Comparing The Performance And Importance Of Trade And Inventory Policies Of Large Cap And Mid Cap Retailers

Edward Chu, California State University, Dominguez Hills, USA

ABSTRACT

A company's trade and inventory policies determine the holding periods incurred to collect the accounts receivable, to convert inventories into sales, and to pay off the accounts payable. In this study, holding days for accounts receivable (AR), inventories (IV), and accounts payable (AP) of large cap and mid cap retailers for the years 2008 to 2012 were analyzed, compared, and regressed on return on assets (ROA). Results indicate that these holding days remain constant over time despite the late 2007 to mid-2009 U.S. recession. Comparative results show large cap retailers have shorter AR, same IV, and longer AP than mid cap retailers. Regression results conclude that for both large cap and mid cap retailers, IV is not correlated while shorter AR (collect sooner) is correlated with higher ROA. For large cap retailers, longer AP (pay later) is correlated with higher ROA, but for mid cap retailers, shorter AP (pay sooner) is correlated with higher ROA. Difference in bargaining power is suggested as the explanation for this discrepancy.

Keywords: Comparing Large Cap and Mid Cap Retailers; Trade and Inventory Policies; Holding Days

INTRODUCTION

*I*n a supply chain, retailers sell finished products and related services to end user consumers. The retail industry plays a very significant role in the U.S. economy as an estimated two-thirds of the Gross Domestic Product (GDP) comes from retail consumption. Transaction flows begin when a retailer purchases products from its suppliers on credit and incurs accounts payable to the suppliers. The products are then stored as inventories waiting for customer demand. When the products are sold to customers on credit, the retailer generates accounts receivable from the customers. Holding periods incurred to pay off the accounts payable, to convert inventories into sales, and to collect the accounts receivable vary depending on retailers' trade and inventory policies. Therefore, to understand retailers' trade and inventory policies, it is important to investigate these holding periods. However, research on retailers' holding periods of accounts receivable, inventories, and accounts payable is rare. In one such rare study, Moss and Stine (1993) stated that a retailer's firm size had an effect on these holding periods. In the investment community, market capitalization is often used to determine a firm's size besides sales and total asset figures. Market capitalization (cap) is calculated by multiplying a firm's number of shares outstanding by the current market price per share. It is well-accepted that the Standard & Poor's 500 Index list (S&P 500) consists of large cap firms and the Standard & Poor's 400 Index list (S&P 400) consists of mid cap firms. Additional mid cap firms are listed in the Russell Midcap Index (RMI).

One objective of this study is to better assess the aforementioned firm size effect by comparing holding periods of large cap retailers (members of S&P 500) with that of the mid cap retailers (members of S&P 400 and RMI). The mid cap retailers are used in this study because studies on mid cap companies are not common and studies on mid cap retailers are nonexistent. This study contributes by filling this research gap.

Another objective of this study is to investigate the relationships of these holding periods with a retailer's profitability so that better trade and inventory policies can be identified. Differences found in the significance of these holding periods on profitability between large cap and mid cap retailers are useful in the development of appropriate policies for retailers of different sizes.

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This paper is organized as follows. In the next section, related studies are reviewed and hypotheses to be tested are given. Then data and research methods are described. Finally, results and conclusions are presented with implications and recommendations.

LITERATURE REVIEW AND HYPOTHESES TO BE TESTED

As indicated, research on retailers' holding periods of accounts receivable, inventories, and accounts payable is rare. Moss and Stine (1993) is the only study found; it is a study of retail firms with the 4-digit Standard Industry Code (SIC) 5200 through 5900, using 1,717 observations from 1971 through 1990 which concluded that regardless of whether firm size was measured by sales or assets, larger retail firms had shorter holding periods for accounts receivable and inventories than smaller retail firms. However, the holding period for accounts payable showed a slight increase as firms get smaller. Thus, smaller retailers were able to stretch out accounts payable somewhat better than the larger retailers. Recently, Chu (2009) conducted a similar study on 135 manufacturing, not retail, companies in seven industries. Coincidentally, he also concluded that larger manufacturing firms had shorter holding periods for accounts receivable and inventories than smaller manufacturing firms. Furthermore, Chu (2009, 2012) demonstrated that all three types of holding periods for large manufacturing and retail companies were stable in the 5-year period from 2003 to 2007. In this study, data in the next 5-year period (from 2008 to 2012) are used. To assess the influence of firm size, holding periods of large cap and mid cap retailers are compared in this study. For test of significance, Chu (2012) concluded that, for the large retailer, holding period for accounts receivable was negatively correlated with a retailer's return on assets, while holding period for accounts payable was positively correlated and holding period for inventories was found to be not correlated. Based on these findings, therefore, in this study, the following hypotheses are tested:

AR = Holding periods of accounts receivable (days)
IV = Holding periods of inventories (days)
AP = Holding periods of accounts payable (days)
ROA = Return on assets (%)

For large cap retailers:

Hypothesis 1:   AR are the same in different years for large cap retailers.
Hypothesis 2:   IV are the same in different years for large cap retailers.
Hypothesis 3:   AP are the same in different years for large cap retailers
Hypothesis 4:   AR of large cap retailers are negatively correlated with ROA.
Hypothesis 5:   IV of large cap retailers are not correlated with ROA.
Hypothesis 6:   AP of large cap retailers are positively correlated with ROA.

For mid cap retailers:

Hypothesis 7:   AR are the same in different years for mid cap retailers.
Hypothesis 8:   IV are the same in different years for mid cap retailers.
Hypothesis 9:   AP are the same in different years for mid cap retailers.
Hypothesis 10: AR of mid cap retailers are negatively correlated with ROA.
Hypothesis 11: IV of mid cap retailers are not correlated with ROA.
Hypothesis 12: AP of mid cap retailers are positively correlated with ROA.

Comparisons:

Hypothesis 13: AR are shorter in large cap retailers than in mid cap retailers.
Hypothesis 14: IV are shorter in large cap retailers than in mid cap retailers.
Hypothesis 15: AP are shorter in large cap retailers than in mid cap retailers.

DATA AND RESEARCH METHODS

The two objectives of this study are first, to make direct comparisons of the holding periods of accounts receivable (AR), inventories (IV), and accounts payable (AP) of large cap and mid cap retailers and second, to compare the significance of these holding periods on a retailer's return on assets (ROA) of these two groups. The large cap retailers were the 36 retail firms, with the first 2-digit Standard Industrial Classification (SIC) codes between 52 and 59 (Division G—Retail), included in the S&P 500 list as of November 15, 2013. To develop the mid cap retailers group, the S&P 400 list was first consulted because it consisted of firms not on the S&P 500 list. However, only 25 mid cap retailers were identified. To augment the sample size for the mid cap retailers group, the RMI list was then searched and 57 retailers were found, but 16 of these 57 retailers were previously identified in the S&P 400 list as mid cap retailers. Of the remaining 41 (57 minus 16) retailers found in the RMI list, 24 had also been previously identified in the S&P 500 list as large cap retailers and therefore not included in the mid cap retailers group. Thus, from the RMI list, 17 (41 minus 24) mid cap retailers were added to the 25 mid cap retailers identified in the S&P 400 list to form an initial sample of 42 (17 plus 25) mid cap retailers. However, of these 42, only 34 mid cap retailers had complete data available from years 2008 to 2012. Therefore, in this study, the final sample sizes were 36 large cap retailers in one group and 34 mid cap retailers in another group. The composition of each group is shown in Table 1 which indicates that the two groups consist of retailers in similar industries.

Table 1: Composition of Large Cap and Mid Cap Retailers Groups

Large Cap Retailers Group:				Mid Cap Retailers Group:			
SIC Code	SIC Code Description	Number of Firms	% of Total	SIC Code	SIC Code Description	Number of Firms	% of Total
53	General	7	19.44	56	Apparel	8	23.53
56	Apparel	6	16.67	59	Miscellaneous	8	23.53
59	Miscellaneous	6	16.67	53	General	6	17.65
58	Eating	5	13.89	58	Eating	5	14.71
55	Automotive	4	11.11	55	Automotive	3	8.82
54	Food	3	8.33	52	Building	2	5.88
57	Furniture	3	8.33	54	Food	1	2.94
52	Building	2	5.56	57	Furniture	1	2.94
	Total	36	100.00		Total	34	100.00

SIC Code Description: Apparel = Apparel and accessory stores, Automotive = Automotive dealers and gasoline service stations, Building = Building materials, hardware, and garden supply, Eating = Eating and drinking places, Food = Food stores, Furniture = Home furniture, furnishings and equipment stores, General = General merchandise stores, Miscellaneous = Miscellaneous retail.

For each of the 70 (36 plus 34) retailers studied, net sales and net earnings figures were obtained from annual income statements while accounts receivable, inventories, accounts payable, long-term debt, and total assets figures were obtained from balance sheets for years 2008 through 2012. Then, for each year, each retailer's holding days for accounts receivable (AR), inventories (IV), and accounts payable (AP) were calculated by dividing the accounts receivable, inventories, and accounts payable, respectively, by the net sales and multiplied by 365 days as in Shin and Soenen (1998). Data were then analyzed and regressed as follows.

Analyses of Retailers' AR, IV, and AP by Year (Testing Hypotheses 1, 2, 3, 7, 8, and 9)

Testing Hypotheses 1, 2, and 3

In this study, the large cap retailers group had the same 36 retail firms in each of the five years (2008 to 2012). Due to the large sample size (36 observations), in each year the Central Limit Theorem could be used to satisfy the normality requirement. The homogeneity of variances assumption was also satisfied - Levene statistics (df1 = 4, df2 = 175) were 0.052 (p-value = 0.995), 0.034 (p-value = 0.998), and 0.140 (p-value = 0.967) for AR, IV, and AP, respectively. Therefore, ANOVA was used to test for the equality of means for AR, IV, and AP in the five years and the post-hoc test was done by using the Tukey HSD test.

Testing Hypotheses 7, 8, and 9

In this study, the mid cap retailers group had the same 34 retail firms in each of the five years (2008 to 2012). Due to the large sample size (34 observations), in each year the Central Limit Theorem could be used to

satisfy the normality requirement. The homogeneity of variances assumption was also satisfied - Levene statistics (df1 = 4, df2 = 165) were 0.081 (p-value = 0.988), 0.035 (p-value = 0.998), and 0.176 (p-value = 0.951) for AR, IV, and AP, respectively. Therefore, ANOVA was used to test for the equality of means for AR, IV, and AP in the five years and the post-hoc test was done by using the Tukey HSD test.

Regression Analysis of Large Cap Retailers' Data (Testing Hypotheses 4, 5, and 6)

In order to assess the significance of each of the three holding periods on large cap retailer's profitability measured by return on assets (ROA = net earnings divided by total assets multiplied by 100%), a pooled sample regression analysis was done using AR, IV, and AP as independent variables. In previous studies, Deloof (2003), Eljelly (2004), and Lazaridis and Tryfonidis (2006) used the natural logarithm of net sales to control for company size. Eljelly (2004) stated that because net sales showed wide variation, net sales were logarithmically transformed to satisfy normality. Also, in previous studies, Shin and Soenen (1998), Deloof (2003), and Lazaridis and Tryfonidis (2006) used financial debt ratio to control for financial obligation. Therefore, in this study, control variables were natural logarithm of net sales (LNS to control for company size), long-term debt divided by total assets multiplied by 100% (LTD to control for financial obligation) and seven industry dummy variables (to control for the eight SIC groups). The general merchandise stores industry (SIC code 53) was chosen as the reference group because it had a ROA group mean of 6.3361% which was at about the mid-point of all the eight ROA group means.

Regression Analysis of Mid Cap Retailers' Data (Testing Hypotheses 10, 11, and 12)

In order to assess the significance of each of the three holding periods on mid cap retailer's profitability measured by return on assets (ROA = net earnings divided by total assets multiplied by 100%), a pooled sample regression analysis was done using AR, IV, and AP as independent variables. The same control and dummy variables previously described and used in the regression analysis of large cap retailers' data were also used in analyzing the mid cap retailer's data. Similarly, the general merchandise stores industry (SIC code 53) was chosen as the reference group because it had a ROA group mean of 4.8086% which was at about the mid-point of all the eight ROA group means.

Comparative Analyses of Large Cap Retailers' AP, IV, and AP with Mid Cap Retailers' AP, IV, and AP (Testing Hypotheses 13, 14, and 15)

To compare the differences in means of AP, IV, and AP between the large cap retailers group and the mid cap retailers group, independent-samples T-tests were conducted. Levene's test for equality of variances was used to determine whether equal variances could be assumed when interpreting the T-test results.

ANALYSIS AND REGRESSION RESULTS OF RETAILERS' DATA

Analysis Results of Large Cap Retailers' Holding Days for Accounts Receivable (AR), for Inventories (IV), and for Accounts Payable (AP) by Year (Hypotheses 1, 2, and 3)

Table 2 indicates that large cap retailers' mean holding days for accounts receivable (AR) are statistically the same (ANOVA F statistic = 0.014 (df1 = 4, df2 = 175), p-value = 1.000) between the years 2008 and 2012. Therefore, accept Hypothesis 1.

Table 2: Post Hoc Test Results of Large Cap Retailers' Holding Days for Accounts Receivable (AR) by Year

Differences in means by year: ANOVA F statistic = 0.014 (df1 = 4, df2 = 175), p-value = 1.000. Means by year in homogeneous subsets using Tukey HSD test are displayed.		
Year	**Number of Data**	**Subset 1**
2011	36	10.2383
2012	36	10.2489
2010	36	10.5536
2009	36	10.7989
2008	36	10.8417
	Significance	1.000

Table 3 indicates that large cap retailers' mean holding days for inventories (IV) are statistically the same (ANOVA F statistic = 0.012 (df1 = 4, df2 = 175), p-value = 1.000) between the years 2008 and 2012. Therefore, accept Hypothesis 2.

Table 3: Post Hoc Test Results of Large Cap Retailers' Holding Days for Inventories (IV) by Year

Year	Number of Data	Subset 1
Differences in means by year: ANOVA F statistic = 0.012 (df1 = 4, df2 = 175), p-value = 1.000. Means by year in homogeneous subsets using Tukey HSD test are displayed.		
2009	36	46.6922
2011	36	47.2611
2010	36	47.7231
2008	36	48.1228
2012	36	48.4664
	Significance	1.000

Table 4 indicates that large cap retailers' mean holding days for accounts payable (AP) are statistically the same (ANOVA F statistic = 0.090 (df1 = 4, df2 = 175), p-value = 0.985) between the years 2008 and 2012. Therefore, accept Hypothesis 3.

Table 4: Post Hoc Test Results of Large Cap Retailers' Holding Days for Accounts Payable (AP) by Year

Year	Number of Data	Subset 1
Differences in means by year: ANOVA F statistic = 0.090 (df1 = 4, df2 = 175), p-value = 0.985. Means by year in homogeneous subsets using Tukey HSD test are displayed.		
2008	36	27.8725
2009	36	29.2072
2010	36	29.5697
2011	36	29.6200
2012	36	31.1406
	Significance	0.976

Analysis Results of Mid Cap Retailers' Holding Days for Accounts Receivable (AR), for Inventories (IV), and for Accounts Payable (AP) by Year (Hypotheses 7, 8, and 9)

Table 5 indicates that mid cap retailers' mean holding days for accounts receivable (AR) are statistically the same (ANOVA F statistic = 0.033 (df1 = 4, df2 = 165), p-value = 0.998) between the years 2008 and 2012. Therefore, accept Hypothesis 7.

Table 5: Post Hoc Test Results of Mid Cap Retailers' Holding Days for Accounts Receivable (AR) by Year

Year	Number of Data	Subset 1
Differences in means by year: ANOVA F statistic = 0.033 (df1 = 4, df2 = 165), p-value = 0.998. Means by year in homogeneous subsets using Tukey HSD test are displayed.		
2010	34	15.0703
2011	34	15.1632
2009	34	15.1906
2012	34	15.8476
2008	34	16.8465
	Significance	0.998

Table 6 indicates that mid cap retailers' mean holding days for inventories (IV) are statistically the same (ANOVA F statistic = 0.021 (df1 = 4, df2 = 165), p-value = 0.999) between the years 2008 and 2012. Therefore, accept Hypothesis 8.

Table 6: Post Hoc Test Results of Mid Cap Retailers' Holding Days for Inventories (IV) by Year

Differences in means by year: ANOVA F statistic = 0.021 (df1 = 4, df2 = 165), p-value = 0.999. Means by year in homogeneous subsets using Tukey HSD test are displayed.		
Year	**Number of Data**	**Subset 1**
2012	34	48.7706
2009	34	48.8709
2010	34	49.1882
2011	34	49.7582
2008	34	51.0094
	Significance	0.999

Table 7 indicates that mid cap retailers' mean holding days for accounts payable (AP) are statistically the same (ANOVA F statistic = 0.080 (df1 = 4, df2 = 165), p-value = 0.988) between the years 2008 and 2012. Therefore, accept Hypothesis 9.

Table 7: Post Hoc Test Results of Mid Cap Retailers' Holding Days for Accounts Payable (AP) by Year

Differences in means by year: ANOVA F statistic = 0.080 (df1 = 4, df2 = 165), p-value = 0.988. Means by year in homogeneous subsets using Tukey HSD test are displayed.		
Year	**Number of Data**	**Subset 1**
2009	34	22.8935
2008	34	23.2259
2010	34	23.5100
2011	34	24.3497
2012	34	24.9215
	Significance	0.989

Regression Analysis Results of Large Cap Retailers (Hypotheses 4, 5, and 6)

Multiple regression assumptions must first be verified before the results are interpreted. Due to a large sample size of 180 observations, the Central Limit Theorem can be used to satisfy the normality requirement of variables. The one-sample Kolmogorov-Smirnov (K-S) test of the standardized regression residuals has a 2-tailed p-value of 0.067 indicating that the normality assumption of the residuals is met. A histogram of the standardized regression residuals also shows a normal curve. A plot of the standardized regression residuals against the standardized estimates of the dependent variable shows a random pattern with no nonlinearity or heteroscedasticity. Table 8 shows that data are not autocorrelated (Durbin-Watson statistic = 1.428) and multicollinearity is not a problem (all variance-inflation factors (VIF) are less than 3) (Belsley, Kuh, & Welsch, 1980).

As shown in Table 8, the regression model is statistically significant (F statistic = 8.752 (df1 = 12, df2 = 167), p-value < 0.001). Individually, based on the standardized regression coefficients (Beta), holding days for accounts payable (AP) are significantly and positively correlated with return on assets (ROA = net earnings divided by total assets multiplied by 100%), the dependent variable. Therefore, accept Hypothesis 6. In contrast, holding days for accounts receivable (AR) are significantly and negatively correlated with the dependent variable. Therefore, accept Hypothesis 4. Hypothesis 5 is also accepted because holding days for inventories (IV) are not correlated with the dependent variable.

Table 8 also indicates that membership in industry group is also significantly correlated with return on assets (ROA), the dependent variable. Specifically, apparel and accessory stores (SIC 56) and eating and drinking places (SIC 58) have significantly higher (7.158% and 6.982% more, respectively) mean ROA than that in the referenced general merchandise stores (SIC 53).

**Table 8: Regression Results of Large Cap Retailers' 2008-2012 Holding Days for Accounts Receivable (AR),
Inventories (IV), and Accounts Payable (AP) on Return on Assets (ROA)**

Model Summary:					
R	**R Square**	**Adjusted R Square**	**Standard Error of the Estimate**		**Durbin-Watson**
0.621	0.386	0.342	4.82048		1.428

ANOVA:					
	Sum of Squares	**Df**	**Mean Square**	**F**	**p-value**
Regression	2400.548	12	203.379	8.752	< 0.001***
Residual	3880.586	167	23.237		
Total	6321.134	179			

Unstandardized (B) and Standardized (Beta) Regression Coefficients:					
Predictors	**B**	**Beta**	**T Statistic**	**p-value**	**VIF**
AR	-0.074	-0.178	-2.588	0.010**	1.285
IV	0.013	0.080	0.908	0.365	2.127
AP	0.068	0.265	3.521	0.001***	1.543
LNS	-0.341	-0.067	-0.774	0.440	2.021
LTD	-0.051	-0.131	-1.751	0.082	1.515
Building (SIC 52)	0.176	0.007	0.100	0.920	1.257
Food (SIC 54)	-1.156	-0.054	-0.750	0.455	1.408
Automotive (SIC 55)	-2.603	-0.138	-1.656	0.100	1.890
Apparel (SIC 56)	7.158	0.450	5.021	<0.001***	2.186
Furniture (SIC 57)	-1.103	-0.051	-0.662	0.509	1.642
Eating (SIC 58)	6.982	0.407	4.357	<0.001***	2.278
Miscellaneous (SIC 59)	0.114	0.007	0.086	0.932	1.901
Constant	9.198		1.876	0.062	

Dependent variable: Return on assets (ROA) = (net earnings/total assets) * 100%. Independent variables: AR = holding days for accounts receivable, IV = holding days for inventories, AP = holding days for accounts payable. Control variables: LNS = log (net sales), LTD = (long-term debt/total assets) * 100%, SIC # are industry dummy variables for the different industries using the general merchandise stores (general) industry (SIC 53) as the reference group. *, **, and *** denote statistical significance at 5%, 1%, and 0.1% levels (2-tailed), respectively.

Regression Analysis Results of Mid Cap Retailers (Hypotheses 10, 11, and 12)

Multiple regression assumptions must first be verified before the results are interpreted. Due to a large sample size of 170 observations, the Central Limit Theorem can be used to satisfy the normality requirement of variables. The one-sample Kolmogorov-Smirnov (K-S) test of the standardized regression residuals has a 2-tailed p-value of 0.070 indicating that the normality assumption of the residuals is met. A histogram of the standardized regression residuals also shows a normal curve. A plot of the standardized regression residuals against the standardized estimates of the dependent variable shows a random pattern with no nonlinearity or heteroscedasticity. Table 9 shows that data are not autocorrelated (Durbin-Watson statistic = 1.395) and multicollinearity is not a problem (all variance-inflation factors (VIF) are less than 3) (Belsley, Kuh, & Welsch, 1980).

As shown in Table 9, the regression model is statistically significant (F statistic = 3.370 (df1 = 12, df2 = 157), p-value < 0.001). Individually, in descending order of relative significance based on the standardized regression coefficients (Beta), both holding days for accounts payable (AP) and holding days for accounts receivable (AR) are significantly and negatively correlated with return on assets (ROA = net earnings divided by total assets multiplied by 100%), the dependent variable. Therefore, reject Hypothesis 12 and accept Hypothesis 10. Hypothesis 11 is also accepted because holding days for inventories (IV) are not correlated with the dependent variable.

Table 9 also indicates that membership in industry group is significantly correlated with return on assets (ROA), the dependent variable. Specifically, automotive dealers and gasoline service stations (SIC 55) and building materials, hardware, and garden supply stores (SIC 52) have significantly higher (10.109% and 9.019% more, respectively) mean ROA than that in the referenced general merchandise stores (SIC 53).

Table 9: Regression Results of Mid Cap Retailers' 2008-2012 Holding Days for Accounts Receivable (AR), Inventories (IV), and Accounts Payable (AP) on Return on Assets (ROA)

Model Summary:				
R	**R Square**	**Adjusted R Square**	**Standard Error of the Estimate**	**Durbin-Watson**
0.453	0.205	0.144	7.88909	1.395

ANOVA:					
	Sum of Squares	**Df**	**Mean Square**	**F**	**p-value**
Regression	2517.113	12	209.759	3.370	< 0.001***
Residual	9771.321	157	62.238		
Total	12288.435	169			

Unstandardized (B) and Standardized (Beta) Regression Coefficients:					
Predictors	**B**	**Beta**	**T Statistic**	**p-value**	**VIF**
AR	-0.070	-0.193	-2.178	0.031*	1.550
IV	0.041	0.173	1.771	0.079	1.880
AP	-0.154	-0.308	-2.482	0.014*	2.751
LNS	-1.942	-0.183	-1.946	0.053	1.744
LTD	0.001	0.001	0.016	0.987	1.193
Building (SIC 52)	9.019	0.250	2.846	0.005**	1.519
Food (SIC 54)	0.379	0.008	0.095	0.924	1.226
Automotive (SIC 55)	10.109	0.337	2.249	0.026*	2.958
Apparel (SIC 56)	0.525	0.026	0.240	0.811	2.366
Furniture (SIC 57)	1.411	0.028	0.359	0.720	1.203
Eating (SIC 58)	-0.853	-0.036	-0.302	0.763	2.725
Miscellaneous (SIC 59)	-1.622	-0.081	-0.698	0.486	2.654
Constant	23.392		2.668	0.008**	

Dependent variable: Return on assets (ROA) = (net earning/total assets) * 100%. Independent variables: AR = holding days for accounts receivable, IV = holding days for inventories, AP = holding days for accounts payable. Control variables: LNS = log (net sales), LTD = (long-term debt/total assets) * 100%, SIC # are industry dummy variables for the different industries using the general merchandise stores (general) industry (SIC 53) as the reference group. *, **, and *** denote statistical significance at 5%, 1%, and 0.1% levels (2-tailed), respectively.

Comparative Analysis Results of Large Cap Retailers' AP, IV, and AP with Mid Cap Retailers' AP, IV, and AP (Hypotheses 13, 14, and 15)

To compare the differences in means of AP, IV, and AP between the large cap retailers group and the mid cap retailers group, independent-samples T-tests were conducted. Levene's test for equality of variances was used to determine whether equal variances could be assumed when interpreting the T-test results.

Based on the T-test for equality of means results shown in Table 10, large cap retailers' holding days for accounts receivable (AR) are shorter than that of mid cap retailers. Therefore, accept Hypothesis 13. However, holding days for inventories (IV) are not significantly different between large cap and mid cap retailers. Therefore, reject Hypothesis 14. Hypothesis 15 is also rejected because Table 10 shows that large cap retailers' holding days for accounts payable (AP) are actually longer, not shorter, than that of mid cap retailers.

Table 10 also indicates that the natural logarithm of net sales (LNS), long-term debt divided by total assets multiplied by 100% (LTD) and return on assets (ROA = net earnings divided by total assets multiplied by 100%), which are measures for company size, financial obligation, and profitability, respectively, are all significantly higher for large cap retailers.

Table 10: Test of Difference in Means Results of Holding Days for Accounts Receivable (AR), Inventories (IV), and Accounts Payable (AP) between Large Cap and Mid Cap Retailers

	Firm Type	Number of Data	Mean	Standard Deviation	Levene's Test for Equality of Variances	T-test for Equality of Means
AR (days)	Large	180	10.5363	14.33130	F = 37.040	T = -2.416
	Mid	170	15.6236	23.66549	(p < 0.001***)	(p = 0.016*)
IV (days)	Large	180	47.6531	37.80820	F = 6.535	T = -0.472
	Mid	170	49.5195	36.09129	(p = 0.011*)	(p = 0.637)
AP (days)	Large	180	29.4820	23.06719	F = 2.539	T = 2.617
	Mid	170	23.7801	17.06793	(p = 0.112)	(p < 0.009**)
LNS	Large	180	9.7791	1.16362	F = 30.591	T = 15.555
	Mid	170	8.1244	0.80301	(p < 0.001***)	(p < 0.001***)
LTD (%)	Large	180	18.9611	15.21004	F = 0.677	T = 2.492
	Mid	170	14.3468	19.29411	(p = 0.411)	(p = 0.013*)
ROA (%)	Large	180	8.4518	5.94252	F = 10.351	T = 3.122
	Mid	170	5.9859	8.52717	(p = 0.001***)	(p = 0.002**)

Firm type: Large = Large cap retailer, Mid = Mid cap retailer. Variables: AR = holding days for accounts receivable, IV = holding days for inventories, AP = holding days for accounts payable, LNS = log (net sales), LTD = (long-term debt/total assets) * 100% and ROA = return on assets = (net earnings/total assets) * 100%. *, **, and *** denote statistical significance at 5%, 1%, and 0.1% levels (2-tailed), respectively.

SUMMARY OF HYPOTHESIS TESTING RESULTS

AR = Holding periods of accounts receivable (days)
IV = Holding periods of inventories (days)
AP = Holding periods of accounts payable (days)
ROA = Return on assets (%)

For large cap retailers:

Accept H1: AR are the same in different years for large cap retailers.
Accept H2: IV are the same in different years for large cap retailers.
Accept H3: AP are the same in different years for large cap retailers
Accept H4: AR of large cap retailers are negatively correlated with ROA.
Accept H5: IV of large cap retailers are not correlated with ROA.
Accept H6: AP of large cap retailers are positively correlated with ROA.

For mid cap retailers:

Accept H7: AR are the same in different years for mid cap retailers.
Accept H8: IV are the same in different years for mid cap retailers.
Accept H9: AP are the same in different years for mid cap retailers.
Accept H10: AR of mid cap retailers are negatively correlated with ROA.
Accept H11: IV of mid cap retailers are not correlated with ROA.
Reject H12: AP of mid cap retailers are positively correlated with ROA.
(This study found AP of mid cap retailers negatively correlated with ROA.)

Comparisons:

Accept H13: AR are shorter in large cap retailers than in mid cap retailers.
Reject H14: IV are shorter in large cap retailers than in mid cap retailers.
(This study found IV not significantly different in large cap and mid cap retailers.)
Reject H15: AP are shorter in large cap retailers than in mid cap retailers.
(This study found AP longer in large cap retailers than in mid cap retailers.)

CONCLUSIONS AND DISCUSSION

In this study, holding days for accounts receivable (AR), inventories (IV), and accounts payable (AP) of 36 large cap retailers and 34 mid cap retailers were analyzed, compared and regressed on return on assets (ROA). Results indicated that, for both large cap and mid cap retailers, all three types of holding days remained statistically the same for the years between 2008 and 2012 despite the U.S. recession that spanned from December 2007 to June, 2009. This finding of stability agrees with Duggal and Budden (2012) who detected no significant change in the recession years and Chu (2009, 2012) who studied for the years between 2003 and 2007.

Comparative results in this study found that large cap retailers had more net sales, higher long-term debt ratio, and higher return on assets than mid cap retailers. These findings are evidence that large cap retailers utilize their selling power to increase their ability to borrow and then employ increased financial leverage to become more profitable. This size effect might also explain why, in this study, large cap retailers had shorter holding days for accounts receivable (AR) and longer holding days for accounts payable (AP) than mid cap retailers while their holding days for inventories (IV) were not significantly different. Presumably, large cap retailers have more bargaining power to hasten their collections of accounts receivable and to delay their payments of accounts payable than mid cap retailers, although both are equally effective in managing their inventories.

Regression results for large cap retailers in this study are consistent with findings by Chu (2012) who studied large retailers in the 2008 Fortune 500 list for the years from 2003 to 2007. Both studies conclude that holding days for accounts receivable (AR) are significantly negatively correlated, holding days for inventories (IV) are not significantly correlated, and holding days for accounts payable (AP) are significantly positively correlated with return on assets (ROA), respectively. Therefore, large cap retailers are recommended to shorten AR (collect sooner) and lengthen AP (pay later) to increase ROA. However, for mid cap retailers, no previous recommendation is available due to lack of studies on mid cap retailers. An important contribution of this study is to provide such a recommendation based on the regression results. Similar to large cap retailers, this study concludes that for mid cap retailers, holding days for accounts receivable (AR) are significantly negatively correlated and holding days for inventories (IV) are not significantly correlated with return on assets (ROA); but unlike large cap retailers, mid cap retailers' holding days for accounts payable (AP) are significantly negatively, not positively, correlated with return on assets (ROA). This interesting finding suggests that mid cap retailers have less bargaining power than the large cap retailers to lengthen their payments of accounts payable and paying early is beneficial to their borrowing capabilities. Therefore, mid cap retailers are recommended to shorten both AR (collect sooner) and AP (pay sooner) to increase ROA. In summary, based on its findings, this study provides useful guidance to retailers to improve their trade and inventory policies so as to increase profitability. Future studies should, therefore, focus on developing effective strategies to achieve these holding period modifications.

AUTHOR INFORMATION

Edward Chu, Ph.D., is a Professor at California State University, Dominguez Hills where he teaches courses in Statistics and Operations Management. His research interests are lean production and supply chain management. E-mail: echu@csudh.edu

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<u>**NOTES**</u>