

Fair Value Measurements of Exchange-Traded Funds

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Purpose: To investigate the extent to which different prices within the bid-ask spread are used for fair value measurements and evaluate the potential consequences thereof.

Design/methodology/approach: The paper investigates different level one fair value measurements of exchange-traded funds' equity investments. Using descriptive methods, it compares actual and stated fair value measurement policies. In addition, comparative value-relevance of these measurements is investigated in regression analysis.

Findings: Most fair value measurements are based on closing prices, but stated accounting policies and actual measurements frequently differ. Results also show that the bid-close spread of underlying investments is value-relevant in determining the bid-close spreads of ETFs themselves.

Research limitations/implications: Findings are specific to unleveraged ETFs, the sample country and sample period used and only apply to investments in listed equities. Conclusions from this study may assist in predicting market perceptions of the risk of listed equity portfolios.

Practical implications: This paper sheds light on the practical impact of the recent change in fair value measurement guidance.

Originality/value: This study provides evidence on the size of the bid-ask spread of actual investment portfolios and its potential impact. It shows that bid-close spreads of underlying investments are used to price the bid-close spreads of ETFs themselves and that stated and actual accounting policies often differ. Findings imply that standard-setters might be influenced by actual accounting practices.

Keywords: Exchange-traded fund; Fair value; Bid-ask spread; Financial reporting; Measurement; IFRS 13

Article Classification: Research paper

1. Introduction

This study investigates the impact of bid-ask spreads on fair value measurements. Although previous research has compared fair value measurements between different levels of the fair value hierarchy (Song, *et al.*, 2010; Cullinan & Zheng, 2013) fair value measurements also differ within each level of the measurement hierarchy. In this respect, different prices within a bid-ask spread may be used for level one fair value measurements. Using a sample of South African exchange-traded funds (ETFs) which invest solely in locally listed equities, this paper investigates which prices practitioners use to determine fair value measurements and evaluates the potential consequences of these decisions. Such an investigation appears warranted, given the continued debate about fair value measurement, the recent change in fair value measurement guidance for level one fair value measurements and anecdotal evidence that practitioners use closing prices for fair value measurements, regardless of measurement guidance.

Previous measurement guidance of IAS 39, *Financial Instruments: Recognition and Measurement*, was comparatively rigid. It required measurement at bid prices for assets held, unless bid prices were not available, in which case the latest transaction price was used (IASB, 2003:AG72). By comparison, the current measurement guidance in IFRS 13, *Fair Value Measurement*, states that a fair value measurement uses the price within the bid-ask spread which is ‘most representative’ of fair value (IASB, 2011:70). The current measurement guidance therefore increased the number of potential prices on which to base level one fair value measurements. The paper investigates the impact of different level one fair value measurements in several ways.

Firstly, the stated accounting policies of the sample ETFs are obtained and analysed. Secondly, as South African ETFs disclose their investment portfolios in detail, the fair value of the investment portfolio of each ETF is recalculated using bid, closing, ask and midpoint

prices. As the sample is uniformly comprised of South African ETFs which invest solely in locally listed equities, any differences detected are due to bid-ask spreads alone (and not, for example, exchange rates). This means that the actual accounting policies of the ETFs can be accurately determined and compared to the stated policies. Lastly, the value-relevance of bid price and closing price fair value measurements is compared in regression models ^[1].

The study finds that most fair value measurements use closing prices, irrespective of measurement guidance. However, stated and actual accounting policies for fair value measurements often differ on which prices are used. Additional investigations into the incremental value-relevance of different fair value measurements show that bid price measurements are incrementally value-relevant to closing price measurements. By contrast this difference is insignificant when the market value of the ETF itself is calculated using bid prices. It therefore appears that the bid-close spread of underlying investments (i.e. the difference between the bid and closing price of the investments) provide value-relevant information to investors in determining or predicting the bid-close spread of the ETF itself. This could be because the bid-close spread of underlying investments conveys information about the likelihood that fair values will be realised (i.e. information about variability of outcome).

This study contributes to the existing literature in several ways. Firstly, it provides evidence on the size of the bid-ask spread of actual investment portfolios and therefore its potential impact. Although the quantitative impact on the carrying amount of investments appears to be relatively small, it does appear to have economic significance as investors use the bid-close spread of underlying investments to price the bid-close spread of ETFs themselves. It is important that the bid-close spread is value-relevant, as this paper also shows that stated accounting policies sometimes differ from actual accounting policies. On the other hand, the latter finding raises questions about the veracity of accounting policy disclosures,

especially those which cannot be confirmed with reference to publically available information. Lastly, findings imply that standard-setters might be influenced by actual accounting practices in developing measurement guidance. These findings will be of interest to investors in any entity with significant holdings in financial instruments and could assist in predicting market perceptions of the risk of listed equity portfolios. Conclusions from this study are also important for those researchers and practitioners interested in the practical impact of the recent change in fair value measurement guidance.

The rest of this paper is set out as follows: section two provides a review of existing literature, section three discusses the research method and section four sets out the sample selection method. Section five details results about the impact of the bid-ask spread on fair value measurements and section seven concludes the paper.

2. Literature review

2.1. Overview of level one fair value measurement requirements

The fair value of investments in listed equities is the number of shares held multiplied by the quoted price per share (i.e. a level one fair value measurement). However, a bid-ask spread complicates this process as multiple quoted prices are available. Previous measurement guidance in IAS 39, *Financial Instruments: Recognition and Measurement*, attempted to resolve potential ambiguity by requiring that bid prices should be used to fair value assets held or, alternatively, the price of the most recent transaction if bid prices are unavailable (IASB, 2003:AG 72). Current measurement guidance in IFRS 13, *Fair Value Measurement*, is more flexible and requires entities to select the price within the bid-ask spread which is the ‘most representative’ of fair value (IASB, 2011:70).

The reason for the change in guidance is that different entities enter into transactions at different prices and that the bid-ask spread represents the boundaries of these prices (IASB,

2011:BC162-163). However, some have disagreed, noting that the current measurement guidance undermines the verifiability and comparability of fair value measurements (IASB, 2011:BC162). Importantly this counterargument is only valid if practitioners apply measurement guidance rigidly. This is in contrast to anecdotal evidence that many entities used closing prices to fair value financial assets, at a time when measurement guidance required bid prices to be used. The first objective of this study is therefore to determine whether actual fair value measurements of investments in listed equities are based on bid or closing prices.

2.2. Prior research on fair value measurement

Fair value measurement for financial instruments has found wide support in prior research. Empirical research has found fair value measurements to be value-relevant for financial assets (Barth *et al.*, 1996), financial liabilities (Barth *et al.*, 2008) and investments in listed associates (Graham *et al.*, 2003). In addition, a large number of theoretical papers support the use of fair value measurements for financial instruments. For example, Penman (2007) notes that fair value measurement is appropriate in the case of financial instruments, as the relationship between exit prices and value to shareholders is a one-to-one relationship. Similarly, Hitz (2007) argues that fair value measurement has a theoretical case in respect of financial instruments.

However, as Badenhorst (2014) notes, only limited prior research has considered the merits of rival fair value measurements. Notable exceptions include So and Smith (2009) who find that fair value changes recognised in profit or loss are more value-relevant than those recognised in equity. Other papers in this area include Song *et al.* (2010) who determine that higher-ranked fair value measurements have greater value-relevance, as well as Cullinan and Zheng (2013) who find that the premium or discount to net asset value is affected by the fair

value hierarchy of underlying investments for a sample of closed-end funds. More recently, Badenhorst (2014) evaluates the theoretical support for differing fair value measurement requirements for control premiums of listed and unlisted investments. However, alternative fair values for a single measurement scenario (within a single level of the fair value hierarchy) have not formed the explicit subject of prior research. This paper considers the impact of bid-ask spreads on the fair value measurement of investments in listed equities.

Prior research provides some insight into the size of the bid-ask spread for listed equities and, consequently, the potential impact on fair value measurements for investments in such instruments. Jiang *et al.* (2011b) document that bid-ask spreads on the NASDAQ and NYSE amounted to 0.75 percent to 1.10 percent of the midpoint price during 2001. Larger bid-ask spreads of 2.20 percent have been documented for German equities (Leuz & Verrecchia, 2000), while mean bid-ask spreads of New Zealand firms reached 6.83 percent around annual report release date from 2001 to 2005 (Jiang *et al.*, 2011a). In addition, prior research finds that the last transaction of the day, which results in the closing price, tends to occur at the ask price (Harris, 1989; Porter, 1992). Consequently, the difference between end of day bid and ask prices may closely resemble the difference between end of day bid and closing prices. However, although these findings offer preliminary evidence, it is not possible to infer the impact on current fair value measurements due to the changes in financial markets since the evidence was collected.

3. Research method

This study firstly investigates the extent to which practitioners use different prices within the bid-ask spread to measure fair value and evaluates the potential consequences of these decisions. Apart from descriptive investigations, a regression analysis, based on the following theoretical construct documented in Barth (2000), is used:

$$MV_E = MV_A - MV_L \quad (1)$$

where MV_E represents the market value of equity, MV_A the market value assets and MV_L the market value of liabilities at a specific point in time.

Typically, the market values of assets and liabilities are not observable. Consequently value-relevance studies use the book values of these variables and include net income in the model as a proxy for unrecognised assets. However, virtually all of ETF assets are measured at or close to fair value and likewise their liabilities. Consequently ETFs do not have unrecognised assets and the model investigated for the purposes of this study is the following:

$$MV = \alpha_0 + \beta_1 TA_{adj} + \beta_2 TL + \beta_3 INV + \varepsilon \quad (2)$$

Where:

MV represents the market capitalisation of the EFT at reporting date, based alternately on bid prices and closing prices;

TA_{adj} is the total assets of the EFT at reporting date, adjusted to exclude the carrying amount of investments;

TL is total liabilities at reporting date entered as a positive value; and

INV represents the fair value of investments, based alternately on bid prices and closing prices.

Model (2) is run on an unscaled basis as Barth and Clinch (2009) show that undeflated specifications produce reliable inferences. ETF and time subscripts have been suppressed.

The variable of interest in the above specification is the error term (ε). The error term is compared between a model where the fair value of investments is specified with reference to closing prices and one where the fair value of investments is specified with reference to bid prices. One model is considered to be superior to the other if the variance of the error term decreases. This approach is similar to that of prior researchers considering alternative

accounting specifications (Barth, 1991; Dechow, 1994; Ashbough & Olsson, 2002; Pouraghajan *et al.*, 2012) and recommended by Gu (2007) based on findings that comparisons of R^2 s often lead to incorrect inferences. Following the researchers above, the significance of the change in variance of the error term is therefore assessed using a Vuong-test, which is appropriate for the comparison of non-nested models (Vuong, 1989).

The next section discusses the sample selection method for this study.

4. Sample selection method

The sample consists of ETFs listed on the Johannesburg Securities Exchange (JSE) in South Africa as at 30 April 2014, which invest solely in locally listed equities. All of the ETFs meeting this criterion are unleveraged and consequently this is also a characteristic of the sample. South Africa is an ideal setting in which to consider the application of measurement guidance due to its high quality financial reporting and auditing standards (WEF, 2013; Guidara *et al.*, 2014). South African ETFs have been selected as they disclose sufficient detail about their investments that fair value can be recalculated using different prices. Limiting the sample to ETFs which invest solely in locally listed equities ensures that exchange rate differences and complexities introduced by more sophisticated instruments do not affect the sample. As a result, the impact of the bid-ask spread can be isolated and the sample is uniform in character.

Historical annual financial statements of the ETFs are not always available, which limits the sample period to years ending from 1 January 2010 up to 31 December 2013 ^[2]. In addition, ETFs must be listed for a full year to be included in the sample, resulting in a final sample of 18 unique ETFs and 52 ETF-year observations ^[3]. Pricing data for the ETFs is obtained from Datastream. The details of investments in listed equities are hand-collected from the published financial statements available on the ETFs' websites. The various fair

value measurements of investments are calculated using the disclosed number of shares held and prices obtained from Datastream. All other data items are hand-collected from the published financial statements of the ETFs.

The following section discusses the detailed findings of this paper.

5. The bid-ask spread and its impact on fair value measurements

5.1. Results of descriptive investigations

5.1.1. Stated and actual accounting policies

This paper firstly considers the extent to which practitioners use different prices within the bid-ask spread to measure fair value. Panel A of Table 1 reveals that for the total sample ETFs disclose an accounting policy as using bid prices for level one fair value measurements 27 percent of the time and closing prices 46 percent of the time. The remaining 27 percent of accounting policies (in total) do not refer to either price, but use unspecific terms such as ‘market prices’. This appears consistent with the findings of prior research that listed South African entities frequently do not disclose sufficient detail in their accounting policies to allow users to judge the impact thereof (Rossouw, 2010). Interestingly, after IFRS 13, *Fair Value Measurement*, became effective on 1 January 2013 (IASB, 2011), only six percent of ETFs have a stated accounting policy to use bid prices for fair value measurement (Panel A of Table 1). Prior to 2013, at least a quarter of ETFs in each year claimed to use bid prices for fair value measurements.

[INSERT TABLE 1 ABOUT HERE]

However, an objective of this study is also determine which prices ETFs actually use for fair value measurements, which is especially important as prior research on listed South

African entities finds that measurement guidance is sometimes contravened (Stainbank & Harrod, 2007). Using prices from Datastream and hand-collected data, the fair value of investment portfolios is therefore recalculated. Panel B of Table 1 shows that 88 percent of actual fair value measurements for these investments use closing prices. Furthermore, this number appears fairly stable over time if the small sample in 2010 is ignored. The discrepancy between stated and actual accounting policies is investigated further in Panel C of Table 1, which shows that actual accounting policies differ from stated accounting policies for 39 percent of observations ^[4]. The vast majority of these involve ETFs who state that fair value measurements are determined using bid prices, while actually using closing prices. However, in two cases in 2010, bid prices are used for fair value measurements by ETFs who claim to be using closing prices. The results also show that IFRS 13, *Fair Value Measurement*, had an impact on financial reporting, as differences between stated and actual accounting policies are no longer evident after the effective date of this standard of 1 January 2013 (IASB, 2011). This is not necessarily a favourable verdict for the change in fair value measurement guidance. Rather, it could imply that the fair value measurement guidance was altered as a result of pressure from practitioners and not based on inherent theoretical superiority. For example, it could be argued that any entity will effectively accept a bid price in a sales transaction, regardless of whether or not it could affect the bid-ask spread by delaying the transaction or through other means.

Panel C of Table 1 also quantifies the impact of differences between stated and actual accounting policies with reference to the carrying amount of investments. This reveals that stating level one measurements at closing, rather than bid prices, increased the mean (median) carrying amount of equity investments by 0.172 (0.150) percent prior to the change in measurement guidance. In economic terms this means that mean (median) investment carrying amounts were overstated by ZAR 2.14 million (ZAR 0.90 million) or 0.172 percent

(0.150 percent) of the mean (median) market value of the EFTs based on closing prices. The amounts are large enough to be economically significant in absolute terms, especially given their persistent nature, but small enough to be plausible.

The findings of this subsection therefore imply that (i) official measurement guidance is not always implemented; (ii) stated accounting policies sometimes agree with such guidance, while actual accounting policies of the same entity do not and (iii) actual fair value measurements for investments are based on bid or closing prices, rather than other available prices within the bid-ask spread. Although the quantitative impact on the carrying amount of investments is relatively small, it still raises a few questions. Firstly, what is the quantitative impact in the wider context of the financial statements? Secondly, do these differences have sufficient economic significance to affect the price formation of the ETFs? In the following sections, the impact of different fair value measurements is therefore considered in more detail.

5.1.2. The impact of the bid-ask spread on fair value measurements

In this subsection, fair value measurements calculated with different prices within the bid-ask spread are compared. Panel A of Table 2 shows that the mean overall bid-ask spread of investments is 0.325 percent of the midpoint price for the sample and fairly stable over time. However, as the results of the previous section show, bid prices and closing prices are the alternatives actually used by ETFs to measure the fair value of their investments. For this reason it is the difference between bid and closing prices which is of particular interest. Consequently, a bid-close spread is also calculated for each investment portfolio, which is the difference between the closing and bid price, as a percentage of the bid price. The results are contained in Panel A of Table 2 which shows that fair values of investments in listed equities are 0.182 percent higher when closing prices rather than bid prices are used for measurement

(i.e. the bid-close spread). This difference is more important than may be initially apparent, as Panel B of Table 2 shows that the mean bid-close spread represents 0.181 percent of the net assets of the unleveraged ETFs of this sample. It also reveals that the mean (median) bid-close spread is 2.625 percent (1.416 percent) of the net income of the funds. In economic terms this means that the mean (median) bid-close spread is ZAR 1.87 million (ZAR 0.24 million) or 0.201 percent (0.159 percent) of the mean (median) market value of the EFTs based on closing prices. These amounts remain large enough to be economically significant in absolute terms, especially given their persistent nature, but small enough to be plausible. In this respect, it is important to note that leverage would increase the impact on net assets and net income.

[INSERT TABLE 2 ABOUT HERE]

Other descriptive statistics in Panel A of Table 2 support prior research findings that closing transactions tend to take place at the ask price (Harris, 1989; Porter, 1992). The mean close-ask spread is 0.143 percent of ask prices compared to a bid-close spread of 0.182 percent. It is also apparent from Panel A that midpoint prices (the mean of the bid and the ask price) is virtually indistinguishable from closing prices with a mean midpoint-close spread of 0.018 percent. This offers a suggestion that midpoint prices do not reflect the size of the bid-ask spread. Panel C of Table 2 offers further support of such a conclusion. It shows the results of a paired sample ANOVA comparison of the different fair values for the investment portfolios. All of the fair values differ significantly from each other at the one percent level ($p = 0.001$), with the exception of closing and midpoint fair values which are substantially the same ($p = 0.879$).

The findings of this subsection therefore imply that (i) fair values calculated using bid, closing or ask prices differ from each other at a statistically significant level and (ii) the unleveraged impact on net assets and net income is noticeable. This leaves the question of whether these differences have sufficient economic significance to affect the price formation of the ETFs ^[5]. The next section details multivariate regression results for the comparison of bid price and closing price fair value measurements to answer this question.

5.2. Results of multivariate regressions

5.2.1. Descriptive statistics and univariate investigations

Descriptive statistics for the variables of the multivariate regressions of this study are detailed in Table 3. Closing bid prices to calculate market values of the ETFs themselves were not universally available for all of the ETF-years in the sample. Panel A of the table therefore details the descriptive statistics for the full sample, while Panel B shows descriptive statistics for those ETFs where bid prices could be obtained. A comparison of the two panels show that ETFs with bid prices available have a mean (median) market value of ZAR 1 544 million (ZAR 544 million) compared to a mean (median) market value of ZAR 927 million (ZAR 150 million) for the full sample. However, for both samples there are no obviously significant differences between the mean (and median) bid price and closing price fair values of their investments. Furthermore, this table confirms that the overwhelming majority of ETF assets comprise investments, as adjusted total assets are negligible by comparison. Some skew is evident for most variables in Table 3, as mean and median values differ. Skew is mitigated in the multivariate regressions by deleting outlying observations more than 2.5 standard deviations from the mean.

[INSERT TABLE 3 ABOUT HERE]

Table 4 details the univariate correlations for the regression variables of this subsection with Pearson (Spearman) correlations above (below) the diagonal. This table reveals that all of the regression variables are significantly correlated with the dependent variable (market value of equity) at the one percent level ($p < 0.001$). Unsurprisingly, as all variables relate to components of the statement of financial position, the variables are also significantly correlated with each other at the one percent level ($p < 0.001$). It is therefore not possible to deduce the comparative value-relevance of bid price and closing price fair values from univariate investigations. The results of the multivariate investigations are detailed in the next subsection.

[INSERT TABLE 4 ABOUT HERE]

5.2.2. *Multivariate results*

The ETF-years for this study form a time series. Reported regression results are therefore autoregression results using maximum likelihood estimation^[6]. Durbin-Watson statistics show that the method is effective in correcting for serial correlation in all of the models. Moreover, Lagrange Multiplier statistics do not detect heteroskedasticity and a graphical analysis of residuals appears approximately normal.

Results from the multivariate regressions are tabulated in Table 5. All of the R^2 s reported in this table round to 100 percent, reflecting that ETF's do not have under or unrecognised assets and liabilities. All of the variables have the predicted signs in this table, although the control variables are only significant when the dependent variable (market value) is determined using closing prices (MVClose)^[7]. However, the variables of interest, namely the fair values of investments, are positive and significant at the one percent level

($p < 0.001$) regardless of the model or fair value measurement specification. In addition, when the dependent variable is MV_{Close} , the Vuong-test is significantly negative at the five percent level ($p = 0.013$). This implies that the variance of the error term is significantly lower for bid price fair values of investments compared to closing price fair values. However, although the Vuong-test remains negative when the dependent variable is based on bid prices, it is only mildly significant at best ($p = 0.138$).

[INSERT TABLE 5 ABOUT HERE]

Findings of this subsection therefore suggest that bid-close spreads of underlying investments provide value-relevant information to investors, as the results of the first two Vuong-tests show. However, when the dependent variable is based on bid prices, the results for the control variables as well as those of the Vuong-test are insignificant at conventional levels. It therefore appears that the bid-close spread of underlying investments (i.e. the difference between the bid and closing price of the investments) provide value-relevant information to investors in determining or predicting the bid-close spread of the ETF itself. This could be because the bid-close spread of underlying investments conveys information about the likelihood that fair values will be realised (i.e. information about variability of outcome). The bid-close spread remains economically significant, however, as it affects the price formation of the ETFs.

5.2.3. *Additional analysis*

In this section, the value-relevance of the bid-close spread is investigated utilising an alternative model specification as follows:

$$MV = \alpha_0 + \beta_1 TA_{adj} + \beta_2 TL + \beta_3 INV_{close} + \beta_4 INV_{diff} + \varepsilon \quad (3)$$

Where:

INVclose represents the fair value of investments, based on closing prices; and

INVDiff represents the difference between the fair value of investments measured using closing prices and the fair value using bid prices.

Other variables remain as previously defined. The model is run on an unscaled basis, as Barth and Clinch (2009) show that undeflated specifications produce reliable inferences. ETF and time subscripts have been suppressed.

The autoregression results from this model specification are tabulated in Table 6. Once again, all of the R^2 s reported in this table round to 100 percent, reflecting that ETF's do not have under or unrecognised assets and liabilities. Similarly to the main regression results, the control variables are only significant when the dependent variable is determined using closing prices (MVClose). In addition, the fair values of investments, measured using closing prices (INV), are positive and significant at the one percent level ($p < 0.001$) in all of the models. By contrast, INVDiff, which essentially measures the bid-close spread of underlying investments, is negative in all of the models. When the dependent variable is determined using closing prices (MVClose), INVDiff is significant at the one percent level ($p < 0.001$). This variable is significant at the ten percent level ($p = 0.075$) when the dependent variable is determined using bid prices (MVBid).

[INSERT TABLE 6 ABOUT HERE]

The above results should be interpreted with caution, given severe multicollinearity between INVclose and INVDiff^[8]. However, findings do support the conclusion that bid-close spreads of underlying investments are value-relevant. As the coefficients of the bid-close spread variable (INVDiff) are significantly negative in all models, this implies that

higher bid-close spreads for underlying investments reduces the perceived value of the ETF for investors. However, the weaker results when MVBid is the dependent variable, continues to suggest that the bid-close spread of underlying investments is used to determine or predict the bid-close spread of the ETFs themselves. In other words, the bid-close spread of underlying investments is value-relevant, as it affects the price formation of the ETF itself.

6. Summary and conclusion

This study investigates the extent to which practitioners use different prices within the bid-ask spread for fair value measurements and evaluates the potential consequences of these decisions for a sample of South African ETFs, which invest solely in locally listed equities. The paper finds that most fair value measurements use closing prices irrespective of measurement guidance. However, stated and actual accounting policies for fair value measurements often differ on whether bid or closing prices are used.

Additional investigations into the incremental value-relevance of different fair value measurements show that bid price measurements are incrementally value-relevant to closing price measurements. However, this difference is insignificant when the market value of the ETF itself is calculated using bid prices. It therefore appears that the bid-close spread of underlying investments provide value-relevant information to investors in determining or predicting the bid-close spread of the ETF itself. This could be because the bid-close spread of underlying investments conveys information about the likelihood that fair values will be realised (i.e. information about variability of outcome).

This study contributes to the existing literature in several ways. Firstly, it provides evidence on the size of the bid-ask spread of actual investment portfolios and therefore its potential impact. Although the quantitative impact on the carrying amount of investments appears to be relatively small, it does appear to have economic significance as investors use the bid-close spread of underlying investments to determine the bid-close spread of the ETFs

themselves. It is important that the bid-close spread is value-relevant, as this paper also shows that stated accounting policies sometimes differ from actual accounting policies. On the other hand, the latter finding raises questions about the veracity of accounting policy disclosures, especially those which cannot be confirmed with reference to publically available information. Lastly, findings imply that standard-setters might be influenced by actual accounting practices in developing measurement guidance. These findings will be of interest to investors in any entity with significant holdings in financial instruments and could assist in predicting market perceptions of the risk of listed equity portfolios. Conclusions from this study are also important for those researchers and practitioners interested in the practical impact of the recent change in fair value measurement guidance.

However, the findings from this study are specifically applicable to unleveraged ETFs and may not be directly generalisable to other entities. Findings, especially those relating to the size of the bid-ask spread and stated accounting policies, are specific to the sample country and sample period used. Lastly, bid-ask spreads differ between different types of financial instruments and the findings of this paper therefore only apply to investments in listed equities.

¹ Although many other prices exist within the bid-ask spread, it is impractical to evaluate every possible spread. For this reason, comparative value-relevance has only been assessed for the prices ETFs most commonly use to measure their investments (as detailed in Table 1).

² Only annual results are included in the sample as the necessary detail to recalculate the value of the ETFs' investments is only provided in these reports. Historical interim reports are frequently unavailable or do not contain the necessary information for the purposes of this study. As a result, the potential effects of seasonality could not be assessed using interim reports. However, seasonality is of limited concern as extrapolation of profit to a full year figure is not necessary to value an ETF.

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- ³ The sample size is comparable to that of prior research on ETFs (e.g. Barnhart and Rosenstein, 2010; Chu, 2011; Milonas and Rompotis, 2006). The sample size is therefore inherent to the nature of the study and not specific to the sample country or sample period.
- ⁴ For the purposes of this investigation, ETFs with stated accounting policies in the ‘Other’ category have been excluded from the sample.
- ⁵ The number of ETF-years where stated and actual accounting policies differ is small. Due to the lack of power that this induces, it was not possible to perform a statistically reliable regression analysis of the valuation differences for only these EFT-years.
- ⁶ Autoregression with maximum likelihood estimation corrects for serial correlation and, as an added advantage, tends to be less sensitive to the impact of outliers, skewness and heteroskedasticity than ordinary least squares as it is a nonparametric estimation method.
- ⁷ The coefficients for the control variables (TAadj and TL) differ from the theoretical expectation of one. These variables are immaterial in the context of ETFs (refer to the descriptive statistics in Table 3) and potentially lack meaning in determining the prices of ETFs (i.e. it is likely that many investors ignore these variables in valuations of ETFs). This would explain why the variables do not map as accurately into market value of the ETFs as theoretically expected. Omitting the control variables from the model appears to confirm this assumption, as it leaves all inferences (including those of the additional analysis) qualitatively unchanged, while the R²s remain consistent at 100 percent.
- ⁸ Although there is strong multicollinearity between INVclose and INVdiff (VIF-scores are far above ten in all of the models), results are consistent with the method used for the main tests, which do not suffer from this problem. However, the multicollinearity between the variables implies that there is a distinct possibility that the coefficients do not reflect the underlying economic relationship accurately. Lacking strong theoretical predictions, the additional regression results should be interpreted with caution in respect of the magnitude, sign and significance of the variables. The inferences of this study are therefore made with reference to the main regression results and the interpretation of the robustness test is limited to consistency with the main results.

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Table 1: Stated and actual accounting policies*Panel A: Stated accounting policy*

Year	Sample		Bid		Close		Other	
2010	4	8%	1	25%	3	75%	-	0%
2011	14	27%	6	43%	8	57%	-	0%
2012	16	31%	6	38%	4	25%	6	38%
2013	18	35%	1	6%	9	50%	8	44%
<i>Total</i>	<i>52</i>	<i>100%</i>	<i>14</i>	<i>27%</i>	<i>24</i>	<i>46%</i>	<i>14</i>	<i>27%</i>

Panel B: Actual accounting policy

Year	Sample		Bid		Close	
2010	4	8%	2	50%	2	50%
2011	14	27%	-	0%	14	100%
2012	16	31%	3	19%	13	81%
2013	18	35%	1	6%	17	94%
<i>Total</i>	<i>52</i>	<i>100%</i>	<i>6</i>	<i>12%</i>	<i>46</i>	<i>88%</i>

Panel C: ETF's where stated and actual accounting policy differs

Year	Sample	Results	Change in carrying amount where actual policy is closing prices ^a		Change in carrying amount where actual policy is bid prices ^b			
			Mean	Median	Mean	Median		
2010	4	11%	3	75%	0.161%	0.161%	-0.296%	-0.296%
2011	14	37%	6	43%	0.178%	0.200%	-	-
2012	10	26%	6	60%	0.170%	0.092%	-	-
2013	10	26%	-	0%	-	-	-	-
<i>Total</i>	<i>38</i>	<i>100%</i>	<i>15</i>	<i>39%</i>	<i>0.172%</i>	<i>0.150%</i>	<i>-0.296%</i>	<i>-0.296%</i>

For the purposes of the last investigations (Panel C), ETFs with accounting policies in the 'Other' category have been excluded from the sample.

^a The change in carrying amount has been calculated as the difference between the carrying amount of investments measured using bid prices and the carrying amount of investments measured using closing prices as a percentage of bid price for 13 sample ETF-years. As the accounting standards required bid prices to be used, this is effectively an overstatement of the fair value of investments.

^b The change in carrying amount has been calculated as the difference between the carrying amount of investments measured using closing prices and the carrying amount of investments measured using bid prices as a percentage of closing price for 2 sample ETF-years. As the accounting standards required bid prices to be used, no under or overstatement resulted in this case.

Table 2: Descriptive statistics relating to the bid-ask spread*Panel A: Size of various spreads for listed equity investments*

Year	N	Bid-ask spread ^a		Bid-close spread ^b		Close-ask spread ^c		Midpoint-close spread ^d	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median
2010	4	0.346%	0.349%	0.236%	0.196%	-0.110%	-0.109%	-0.063%	-0.041%
2011	14	0.309%	0.324%	0.177%	0.170%	-0.132%	-0.134%	-0.020%	-0.014%
2012	16	0.304%	0.264%	0.162%	0.124%	-0.143%	-0.121%	-0.009%	-0.009%
2013	18	0.352%	0.327%	0.192%	0.170%	-0.160%	-0.147%	-0.016%	-0.010%
<i>Overall</i>	52	<i>0.325%</i>	<i>0.322%</i>	<i>0.182%</i>	<i>0.167%</i>	<i>-0.143%</i>	<i>-0.144%</i>	<i>-0.018%</i>	<i>-0.010%</i>

Panel B: Relative size of selected spreads for listed equity investments

Year	N	Bid-ask spread ^a				Bid-close spread ^b			
		Percentage of net assets		Percentage of net income		Percentage of net assets		Percentage of net income	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median
2010	4	0.346%	0.349%	1.844%	1.840%	0.236%	0.195%	1.083%	1.099%
2011	14	0.308%	0.324%	7.052%	3.750%	0.176%	0.169%	3.868%	2.139%
2012	16	0.304%	0.264%	3.610%	1.954%	0.161%	0.122%	1.933%	1.164%
2013	18	0.351%	0.326%	4.581%	2.514%	0.191%	0.170%	2.614%	1.422%
<i>Overall</i>	52	<i>0.324%</i>	<i>0.317%</i>	<i>4.737%</i>	<i>2.412%</i>	<i>0.181%</i>	<i>0.166%</i>	<i>2.625%</i>	<i>1.416%</i>

Panel C: Comparison of listed equity investments measured at different prices within the bid-ask spread

	Close	Ask	Midpoint
Bid	***-3.518 (0.001)	***-3.609 (0.001)	***-3.611 (0.001)
Close		***-3.480 (0.001)	-0.154 (0.879)
Ask			***3.608 (0.001)

Significance of differences between the alternative measurement bases have been assessed with reference to a paired sample ANOVA.

^a The bid-ask spread is calculated as a percentage of the midpoint price.

^b The bid-close spread is calculated as a percentage of the bid price.

^c The close-ask spread is calculated as a percentage of ask price.

^d The midpoint-close spread is calculated as a percentage of the midpoint price.

*** Significant at the one percent level (p-values for two-tailed significance are indicated in brackets)

Table 3: Descriptive statistics of regression variables

	N	Mean	Median	Standard deviation	Minimum	Maximum
<i>Panel A: Full sample</i>						
		ZAR '000	ZAR '000	ZAR '000	ZAR '000	ZAR '000
MVClose	52	926 554	150 127	2 005 499	4 658	8 847 108
TAadj	52	5 894	1 542	13 020	-126	80 767
TL	52	5 679	793	13 309	1	82 293
INVbid	52	924 022	148 492	2 002 939	4 608	8 840 330
INVclose	52	925 550	148 825	2 005 848	4 620	8 856 199
<i>Panel B: ETF-years with bid prices available</i>						
		ZAR '000	ZAR '000	ZAR '000	ZAR '000	ZAR '000
MVClose	29	1 543 504	543 605	2 525 622	12 760	8 847 108
MVBid	29	1 539 052	543 605	2 525 192	12 300	8 847 108
TAadj	29	10 126	2 672	16 324	101	80 767
TL	29	9 994	2 672	16 702	18 159	82 293
INVbid	29	1 541 124	541 600	2 522 341	12 677	8 840 330
INVclose	29	1 543 671	543 385	2 525 933	12 698	8 856 199
MVClose	Market capitalisation at reporting date, based on closing prices.					
MVBid	Market capitalisation at reporting date, based on bid prices.					
TAadj	Total assets at reporting date, adjusted to exclude the carrying amount of investments.					
TL	Total liabilities at reporting date.					
INVbid	Fair value of listed equity investments, calculated using bid prices at reporting date.					
INVclose	Fair value of listed equity investments, calculated using closing prices at reporting date.					

Table 4: Univariate correlations for analysis of competing measurement bases

	MVClose	TAadj	TL	INVbid	INVclose
MVClose		***0.878 (<0.001)	***0.883 (<0.001)	***1.000 (<0.001)	***1.000 (<0.001)
TAadj	***0.931 (<0.001)		***0.999 (<0.001)	***0.878 (<0.001)	***0.877 (<0.001)
TL	***0.931 (<0.001)	***0.950 (<0.001)		***0.882 (<0.001)	***0.882 (<0.001)
INVbid	***1.000 (<0.001)	***0.932 (<0.001)	***0.933 (<0.001)		***1.000 (<0.001)
INVclose	***1.000 (<0.001)	***0.932 (<0.001)	***0.933 (<0.001)	***1.000 (<0.001)	
N	52				

MVClose Market capitalisation at reporting date, based on closing prices.

TAadj Total assets at reporting date, adjusted to exclude the carrying amount of investments.

TL Total liabilities at reporting date.

INVbid Fair value of listed equity investments, calculated using bid prices at reporting date.

INVclose Fair value of listed equity investments, calculated using closing prices at reporting date.

Pearson correlations are presented above the diagonal and Spearman correlation below the diagonal.

* Significant at the ten percent level ** Significant at the five percent level *** Significant at the one percent level
(p-values for two-tailed significance are indicated in brackets)

Table 5: Comparative value-relevance of fair values of listed equity investments

	Predicted sign	Full sample		EFT-year with bid prices available			
		MVClose as dependent		MVClose as dependent		MVBid as dependent	
		Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
TAadj	+	**2.118 (0.039)	**2.256 (0.011)	2.514 (0.119)	*2.611 (0.063)	2.736 (0.214)	2.923 (0.162)
TL	-	*-1.678 (0.098)	** -1.939 (0.027)	-2.057 (0.197)	-2.284 (0.101)	-2.668 (0.226)	-2.983 (0.155)
INVclose	+	***0.998 (<0.001)		***0.998 (<0.001)		***0.999 (<0.001)	
INVbid	+		***1.000 (<0.001)		***1.000 (<0.001)		***1.002 (<0.001)
N		50	50	28	28	28	28
Structural R ²		100%	100%	100%	100%	100%	100%
Vuong-test (t-stat)			** -2.594 (0.013)		** -2.624 (0.014)		-1.529 (0.138)

MVClose Market capitalisation at reporting date, based on closing prices.
MVBid Market capitalisation at reporting date, based on bid prices.
TAadj Total assets at reporting date, adjusted to exclude the carrying amount of investments.
TL Total liabilities at reporting date.
INVclose Fair value of listed equity investments, calculated using closing prices at reporting date.
INVbid Fair value of listed equity investments, calculated using bid prices at reporting date.

The Vuong-test (Vuong, 1989) is directional. Positive test statistics indicate that the first model is superior to the second model, while negative test statistics indicate that the second model is superior to the first model.

* Significant at the ten percent level ** Significant at the five percent level *** Significant at the one percent level
(p-values for two-tailed significance are indicated in brackets)

Table 6: Value-relevance of the bid-close spread

	Predicted sign	Full sample MVClose as dependent	EFT-year with bid prices available	
			MVClose as dependent	MVBid as dependent
TAadj	+	***2.458 (0.002)	**2.854 (0.027)	3.140 (0.136)
TL	-	***-2.374 (0.003)	** -2.755 (0.033)	-3.306 (0.121)
INVclose	+	***1.004 (<0.001)	***1.004 (<0.001)	***1.004 (<0.001)
INVDiff	?	***-2.676 (<0.001)	***-2.763 (<0.001)	*-1.826 (0.075)
N		50	28	28
Structural R ²		100%	100%	100%

MVClose	Market capitalisation at reporting date, based on closing prices.
MVBid	Market capitalisation at reporting date, based on bid prices.
TAadj	Total assets at reporting date, adjusted to exclude the carrying amount of investments.
TL	Total liabilities at reporting date.
INVclose	Fair value of listed equity investments, calculated using closing prices at reporting date.
INVDiff	Difference between the fair value of listed equity investments, calculated using closing prices at reporting date, and the fair value of listed equity instruments, calculated using bid prices at reporting date.

The Vuong-test (Vuong, 1989) is directional. Positive test statistics indicate that the first model is superior to the second model, while negative test statistics indicate that the second model is superior to the first model.

* Significant at the ten percent level ** Significant at the five percent level *** Significant at the one percent level
(p-values for two-tailed significance are indicated in brackets)