The Effect of Platform-Based Markets on Firm Security Prices

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With respect to retail trade in the United States, the platform-based market share has come at the expense of traditional brick and mortar stores. This study focused on two specific areas of retail trade: 1. assessing the stock performance of the industry in each of the past four decades; and 2. assessing the rise of platform-based firms in the industry and their stock performance. The significance of the analysis was to view the dynamics of this industry's shift from an accounting perspective. Results indicate that when correlating the historical measure of unexpected earnings to stock prices, platform-based firms out-perform the industry, in some instances by a margin of two to one. When correlating a wealth measure, proxied by book value, to stock prices, platform-based firms again out-perform the industry by as much as a four to one margin.

INTRODUCTION

Platform-based markets have become increasingly prevalent, and comprise a large and rapidly growing share of today's economy (Eisenmann 2011). Such markets are often described as multi-sided because multiple groups of participants, such as consumers and sellers, need to gain access to the same platform to interact with each other, and a platform's success depends on its ability to bring them on board (Rochet and Tirole 2003; Parker and Van Alstyne 2005). A platform-based market is best described as one that sells via the internet or web-based application. Over the past decade, thousands of entrepreneurs have built businesses and sell products and services on such platforms. Collectively, these entrepreneurs have created both value and market share.

With respect to retail trade in the United States, this value and market share have come at the expense of traditional brick and mortar stores. Four significant factors have created a confluence in the past decade to fuel this phenomenon: 1. the emergence of the internet and mobile technology; 2. the rise in millennial spending power; 3. the impact of globalization; and 4. the empowerment of the consumer (Savenije 2016). During 2016, online commerce grew between 15-20%, with no foreseeable sign of letup (Barr 2017). Retailers have historically measured growth in terms of square footage of the store footprint. However, with the rise of e-commerce, which requires zero square foot of store space, the way in which retailers think is changing.

The net result is that traditional brick and mortar retailers are now saddled with overhead costs that make them less competitive. This lack of competitiveness leads to reduced sales, profits, market share, and ultimately security price of the retailer. The final stage is closure or bankruptcy (e.g., J.C. Penny). But how and when exactly has the demise of one retailer type and the rise of the other come about and has this process been discernable from a market-based accounting approach? This paper will assess the

change in the retail trade environment in the United States over the past four decades in an attempt to determine to what extent the structural changes have had on firms within the retail industry from a wealth perspective. Such an assessment would be greatly valued by long-standing traditional brick and mortar retail firms and future firms which seek to enter the e-commerce environment.

LITERATURE RVIEW

Researchers have assessed platform-based markets from multiple perspectives. Some have examined firms' pricing decisions (Rochet and Tirole 2003; Parker and Van Alstyne 2005; Hagiu 2006; Chen et al. 2012; Seamans and Zhu 2014). Others have evaluated the interactions between competing platform-based market and traditional retail (Armstrong 2006; Economides and Katsamakas 2006; CasadesusMasanell and Llanes 2011). Additional research has assessed the value of diversifying into both types of markets (Yoffie and Kwak 2006; Parker and Van Alstyne 2014; Cennamo and Panico 2015; Cennamo and Santalo 2015). Still other research has evaluated the next generation of markets (Claussen et al. 2015; Kretschmer and Claussen 2016). This study attempts to contribute something different. If an accurate wealth assessment of the retail trade industry can be identified and compared between traditional brick and mortar markets and e-commerce platform-based markets then the firm managers, investors and consumers would have greater insight into the changes which have occurred in this industry over the past decade or more from a wealth perspective.

Unexpected Accounting Earnings

With regard to accounting earnings as a wealth measure, analysis follows the procedure first established by Ball and Brown (1968). The premise of the Ball and Brown study was to see whether the magnitude of unexpected earnings (as opposed to merely the sign of unexpected earnings) was related to the magnitude of the stock price response. Beaver, Clarke and Wright (1979) addressed the issue and discovered, in fact, that the magnitude of unexpected earnings was related to the magnitude of the stock price response. Again, they focused on market-adjusted stock returns to facilitate across-firm comparisons and to control for market-wide movements in stock prices. Ball and Brown (1968) and Beaver, Clarke and Wright (1979) show that despite the deficiencies of historical cost accounting, accounting earnings are potentially useful to investors. They also ushered in the so-called information perspective on the decision usefulness of accounting. The information perspective implies that investors' response to accounting information can provide a guide as to what type of information is or is not valued by investors.

The next logical question to ask was whether the market responded more strongly to unexpected earnings in some firms, and less strongly in other firms. This question is quite pertinent to accountants because we potentially would be better able to design financial statements if we knew the factors that predict when and why investors respond more strongly (less strongly) to financial statement information. Consistent with the literature, the term "Earnings Response Coefficient," or "ERC" is used to describe the strength of the market response to unexpected earnings. To understand this line of research, one needs to have an intuitive understanding of how investors might respond to accounting information in light of single person decision theory, portfolio theory, and efficient market theory. Here is the basic idea: Let's say that last period's earnings were $1 and, accordingly, that is the level of earnings an investor expects this year. When this year earnings are announced, the level of earnings are, say, $1.25, implying a $0.25 earnings surprise. If the investor believes this $0.25 level of unexpected earnings is a one-time shot that will not recur into the future, the investor will increase his assessment of stock value by $0.25. However, if the investor believes this $0.25 unexpected increase in earnings is a permanent boost to earnings that will recur in future years, then the investor's increase in stock price is $0.25 + the present value of receiving $0.25 into perpetuity. Given this framework for thinking about how investors should respond to unexpected earnings, it can be predicted that investors will respond more strongly to unexpected earnings when those earnings are expected to persist into the future. It can also be predicted that investors'

response to unexpected earnings will be smaller the higher the discount rate they use in discounting those unexpected earnings that are expected to be received into perpetuity.

Subsequent numerous studies have tested these predictions, and here is what they found:

(1) ERC are increasing in the persistence of earnings. This has implications for accountants because it suggests the importance of clearly identifying on the income statement those transactions that are nonrecurring transactions (Baginski and Hassell, 1990).

(2) ERC are decreasing in the riskiness of the firm and the leverage of the firm because both imply that investors demand higher expected returns and thus will use a higher discount rate in discounting the unexpected earnings expected to persist into the future. Thus, accountants should minimize the opportunities for off-balance sheet financing (or make sure the off-balance sheet financing is transparent) (Ajinkya, Atiase, and Gift, 1991).

(3) ERC are increasing in the growth opportunities of the firm because unexpected earnings reported by growth firms are expected to persist into the future. Thus, the forward-looking MD&A disclosures are particularly important because they provide information about growth opportunities (Collins and Kothari, 1994).

(4) ERC are increasing in the quality of accounting accruals. Thus, detailed information about the components of accounting accruals might be useful to investors (Lev, 1989).

Book Value

More recent research on wealth valuation has focused on ratios. Valuation ratios help identify variation in expected returns, with higher book-to-markets indicating higher firm value (Berk 1995). Similar arguments suggest that firms with productive assets should yield higher average returns (Lakonishok, Schleifer, and Vishny 2004). Nissim and Penman (2001) find cross-sectional correlation between financial ratios and equity prices. Penman and Zhang (2005) find that Price/Earnings and Book Value ratios provide greater persistence than earnings when correlating to equity prices, while Nissim and Penman (2005) indicate that financial ratios may be viewed as a building block to analyze future equity payoffs. Consistent with these studies, portfolios sorted on an earnings basis may exhibit large variation in average returns, this is less likely to occur with book value measures (Sloan and Chan 2006).

While unexpected earnings are time specific (i.e., quarterly or annual), they are less adaptable to such things as stock splits, management changes and structural changes of the firm (Marx 2012). Ratios are more elastic and are better adapted to measuring such changes (Eisfeldt and Papanikolaou 2011). As a result, in addition to unexpected earnings, indicated by an earnings response coefficient, as the traditional proxy for wealth, this study will also use book value as a proxy for wealth and then link that measure to security prices in order to ascertain correlation between a wealth measure and security prices for retail industry firms. The wealth measure that will be used in this study is Book Value per Share (defined as total common equity divided by number of common shares outstanding).

RESEARCH DESIGN

This study will focus on two specific areas of retail trade: 1. assessing the stock performance of the industry in each of the past four decades; and 2. assessing the rise of platform-based markets in the industry and their stock performance. The significance of the analysis will be to view the dynamics of this industry's shift from an accounting perspective.

A cross sectional sample of firms contained in SIC code 5311 is derived for each decade under evaluation. Quarterly earnings and book value per share data is derived from Compustat. Security price data is obtained from the Center for Research on Security Prices (CRSP). Information content of the cross-sectional sample of firms' earnings and wealth measure are assessed for respective decades. Also, the Electronic Data Gathering and Retrieval System (EDGAR), and the Wall Street Journal (WSJ) are used to analyze financial notes and other associated firm information in order to control for such things as change of corporate form, change in ownership, or change in management. If any of these could be documented during the test period, the firm is subsequently eliminated from the study.

The sample derived from this SIC code includes all retail trade industry firms containing the above available information. In order to compare the general industry to platform-based firms within the industry, the platform-based firms must be identified. A problem that arises when deriving information for such firms is the newness of these entities. In addition, the dates in which each went public must also be determined. Because of these limitations, the decade samples are limited.

Table 1 provides a summary of available firms in the cross sectional analysis by decade for total firms in the retail trade industry sample (i.e., SIC code 5311), and total available platform-based firms within the industry.

TABLE 1
STUDY SAMPLE FIRMS SUMMARY

Study periods	Total Retail Trade	Platform-Based
1980-1989	92	0
1990-1999	98	12
2000-2009	115	36
2010-2016	138	41

HYPOTHESIS DEVELOPMENT

As previously noted, no prior studies have assessed the decade by decade changes in the retail trade industry from an accounting perspective. Stunda (2009) assesses one firm in the retail trade industry, i.e., Wal-Mart, and finds that the firm has a distinct advantage over competitors when it comes to wealth generation and its link to security prices.

Prior studies going as far back as Ball and Brown (1968) through more recent literature such as Barton 2001, Skeel and Partnov 2007, Gilani 2008, Stulz 2009, Stunda 2014, and numerous others link earnings to security prices through an earnings response coefficient. Thus, the first hypothesis tests for the market reaction for the sample firms. Stated in the null form, the hypothesis tested is:

H1: Earnings information content effect on security prices for all retail trade industry sample firms is not significantly different from platform-based sample firms within the same industry.

Although earnings, and more specifically, unexpected earnings, has been used to document stock price reaction for more than four decades, more recent research advocates the use of wealth measures which correlate to stock price change. First advocated by Berk 1995 and others to date, book value has become a vital link to assessing wealth and therefore stock price reaction. It is therefore used as another measure in assessing any differences in sample firms contained in this study. This leads to the next hypothesis, stated in the null form:

H2: The information content of book value per share on security prices for all retail trade industry sample firms is not significantly different from platform-based sample firms within the same industry.

METHODOLOGY

In assessing hypothesis one, extant theory and rationale is used to replicate the model first used by Ball and Brown in 1968 in order to establish that there is a correlation between earnings and security prices. The Dow Jones News Retrieval Service (DJNRS) was used to identify the date that each firm released quarterly financial data for the study periods. This date of data release is known as the event date. The following model is established for determining information content:

$$CARit = a + b1UERit + b2UEPit + b3MBit + b4Bit + b5MVit + eit \qquad (1)$$

Where: CARit   =   Cumulative abnormal return firm i, time t
        a   =   Intercept term
        UERit   =   Unexpected earnings for all retail trade industry firms
        UEPit   =   Unexpected earnings for all platform-based retail trade industry firms
        MBit   =   Market to book value of equity as proxy for growth and persistence
        Bit   =   Market model slope coefficient as proxy for systematic risk
        MVit   =   market value of equity as proxy for firm size
        eit   =   error term for firm i, time t

The above regression is run multiple times for each decade in the sample. The coefficient "a" measures the intercept. The coefficient b1 is the traditional earnings response coefficient (ERC), found to have correlation with security prices in traditional market based studies (see Ball and Brown 1968) and relates to all firms in the retail trade industry sample. The coefficient b2 is the ERC relating to platform-based sample firms within the retail trade industry. Unexpected earnings (UEi) is measured as the difference between the management earnings forecast (MFi) and security market participants' expectations for earnings proxied by consensus analyst following as per Investment Brokers Estimate Service (IBES) (EXi). The unexpected earnings are scaled by the firm's stock price (Pi) 180 days prior to the forecast:

$$UEi = [(MFi) - (EXi)]/Pi \qquad (2)$$

Unexpected earnings are measured for each of the sample firms during the test period. The coefficients b3, b4, and b5, are contributions to the ERC for all firms in the sample. To investigate the effects of the information content of earnings on security returns, there must be some control for variables shown by prior studies to be determinants of ERC. For this reason, the variables represented by coefficients b3 through b5 are included in the study.

For each firm sample, an abnormal return (ARit) is generated around the event dates of -1, 0, +1 (day 0 representing the day that the firm's financials were available per DJNRS). The market model is utilized along with the CRSP equally-weighted market index and regression parameters are established between -290 and -91. Abnormal returns are then summed to calculate a cross-sectional cumulative abnormal return (CARit).

In testing hypothesis 2, a regression analysis, similar to that used in testing hypothesis 1, is utilized. That model is presented below:

$$CARit = a + b1BVRit + b2BVPit + b3MBit + b4Bit + b5MVit + eit \qquad (3)$$

where: CARit   =   Cumulative abnormal return firm i, time t
        a   =   Intercept term
        BVRit   =   Book value for all retail trade industry firms
        BVPit   =   Book value for all platform-based retail trade industry firms
        MBit   =   Market to book value of equity as proxy for growth and persistence
        Bit   =   Market model slope coefficient as proxy for systematic risk
        MVit   =   market value of equity as proxy for firm size
        eit   =   error term for firm i, time t

Again, the above regression is run multiple times for each decade in the sample. All parameters used in hypothesis 1 are again used in testing this hypothesis.

RESULTS

Unexpected Earnings

Table 2 indicates the results of the cross sectional regression analysis for each of the four decades under observation. The ERC associated with all retail trade firms is positive and significant at conventional levels for each of the decades. With respect to platform-based firms within the industry, there were no observations for the decade 1980-1989. For the decade 1990-1999, the few observations resulted in an ERC of .048 which was slightly higher than that of all firms in the industry. Significance was observed at the .05 level. The ERC for the platform-based firms for the 2000-2009 decade was .062, more than double that of the total firms, while for the decade containing years 2010-2016 the ERC was .091, more than three times that of the total industry firms. The ERC for each of these two decades was significant at the .01 level. None of the other variables in the model were significant at conventional levels.

Results indicate, that with respect to unexpected earnings, both sample groups have a positive correlation between unexpected earnings and stock prices, validating findings of Ball and Brown 1968 and a multitude of other researchers. However, upon closer examination of the results, investors seem to react differently to platform-based firms by generating a higher earnings response relative to stock price, and at different significance levels than the other sample group. As a result, the first hypothesis which states that earnings information content effect on security prices for all retail trade industry sample firms is not significantly different from platform-based sample firms within the same industry but be rejected.

In addition, whenever regression variables are employed, there is a probability of the presence of multicollinearity within the set of independent variables which may be problematic from an interpretive perspective. To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. Values of VIF exceeding 10 are often regarded as indicating multicollinearity. In the test of hypothesis 1, a VIF of 2.4 was observed, thus indicating a non-presence of significant multicollinearity

TABLE 2
ASSESSMENT OF UNEXPECTED EARNINGS CORRELATION TO SSECURITY PRICES
MODEL: $CARit = a + b1UERit + b2UEPit + b3MBit + b4Bit + b5MVit + eit$

	1980-1989		1990-1999		2000-2009		2010-2016	
Variable	ERC	p-value	ERC	p-value	ERC	p-value	ERC	p-value
b1 all firms	.039	1.95[b]	.033	1.88[b]	.028	2.21[c]	.027	2.26[c]
b2 e-based firms	-	-	.048	1.81[b]	.062	1.59[a]	.091	1.66[a]
b3 growth	.021	.42	.181	.38	.237	.70	.188	.62
b4 risk	.033	.61	.132	.52	.153	.55	.117	.48
b5 firm size	.047	.57	.119	.47	.092	.43	.088	.38

a = significant at the .01 level
b = significant at the .05 level
c = significant at the .10 level

b1 sample includes:
1980-1989 - 92 firms, 3,680 quarterly observations
1990-1999 - 98 firms, 3,920 quarterly observations
2000-2009 – 115 firms, 4,600 quarterly observations
2010-2016 – 138 firms, 3,864 quarterly observations

b2 sample includes:
1980-1989 – 0 firms
1990-1999 - 12 firms, 480 quarterly observations
2000-2009 - 36 firms 1,440 quarterly observations
2010-2016 – 41 firms 1,148 quarterly observations

Book Value

Table 3 indicates the results of the cross sectional regression analysis for each of the four decades under observation. Similar to unexpected earnings, the book value coefficient associated with all retail trade firms is positive and significant at conventional levels for each of the decades. With respect to platform-based firms within the industry, there were again no observations for the decade 1980-1989. For the remaining decades a significant increase in the coefficient correlating book value to stock prices was noted, ranging from twice that of all firms (1990-1999) to almost four times more than total industry firms (2010-2016). The coefficient for each decade was significant at the .01 level.

Results indicate, that with respect to book value, investor reaction is significantly greater with regard to platform-based firms within the retail trade industry, when comparing with the industry as a whole. As a result, the second hypothesis which states that book value information content effect on security prices for all retail trade industry sample firms is not significantly different from platform-based sample firms within the same industry but be rejected.

In assessing the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. Values of VIF exceeding 10 are often regarded as indicating multicollinearity. In the test of hypothesis 2, a VIF of 2.6 was observed, thus indicating a non-presence of significant multicollinearity

TABLE 3
ASSESSMENT OF BOOK VALUE CORRELATION TO SECURITY PRICES
Model: $CARit = a + b1BVRit + b2BVPit + b3MBit + b4Bit + b5MVit + eit$

	1980-1989		1990-1999		2000-2009		2010-2016	
Variable	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
b1 all firms	.091	1.88[b]	.087	2.27[c]	.079	2.31[c]	.071	2.19[c]
b2e-based firms	-	-	.172	1.66[a]	.205	1.55[a]	.268	1.60[a]
b3 growth	.011	.32	.029	.40	.031	.38	.033	.51
b4 risk	.027	.49	.033	.42	.041	.39	.032	.44
b5 firm size	.079	.47	.062	.36	.055	.68	.034	.30

a = significant at the .01 level
b = significant at the .05 level
c = significant at the .10 level

b1 sample includes:
1980-1989 - 92 firms, 3,680 quarterly observations
1990-1999 - 98 firms, 3,920 quarterly observations
2000-2009 – 115 firms, 4,600 quarterly observations
2010-2016 – 138 firms, 3,864 quarterly observations

b2 sample includes:
1980-1989 – 0 firms
1990-1999 - 12 firms, 480 quarterly observations
2000-2009 - 36 firms 1,440 quarterly observations
2010-2016 – 41 firms 1,148 quarterly observations

CONCLUSIONS

Platform-based markets have become increasingly prevalent, and comprise a large and rapidly growing share of today's economy (Eisenmann 2011). With respect to retail trade in the United States, this market share has come at the expense of traditional brick and mortar stores. This study focused on two specific areas of retail trade: 1. assessing the stock performance of the industry in each of the past four decades; and 2. assessing the rise of platform-based firms in the industry and their stock performance. The significance of the analysis was to view the dynamics of this industry's shift from an accounting perspective

Two samples were assessed for each of the four most recent decades. One sample contained all observed retail trade industry firms, the other sample include only the platform-based firms within that industry. Results indicate that when correlating the historical measure of unexpected earnings to stock prices, platform-based firms out-perform the industry, in some instances by a margin of two to one. When correlating a wealth measure, proxied by book value, to stock prices, platform-based firms again out-perform the industry by as much as a four to one margin.

The implications of the results are quite clear; from a marketing perspective, platform-based firms are consuming a greater share of the retail trade market, and from an accounting perspective, investors react significantly different to platform-based retail firms. The fact is that when assessing both historical earnings and firm wealth, investors view platform-based firms in a much more positive light and therefore react more positively, thus reflecting greater upward movement of associated stock price.

Although the number of platform-based firms utilized in the study are small, non-existent in fact for the 1980-1989 decade, they have continued to grow and will continue to grow further in the future. Also, the minimal numbers of firms were mitigated by using quarterly observations, thus providing larger numbers of total observations. This area of study has received significant research from a marketing perspective, it has received little to none from an accounting perspective. The line of research has implications not only for investors, but financial analysts, consultants, and managers of the firms themselves because it indicates the future of this industry from a financial perspective.

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