such reporting, although it helps users to understand that intangibles have future economic benefits, does not quantify those benefits. This study conducted four

experiments to find out whether firms' providing earnings forecasts about intangibles can resolve the difference in view about intangibles produced within the firm and intangibles bought from outside. The participants chosen for these experiments were analysts because they would be able to respond to the scenarios provided using their real-life experience.

This study expected analysts to decide the value of an intangible by its future economic worth rather than by using the principles of accounting, because of their practical experience in evaluating firm performance. Analysts would then decide that the class of intangibles has no practical implications. If an intangible produced within the firm and a bought intangible have identical expected earnings, then analysts should treat them as similar in producing economic worth when forming their stock pricing forecasts.

This study tells whether firms' providing expected cash flow forecasts about intangibles can remove differences in views about classification of intangibles possibly held by analysts. Second, it tells policy makers to think about whether firms should provide earnings forecasts of internally produced and bought intangibles. Third, it shows an application of equivalence testing.

The paper continues as follows. Section 2 presents the design of experiments and how they were conducted. The literature review and statement of the hypothesis to be tested are outlined in Section 3. Section 4 presents a brief review of equivalent testing. Section 5 presents results, followed by a discussion. The final section provides concluding remarks.

## **2. Research method**

### **Participants**

The 26 analysts who took part in the study were analysts working in stockbroking firms licensed by the Colombo Stock Exchange in Sri Lanka. Seven were females. All participants routinely analyse information about firms and make stock forecasting decisions in their jobs. Most analysts had remained in the role for an average of three years (standard deviation 3.59). Hunton, Libby, and Mazza (2006), and Libby, Bloomfield, and Nelson (2002) encourage using experienced people as participants, as they have learned the costs and benefits of making decisions, but experience alone and analysts' forecast accuracy have yielded inconclusive results in prior studies. Although Clement (1999) found analysts' firm-specific experience to be related to forecasting accuracy, Jacob, Lys, and Neale (1999) found no such relationship. The participants in this study with job titles comprised 19 analysts, two analyst research managers, four heads of research analysts, and one analyst CEO. All participants were involved in analysing stocks and forecasting stock prices in their firms. Except for three who have a high school certificate, the participants have one or more formal-education qualifications: 13 participants have a bachelor's degree, six have a master's degree along with a bachelor's degree, 16 have a professional accounting qualification only or with degree qualification, and two are chartered financial analysts with degree qualification.

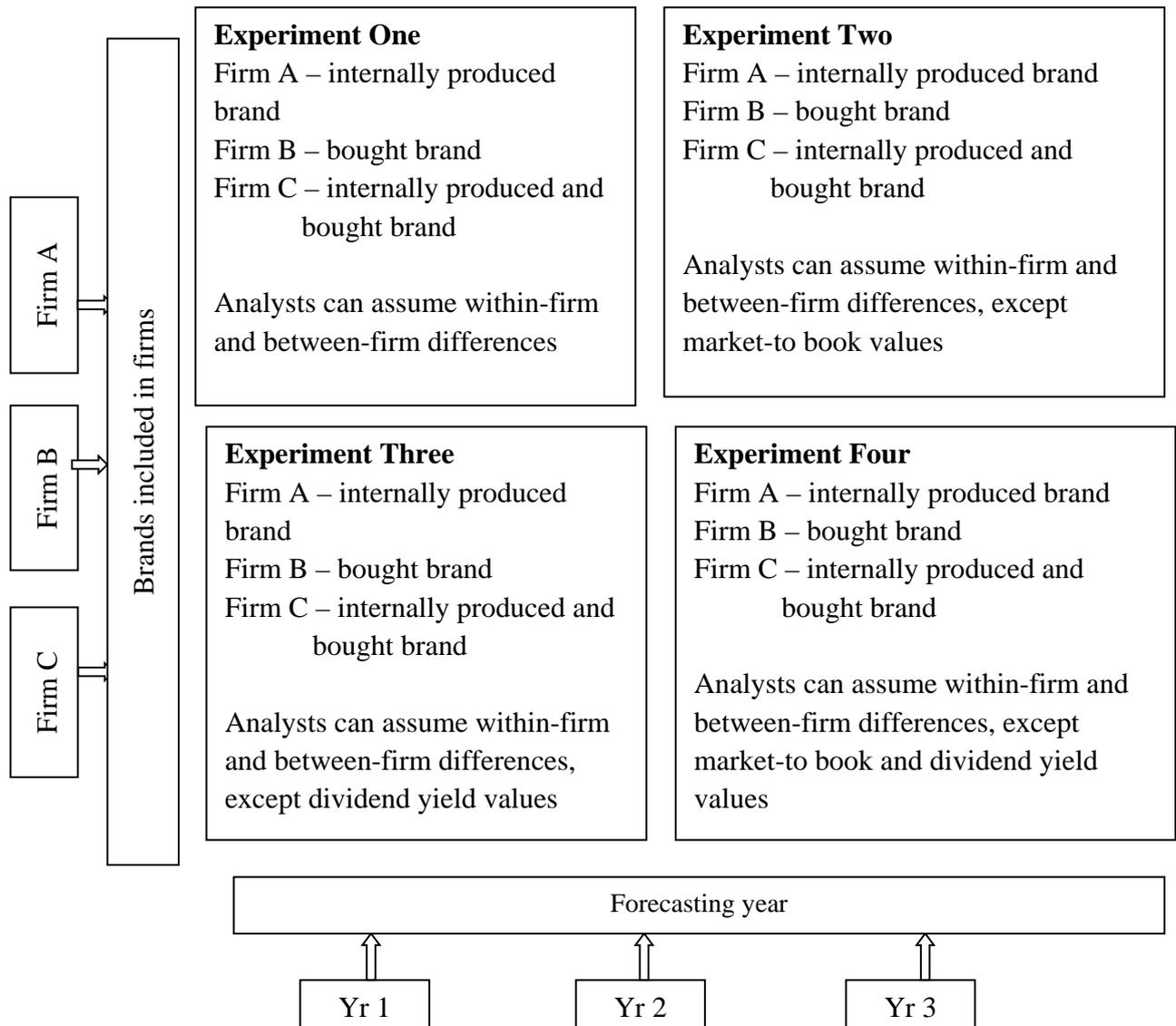
### **Procedure**

Following the protocols of the ethics approval from the tertiary institution, the researcher administering experiments visited workplaces of participants and conducted the experiments in-house in 2008. This study tested analysts' stock price forecasting response to the brand

classes over three continuous years using experiments. The experiments provided cash flows and earnings information over the next five years where analysts needed to forecast stock prices for the next three years (Collins et al., 1994; Lundholm and Myer, 2002).

Experiment One allowed participants to consider any reasons influencing stock price forecasts. Experiment Two gave dividend yields of firms, but other than that, allowed participants to consider any factors that can influence stock pricing forecasts. Experiment Three gave market-to-book value, but other than that, allowed participants to consider any other reasons that can influence stock pricing forecasts. Experiment Four provided market-to-book value and dividend yield simultaneously, but other than that, participants could consider any other reasons that can influence stock pricing forecasts. The reasons not controlled in experiments can randomly influence analysts' view about future economic benefits in intangible classes, and stock pricing forecasts (Figure 1). In each of the four experiments, participants made stock price forecasts for three firms, for three future years. Previous studies show that as the forecasting year becomes further away from the current year the forecasting accuracy decreases (Collins et al., 1994; Lundholm and Myer, 2002).

Figure 1: Experimental design



Before taking part in experiments, the participants read the cover sheet. It explained the activities involved in the experiments, and the tasks participants should complete. It also explained the firms' financial year ended on 31 December 2007. The cover sheet told participants that each firm recorded earnings of 50 million Sri Lankan Rupees (Rs.) (profits after tax) for the year ended 31 December 2006, and Rs. 50 million for the year ended 31

December 2007. The 31 December 2006 annual report became publicly available on 1 April 2007, and the stock price soon after its release was Rs. 65. The 31 December 2007 annual report became available on 1 April 2008. The stock price soon after the release of the annual report was Rs. 100 and the market capitalisation was Rs. 250 million for each firm. On 1 April 2008, analysts began forecasting stock prices for the three future years.

The study required participants to take part in all four experiments. Each experiment had information about three firms. Firm One had an internally produced brand, called Brand A. Firm Two had a bought brand called Brand B. Firm Three had an internally produced brand (Brand A), a bought brand (Brand B), and a bought brand now sold (Brand C). Each firm had an expected profit after tax of Rs. 65 million a year, in each of the next five years. Firms Two and Three had bought brands. Their useful lives were not given to participants. Participants could assume any useful or indefinite life. Participants could assume amortisation and/or impairment expense for bought brands in Firms Two and Three. Similarly, participants could assume any other factors not mentioned in the experiment (example, industry membership) that could contribute to differences in future earnings. On the other hand, if analysts believed that future cash flows were the only basis to determine worth of intangibles, then other factors would have little influence in varying the forecast stock prices.

Firm One (Brand A) and Firm Two (Brand B) are sufficient to test the influence of brand classification on analysts' stock pricing forecasts. This study however, included Firm Three (Brands A, B, and C) to enable a cleaner test of the underlying theory (Libby et al., 2002).

Each participant received an envelope containing the cover sheet outlining the information and details of Experiments One to Four. The participants read the cover sheet first, and undertook each experiment in the order provided. Participants needed to identify whether firms should expense, capitalise, or expense and capitalise the intangibles for the year ended

31 December 2007, for the three firms in each experiment. This ensured that analysts had understood the manipulated levels of the variable of interest in this study. Firm One had an internally produced brand needing to be expensed, Firm Two had a bought brand needing to be capitalised, and Firm Three had internally produced and bought brands needing to be expensed and capitalised. On the last sheet participants listed their qualifications, methods used to forecast stock prices, and their understanding of the statement of cash flows in the annual reports. This study used a five-point Likert scale for the last activity. The question asked about analysts' understanding of the statement of cash flows published by the Institute of Chartered Accountants in Sri Lanka. This Sri Lankan standard complies with international accounting standards. Participants marked one point on a five-point scale: well understand, mostly understand, neutral, lack understanding, and little understand

## **Design**

This study used a within-subject experimental design. This has the advantage of increasing statistical power and optimising the use of few participants. A weakness of within-subject design is that participants can carry over the effect of the previous experiment to the next experiment, confounding their stock pricing forecast responses in the next experiment. To mitigate the carry-over (or order) effect, this study provided experiments to analysts in a random order.

## **Experiment One - First forecasting environment**

Experiment One had three firms: Firm One, Firm Two, and Firm Three. Firm One had an internally produced brand (Brand A) and the notes to the accounts in the 2007 annual reported a decrease in the operating cash flow of Rs. 15 million because of cost incurred as expenses on the internally produced brand. They also stated there would be no further cost on Brand A. The firm reported an earnings potential for Brand A of Rs. 15 million earnings (after tax profits) in each of the next five years. The participants recorded their stock prices for the next three years for Firm One. The experiment also asked participants to identify whether the firm treated intangibles cost as an expense, an asset, or both asset and expense.

Firm Two had a bought brand (Brand B). The notes to the accounts in the 2007 annual report stated that investing cash flow had decreased by Rs. 15 million because of cost of buying Brand B. They also stated there would be no further cost of Brand B. The firm reported an earnings potential for Brand B of Rs. 15 million earnings (after tax profits) in each of the next five years. The participants recorded their stock prices for the next three years for Firm Two. Participants also identified whether the firm treated intangibles cost as an expense, an asset, or both asset and expense.

Firm Three had Brand A, Brand B, and Brand C. The notes to the accounts as at 31 December 2007 stated the operating cash flow had decreased by Rs. 15 million because of cost incurred on Brand A. They also said there would be no further cost incurred on Brand A. The cash spent on Brand A had an earning potential that would increase earnings by Rs. 15 million in each of the next five years. Investing cash flow had decreased by Rs. 15 million because of buying Brand B. The notes to the accounts stated that the cash spent on Brand B had an earning potential that would increase earnings by Rs. 15 million in each of the next five years. They also stated the financing cash flow had increased by Rs. 15 million because of selling Brand C, and that the cash received from selling Brand C would decrease earnings

by Rs. 15 million because of the opportunity lost in each of the next five years. The participants recorded their stock prices for the next three years for Firm Three. Participants also identified the intangibles in firms as an expense, an asset, or asset and expense.

### **Experiment Two - Second forecasting environment**

Experiment Two repeated the data related to the three firms outlined in Experiment One. This experiment also stated that at 1 April 2008 Firm One had 4.6, Firm Two had 2.1, and Firm Three had 0.7 market-to-book value. This experiment made the market-to-book values of the three firms different. The study selected market-to-book value for manipulation because these experiments were conducted in Sri Lanka during a politically unstable period. In that period, listed firms experienced continued growth of profits but lower stock prices because investors had a short-term outlook. Participants recorded their stock pricing forecasts for the next three years for the three firms. Participants also identified whether each firm should classify costs of intangibles as an expense, an asset, or both asset and expense.

### **Experiment Three - Third forecasting environment**

Experiment Three repeated the data outlined in Experiment One. This experiment also stated that at 1 April 2008 Firm One had 1.6, Firm Two had 5.1, and Firm Three had 9.0 dividend yields. This experiment had different dividend yield values among the firms. The study chose dividend yield because listed firms in Sri Lanka during the politically unstable period used dividend yield to continue investor interest in them. Participants recorded their stock pricing

forecasts for the next three years for the three firms. Participants also identified whether firms treated intangibles cost an expense, an asset, or both asset and expense.

#### **Experiment Four - Fourth forecasting environment**

Experiment Four repeated the data outlined in Experiment One. Experiment Four also gave market-to-book value (P/B) and dividend yield (Div Yield) at 1 April 2008 as added information for each firm. The respective market-to-book value and dividend yield were 4.6 and 1.6 for Firm One, 2.1 and 5.1 for Firm Two, and 0.7 and 9.0 for Firm Three. Firms differed among dividend yield values and market-to-book values. Participants recorded their stock pricing forecasts for the next three years for the three firms. Participants also identified intangibles costs in firms as an expense, an asset, or both asset and expense.

#### **Measurement of variables**

The dependent variable in this study is the analysts' stock price forecasts. The study tested three separate firm-brand conditions: internally produced brand (Firm One), bought brand (Firm Two), and the simultaneous presence of internally produced and bought brand (Firm Three). The firm-brand condition is the variable of interest for empirical testing and speaks for the brand classification. The three years of forecasts for each firm controlled for confounding the influence of firm-brand condition on stock price forecasts.

### **3. Relevant literature and hypothesis**

#### **Discretionary disclosure**

Sri Lankan accounting standards are an adaptation of international accounting standards, and hence the intangibles standard and statement of cash flows standards. The International Accounting Standard (IAS) 38 explains how to classify costs related to intangibles in firms. The IAS 38 states that costs incurred on developing internally produced intangibles are not distinguishable from the cost of business development. Therefore, cost of internally produced intangibles should become an expense (see paragraph 63 in IAS 38).

Nevertheless, previous studies have shown that being transparent about intangibles can help users to understand about their future economic benefits. Lang and Lundholm (1996), using data from the Report of the Financial Analysts Federation Corporation Information Committee in the U.S. found that more informative disclosure policies in firms lead to more accurate earnings forecasts by analysts. Eng and Teo (1999) found that increased level of corporate disclosure leads to more accurate earnings forecasts by analysts. More specifically, Lev (2001), and Amir, Lev, and Sougiannis (2003) found that increasing intangible information content increases accuracy of analysts' stocks pricing forecasts for firms. Zeghal and Maaloul (2011) reviewed research studies that examined intangibles producing economic value in firms. They pointed out that many studies showed expensing costs related to internally produced intangibles can lead to investors' mistaken valuing of firms. Same conclusions were reached empirically by Amir et al. (2003), and Barron, Byard, Kile, and Rield (2002). Zeghal and Maaloul (2011) also drew a conclusion that firms making disclosure about these intangibles in annual reports as narrative and visual, helped users to understand future economic benefits arising from them. Studies have provided evidence that non-financial information helps analysts to become more accurate with the earnings they forecast

for firms, and banks become more willing to reduce the cost of capital. This is because they can more easily recognise the future economic benefits resulting from intangibles. The connection between future economic benefits and research and development disclosure are not so clear-cut, given that such costs yielding future economic benefits can have varying levels of uncertainty, depending on costs related to the research or development stages. For instance, Jones (2007) found that forward-looking disclosure about research and development is positively associated with analysts' forecasting errors. However, studies have yet to show decisively whether internally produced intangibles and bought intangibles have similar economic values.

### **Fixated thinking**

Luft and Shields (2001) used Master of Business Administration students as surrogate analysts in an experimental setting. They compared two groups of participants. Before taking part in the experiment, both groups learned that both classes of intangibles were similar in future economic benefits. The researchers told one group that intangible cost should be expensed. They said to the other group that intangible cost should be capitalised. Participants then made stock price forecasts. Luft and Shields found that the group that received instruction to expense intangible costs made greater forecasting errors. They concluded that participants had not learned the extent and difference of intangibles on future economic benefits. The sessions that, prior to the experiments, educated participants that all intangibles are similar in economic benefits did not remove their previously held conceptions. They still held the view that expensed intangibles have less future economic benefits than capitalised intangibles.

This study extends the findings of Luft and Shields, but with analysts who have practicing knowledge about intangibles. It explores whether analysts find the two intangible classes are similar, after providing them with potential future earnings information about intangibles. Libby et al. (2002) pointed out that trained students taking part in experiments are unlikely to have gained the same depth and breadth of knowledge as practitioners who have experience about that knowledge. Student participants can provide findings related to an assumed setting, but practitioners can provide findings related to a real-life setting. In this context, monetised intangibles disclosure can help analysts increase their forecast accuracy.

### **Hypothesis development**

The framework of cognitive transparency argues that poor design of information increases the cognitive load. Insufficient information can undermine user performance (Irwin et al., 1998). This study chose brands as a case example for intangibles given that IAS38 bans recognising internally produced brands as assets. Revealing earning potential on brands in firms can reduce the cognitive load of analysts in forecasting stock prices. The study expected that firms' revealing earnings forecast on brands in annual reports can remove analysts' view that bought brands and internally produced brands have different future economic benefits. They will also not become distracted by various differences existing between firms because those differences have no relevance to stated future economic benefits from brands. This study examined the association between the firm value and information transparency from a theoretical perspective. The stock pricing forecast variable represented the firm value construct, and the earnings potential variable represented the information transparency construct. This study expected that transparent earnings forecasts would allow analysts to recognise that the economic value of the two brand classes is substantively similar.

### *Forecasting environments*

Experiment One framed the Forecasting Environment One. This forecasting environment allowed participants to assume any reasons that could influence stock pricing forecasts. Experiment Two was the Forecasting Environment Two. This forecasting environment allowed participants to assume any reasons that could influence stock pricing forecasts, with specific market-to-book values assigned to the three firms. The difference between market value and net book value (market-to-book value) of firms has become known as a strong determinant of stock price forecasts. It has explained for differences in stock returns among firms (Kothari and Shanken, 1992) moderated by firm size (Kothari, Shanken, and Sloan, 1995). Clean surplus accounting suggests that the market-to-book value rather than the market-to-earnings ratio is a signal of future return of owners (Penman, 1996). It is a measure independent of the current profitability of firms (Brief and Lawson, 1992; Wilcox, 1984). Pontiff and Schall (1998) examined the predictors of the Dow Jones Industrial Average and found that the market-to-book value provided explanatory information about the stock return not captured by dividend yield. Lev (1999) and Lev and Sougiannis (1999) showed that market-to-book value signals the amount of future earnings internally produced intangibles can produce. It prompts investors to buy stocks at a market price that exceeds the firm's net book value. In this forecasting environment, different market-to-book values among the three firms might influence the analysts' stock price forecasts, if analysts believe that dividend yield distorts the future economic benefits of intangibles in the two classes.

Experiment Three was the Forecasting Environment Three. This forecasting environment allowed participants to assume any reasons that could influence stock pricing forecasts, with specific dividend yield values assigned to the three firms. Several cross-sectional (Litzenberger and Ramaswamy, 1979) and time-series (Fama and French, 1988, 1989; Hodrick, 1992) studies point to dividend yield (dividend payment over firm market value) as having predictive power for the stock price. Recent studies have seldom examined the influence of dividend yield because emphasis is now on market-to-book value as the main sign of return on investment. It is however relevant to the listed firms on the Colombo Stock Market in a civil war setting. This politically unstable environment resulted in a puzzle of firms increasing earnings without matching increases in market-to-book value. This setting allowed investors to receive cash through dividend distribution and reduce risk instead of the high expectation of capital gains, and enabled firms to continue investor interest in them (CSE, 2000, p. 10). Dividend yield is a frequent measure of a firm's value through income returns. Many reasons influence the dividend level; for instance a high-growth firm may reduce its payment level to hold funds for future expansion. In this forecasting environment, different dividend yields among the three firms might influence the analysts' stock price forecasts. Analysts could also believe that dividend yield distorts the future economic benefits of intangibles in the two classes.

Experiment Four was the Forecasting Environment Four. This forecasting environment allowed participants to assume any reason that could influence stock pricing forecasts, with specific market-to-book values and dividend yield assigned to the three firms. Returns on investing in stock can arise from dividend and capital appreciation; the two do not always have a positive correlation. Pontiff and Schall (1998) examined the behaviour of market-to-book value and dividend yield with the stock return. They found that when the market-to-book value increased (or decreased), the stock return increased (or decreased). Also when the

dividend yield increased (or decreased) and stock return increased (or decreased). However, in the presence of dividend yield and market-to-book value, when the stock return increased, the market-to-book value increased, but the dividend yield decreased. This suggests how complex it is to forecast stock prices in the presence of both financial ratios rather than taking one at a time. Because this study expects that providing earnings forecasts will lead to uniting analysts' views about internally producing brands and bought brands, the following hypothesis is in alternative form for later equivalence testing.

H1: Brand classification does not influence analysts' stock price forecasts.

#### **4. Equivalence testing**

Analysts act as a judge about the economic equality of the two classes of intangibles. Hypothesis testing makes inferences about whether the two classes of intangibles are different after providing earnings forecasts about intangibles to analysts. The hypothesis testing inferring that the two classes of intangibles are not different prompts that they can be similar. However, hypothesis testing does not make that inference. To test the hypothesis, a test should be conducted to determine how similar the two classes of intangibles are. If the two are almost identical, then they are equivalent. Equivalence testing makes that inference. The testing needs to decide about the economic likeness among the two classes of intangibles, with greater statistical confidence. The confidence interval is greater for equivalence testing compared with hypothesis testing. The equivalence test widens the confidence interval used in hypothesis testing by one-half or one-third to draw a conclusion on whether the two brand classes are equivalent (Durkalski, 2007; Julious, 2004; ICH, 2000; EMEA, 2006). For instance, hypothesis testing sets the confidence interval at 95

per cent. Equivalence testing sets the confidence interval at 96.7 (that is, 95 plus 1.7) per cent or 97.5 per cent (that is, 95 plus 2.5) to infer about equality among the two classes of intangibles. This study sets the confidence interval at 98 per cent because greater than the maximum confidence interval would provide robust evidence of equality among the two classes of intangibles.

There are three ways to conduct an equivalence test. First is the confidence interval approach. Second is non-equivalence null hypothesis test. Third is Bayesian methods. The confidence interval approach is the most conservative because the actual type one error rate is either equal to, or less than the stated type one error rate (Rogers, Howard, and Vessey, 1993). The null hypothesis in equivalence testing asserts that analysts find a large enough difference in future economic benefits between the two classes of intangibles. It leads to an inference that the intangible classes are not equivalent. The alternative hypothesis states that analysts find a small difference between the two classes of intangibles. The difference is substantively small enough to make an inference that the two intangible classes are equivalent.

## **5. Results and discussion**

This section reports findings about analysts' understanding of the statement of cash flows, descriptive statistics from the experiments, results of the hypothesis testing to determine whether the hypothesis is rejected or not rejected, and equivalent testing to determine the similarity of the two brand classes. The dependent variable is analysts' stock price forecasts, and the independent variable of interest is the firm-brand condition.

### **Analysts understanding of cash flows**

The participants' responses to the five-point Likert scale averaged 4.27 out of a maximum score of 5. This suggests that the analysts have enough skills to understand and interpret cash flows information. All participants identified the three firms with correct accounting treatment of intangibles in all four experiments, indicating analysts' awareness of how accounting principles view future economic benefits of the two brand classes.

### **Descriptive statistics**

The study analysed the influence of the two things that could impact analysts' stock pricing forecasts: the firm–brand condition and the forecast years. It used 3x3 within-subjects Analysis of Variance (ANOVA) for each experiment. Table 1 summarises the four experiments' stock price forecasts. The standard deviation values and quartile values of stock price forecasts vary randomly among the experiments, suggesting that prior experiments do not serve analysts as a learning experience to forecast stock prices for the experiments that follow, and that the stock price forecasting environments with different market noise (i.e., firm-specific capital market information) led analysts' forecast stock prices in those contexts.

Table 1

Descriptive statistics of stock price forecasts

Experiment	Mean	Std. deviation	25% quartile	Median	75% quartile
One	135.7	55.1	110	130	140
Two	159.4	104.7	110	140	170
Three	142.9	53.0	113	130	156
Four	159.8	99.6	115	138	169

### Hypothesis testing

As shown in Table 2, Experiment One (Forecasting Environment One) results show that analysts noticed that firms with brand classes had similar risk profiles. The firm–brand condition in a given forecast year did not statistically influence the analysts’ stock price forecasts. This shows that brands in firms had no significant influence on analysts’ stock price forecasts. The study found similar results for Experiment Two (Forecasting Environment Two), Experiment Three (Forecasting Environment Three), and Experiment Four (Forecasting Environment Four). Different forecasting years led to statistically different stock price forecasts. The study expected this outcome, and the model included a variable to ensure that any stock price differences due to firm–brand condition were over and above the stock price differences arising because of the different forecasting years. Different forecasting years did not influence analysts’ view of the future economic benefits of the brands in the two classes. The interaction between firm–brand condition and forecasting years also had no statistical significance (Table 2).

Table 2  
ANOVA Analysis of Experiments

	SS	d.f.	MSE	F-Statistic	p-value
Experiment One					
Model	50034.91	7	7147.84	2.38	0.021
Firm–brand condition	93.08	2	46.54	0.02	0.985
Forecast year	40061.15	2	20030.57	6.68	0.001
Firm–brand condition * Forecast year	99.99	3	33.33	0.01	0.998
Residual	2080495.87	694	2997.83		
Total	2130530.78	701	3039.27		
Experiment Two					
Model	140116.35	7	20016.62	1.84	0.077
Firm–brand condition	1179.14	2	589.57	0.05	0.947
Forecast year	109647.09	2	54823.54	5.05	0.007
Firm–brand condition * Forecast year	1256.29	3	418.76	0.04	0.990
Residual	7540285.35	694	10864.96		
Total	7680401.70	701	10956.35		
Experiment Three					
Model	67680.99	7	9668.71	3.53	0.001
Firm–brand condition	22.01	2	11.00	0.00	0.996
Forecast year	57425.30	2	28712.65	10.50	0.001
Firm–brand condition * Forecast year	386.51	3	128.84	0.05	0.986
Residual	1898388.86	694	2735.43		
Total	1966069.85	701	2804.66		
Experiment Four					
Model	162582.52	7	23226.07	2.37	0.021
Firm–brand condition	955.31	2	477.66	0.05	0.952
Forecast year	122074.64	2	61037.32	6.24	0.002
Firm–brand condition * Forecast year	1645.97	3	548.66	0.06	0.983
Residual	6788210.31	694	9781.28		
Total	6950792.83	701	9915.54		

## **Equivalence testing**

Analysts did not forecast stock prices differently for the three firms in each experiment. Note that each firm had a firm–brand condition for claiming no statistical significance. The study then compared stock pricing forecasts of two firms at a time, that is having two firm–brand conditions at a time, using Tukey’s Honestly significant difference test. This study found no statistical difference at 95 per cent confidence interval. These results further confirm that firm–brand condition in firms has no statistical influence on analysts’ making statistically different stock pricing forecasts. The absence of statistical difference is insufficient to confirm that analysts considered internally produced brands and bought brands to have similar economic benefits.

As shown in Table 3, this study therefore conducted an equivalence test to find out the closeness of future economic benefits resulting from brand classes. This required comparing the mean value differences of stock pricing forecasts of firm–brand condition, two conditions at a time. The study found that the mean value difference at 98 per cent confidence interval under equivalence testing is within the 95 per cent rejection interval under hypothesis testing. This study found similar results for Experiment One (Forecasting Environment One), Experiment Two (Forecasting Environment Two), Experiment Three (Forecasting Environment Three), and Experiment Four (Forecasting Environment Four).

Table 3

## Equivalence testing

Firm	Contrast	Std. error	Tukey's P	Tukey confidence interval (95%)		Equivalence confidence interval (98%)	
				LE	UE	LE	UE
Experiment One							
Two vs. One	-1.85	5.10	0.93	-13.84	10.14	-13.74	10.04
Three vs. One	-0.14	5.10	1.00	-12.13	11.85	-12.03	11.75
Three vs. Two	1.71	5.10	0.94	-10.28	13.70	-10.18	13.60
Experiment Two							
Two vs. One	0.89	9.69	1.00	-21.87	23.65	-21.69	23.47
Three vs. One	4.18	9.69	0.90	-18.58	26.94	-18.40	26.76
Three vs. Two	3.29	9.69	0.94	-19.47	26.05	-19.29	25.87
Experiment Three							
Two vs. One	-0.99	4.90	0.98	-12.51	10.52	-12.42	10.43
Three vs. One	-0.72	4.90	0.99	-12.24	10.79	-12.15	10.70
Three vs. Two	0.27	4.90	1.00	-11.25	11.78	-11.15	11.69
Experiment Four							
Two vs. One	2.2	9.2	0.97	-19.46	23.84	-19.29	23.67
Three vs. One	2.1	9.2	0.97	-19.57	23.73	-19.40	23.56
Three vs. Two	-0.1	9.2	1.00	-21.76	21.54	-21.59	21.37

LE = lower end of test of equivalence at 98 per cent confidence contrast – 2.33\* std. error;  
 UE = upper end of test of equivalence at 98 per cent confidence contrast + 2.33\* std. error

## 6. Concluding remarks

As shown in Table 3, the results suggest that internally produced brands and bought brands are economically equivalent in the presence of earnings forecasts revealed in annual reports. The presence of specific capital market ratios (market-to-book value and dividend yield value) did not change this. An implication for policy is that revealing earnings forecast of the two classes of brands can remove the view that the two classes of intangibles result in different future economic benefits. Such disclosure also increases information relevant to

users. The information becomes faithfully represented when assumptions and logic behind the forecast are outlined to the readers of the annual report. This not only increases the quality of accounting information outlined in the conceptual framework in accounting, but also removes the possibility of users taking punitive action against firms misrepresenting information. In interpreting the conclusions, it should be acknowledged that this study provided earnings forecasts and required analysts to forecast stock prices, because the objective was to determine analysts' perception about the intangibles classification, but in practice, analysts need to carry out both tasks.

Studies have found that the political environment in which businesses conduct their affairs also influences stock returns of firms. This effect is more prominent in emerging capital markets than in developed capital markets. Although during the past decade political risk in emerging markets has decreased and in developed markets has increased, the difference is still statistically significant. Hence, the differences in political risk in capital markets may limit generalising results of this study. This study placed earnings forecasts as a footnote to the financial statement, and some studies point out that the location of information can influence the nature and size of stimulus to the reader (Hirshleifer and Teoh, 2003; Hirst and Hopkins, 1998). Future studies can explore whether placing earnings forecasts in different locations of the annual report can differently influence analysts' stock pricing forecasts.

Longren (2009) proposes TDRM as a possible technique that can be used to measure the value of intangibles by discounting future cash flows or capitalising earnings. Although earnings potential of the firm-brand condition was set to be constant by the design of the experiment, analysts had the choice to assume impairment and/or amortisation of bought brands. If analysts made that assumption, it is likely then they would conclude that bought brands generated more potential earnings before impairment and/or amortisation compared to

internally developed brands. If analysts assumed that bought brands had an indefinite life, then there are no amortisation and/or impairment expenses, and potential earnings become equal between bought brands and internally developed brands. However, the analysis valuation of firm–brand condition to forecast stock prices is not analysed here to make any definite conclusions about using discounted cash flows or capitalised earnings for stock pricing forecasts,

Luft and Shields (2001) showed by conducting experiments that participants forecast profits less accurately when expenditures are expensed rather than capitalised, although expenditures had identical predictive ability. The forecast inaccuracy with expenditures expensed became statistically significant, but not with expenditures capitalised.. In this study, although forecast year was statistically significant in participants' forecast stock prices, the study shows that the brand condition (capitalised, expensed, or hybrid) did not influence analysts' forecast stock prices. These results support the proposition put forward by Libby et al. (2002) that practitioners decide differently from trained students. Libby et al. said this is because practitioners gained knowledge by dealing with facts in a real life, whereas students did not. This study supports these findings with greater theoretical clarity as it included a third firm which contained an internally produced intangible, a bought intangible, and an intangible now sold (Brands A, B, and C).

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