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The influence of investor sentiment on stock prices among industries in the US

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Abstract: Research has shown that company-specific fundamental valuation factors impact stock prices, including diluted earnings (DEPS), book value (BV), and dividends (DIV) on a per-share basis. Free cash flow (FCF) has also been investigated, albeit not as extensively. Recently, investor sentiment, a behavioural factor, has been studied. Using the ordinary least square (OLS) method, this study explores the impact of company-specific fundamental valuation factors on stock prices of firms in significant industries in the US, for which investor sentiment is statistically significant. The results indicate that the industry variable is significant in the stock price. Further, investor sentiment, specifically whether it is optimistic or pessimistic, is significant in two industries, finance and manufacturing. Finally, the significance of the valuation factors differed based on investor optimism, for which all included variables are significant, and investor pessimism, for which only earnings-based factors are significant in the finance sector but not in manufacturing.

Keywords: investor sentiment; psychological factors; stock price; diluted earnings; book value; dividends; free cash flow; FCF.

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1 Introduction

Fundamental analysis of a stock's intrinsic value utilises information specific to a particular company, such as earnings, book value, dividends, and cash flows (Chavan and Patil, 2013). These valuation factors have been well studied and while some variances exist, they have been shown to have an effect on stock price. Macroeconomic factors such as exchange rates, consumer price index, inflation, and unemployment rates have also been shown to influence stock markets (Azar, 2014; Jasra et al., 2012; Ozlen, 2014). While important, these rational type factors are not the only category of influence on stock values. Physiological factors also play a role (Chavan and Patil, 2013).

The field of behavioural finance is an area of research that seeks to explain investor behaviour from a social science perspective (Kourtidis et al., 2015; Lopez-Cabarcos et al., 2019). Several areas of interest have emerged. For example, studies have been conducted to explore calendar-based return patterns (Khan et al., 2017; Rossi and Fattoruso, 2017). This behaviour, if significant, would violate the efficient market hypothesis. The results have varied. A paper by Rossi and Gunardi (2018) focused on several European countries and displayed a lack of significance, while Khan et al. (2017) noted a small positive impact in Pakistan during Ramadan. Another area of interest, and the focus of this paper, is investor sentiment, which involves the attitude of investors toward a firm's stock, based on factors other than fundamental valuation factors (Baker and Wurgler, 2007). While an established area of study, a precise agreed upon measure of optimism continues to be explored (Baker and Wurgler, 2006). This study examines the effect of investor sentiment on stock price, by industry, for companies in the US. Further, investor sentiment is explored for firms that investors display optimism vs. pessimism. Included are traditional fundamental valuation factors, DEPS, BV, DIV, and FCF, to explore their significance, by industry, under both positions of investor sentiment, optimism and pessimism.

2 Literature review and hypotheses

Early studies of financial markets focused on models that relied on informed rational investors (Grossman and Stiglitz, 1980; Townsend, 1983). Subsequent studies identified fundamental valuation factors. These included, among other things, diluted earnings per share or DEPS (Alam et al., 2016; Bepari et al., 2013; Warrad, 2017), book value per share or BV (Alam et al., 2016; Bepari et al., 2013; Sharif et al., 2015), dividends per share or DIV (Sharif et al., 2015; Warrad, 2017), and free cash flow (FCF) per share or FCF (Asif et al., 2016; Bepari et al., 2013; Kumar and Krishnan, 2008; Oroud et al., 2017; Tahat and Alhadab, 2017).

The sector, or industry, has also been researched, mostly focusing on macroeconomic factors (Hong et al., 2007; Ponka, 2017). These include exchange rates, consumer price index, interest rates (Jasra et al., 2012), unemployment rates, and current account deficits (Ozlen, 2014) among others. However, although these factors remain important determinants of stock price, these models failed to explain many stock market events and researchers began to look at behavioural factors to provide an enhanced alternative (De Long et al., 1990). What emerged is a rich body of literature reflecting the empirical impact of a construct generally referred to as investor sentiment.

2.1 Fundamental valuation factors of stock price

One of the most consistently significant valuation factors in terms of stock price is DEPS. Studies conducted in numerous countries, under differing economic conditions, and various industries report this variable as statistically significant (Alam et al., 2016; Bepari et al., 2013; Kumar and Krishnan, 2008; Tahat and Alhadab, 2017). However, under some conditions, such as emerging markets in Bahrain (Sharif et al., 2015) and Jordanian banks (Warrad, 2017), it has been found to be insignificant.

Another primary valuation factor is BV. Many, but not all, of the same studies that noted statistical significance for DEPS also reported BV as consistently statistically significant. Alam et al. (2016), Bepari et al. (2013), Tahat and Alhadab (2017) and Warrad (2017). However, even this basic financial measure was at times insignificant (Musallum, 2018).

Many studies have investigated DIV for its impact on stock price, with most reporting positive significance (Margaretha and Firzitya, 2015; Osundina et al., 2016; Warrad, 2017). Yet, Sharif et al. (2015) noted a negative impact on stock price in the developing market in Bahrain. Finally, a study of firms in Qatar reported DIV was not statistically significant (Musallum, 2018).

Cash flows, and specifically FCF, has received somewhat less attention in the literature as a determinant of stock prices than the factors previously discussed. When included, FCF was mostly positively significant (Asif et al., 2016; Bepari et al., 2013; Kumar and Krishnan, 2008; Oroud et al., 2017; Tahat and Alhadab, 2017). However, its significance varied by country and possibly by accounting reporting standard (Whitten and Brahmasrene, 2019). Based on the differing results regarding traditional valuation factors in studies involving stock price determinants, further research continues to add to the literature.

2.2 Industry factors

The impact of industry on stock prices includes a number of differently focused studies. One area of research involves the ability of certain industries to predict market returns. In a paper on individual industry returns and the potential of selected industries to predict stock market movements, the authors found that 14 out of the 34 industries studied, forecasted the US market (Hong et al., 2007). These included retail, finance, and services, among others. Ponka (2017) built on Hong et al.'s paper by looking at the directional predictability of industry data. The findings resulted in fewer significant industries, with the finance sector still among them.

Another area of focus is how fundamental valuation factors differ in significance by industry. For example, a study of the coal mining industry in Indonesia reported that

when examined individually, earning per share (EPS) was significant in terms of stock price, but return on assets (ROA) was not (Idawati and Wahyudi, 2015). However, when examined jointly, both were positively significant. For selected industries in Pakistan, including sugar, food, chemical, and energy, dividend yield, dividend payout, EPS, and profit were all significant, while return on equity (ROE) was not (Hunjra et al., 2014). Interestingly, dividend yield had a positive impact on stock price, while dividend payout had a negative influence. Automobile and IT industries in India were studied with EPS, BV, and price earnings (PE) ratio reporting statistical significance, but dividend yield was not (Geetha and Swaaminathan, 2015).

Finally, macroeconomic variables have been investigated using time series data for their impact on particular industries. Research on four industries in Pakistan revealed that several macroeconomic factors, such as exchange rates, consumer price index, and interest rates differ in significance by industry (Jasra et al., 2012). Ozlen's (2014) study of firms in Istanbul showed that industry presents implications in terms of the significance of the same factors mentioned in the previous study and several others, such as the unemployment rate and current account deficit. For US markets, two studies on macroeconomic factors revealed significant variables on stock price. First, Azar (2014) found that inflation, inflation uncertainty, and foreign exchange rates influence US stock market returns. Additionally, Antonakakis et al. (2013) reported that policy uncertainty, oil price shocks, and recessions all impacted the market. Clearly, the influence of industry on stock prices is an area worthy of further study. As such, the literature influenced the hypotheses noted in the next section.

2.3 Investor sentiment and stock price

While fundamental valuation, using company-specific data, remains an important factor in stock prices, behavioural factors also play a role (Chavan and Patil, 2013). The field of behavioural finance is defined as a social science perspective and analyses the behaviour of investors from a psychological standpoint (Lopez-Cabarcos et al., 2019). The area has experienced an increase in interest, as evidenced by the rapid growth in published papers, while continuing to lack concurrence in some areas. As such, continued research is warranted.

A specific area of this behavioural field involves investor sentiment, which is defined as the attitude of investors towards a firm's potential, in terms of cash flows and risks, not based on fundamental valuation factors (Baker and Wurgler, 2007). This behavioural construct reflects the optimism, or pessimism, of investors (Baker and Wurgler, 2006).

Studies have focused on several areas regarding sentiment. For example, Baker and Wurgler (2007) looked at predicting stock returns using sentiment. Gupta (2019) established that manager sentiment is related to investor sentiment and that it can predict both returns and volatility. Rapp (2019) distinguished sentiment from mood and determined they have different empirical impacts. Mukherjee and De (2019) focused on the degree of rationality, vs. non-rationality, and the balance between the two positions. Murphy and Fu (2019) explained what initiates calendar month effects and the interrelationship between items including collective market sentiment.

Currently, the literature on the relationship between investor sentiment and stock prices has led to the well-accepted conclusion that investor sentiment can explain some of the divergence of stock prices from the fundamentals (Baker and Wurgler, 2007; Shefrin, 2008). Several proxies have been identified to represent investor sentiment and these

have been applied to single stocks, industries, and the market as a whole (Chen et al., 2013; Jame and Tong, 2014; Joseph et al., 2011). Further, there is evidence that the relationship between stock returns and sentiment may differ for optimistic vs. pessimistic regimes (Chen et al., 2013). To date, there lacks a consensus on a single measure of the metric (Baker and Wurgler, 2006; Concetto and Ravazzolo, 2019).

This study utilises an enhanced version of the stock-specific, market-based measure used by Rapp (2019), which includes the stock price to book ratio. High ratios are an indicator of investor optimism that a particular company will produce more benefit from their assets than another company with a lower ratio (Donnelly, 2014). Quantitatively, price to book ratios that equal one or more are an indication of optimism, and those with values below one are interpreted to be a sign of pessimism (“Price-to-Book or P/B Ratio”, n.d.; Papakyriakou et al., 2019). Building on these studies, this paper used an indicator variable for the investor sentiment variable, with 1 indicating optimism and 0 to represent pessimism. Hence, based on the issues and discussion raised in this section and the previous one, the following hypothesis is generated for further verification:

Hypothesis 1: The stock prices of US firms are affected by DEPS, BV, DIV, FCF, investor sentiment variable (optimism = 1; pessimism = 0), and industry sector indicator variable (industry = 1; otherwise 0) for finance, manufacturing, retail wholesale, and service industry sectors, ceteris paribus.

Although investor sentiment has been researched as a predictor, it may also reveal investors attitudes, in select industries, towards variables that have been significant on stock price in previous studies. These include diluted earnings per share (DEPS), book value per share (BV), dividends per share (DIV), free cash flow per share (FCF), and investor sentiment. Recall the study, discussed in the previous section, of firms in Istanbul, which noted that industry presents implications in terms of the significance of other factors noted in the literature (Ozlen, 2014). Thus, guided by the literature, three additional hypotheses are developed:

Hypothesis 2: The stock prices of US firms for the industry sectors of financing, manufacturing, retail wholesale, and service are affected by the investor sentiment indicator variable (optimism = 1; pessimism = 0), ceteris paribus.

Hypothesis 3: There exists a difference in impact of DEPS, BV, DIV, and FCF on stock price when investor sentiment is optimistic for firms in the US for the industry sectors of finance and manufacturing.

Hypothesis 4: There exists a difference in impact of DEPS, BV, DIV, and FCF on stock price when investor sentiment is pessimistic for firms in the US for the industry sectors of finance and manufacturing.

3 Methodology and data

To test the hypotheses in this study, the ordinary least square (OLS) method was employed. Data was collected using the Wharton Research Data Services (WRDS). Search criteria included companies with fiscal year ends in 2018. Since the majority of studies on investor sentiment have focused on US market, due to its influence, the search criteria included only companies in the US (Concetto and Ravazzolo, 2019). Therefore,

due to the use of cross-sectional data that focuses on one country, US, macroeconomic factors were not included. The search returned a population of 1670 companies. The data was tested for outliers, which resulted in the removal of six firms for a sample size of 1664 companies.

Three variables were computed. First, free cash flow (FCF) per share was calculated using a common measure utilised by analysts, operating cash flows minus capital expenditures (Pizam, 2010; “The Ultimate”, 2018). Next, a measure of company specific investor sentiment employed the method described by Rapp (2019), the individual stock’s price to book ratio. The ratio was then converted to an indicator variable where a ratio of 1 or above was interpreted as a sign of optimism, and below 1, an indication of pessimism (“Price-to-Book-P/B Ratio”, n.d.; Papakyriakou et al., 2019). Finally, four dummy industry variables were constructed for finance (FIN = 1, 0 otherwise), manufacturing (MANU = 1, 0 otherwise), retail wholesale (RETWHS = 1, 0 otherwise), and services (SERV = 1, 0 otherwise).

4 Results and discussion

Table 1 presents summary statistics of the variables in this study while a list of correlation among the variables is also reported in Table 2. The expected correlation among stock price (SP), diluted earnings per share (DEPS), FCF per share, book value per share (BV), and dividends per share (DIV) are evident in the associations. Furthermore, all models are tested for the assumption of linear multiple regression and fitness by the residual analysis with no apparent violation in the pattern of the plot in residuals and independent variables.

Table 1 Summary statistics of the variables

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>
SP	1664	0.0003	283.5800	27.361926
DEPS	1664	-47.5200	69.5900	0.5675
FCF	1664	-42.8222	37.7334	0.7594
BV	1664	-127.4366	202.8994	10.9383
DIV	1664	0.0000	10.6500	0.426724
Valid N (listwise)	1664			

According to the computed values of a multiple regression model in Table 3, the null hypothesis is rejected with a statistically significant $p < 0.001$ (F test = 217.487). This means that there exists a relationship between stock price and the explanatory variables; the company’s DEPS, FCF, BV, DIV, all four industries (FIN, MANU, RETWHS, SERV), and investor sentiment. Furthermore, significant test (t-test) for each independent variable indicates that DEPS, FCF, BV, DIV, FIN, SERV and investor sentiment are statistically significant at $p < 0.001$ while significant t value of MANU, RETWHS are statistically significant at $p < 0.01$ and 0.05, respectively. In brief, all variables positively impact stock price, with the exception of FIN which has a negative impact. The coefficient of multiple determination (R Square = 0.542) indicated that 54.2% of variation in the stock price could be explained by the variations of these variables.

Table 2 Correlation matrix of the variables

		<i>SP</i>	<i>DEPS</i>	<i>FCF</i>	<i>BV</i>	<i>DIV</i>
SP	Pearson Correlation	1	0.297**	0.373**	0.574**	0.533**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	1664	1664	1664	1664	1664
DEPS	Pearson Correlation	0.297**	1	0.133**	0.210**	0.221**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	1664	1664	1664	1664	1664
FCF	Pearson Correlation	0.373**	0.133**	1	0.211**	0.272**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
	N	1664	1664	1664	1664	1664
BV	Pearson Correlation	0.574**	0.210**	0.211**	1	0.382**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
	N	1664	1664	1664	1664	1664
DIV	Pearson Correlation	0.533**	0.221**	0.272**	0.382**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	N	1664	1664	1664	1664	1664

**Correlation is significant at the 0.01 level (2-tailed).

Table 3 Regression analysis of both optimism and pessimism

<i>Variables</i>	<i>Coefficients</i>	<i>Std. error</i>
(Constant)	-0.585	1.591
DEPS	0.819***	0.126
FCF	1.664***	0.164
BV	0.857***	0.040
DIV	12.766***	0.783
FIN	-6.240***	1.883
MANU	4.853**	1.630
RETWHS	5.639*	2.519
SERV	8.528***	1.985
Sentiment	12.462***	1.361
R Square	0.542	
F Test	217.487***	

Dependent variable is stock price.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

These four significant industries are further investigated to determine whether investor sentiment influences stock price in each of these industries. The number of companies in each industry are 307 for finance (FIN), 607 in manufacturing (MANU), 123 under retail and wholesale (RETWHS), and 263 companies in services (SERV).

Due to the highly significant ($p < 0.001$) as F test for FIN, MANU, RETWHS and SERV at 120.679, 191.273, 59.272 and 87.254 respectively, the null hypothesis is rejected so that among these industries, there is relationship between the stock price and the explanatory variables. As shown in Table 4, the results of the four regression models are highly significant for all four industries with $p < 0.001$, while R Square for each industry, FIN, MANU, RETWHS and SERV, reports 0.666, 0.614, 0.715 and 0.628, respectively. However, investor sentiment has a significant influence on stock price in FIN and MANU, but does not appear to be a significant predictor in RETWHS and SERV industry. Therefore, these two industries are not included in the subsequent analysis to explore the relationship of DEPS, FCF, BV, and DIV by industry. Due to the significance of the investor sentiment indicator variable, the next step dissects investor sentiment into optimistic and pessimistic behaviour. The number of companies under study for optimism is 201 firms for finance and 475 firms for manufacturing, while for pessimism there are 105 companies in finance and 131 companies in manufacturing.

Table 4 Regression analysis both optimism and pessimism by industry

<i>Variables</i>	<i>FIN</i>		<i>MANU</i>		<i>RETWHS</i>		<i>SERV</i>	
	<i>Coef.</i>	<i>Std. error</i>	<i>Coef.</i>	<i>Std. error</i>	<i>Coef.</i>	<i>Std. error</i>	<i>Coef.</i>	<i>Std. error</i>
(Constant)	1.326	1.913	3.931*	2.034	12.340***	3.566	5.531	3.272
DEPS	6.401***	0.726	0.956*	0.400	9.804***	1.119	1.086**	0.437
FCF	0.326	0.228	2.500***	0.486	0.341	0.727	2.676***	0.357
BV	0.321***	0.068	1.155***	0.093	0.046	0.157	1.508***	0.115
DIV	9.726***	1.396	14.801***	1.507	10.103***	1.711	14.614***	2.701
Sentiment	8.758***	2.161	8.073***	2.388	3.192	4.631	5.933	3.834
R Square	0.666		0.614		0.715		0.628	
F Test	120.679***		191.273***		59.272***		87.254***	

Dependent variable is stock price.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The results in Table 5 imply the existence of difference in terms of investor sentiment projecting on key financial variables such as DEPS, FCF, BV, and DIV. Table 5 displays how these variables affect stock price under investor sentiment with optimism, while Table 6 represents investor sentiment with pessimism.

The results of a multiple regression for FIN model in Tables 5 and 6 indicate rejection of the null hypothesis at $p < 0.001$. As a result, there is relationship between stock price and the explanatory variables. While all explanatory variables, DEPS, FCF, BV, and DIV, in varying degrees, affect stock prices for optimistic sentiment (i.e., DEPS $p < 0.01$, FCF $p < 0.05$, BV and DIV $p < 0.001$), only two variables, DEPS and DIV, are significant under pessimistic sentiment, with $p < 0.01$. In addition, the coefficient of multiple determination (R Square = 0.839 and 0.313) indicated that 83.9% of variation in the stock price can be explained by the variations of the company's DEPS, FCF, BV, and DIV if investor sentiment is optimistic while only 31.3% under pessimism.

Table 5 Regression analysis with optimism

Variables	FIN		MANU	
	Coef.	Std. error	Coef.	Std. error
(Constant)	0.589	1.419	9.302***	1.507
DEPS	2.289**	0.823	1.616**	0.566
FCF	0.420*	0.201	1.700**	0.579
BV	1.288***	0.107	1.503***	0.115
DIV	7.360***	1.314	13.884***	1.676
R Square	0.839		0.634	
F Test	256.334***		204.704***	

Dependent variable is stock price.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6 Regression analysis with pessimism

Variables	FIN		MANU	
	Coef.	Std. error	Coef.	Std. error
(Constant)	8.243***	2.139	5.370***	0.777
DEPS	3.868**	1.204	0.032	0.214
FCF	0.232	0.440	-0.041	0.501
BV	0.087	0.076	0.038	0.066
DIV	6.426**	2.425	4.398*	1.841
R Square	0.313		0.052	
F Test	11.506***		1.727	

Dependent variable is stock price.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

For the manufacturing model under optimism, the null hypothesis is rejected due to the significant F test displayed in Table 5 ($F = 204.704$, $p < 0.001$). Therefore, when investor sentiment is optimistic, there is relationship between stock price and the explanatory variables. Further investigation of t-test for each independent variable indicate that DEPS and FCF are significant with $p < 0.01$, while BV and DIV are highly significant with $p < 0.001$. In effect, the stock price is positively and significantly related to the company's DEPS, FCF, BV, and DIV. In addition, the coefficient of multiple determination (R Square = 0.634) indicates that 63.4% of variation in the stock price could be explained by the variations of the company's DEPS, FCF, BV, and DIV.

However, for manufacturing, under investor sentiment with pessimism (Table 6, MANU), the results of a multiple regression model for this hypothesis implies acceptance of the null hypothesis at $p > .05$. As a result, there is no relationship between stock price and the explanatory variables; DEPS, FCF, BV, and DIV.

5 Contribution and implication

This study adds to the literature on investor sentiment by examining highly significant fundamental valuation factors on stock price within significant industries that are impacted by investor sentiment. Most studies involving pricing have focused on time-series data on markets or countries (Escobari and Jafarinejad, 2019; Murphy and Fu, 2019). These studies cannot pick out differences within a group and tend to focus on a very small number of variables, at times as few as one (Chen et al., 2016). In addition, they are considered appropriate for studies interested in forecasting, with some models encountering problems. This study focused on the impact of investor sentiment on stock prices for specific firms within a particular country, US. Although fewer in number, research involving pricing have used cross-sectional data when appropriate (Duca and Whitesell, 1995; Fischer, 2013; Lillis and Mundy, 2005). This is important since studies using cross-sectional data of a particular population have advantages. For example, while significant variables are not to be inferred as causal, the results allow for inferences regarding possible relationships and support further research into specific areas of interest (Wang and Cheng, 2020). This paper contributes an approach that explores the significance of valuation factors separately under conditions of investor optimism vs. pessimism. Moreover, the results of this study present a highly significant difference. Contributions and implications are detailed below:

- 1 This study reports that four industry sectors in the US are statistically significant on stock price. These include finance, manufacturing, retail wholesale, and service. The results of this study are mostly supported by Hong et al. (2007) which found significance for retail, finance, and services, and Ponka (2017) for which finance was significant. Further, finance has a negative impact on stock price, while manufacturing, retail wholesale, and service have a positive impact.
- 2 The findings in this study include information on the significance of fundamental valuation factors and shows that they differ by industry. The results are in keeping with Idawati and Wahyudi (2015), Hunjra et al. (2014), and Geetha and Swaminathan (2015). While this topic has been addressed in several studies, and it is understood that these factors vary by country, this study provided additional information in this area. The data provided includes information regarding industry sectors in the US that are significant in terms of stock price and the fundamental valuation factors that are significant in each of these industries.
- 3 The results of this study reported that investor sentiment is significant for two of the four significant industries, namely finance and manufacturing. This allowed exploration of differences between firms for which investors were more optimistic about vs. those they displayed pessimism towards, which leads to the next contribution.
- 4 This study explores investor sentiment under conditions of optimism separate from those for which pessimism is demonstrated. The results indicate a significant difference. First, for finance under both optimism and pessimism the model is significant, but for manufacturing only the optimism model is significant. This indicates that investors demonstrating pessimism towards specific firms in the manufacturing sector seem to be looking at factors other than those included in traditional company specific analyses.

- 5 Then, the models under optimism for finance and manufacturing reveal significance for all four fundamental valuation factors, including FCF. This finding is interesting because under accounting reporting standards in the US, cash flow reporting is prohibited in a company's financial statements.
- 6 Next, under pessimism for the finance sector, only earnings per share and dividends are significant, while cash flow per share and book value are not. This indicates that investors may be taking an earnings outlook, rather than an asset approach, when pessimistic investor sentiment exists.
- 7 Finally, information on differences in the significance of FCF under each of these conditions is presented. Specifically, for firms in the financing sector when investor sentiment reveals optimism, FCF per share is significant, but it is not significant for firms in this sector when pessimism is demonstrated. For the manufacturing sector, the same can be said in terms of optimism, FCF per share is significant, but for pessimism, no conclusion can be drawn due to the insignificance of the model. This is important as it demonstrates the impact of investor behaviour separate from fundamental valuation factors, and therefore indicates that investor sentiment may need to be viewed separately when there is an indication of optimism as opposed to pessimism.

6 Conclusions and recommendations

The results of this research provides information on the impact of fundamental valuation factors and a behavioural factor, investor sentiment, on stock price within significant industries, in the US, for which optimism vs. pessimism is significant. Specifically, four industry sectors are found to have a statistically significant impact on stock price, finance, manufacturing, retail wholesale, and service. However, investor sentiment is only significant in finance and manufacturing. Further, while the model for optimism is significant for both sectors, it is only significant for the finance sector under pessimism. Additionally, for the significant models, the explanatory power of the models is much higher under optimism than for pessimism, which indicates factors not included must impact stock prices more when investors are pessimistic, rather than optimistic, towards particular firms within that sector.

Regarding significant industry sectors, one major difference emerges. While manufacturing, retail wholesale, and service are all positively significant on stock price, finance is negatively significant. This means that by virtue of being a firm in the finance sector, stock prices are lower, whereas in the other industries it is higher. This result is not surprising since the finance sector is somewhat different than other industries, namely the business revolves around managing money rather than providing goods and services. Also, many firms in the sector are banks and therefore their operations are influenced in part by the Federal Reserve monetary policies in the US. These policies include managing interest rates and affecting the availability of credit, influences not present in other industries. Another possible reason could be the continued impact from the 2008 global financial crisis, which had an effect on long term finance regardless of whether or not a particular country experienced a systematic banking crisis (Demirguc-Kunt et al., 2015).

In terms of fundamental valuation factors, the results for finance indicate that while all of the fundamental valuation factors included are significant under investor optimism, albeit at varying level of confidence, only DEPS and DIV are significant under pessimism. This indicates that investors look to different fundamental valuation factors depending on the investor sentiment towards that firm. Specifically, FCF and book value are significant under optimism, but not when pessimism exists. This is important since it indicates that investors are interested in cash and assets under optimism, but not so for pessimism. When pessimistic about a particular firm within the finance industry, the most basic and widely studied fundamental valuation factors, earnings per share and dividends matter, but cash flow and book value per share do not.

For manufacturing, the results indicate similar results under optimism, but a different situation emerges for pessimism. For optimism, the same four valuation factors were significant, at similar levels of confidence, even as the explanatory power of the model is a bit lower, 63.4% of the variance explained vs. 83.9% for finance. Under pessimism, the model revealed no relationship between the stock price and the valuation variables included in this study, DEPS, FCF, BV, and DIV. Therefore, different factors explain stock prices in the manufacturing sector under investor optimism and pessimism. This may be partially explained by the shift in the US beginning in 1970s from a manufacturing economy to more service providing industries (Ghanbari and McCall, 2016). Perhaps investors remain confident regarding certain companies within the industry, and therefore rely on fundamental valuation factors, but others may be regarded as having a less favourable outlook due to the shift in the economy and, as such, different factors drive those stock prices.

Finally, significance of FCF varied among significant industries. In particular, it is significant for manufacturing and service sectors, but not for finance and retail wholesale. That it is significant for any industry in the US is revealing due to the prohibition of the Financial Accounting Standards Board (FASB) demonstrates towards firms reporting this information in their financial statements. Further, the significance of FCF varied under optimistic vs. pessimistic investor sentiment. For firms in the financing sector under investor optimism, FCF per share is significant, but it is not significant under pessimism. The manufacturing sector is the same under optimism, statistically significant, but under pessimism no conclusion can be determined since the model is insignificant.

7 Future research

The models for optimism display a high level of explanatory power for the included variables, 83.9% of the variation in stock price explained for finance firms and 63.4% for manufacturing, vs. only 31.3% explained with the significant model for finance firms under pessimism and insignificant for manufacturing. As such, this area of research may benefit from further study under these two diverse levels of investor sentiment. Continued research into the various measures of investor sentiment, and how best each of these measures might be included in studies, remains worthy of further investigation. Specifically, maintaining the goal of reaching some level of concurrence on the measure, and use, of this important influence on stock prices, should persist.

While this study focused on the company-specific level within selected industry sectors, the results lead to other possible areas of focus for this type of analysis, for

example at the market and country level. In addition, further examination of the impact of macroeconomic factors under optimism as opposed to pessimism seems justified. The difference in significant factors for finance and manufacturing sectors under optimism and pessimism indicates the need for further study regarding the behavioural construct of investor sentiment and its interrelatedness with fundamental valuation factors. Finally, the focus of investors on FCF under optimism, but not for pessimism, may be an indication of an interesting area to explore. This may be especially enlightening if reviewed under differing accounting reporting standards, especially in light of the divergence in attitude of the standard setters regarding cash flow reporting.

References

- Alam, S., Miah, M.R. and Karim, M.A. (2016) 'Analysis of factors that affect stock prices: a study on listed cement companies at Dhaka stock exchange', *Research Journal of Finance and Accounting*, Vol. 7, No. 18, pp.93–113.
- Antonakakis, N., Chatziantoniou, I. and Filis, G. (2013) 'Dynamic co-movements of stock market returns, implied volatility and policy uncertainty', *Economics Letters*, Vol. 20, pp.87–91.
- Asif, M., Arif, K. and Akbar, W. (2016) 'Impact of accounting information on share price: empirical evidence from Pakistan stock exchange', *International Finance and Banking*, Vol. 3, No. 1, pp.124–135.
- Azar, S.A. (2014) 'The determinant of US stock market returns', *Open Economics and Management Journal*, Vol. 1, pp.1–13.
- Baker, M. and Wurgler, J. (2006) 'Investor sentiment and the cross-section of stock returns', *The Journal of Finance*, Vol. 61, No. 4, pp.1645–1680.
- Baker, M. and Wurgler, J. (2007) 'Investor sentiment in the stock market', *Journal of Economic Perspectives*, Vol. 21, No. 2, pp.129–151.
- Bepari, K., Rahman, S. and Mollik, T.M. (2013) 'Value relevance of earnings and cash flows during the global financial crisis', *Review of Accounting and Finance*, Vol. 12, No. 3, pp.226–251.
- Chavan, P.S. and Patil, S.T. (2013) 'Parameters for stock market prediction', *Computer Technology and Applications*, Vol. 4, No. 2, pp.337–340.
- Chen, M., Chen, P. and Lee, C. (2013) 'Asymmetric effects of investor sentiment on industry stock returns: panel data evidence', *Emerging Markets Review*, Vol. 14, pp.35–54.
- Chen, Y., Cheng, C., Chin, C. and Huang, S. (2016) 'A study of ANFIS-based multifactor time series models for forecasting stock index', *Applied Intelligence*, Vol. 45, pp.277–292.
- Concetto, C.L. and Ravazzolo, F. (2019) 'Optimism in financial markets: stock market returns and investor sentiment', *Journal of Risk and Financial Management*, Vol. 12, No. 85, pp.1–14.
- De Long, J.B., Shleifer, A., Summers, L.H. and Waldmann, R.J. (1990) 'Noise trader risk in financial markets', *Journal of Political Economy*, Vol. 98, No. 4, pp.703–738.
- Demirguc-Kunt, A., Peria, M.S. and Tressel, T. (2015) *The Impact of Global Financial Crisis on Firm's Capital Structures* (Report No. 7522), Retrieved from <https://www.worldbank.org/en/publication/gfdr>
- Donnelly, R. (2014) 'The book-to-market ratio, optimism and valuation', *Journal of Behavioral and Experimental Finance*, Vol. 4, pp.14–24.
- Duca, J.V. and Whitesell, W.C. (1995) 'Credit cards and money demand: a cross-sectional study', *Journal of Money, Credit, and Banking*, Vol. 27, No. 2, pp.604–623.
- Escobari, D. and Jafarnejad, M. (2019) 'Investors' uncertainty and stock market risk', *Journal of Behavioral Finance*, Vol. 20, No. 3, pp.304–315.

- Fischer, K.F. (2013) 'Influences on administrative costs in convenience store chains: a cross-sectional activity-based study', *Academy of Accounting and Financial Studies Journal*, Vol. 17, No. 3, pp.71–100.
- Geetha, E. and Swaaminathan, T.M. (2015) 'A study on the factors influencing stock price: a comparative study of automobile and information technology industries stocks in India', *International Journal of Current Research and Academic Review*, Vol. 3, No. 3, pp.97–109.
- Ghanbari, L. and McCall, M. (2016) *Current Employment Statistics Survey: 100 Years of Employment, Hours, and Earnings*, Monthly Labor Review, U.S. Bureau of Labor Statistics. Retrieved from <https://doi.org/10.21916/mir.2016.38>.
- Grossman, S.J. and Stiglitz, J.E. (1980) 'On the impossibility of informationally efficient markets', *The American Economic Review*, Vol. 70, pp.393–408.
- Gupta, R. (2019) 'Manager sentiment and stock market volatility', *Journal of Management Information and Decision Sciences*, Vol. 22, No. 1, pp.10–12.
- Hong, H., Torous, W. and Valkanov, R. (2007) 'Do industries lead stock markets?', *Journal of Financial Economics*, Vol. 83, No. 2, pp.367–396.
- Hunjra, A.I., Ijaz, M.S., Chani, M.I., Hassan, S.U. and Mustafa, U. (2014) 'Impact of dividend policy, earnings per share, return on equity, profit after tax on stock prices', *International Journal of Economics and Empirical Research*, Vol. 2, No. 3, pp.109–115.
- Idawati, W. and Wahyudi, A. (2015) 'Effect of earnings per share (EPS) and return on assets (ROA) against share price on coal mining company listed in Indonesia stock exchange', *Journal of Resource Development and Management*, Vol. 17, pp.79–91.
- Jame, R. and Tong, Q. (2014) 'Industry-based style investing', *Journal of Financial Markets*, Vol. 19, pp.110–130.
- Jasra, J.M., Azam, R.I. and Khan, M.C. (2012) 'Impact of macroeconomic variables on stock prices: industry level analysis', *Actual Problems in Economics*, Vol. 134, No. 8, pp.403–412.
- Joseph, K., Wintoki, M.B. and Zhang, Z. (2011) 'Forecasting abnormal stock returns and trading volume using investor sentiment: evidence from online search', *International Journal of Forecasting*, Vol. 27, No. 4, pp.1116–1127.
- Khan, K., Nasir, M.A. and Rossi, M. (2017) 'The calendar anomalies on performance and volatility of stock market: the effects of Ramadan on Karachi stock exchange', *Global Business and Economics Review*, Vol. 19, No. 1, pp.54–69.
- Kourtidis, D., Sevic, Z. and Chatzoglou, P. (2015) 'Overconfidence and stock returns: a behavioural perspective', *International Journal of Behavioural Accounting and Finance*, Vol. 5, No. 1, pp.57–81.
- Kumar, K.R. and Krishnan, G.V. (2008) 'The value-relevance of cash flows and accruals: the role of investment opportunities', *The Accounting Review*, Vol. 83, No. 4, pp.997–1040.
- Lillis, A.M. and Mundy, J. (2005) 'Cross-sectional field studies in management accounting research: closing the gaps between surveys and case studies', *Journal of Management Accounting Research*, Vol. 17, pp.119–141.
- Lopez-Cabarcos, M.A., Perez-Pico, A.M., Vasquez-Rodriguez, P. and Lopez-Perez, M.L. (2019) 'Investor sentiment in the theoretical field of behavioural finance', *Economic Research*, Vol. 33, No. 3, pp.1–19.
- Margaretha, F. and Firzitya (2015) 'The effect of cash dividend, retained earnings, and stock price of manufacturing company listed in Indonesia stock exchange', *The Winners*, Vol. 16, No. 1, pp.36–43.
- Mukherjee, S. and De, S. (2019) 'When are investors rational?', *Journal of Behavioral Finance*, Vol. 20, No. 1, pp.1–18.
- Murphy, A. and Fu, L. (2019) 'An empirical analysis of investor confidence incorporated in market prices', *Journal of Behavioral Finance*, Vol. 20, No. 3, pp.267–293.
- Musallam, S.M. (2018) 'Exploring the relationship between financial ratios and market stock returns', *Eurasian Journal of Business and Economics*, Vol. 11, No. 21, pp.101–116.

- Oroud, Y.S., Islam, M.A. and Salha, T. (2017) 'The effect of cash flows on the share price on amman stock exchange', *American Based Research Journal*, Vol. 6, No. 7, pp.22–28.
- Osundina, J.A., Jayeoba, O.O. and Olayinka, I.M. (2016) 'Impact of accounting information on stock price volatility: a study of selected quoted manufacturing companies in Nigeria', *International Journal of Business and Management Invention*, Vol. 5, No. 11, pp.1–16.
- Ozlen, S. (2014) 'The effects of domestic macroeconomic determinants on stock returns: a sector level analysis', *European Researcher*, Vol. 81, pp.1551–1560.
- Papakyriakou, P., Sakkas, A. and Taoushiania, Z. (2019) 'Financial firm bankruptcies, international stock markets, and investor sentiment', *International Journal of Financial Economics*, Vol. 24, pp.461–473.
- Pizam, A. (2010) *International Encyclopedia of Hospitality Management*, 2nd ed., Elsevier, Burlington, MA.
- Ponka, H. (2017) 'Predicting the direction of US stock markets using industry returns', *Empirical Economics*, Vol. 52, No. 4, pp.1451–1480.
- Price-to-Book or P/B Ratio. (n.d.) Retrieved November 4, 2019, from Investopedia website: <https://www.investopedia.com/terms/p/price-to-bookratio.asp>
- Rapp, A. (2019) 'Sentiment versus mood; A conceptual and empirical investigation', *Journal of Capital Markets Studies*, Vol. 3, No. 1, pp.6–17.
- Rossi, M. and Fattoruso, G. (2017) 'The EMH and the market anomalies. An empirical analysis on Italian stock market', *International Journal of Managerial and Financial Accounting*, Vol. 9, No. 3, pp.222–241.
- Rossi, M. and Gunardi, A. (2018) 'Efficient market hypothesis and stock market anomalies: empirical evidence in four European countries', *Journal of Applied Business Research*, Vol. 34, No. 1, pp.183–192.
- Sharif, T., Purohit, H. and Pillai, R. (2015) 'Analysis of factors affecting share price: the case of Bahrain stock exchange', *International Journal of Economics and Finance*, Vol. 7, No. 3, pp.207–216.
- Shefrin, H. (2008) *A Behavioral Approach to Asset Pricing*, Elsevier Academic Press, New York, NY.
- Tahat, Y.A. and Alhadab, M. (2017) 'Have accounting numbers lost their value relevance during the recent financial credit crisis?', *The Quarterly Review of Economics and Finance*, Vol. 66, pp.182–191.
- The Ultimate Cash Flow Guide (2018) Retrieved from <https://corporatefinanceinstitute.com/resources/knowledge/valuation/cash-flow-guide-ebitda-cf-fcf-fcff/>
- Townsend, R.M. (1983) 'Forecasting the forecasts of others', *The Journal of Political Economy*, Vol. 91, No. 4, pp.546–588.
- Wang, X. and Cheng, Z. (2020) 'Cross-sectional studies: strengths, weaknesses, and recommendations', *Chest*, Vol. 1, pp.565–471.
- Warrad, L.H. (2017) 'The effect of market valuation measures on stock price: an empirical investigation on Jordanian banks', *International Journal of Business and Social Sciences*, Vol. 8, No. 3, pp.67–73.
- Whitten, D.L. and Brahmaasrene, T. (2019) 'Accounting reporting standards: attitudes toward cash flow reporting and the impact on share price', *International Journal of Critical Accounting*, Vol. 11, No. 1, pp.26–39.