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Introduction

The restaurant industry has several, recognizable unique industry characteristics, such as labor intensity, seasonality, and short distribution channels (Schmidgall, 2006). Among these industry characteristics, capital intensity also plays a role in explaining and determining the restaurant industry (Schmidgall, 2006; Surowiecki, 1999). Restaurants need to have physical buildings, equipment, fixtures, and furniture, all in-place upon launching a business; these infrastructural components require considerable capital investment. Considering significance of the capital intensity for the restaurant industry, little literature and empirical findings exist in relation to the capital intensity to provide educational and practical knowledge, and thus, it is encouraging to investigate implications and effects of capital intensity for food service operations. In particular, when understanding that the ultimate goal of financial managers is to maximize firm value (Andrew, Damitio & Schmidgall, 2007), an examination about effects of the capital intensity on restaurant corporations' firm value should enlighten hospitality researchers and practitioners further, which is the main goal of this study.

Some business factors with which capital intensity may have, directly or indirectly, a relationship, are business risk and value. Being more capital intensive may increase business or firm risk due to the fact that significant fluctuations in an operation's profitability are more likely for highly capital intensive businesses or firms (Shapiro & Titman, 1986). The increase of risk can happen because a business with more fixed assets commits a high level of fixed costs in deriving its profitability due to the fact that the high volume of fixed cost do not vary according to the sales volume and thus cause higher fluctuations of profits (Brealey & Myers, 1984). According to this argument, higher risk deriving from high capital intensity will lead to higher cost of capital that decreases a business' value or a firm's value performance.

On the other hand, according to Lubatkin and Chatterjee (1994), capital intensity may reduce business risk because firms with high capital intensity have already allocated a great amount of cash on fixed assets and thus may incur cost savings through subsequent, normal operations. Risk reduction may be more pronounced during uncertain economic environments or economic downturns because of an ability to reduce some fixed costs. Following this argument, restaurants with high capital intensity decrease risk and thus the cost of capital. Consequently, their firm's value will be elevated.

When total fixed assets, scaled by total revenues, is the measure of capital intensity, another characteristic of the restaurant industry, franchising, may play a role in determining the effect of capital intensity on firm risk and value. An inverse relationship between franchising and the capital intensity measure (fixed

assets to revenues) may exist because as restaurant firms increasingly adopt franchising, they are more likely to own fewer properties or operating units compared to their sales level. Many restaurant firms adopt franchising as their main expansion strategy because of implications related to risk and value (Andrew, et al., 2007).

Based on the argument that franchising benefits franchisors (chain firms) with stable fee structures, chain restaurant firms should be able to reduce risk by adopting the franchising strategy; consequently, the reduction of risk should lead to reducing the cost of capital and increasing firm value. Considering the inverse relationship between the franchising and the capital intensity measure, and the benefit of risk reduction from the franchising strategy, the restaurant setting may support a negative relationship between capital intensity and a firm's value performance. However, there are also negative sides of franchising. Agency costs occur for franchisors to monitor franchisees' operations or although franchisees go through a rigorous application process, it is also possible that franchisees may be poor operators to begin with. In such cases, franchising will hurt firm value and thus suggest a positive relationship between capital intensity and a firm's value performance.

The current study, therefore, examines, for the U.S. restaurant industry, the effect of capital intensity on a firm's value performance. The investigation period spans 2000 to 2008, the most recent time periods. The current study does not propose a directional hypothesis, but rather adopts an open position due to the mixed results proffered in the literature. This study next reviews the literature, followed by descriptions of the methodology. Results and discussions conclude the study.

Literature Review

Capital intensity is often considered a representative of a firm's operating leverage (Lubatkin and Chatterjee, 1994), and levels of capital intensity vary among different industries. Examples of capital intensive industries are mining, utilities, airlines, railroads, cruise lines, hotels, and restaurants (Schmidgall, 2006; Solution Matrix, n.d.). Acknowledging that the hospitality industry (typically, hotels and restaurants) is capital intensive (Andrew, et al., 2007), the topic does not seem to have garnered extensive attention by hospitality industry researchers. One exception is Hsu and Jang's (2008) study which examined determinants of unsystematic risk for hospitality firms and compared the determinants for hotels and restaurants. As one of the determinants, that study investigated capital intensity and found a positive relationship between capital intensity and unsystematic risk; capital intensive hotel and restaurant firms presented high unsystematic risk, estimated by using the capital asset pricing model (CAPM).

However, little further examination seems to exist in the hospitality literature regarding capital intensity issues.

General, financial economics literature has examined the relationship of capital intensity according to several factors, including cost of capital, firm performance, and risk. Overall, the literature suggested mixed and inconclusive results. Harris (1988) examined the effect of capital intensity on a firm's price-cost margin and found a positive effect: capital intensive firms showed higher price-cost margins. However, Martin (1983) and Harris (1986) found a negative effect for capital intensity on firm performance. According to Scott and Pascoe (1984; 1986), some mixed findings might stem from a construct validity issue of the measure of capital intensity and model specification errors.

Reitenga (2000) extended the Blacconiere and Patten (1994) study that examined effects of disclosure about environmental issues by incorporating the addition of capital intensity to the model to determine whether or not capital intensity imposes a positive effect on market returns. Reitenga (2000) used an event study method from the Bhopal chemical accident and estimated cumulative abnormal returns (CARs). The study found a positive effect of capital intensity on CARs, suggesting that a great portion of already committed tangible structure of the firm may help decrease additional capital expenditures, and thus increase market returns.

Literature on capital intensity and firm risk also shows inconclusive findings. According to Brealey and Myers (1984) and Shapiro and Titman (1986), capital intensity represents a firm's operating leverage and tends to increase a firm's risk. They formulated this argument because a firm's sales level normally fluctuates more when the firm possesses a high level of fixed assets. This condition is due to the fact that a great part of a firm's cost structure does not vary according to sales levels, but remains fixed: When demand fluctuates, the profitability level of a capital intensive firm should fluctuate more than a less capital intensive firm.

To the contrary, some researchers argued that capital intensity decreases a firm's risk (Barton, 1988; Hurdle, 1974; Lubatkin and Chatterjee, 1994) because a capital intensive firm may reduce its costs, especially during economic downturns or uncertain economic environments, since a firm's previously-committed or -invested fixed structure does not require further capital investment or additional expenditures. For example, Lubatkin and Chatterjee (1994) found a negative relationship between capital intensity and unsystematic risk. The findings support the view, but are inconsistent with the findings of Hsu and Jang (2008) for the hospitality context.

In addition, when considering capital intensity in relation to a franchising strategy (an inverse relationship between the two factors), a restaurant industry specific expansion strategy, capital intensity may increase risk. This is because,

following the modern portfolio theory (Markowitz, 1952), a franchising strategy may aid restaurant firms diversifying their operations, and action that would decrease firm risk and thus increase firm value. Capital intensity, apparently, inversely related to the degree of franchising, would increase firm risk and thus decrease firm value. Based on the various discussions currently available, the literature concerning capital intensity shows inconclusive and mixed results. Moreover, considering the important role of capital intensity in the restaurant industry, an interesting and valuable examination is the capital intensity issue in the restaurant business context.

Methodology

Model
This study performs a pooled regression analysis to examine the effect of capital intensity on firm value. The proposed model is:
$$Q_t = \alpha_0 + \alpha_1 CI_t + \alpha_2 LEV_t + \alpha_3 SIZE_t + \alpha_4 PROFIT_t + \alpha_5 UR_t + \varepsilon_t,$$
where, Q represents a restaurant firm's value performance, measured by Tobin's Q, following Chung and Pruit (1994)'s approximate q (more detail explanation appears in the following section); CI represents a restaurant firm's capital intensity, measured by total fixed assets scaled by total revenues; LEV represents a restaurant firm's leverage, measured by total stockholders' equity scaled by total liabilities; SIZE represents a restaurant firm's size, measured by the log of revenues; PROFIT represents a restaurant firm's profitability, measured by operating income before depreciation expense scaled by total assets; UR represents economic conditions, measured by unemployment rate; all ratios (Q, CI, LEV, and PROFIT) are in log form, and subscript, t, represents a time period.

Dependent and Main Variables
This study adopts Tobin's Q as the dependent variable to represent a firm's value performance. Following Chung and Pruit (1994), this study uses approximate q and its definition is: *approximate q = (MVE + PS + DEBT) / TA*, where MVE is the product of a firm's stock price and the number of common shares outstanding; PS represents the liquidating value of outstanding preferred shares; DEBT is the value of short-term liabilities, net of short-term assets plus the book value of long-term assets, and TA represents the book value of total assets. Tobin's Q has been recognized as a measure that better reflects a firm's performance than accounting and stock return measurements due to its ability to control for a firm's risk and, at the same time, consider future perspectives about the firm (Jose, Nichols, & Stevens, 1986; Lang & Stulz, 1994).

Capital intensity is the main variable of this study and its measure is fixed assets scaled by total revenues, following Miller (1986). The expectation is that this variable positively impacts a firm's value performance if the variable's role of

reducing a firm risk holds, either according to the Lubatkin and Chatterjee (1994) argument or the franchising argument discussed earlier. A negative impact from capital intensity on a firm's value performance would exist if capital intensity increases a firm risk, as argued by Shapiro and Titman (1986). This study does not support a particular argument, but rather examines the issue, non-directionally.

Control Variables
The main regression model includes four control variables: firm size, capital structure, profitability, and economic conditions. The included firm size (SIZE) variable controls for any systematic impacts of a firm's size on the relationship between capital intensity and a firm's value performance because large firms may perform differently from small firms in terms of their values. According to Banz (1981), smaller firms, on average, yield higher expected common stock returns than larger firms, while according to Ball (1978), small firms are riskier than larger firms; thus smaller firms are less valued compared to larger firms. Therefore, this study expects to find a positive effect from firm size on value performance. A general expectation is that a firm's capital structure imposes certain effects on the firm's value through tax advantages from debt and risk implications involved an optimal debt level. This line of thinking follows the trade-off theory (Kraus & Litzenberger, 1973) which does not support one direction. According to the trade-off theory, a firm can enjoy tax advantages from raising its debt because interest expenses are tax deductible which will enhance the firm value. However, the firm can enjoy such benefit only up to the point where the tax advantage outweighs bankruptcy costs. Once the firm passes the point (i.e., optimal leverage point) (i.e., bankruptcy costs outweigh the tax benefit), the firm value will decrease. Based on several hospitality financial studies (for example, Hsu & Jang, 2009; Koh, Lee & Boo, 2009; Lee, 2008), however, this study expects to show a negative effect of a firm's capital structure on value performance. The study measures the capital structure by leverage ratio (i.e., debt-to-equity ratio). The model includes the third control variable, profitability, because profitability may relate to both capital intensity and a firm's value performance. Especially, a strong relationship between a firm's profitability and value performance clearly encourages researchers to control for the factor. This study anticipates finding a positive effect of profitability on a firm's value performance. Last, the study controls for economic conditions due to the expectation that firms may do better in terms of profits during good economic times, and the reverse during economic downturns. Thus, the study expects to see a positive relationship between economic conditions and a firm's value performance.

Data

The current study uses the two data sources to examine the proposed research question: 1) the COMPUSTAT database for required financial data for the sampled restaurant firms, such as total assets, revenues, and stock prices, and 2) the U.S. Bureau of Labor Statistics for annual unemployment rates. The sample period spans 2000 to 2008, focusing exclusively on recent time periods, but still encompassing all different stages of economic cycles (i.e., recessionary, booming and steady). All publicly traded restaurant firms were then retrieved from COMPUSTAT for the sample period, and the data set was cleaned by eliminating, first, those companies that do not operate restaurants as their main businesses, and second, those companies that are not based in the U.S. After the cleaning process, the obtained number of observations was 579. Then, an outlier check was performed and those outliers based on the cut-off of standardized residuals at the 0.01 significance level were eliminated (Anderson, Sweeney, & Williams, 2005). After eight iterations of the outlier elimination process, the final sample attained for the main analysis was 524.

Results

Descriptive Statistics

The study first performs a descriptive analysis with the variables included in the model. Table 1 presents the results. Tobin's Q shows a mean value of 1.30, indicating that U.S. restaurant firms' market related values are 1.30 times their replacement costs. The minimum value of Tobin's Q is 0.09 while the maximum value is 3.97. Capital intensity, measured by dividing fixed assets by total revenues, ranges from 0.08 to 3.69, with a mean value of 0.47. Leverage ratio shows a mean value of 1.43 with minimum (maximum) value of 0.12 (19.90). Revenues of the sampled restaurant firms are 1,140 USD in millions, on average, ranging from 7.62 USD to 23,522 USD in millions. Last, the unemployment rate, in percentage, demonstrates a mean value of 5.09% with a minimum and maximum of 4% and 6%, respectively.

Table 1

Summary of Descriptive Statistics[†]

Variable	N	Mean	S.D.	Minimum	Maximum
Tobin's Q	524	1.30	0.72	0.09	3.97
Capital Intensity	524	0.47	0.27	0.08	3.69
Leverage	524	1.43	1.91	0.12	19.90
Revenue (USD)	524	1,140	2,794	7.62	23,522
Unemployment Rate (%)	524	5.09%	0.68%	4%	6%

[†]Tobin's Q is measured by approximate q as follows: [*(MVE + PS + DEBT) / TA,* where MVE is the product of a firm's stock price and the number of common shares outstanding; PS represents the liquidating value of outstanding preferred shares; DEBT is the value of short-term liabilities, net of short-term assets plus the book value of long-term assets, and TA represents the book value

of total assets]; Capital Intensity is measured by dividing total fixed assets by total revenues, and Leverage is measured by dividing total liabilities by total stockholders' equity.

The study, next, performs Pearson's correlation analysis to examine a bivariate relationship among all variables introduced to the main regression model. The correlation analysis additionally provides insight regarding a potential multicollinearity problem among independent variables. Table 2 presents results. Tobin's Q shows a statistically significant correlation with all variables except unemployment rate (r = 0.02). With capital intensity (r = 0.13), firm size (SIZE) (r = 0.48), and PROFIT (r = 0.71), a positive correlation exists while Tobin's Q shows a negative correlation with leverage (LEV) (r = -0.12). Capital intensity (CI) additionally shows a positive correlation with SIZE (r = 0.54) and PROFIT (r = 0.10) while LEV shows a negative correlation with PROFIT (r = -0.16) and a positive one with SIZE (r = 0.12). PROFIT and SIZE are significantly and positively correlated with each other (r = 0.40), while unemployment rate is not significantly correlated with any of the examined variables.

Table 2

Summary of Pearson's Correlation[†]

Variable	CI	LEV	SIZE	PROFIT	UR
Q	0.13[**]	-0.12[**]	0.48[**]	0.71[**]	0.02
CI		-0.06	0.54[**]	0.10[*]	0.01
LEV			0.12[**]	-0.16[**]	0.00
SIZE				0.40[**]	0.06
PROFIT					0.03

[*] and [**] represent significance level of 5% and 1%, respectively.
[†]Q represents a firm's value performance and is measured by approximate q as follows: [*(MVE + PS + DEBT) / TA,* where MVE is the product of a firm's stock price and the number of common shares outstanding; PS represents the liquidating value of outstanding preferred shares; DEBT is the value of short-term liabilities, net of short-term assets plus the book value of long-term assets, and TA represents the book value of total assets]; CI represents a firm's capital intensity, measured by dividing total fixed assets by total revenues; LEV represents a firm's leverage, measured by dividing total liabilities by total stockholders' equity; SIZE represents a firm's size, measured by log of revenues; PROFIT represents a firm's profitability, measured by dividing operating income before depreciation expense by total assets; UR represents economic conditions, measured by unemployment rates, and all ratios (Q, CI, LEV, and PROFIT) are in log form.

Main Findings

To examine the proposed hypothesis, this study performed a pooled regression analysis. The analysis, however, indicated a positive autocorrelation with 1.004 of Durbin-Watson statistic. Therefore, the study applied the Newey-West standard errors to the pooled regression results to control for autocorrelation and also potential heteroscedasticity issues (Newey & West, 1994). The results appear in Table 3. The analysis shows a good model fit with an F-value of 118.46

at a significance level less than 0.001 and an adjusted R-square of 0.53. Capital intensity (CI), the main factor of this study, negatively impacts Tobin's Q (Q) with a t-value of -2.82 (p-value of 0.005), supporting the hypothesis and the argument of Harris (1988) and Martin (1983). Leverage (LEV) shows a negative effect on Q with a t-value of -2.87 (p-value of 0.004), consistent with many hospitality financial studies. Firm size (SIZE) and PROFIT both show positive and significant effects on Q (t-value of 7.06 and 16.78, respectively) while unemployment rate (UR), representing economic conditions, does not have a significant coefficient (t-value = -0.91). The study also estimates variance inflation factors (VIFs) for independent variables to check for a potential multicollinearity problem, and results suggest that no such problem exists; the largest VIF value is 1.81 for the firm size variable which is far less than a typical cut-off value of 10 (Hair, Anderson, Tatham, & Black, 1998).

Table 3

Summary of Pooled Regression Analysis[†]

$$Q_t = \alpha_0 + \alpha_1 CI_t + \alpha_2 LEV_t + \alpha_3 SIZE_t + \alpha_4 PROFIT_t + \alpha_5 UR_t$$

Variable	Coefficients	t-value	p-value	VIF
CI	-0.20	-2.82[**]	0.005	1.46
LEV	-0.06	-2.87[**]	0.004	1.10
SIZE	0.05	7.06[***]	< 0.001	1.81
PROFIT	2.35	16.78[***]	< 0.001	1.31
UR	-0.01	-0.91	0.36	1.01
N	524			
Adj R^2	0.53			
F	118.46[***]			

[*], [**] and [***] represent significance level of 5%, 1%, and 0.01%, respectively.

Discussions and Conclusions

The current study attempts to investigate effects of capital intensity on firm value performance for publicly traded U.S. restaurant companies beginning in 2000. Since the previous literature provides mixed findings with regard to the effect of capital intensity on firm risk, and thus firm value, this study does not propose a directional, but rather non-directional hypothesis. Findings suggest the negative effect of capital intensity on a firm's value performance (measured by Tobin's Q), implicitly supporting the literature: Capital intensity increases a firm's risk (Brealey and Myers, 1984; Shapiro and Titman, 1986).

The findings also support the argument made by this study that franchising may play a role in relating capital intensity measurement and a firm's value performance. Franchising strategies benefit chain restaurant companies by providing stable income, thus reducing business risk (Andrew, et al., 2007). Such

risk reduction certainly helps restaurant firms improve their values. When considering that the proxy that this study uses to represent capital intensity is fixed assets to total revenues, the measurement is expected to inversely relate to the degree of franchising. This is because a restaurant firm with a greater degree of franchising would have a relatively smaller portion of fixed assets tied to its revenues because the company owns fewer properties and mainly generates revenues from franchising. In such case, a negative impact of capital intensity on firm value can be hypothesized (i.e., a positive impact of franchising on firm value is expected). A worthwhile future exploration would be this restaurant industry's specific characteristic in the context of capital intensity because what this study proposes is speculation. An empirical question remains: Does the franchising strategy have a direct relationship with capital intensity in regard to the effect on firm value?

While finding a positive effect from a firm's profitability on the value performance is not surprising, the strong (t-value is 10.09) and positive effect of a firm's size on firm value is of interest. While many previous studies support a positive relationship between firm size and value, many studies supported the opposite perspective which generates questions which of the two contradictory arguments for the firm size effect really holds for restaurant companies. Based on this study's findings, during the first nine years of this century, larger restaurant firms, in terms of their revenues, performed better than smaller restaurant firms in terms of their values. Perhaps, this positive firm size effect on value occurred during the prescribed time period because of dramatic economic environment changes, including the 9/11 terror attack in 2001 and massive economic turmoil beginning in 2008. Due to these severely fluctuating economic conditions, smaller companies may have been considered riskier than their counterpart, larger companies, and penalized for such risk by value reduction. However, again, this issue is a question that needs empirical investigation and justification. Thus, researchers are encouraged to examine this topic in future research.

Findings of this study have managerial implications. First, for a value maximization point of view, restaurant executives and managers may consider a strategic approach to reduce their fixed assets when compared to their revenue levels. One way to achieve such a goal is to increase the degree of franchising. By doing so, the proportion of fixed assets to revenues would decrease and value enhancement may be accomplished. However, in such case, the assumption is that the franchising strategy is the driver of the value improvement, and again, more empirical examination should be conducted to build a more solid case for such an assumption. The other way to decrease the proportion of fixed assets to revenues may be to sell unnecessary or obsolete assets. However, such sales

should be valid consideration only after thorough evaluations. Moreover, it should be noted that this recommendation assumes homogeneity of fixed assets.

For the restaurant investment community, this study's findings may suggest that investors and analysts consider restaurant firms' capital intensity as one of their evaluation tools or factors for determining investment portfolio. For example, everything else being equal, capital intensity level may help investors decide company selections for portfolio. However, further investigation to confirm this speculation is strongly encouraged, such as a comparison of portfolios based on different levels of capital intensity. Hospitality financial educators and researchers may also derive some benefits from the findings when teaching students or when conducting research which relates to firm value performance or capital intensity. For a model that examines the relationship among various independent variables with a firm's value performance, researchers may want to consider capital intensity as a factor to be controlled.

With the franchising argument by this study, some may propose to directly introduce the franchising variable to the model. There are, however, two issues in regard to such idea. First, the franchising variable will mostly have a very high correlation with the main variable of this study, capital intensity which will tend to cause multicollinearity problem. The expected high correlation is the reason why the current manuscript makes certain speculations and implications in relation to the franchising strategy from the current findings. Second, an inclusion of franchising variable would dramatically decrease the sample size. For example, Koh, et al. (2009) examined the franchising issue for the restaurant industry and came up with total sample size of 164 for 2000s (the current study's sample size is 495). Due to the two concerns discussed here, the study chose not to include the franchising variable.

This study is not free from limitations. First, findings of this study may have limited generalizability due to the fact that the study sample only includes U.S. restaurant companies. Consequently, the findings may not be applicable to non-U.S. restaurant companies. Also, the sampled companies are publicly traded, thus application of findings to countless independent restaurant operators may not be appropriate. Second, other strategic factors might impact a restaurant firm's value performance, but these are not included in this study's model. Examples of such omitted variables are internationalization and various diversification strategies. Incorporating those variables may enhance validity of the model even further, so future studies may consider inclusion of some of those omitted variables. Last, although a positive impact of franchising strategy is implicitly speculated by this study's findings, it is still an empirical question. Thus, it is recommended to study this topic more explicitly in the future.

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