

# Restaurant Operating Expenses and Their Effects on Profitability Enhancement

## Abstract

Restaurant firms need efficient cost management strategies due to highly competitive market conditions and the weak financial structure of the restaurant industry. In this regard, the objectives of this study were to examine the operating expenses of restaurant firms and their impact on profitability enhancement by business segment and firm size. This study found that high prime costs (food costs and salary expenses) could be a major concern for full-service restaurant businesses and cause lower profitability compared with their limited-service counterparts. Improving the operational performance of full-service restaurants depends on sophisticated cost retrenchment skills, such as balancing productivity and revenues while minimizing quality detrimental. Further, firm size had an impact due to economies of scale decreasing food costs. Nevertheless, managers of limited-service restaurants, especially large firms, need to consider improving food quality instead of relying on advertising effects to maximize profits.

**Keywords:** *Operating expenses, profitability, restaurant firms, prime costs, full-service restaurants, limited-service restaurants*

## 1. Introduction

The restaurant industry has witnessed fast sales growth (13% per year) over the past 30 years, although the revenue growth rate recently decreased to around 4% per year (NRA, 2014). Despite continuous business growth, restaurant firms' low

operating profitability, lack of financial flexibility, and highly competitive market environment are chronic industry-wide challenges with no sign of improvement (DeFranco & Lattin, 2006). The inherent difficulties are mainly due to the nature of restaurant business, such as low entry barriers (e.g. small amount of required capital), high proportion of operating expenses (e.g. food costs, labor costs, and rent expenses), and the existence of many substitutions in the market (DeFranco & Lattin, 2006; Assaf et al., 2011). In addition, readily accessible information on customer review sites (e.g. Yelp and Trip Advisor) about food quality, price, taste, promotions, service quality, and restaurant facilities intensify the competition among restaurant firms for limited resources in every aspect of business. Furthermore, frequent changes in legislation (e.g. minimum wage, hygiene, and nutrition), globalization, evolving technologies, unexpected natural events (e.g. SARS, hurricane, and terrorist attacks), and emerging competitors (e.g. food trucks and delivery services) add levels of complexity and vulnerability to the restaurant industry (Parsa et al., 2011).

The fundamental weaknesses of the restaurant industry are too distinctive to overlook or underestimate. According to Lee, Hallak, and Sardeshmukh (2016), in Australia 99% of restaurant firms were small and medium enterprises and 63% of restaurants earned less than 2% net profit. In a study by Parsa et al. (2011), 25% to 49% of restaurant firms failed during the first year of operation in the U.S. due to a lack of financial and human resources. Kim and Gu (2006) also suggested that restaurant firms' low profitability and insufficient financial flexibility were the most prominent indicators of business failure in U.S. Due to this industry-wide vulnerability in terms of operational and financial aspects even a 1% or 2% increase in operating expense can easily force a restaurant firm into a cash flow shortfall or to operate at a deficit. Therefore, the importance of management competence in realms

such as controlling operating costs and financial management cannot be overemphasized enough to sustain a business (Youn & Gu, 2010; Parsa et al., 2011; Assaf et al., 2011; Alonso & Krajsic, 2014).

Despite the strategic value and importance of cost management, surprisingly limited attention has been paid to the effectiveness of cost management practices in the hospitality research field (Kim et al., 2007). According to Hesford and Potter (2010), only one study (e.g., Chan & Au, 1998) in the *Cornell Hospitality Quarterly* examined the practices of cost management in the restaurant industry from 1979 to 2008. Further, Park and Jang (2014) extensively reviewed four peer-reviewed hospitality journals and found that the topic of cost management or cost accounting was not typically studied in the hospitality industry from 1990 to 2013. Instead, much more effort has been devoted to understanding the relationship among food quality, service quality, customers' satisfaction, and behavioral intentions (Namkung & Jang, 2007; Kim et al., 2009; Tsaur et al., 2015; Peng et al., 2017). These studies mostly relied on customer survey questionnaires without controlling for cost and price effects in the models. In other words, the studies did not reflect the simple but very important fact that improved food or service quality inevitably increases related expenses and often menu prices, which ultimately influences the firm's sales and profitability. Consequently, the previous findings had serious limitations in terms of providing appropriate answers to the following question: Among restaurant quality attributes, such as food, service, and marketing, which aspect should restaurant managers pay more attention to in order to enhance profitability?

The answers to the above question are important not only for restaurant firms that strive for better business performance but also for restaurant firms that struggle with poor performance. Although cost or asset retrenchment, such as layoffs or

selling-off properties, are the most frequently used strategies when a restaurant firm faces operational difficulties, the efficacy of these strategies is generally limited and has been shown to work for only a small number of firms in matured industries (Morrow et al., 2004). For example, Kukanja and Planinc (2013) found that cost reduction strategies had a negative impact on long-term restaurant firm performance and argued that a lack of scientific research and professional guidelines impedes efficient cost management practices for restaurant managers. Alonso-Almeida, Bremser, and Llach (2015) revealed that the negative effects of cost cutting are caused by deteriorated service and food quality when restaurant firms focus on immediate savings rather than strategic effects. Considering that restaurant firms typically have high operating costs and low profitability, the results are surprising because cost reduction or asset retrenchment strategies are the first choice for most restaurant managers faced with overcoming operational and financial difficulties (Alonso-Almeida et al., 2015). However, the findings evidently indicate that if overly simplified cost reduction or asset retrenchment strategies fail to account for the significance of each operating expense or assets, then the strategy obscures operational effectiveness as a whole.

To fully understand the effects of cost management strategies on restaurant firm performance, it is essential to examine the relationship between all of a restaurant firm's operating expenses and profitability- not only individually but also jointly. Nevertheless, previous studies only investigated the impact of each type of operational expense on operational performance separately but not jointly. A few studies have examined the unilateral effects of food quality (Sulek & Hensley, 2004; Namkung & Jang, 2007), advertising expenses (Hsu & Jang, 2008; Park & Jang, 2012), or employee compensation (MacDonald & Aaronson, 2006; Fougère et al.,

2010) on a restaurant firm's operational performance. Yet these results may provide incomplete information and lead to inappropriate strategic decisions (Assaf et al., 2011). Hence, it is obvious that the efficiency of each operating expense cannot be understood properly without controlling for other operating expenses. Thus, this study aimed to fill these research gaps. Specifically, the objectives of this study were to empirically examine all operating expenses that restaurant firms incur and to simultaneously analyze their impact on profitability enhancement. For this reason, this study did not intend to provide theoretical underpinnings for cost management practices but rather aimed to suggest practical implications through analyses. Thus, this study is purely exploratory in nature.

To provide more meaningful implications, this study also considered the fact that the characteristics of a restaurant firm can significantly differ by business segment (limited-service or full-service restaurant) and firm size in terms of food quality, employee roles, expected service, reputation, market shares, economies of scale, etc. The food at full-service restaurants is less standardized and more complicated than the food at limited-service restaurants. Thus, food quality is a critical factor influencing customers' satisfaction and revisit intentions at full-service restaurants but speed of service and menu prices are significant factors for limited-service restaurants (Fougère et al, 2010). Another example is that the roles and expectations of full-service restaurant employees who interact with customers for a longer period of time differ from those of limited-service restaurant employees who have limited customer contacts (Fougère et al., 2010). From another angle, cost management practices at smaller restaurants often differ from large restaurants due to the difficulties in supply management, hiring skilled workers, and obtaining financial resources (Beck & Demirguc-Kunt, 2006). In this regard, it would be reasonable to

examine the efficiency of operating expenses and the effectiveness of cost management strategies separately by restaurant type and firm size.

In short, this study intended to identify which operating expenses restaurant managers should pay more attention to in order to improve profitability. To the best of the authors' knowledge, this study is the first to investigate the comparative effects of each operating expense on restaurant firms' profitability enhancement using accounting information.

## **2. Literature review**

### *2.1. Food costs*

Food costs are the foremost and largest portion of operating expenses for a restaurant business. The food cost ratio (food costs / sales) increases if a change in unit food costs is higher than the corresponding change to the unit menu price. For example, the food cost ratio increases when a restaurant firm uses better quality but more expensive ingredients, such as organic vegetables, antibiotic-free hogs, or free-range chickens, relative to its menu prices. If this is the case, it is reasonable to expect that the food cost ratio (or food quality) has a positive relationship with sales because food quality is one of the most important determinants of restaurant customers' revisit intentions, as previous studies have illustrated (Susskind & Chan, 2000; Sulek & Hensley, 2004; Namkung & Jang, 2007).

However, if the increased expenditure for better ingredients (or food quality) causes a significant increase in menu prices without noticeable improvement in customers' perceptions of food quality, then the restaurant's sales will not increase as much as expected and, consequently, its operational performance will deteriorate

(Min & Min, 2011). This is because customers tend to react negatively to price changes; restaurant customers are more likely to be displeased by unexpected price increases rather than expected price changes (e.g. antagonization costs) (Rotemberg, 2005). To minimize antagonization costs, restaurant managers need to represent price increase in tangible ways, such as developing menus with clearly improved food quality or remarkably adding values for menu items. The theory of utility explains that consumers derive value based on the trade-off between the 'utility' attributes (or perceived value (Zeithaml, 1988)) of a product and the 'disutility' represented by the price paid for the product (Tellis & Gaethe, 1990). In this sense, an increased food cost ratio (or food quality) does not always have positive effect on a firm's operational performance since consumers' perceptions of value are related not only to food quality but also menu prices (Zeithaml, 1988; Agarwal & Teas, 2004). Previous findings also supported that food prices are an indispensable factor in determining food choices (Epstein et al., 2007).

Along the same lines, the effect of an increased food cost ratio (or food quality) on sales growth would significantly differ based on current food quality (or the level of the current food cost ratio). If a restaurant firm has high food quality (or low menu prices relative to food costs), then increasing the food cost ratio (or food quality) would have a weak or even negative impact on profitability. However, if a firm has low food quality (or high menu prices relative to food costs), then the firm might be able to increase its food cost ratio (or food quality) without changing menu prices. This would have a strong positive effect on sales growth. According to Monroe (1979), price has a negative effect on a product's value although it has a positive relationship with perceive product quality (Dodds, 1991). Therefore, customers' perceptions of food quality and the value of a product after a price change

will differ based on current levels of food quality and value, as well as by different restaurant segments. For instance, food quality, such as freshness of raw ingredients, is the most important factor for full-service restaurant customers' revisit intentions (Davies & Vollman, 1990). In contrast, food safety, restaurant cleanliness, and speed of service are critical attributes of limited-service restaurants (Harrington et al., 2013). Accordingly, as prices increase customers' expectations for food quality and value will be higher at full-service restaurants than at limited service restaurants. Consequently, the effect of an increased food cost ratio on operational performance will be lower for full-service restaurants compared with limited service restaurants.

In this context, the effects of an increased food cost ratio (or food quality) on operational performance can vary depending on many factors, such as current menu prices, food quality, and customers' perceptions of food quality. Therefore, it is not easy to predict whether increased food quality (or an increased food cost ratio) will have a positive or negative impact on a firm's sales and profitability. To clarify these two contradictory expectations, this study asked the following questions: Is higher food quality really necessary to maximize a restaurant firm's profitability? Is there any room to improve a restaurant firm's bottom line through spending more money on raw ingredients? Is it beneficial for full-service or limited-service restaurants to focus more on food quality to maximize operational performance? This study was designed to provide answers to these complicated questions by investigating the effectiveness of food cost ratios on restaurant firms' operational performance after controlling for all other operating costs.

## *2.2. Salary expenses*



Salary expenses usually account for the second largest portion of operating expenses for a restaurant business and are considered one of the largest incremental contributors to employee satisfaction (Loveman, 1998). According to social exchange theory (Cropanzano & Mitchell, 2005), employees are satisfied with their company and job when their employer provides favorable working conditions. In turn, satisfied employees tend to commit extra effort for the company as a means of reciprocity towards their employers, which leads to a higher level of service quality (Flynn, 2005). Yoon and Suh (2003) also confirmed that satisfied employees are eager to provide superior service to customers and more likely to provide a higher level of service quality. These studies agreed that there is a positive relationship between employee satisfaction and customer satisfaction (Matzler & Renzl, 2007), which could lead to higher operational performance.

In contrast, other scholars did not agree with the positive relationship between employee satisfaction and firms' profits (Tornow & Wiley, 1991; Chi & Gursoy, 2009). For example, Tornow and Wiley (1991) found a consistent negative correlation between employee satisfaction and a firm's profitability. Chi and Gursoy (2009) reported that employees' satisfaction could be improved through a firm's investment in employee benefits or compensation, but it cannot directly induce sufficient sales growth and could even result in diminishing profits. Gursoy and Swanger (2007) also mentioned that customer satisfaction is not optional but instead an inevitable goal when operating in the hospitality industry. In this regard, it can be suggested that restaurant customers' demands are not fully responsive to a higher level of service quality. Therefore, the relationship between employee satisfaction and firms' performance may not be explicit (Yee et al., 2008) because employee satisfaction

inevitably entails costs from the perspective of strategic operations management, such as training and compensation (Chi & Gursoy, 2009).

Further, the effects of salary expenses on a firm's profitability could differ between limited-service and full-service restaurants due to their employees' varied characteristics and roles. For instance, a higher proportion of employees are unskilled minimum wage workers at limited-service restaurants, while many full-service restaurant employees are either full-time workers or paid through tips and have appropriate experience and knowledge (Fougère et al., 2010). Full-service restaurant employees also interact with customers for much longer periods of time than limited-service restaurant employees because they provide table service and food is sold primarily for on-premises consumption (MacDonald & Aronson, 2006). In this regard, employees' experience and communication skills (e.g., relationship quality) are more significant factors for customer satisfaction and revisit intentions at full-service restaurants (Kim et al., 2001).

Nevertheless, many past studies only focused on the service-profit-chain perspective rather than an operational-management or efficiency perspective (Reynold & Biel, 2007). Therefore, this study is expected to make a meaningful contribution to understanding the relationship between salary expenses and a restaurant firm's operational performance within both limited-service and full-service restaurant settings from an operational efficiency perspective using each firm's accounting information.

### *2.3. Selling, general, and administrative (SG&A) expenses and advertising expenses*

The effectiveness and duration of a firm's marketing expenses, such as SG&A and advertising expenses, have been extensively investigated in the marketing

literature. SG&A expenses include all expenditures that are required to sell products, such as rent, utilities, insurance, fees, etc. In manufacturing industries, most SG&A expenses are approximately fixed and, thus, the relationship between SG&A expenses and sales is negative since the fixed cost per unit decreases as sales increase (Lev & Thiagarajan, 1993). For this reason, Bernstein (1989) suggested that a disproportionate increase in SG&A costs over sales is due to inefficient cost control or an unusual sales effort. Similarly, Abarbanell and Bushee (1997) showed that an increase in the SG&A cost ratio signaled unfavorable future earnings. Similarly, SG&A expense ratios would not grow substantially larger as a restaurant firm grows. Thus, SG&A expenses should have similar characteristics to variable costs. Therefore, this study expected that increased SG&A expenses would have a negative effect on firm profitability.

In terms of advertising expenses, many previous studies revealed that advertising expenditures have a positive impact on a firm's perceived brand equity (Aaker & Jacobson, 1994; Rao et al., 2004). Among them, Aaker and Jacobson (1994) suggested that advertising expenditures generate future cash flows and enhance shareholder value by creating brand loyalty and brand association. Rao et al. (2004) also suggested that corporate branding strategies are positively associated with Tobin's Q, which represents intangible firm value. Other studies examined the direct effects of advertising on operating performance and suggested a positive effect on sales (Duffy, 2001) or operating profits (Paton & Williams, 1999).

In restaurant business settings, Hsu and Jang (2008) found that advertising expenditures create intangible value as measured by Tobin's Q. However, they did not measure the direct effects of advertising expenses on a firm's financial performance. In another study, Park and Jang (2012) specified the impact of

advertising expenses on sales growth and revealed that advertising expenditures have a significant positive short-term effect on sales growth. However, none of these past studies considered advertising expenses comparatively with other operating expenses, such as food costs, salary expenses, and SG&A expenses, included in the models. Therefore, it is difficult to confirm the *real* effects of advertising expenses on firm performance because other operating expenses that influence a firm's sales growth were not controlled in the models.

Furthermore, the effectiveness of advertising can differ by business segment. For instance, at full-service restaurants front of the house employees introduce new menus and often promote target menus directly to customers during table service. In contrast, customers at limited-service restaurants have little contact with employees but can easily obtain information about new menus from advertisements. Thus, quality food and service would be more important factors than advertising for building brand equity or generating sales (Susskind & Chan, 2000) for full-service restaurants. Also, the complexity of menu items at full-service restaurants hinders effective advertising, while the simplicity of menu items at limited-service restaurants increases its effects. Therefore, this study expects that the impact of advertising expenses on firm performance should be considered jointly with other operating expenses and would be stronger for limited-service restaurants than full-service restaurants.

#### *2.4. Moderating role of firm size*

Previous studies agreed that firm size plays a significant moderating role in a firm's operating efficiency (Rumelt, 1997; Melitz & Ottaviano, 2008). In general, large firms have an advantage in the aspects of market power, economies of scale,

managerial expertise, and accessibility to financial resources compared to small firms (Beck et al., 2008). In other words, small firms could face disadvantages in the market in terms of bargaining power with suppliers and buyers, humane resource management, and financial constraints. To overcome such inherent difficulties, small firms should target narrow or specific customers or markets rather than compete with larger firms because they can better serve narrow market segments by offering customized products or exceptional levels of customer service (Katz, 1970). Accordingly, the internal resources required to run small firms that must meet more complex customer needs, such as employees' skills and knowledge, should differ from those of large firms.

However, the heterogeneous characteristics among large and small firms within each business segment have rarely been examined in the restaurant industry from the perspective of operational management efficiency. Therefore, based on past research (e.g., Jang & Kim, 2009; Park & Kim, 2010) this study expected firm size to have a differential influence on the relationship between operating expenses and a firm's profitability because each firm's operational efficiency is idiosyncratic based on market power, economies of scale, and financial flexibility.

### **3. Methodology**

#### *3.1. Samples and data*

This study used financial data from publicly traded U.S. restaurant firms from 1973 to 2012. The data was collected from the COMPUSTAT database with a Standard Industry Code (SIC) of 5812. After excluding firms with serious missing data for food costs, SG&A, advertising, or salary expenses, this study used a total of

372 observations. For further analysis, we divided the overall restaurant firms using the North American Industry Classification System (NAICS code) into full-service restaurants (NAICS code: 722511) and limited-service restaurants (NAICS code: 722513). Full-service restaurants include restaurant firms that offer table service (e.g., semi-casual, casual, and fine dining), while limited-service restaurants do not offer table service.

### *3.2. Variables*

In order to analyze the impact of cost management on a firm's performance, the firm's profitability (Return on Sales (ROS) = Net income / Total sales) was used as a dependent variable. For the independent variables, food cost ratio (food costs / sales), salary expense ratio (salary expenses / sales), SG&A expense ratio (selling, general, and administrative expenses / sales), and advertising expense ratio (advertising expenses / sales) were used. For control variables, firm size (natural log of total assets), consumer price index (CPI), and gross domestic product (GDP) were used because they can affect consumers' price sensitivity and disposable income.

### *3.3. Statistical Analysis*

First, this study compared the mean value of each operating expense ratio (food costs, salary expenses, SG&A expenses, and advertising expense ratios) between limited-service and full-service restaurants by using independent samples t-test to understand overall operating expense management behaviors. This study also compared food cost, salary expense, SG&A expense, and advertising expense ratios between large and small firms within each restaurant segment.

Second, this study tested whether the parameter estimates of the limited-service restaurant group significantly differed from those of the full-service restaurant group by using Chow test (Chow, 1960). The test results specified whether the efficiencies of each operating expense were sufficiently related or unrelated between the two groups. Model (1) was used for all firms, as well as the limited-service restaurant group and the full-service restaurant group separately.

$$ROS_{it} = \beta_0 + \beta_1 * Food\ cost_{it} + \beta_2 * Salary_{it} + \beta_3 * SG\&A_{it} + \beta_4 * Advertsing_{it} + \varepsilon_{it} \quad (1)$$

Then, the test statistic was formally stated as follow:

$$F = (RSS_{all\ firms} - (RSS_{limited} + RSS_{full})) / (RSS_{limited} + RSS_{full}) \times (T - 2K) / K$$

$RSS_{all\ firms}$  = residual sum of square for all firms

$RSS_{full}$  = residual sum of square for full-service restaurant firms

$RSS_{limited}$  = residual sum of square for limited-service restaurant firms

T = total number of observation; K = number of regressors including intercept

Third, to identify the comparative effects of each operating expense on a firm's profitability, this study used fixed-effects panel data analysis as presented in equation (2). The fixed-effects panel model is useful in that it removes the effects of time-constant unobserved factors. A Hausman test for the exogeneity of the unobserved error was also performed. According to the test, the model did not have any significant exogeneity issue with the unobserved error ( $\chi^2 = 27.53$ , p-value < 0.01). Thus, the fixed-effects models were preferred to the random-effects models. In all models, the robust standard error was used to obtain heteroskedasticity-robust estimators. Thus, this study minimized potential multi-collinearity issues. In

the models, the coefficient of each operating cost was interpreted as the change of ROS when one of the operating expense ratios changed while other variables were controlled. Therefore, the coefficient of each operating expense in model (2) implies the relative effect of each operating expense on profitability.

$$ROS_{it} = \beta_0 + \beta_1 * Food\ cost_{it} + \beta_2 * Salary_{it} + \beta_3 * SG\&A_{it} + \beta_4 * Advertising_{it} + \beta_5 * Firm\ size_{it} + \beta_6 * CPI_t + \beta_7 * GDP_t + \varepsilon_{it} \quad (2)$$

For further analyses, this study included interaction terms by multiplying each operating expense and firm size variable in equation (3). We also used a fixed-effects regression model for the analyses. In the model, the interaction term implies the moderating effect of firm size on the relationship between operating expenses and profitability (ROS).

$$ROS_{it} = \beta_0 + \beta_1 * Food\ cost_{it} + \beta_2 * Salary_{it} + \beta_3 * SG\&A_{it} + \beta_4 * Advertising_{it} + \beta_5 * Firm\ size_{it} + \beta_6 * (Food\ cost * Firm\ size)_{it} + \beta_7 * (Salary * Firm\ size)_{it} + \beta_8 * (SG\&A * Firm\ size)_{it} + \beta_9 * (Advertising * Firm\ size)_{it} + \beta_{10} * CPI_t + \beta_{11} * GDP_t + \varepsilon_{it} \quad (3)$$

## 4. Results

### 4.1. Descriptive statistics

The restaurant industry witnessed rapid revenue growth until 2007 (about 10.9% from 2001 to 2007), but since 2008 the rate of growth has declined (about 5.7% from 2008 to 2012). As shown in Figure 1, restaurant firms have maintained



stable food cost, salary, SG&A, and advertising expense ratios. The figures clearly show that food costs are the largest operating expense, followed by salary expenses, SG&A expenses, and advertising expenses. However, the figures also demonstrate that restaurant firms garner a very small amount of net income over total sales (less than 5% over the period).

(Insert Figure 1 here)

As Table 1 presents, food costs and salary expenses (prime costs) account for approximately 68% of revenue, while the average net profit (ROS) was only 2.2%. The average food cost ratio for all restaurant firms was 40.48%, with limited-service restaurants 1.9% lower than full-service restaurants (39.4% vs. 42.3%). As expected, the average salary expense ratio was lower for limited-service restaurants by 6.7% compared with full-service restaurants (23.9% vs. 30.5%). However, both the average SG&A expense ratio (0.8% higher, 17.3% vs. 16.5%) and the average advertisement expense ratio (2.6% higher, 5% vs. 2.4%) were higher for limited-service restaurants. Thus, prime costs (food costs and salary expenses) accounted for about 63% of revenue for limited-service restaurants, but almost 72% for full-service restaurants. Consequently, the average ROS was 2.8% higher for limited-service restaurants compared with full-service restaurants (3.8% vs. 1.0%). One noticeable difference was firm size: the firm size of limited-service restaurants was much larger (\$4,146 million dollars) than full-service restaurants (\$262 million dollars).

(Insert Table 1 here)

#### *4.2. Operating expense ratios in limited-service and full-service restaurant segments*

To identify whether different operating expense ratios exist between limited-service and full-service restaurants, this study performed an independent samples t-test. First, operating expenses for limited-service and full-service restaurants were compared, as shown in Table 2. The food cost ratio was significantly lower (2%) for limited-service restaurant firms than full-service restaurant firms as seen in Table 1, which was opposite to the study's expectations. However, the salary expense ratio was significantly higher (6.7%) for full-service restaurants than limited-service restaurant firms, which was the biggest difference between the two restaurant segments. The difference in advertising expense ratios was significant (2.6% higher for limited-service restaurants) but the SG&A expense ratios did not significantly differ.

(Insert Table 2 here)

This study also examined each business segment by firm size, as shown in Table 3. For limited-service restaurant firms, large firms had a 6.8% lower food cost ratio, a 4.5% lower salary expense ratio, and a 1.6% lower advertising expense ratio than small firms. In contrast, large full-service restaurant firms showed a 6.2% lower food cost ratio, but a 2.7% higher salary expense ratio and a 0.47% higher advertising expense ratio than small firms. The results showed that all of the ratios for large firms in the limited-service segment were lower than those of small firms. However, larger full-service restaurants had unexpectedly higher salary and advertising expense ratios than the smaller full-service restaurant segment, as seen in Table 4. The results suggest that human resource and advertising management at large full-service restaurants are inefficient and could be improved. Nevertheless, this study also found

that the food cost ratio was significantly lower for large firms than small firms in both restaurant segments. Importantly, salary expense ratios for both small and large limited-service restaurants were lower than for either size firm in the full-service restaurant segment. However, the advertising expense ratios of both small and large restaurant firms in the limited-service segment were higher than either size firm in the full-service restaurant segment.

(Insert Table 3 here)

A linear regression of the Chow test was used to confirm whether the parameter estimates for limited-service restaurants and full-service restaurants significantly differed, as presented in Table 4. As shown in the results, the parameter estimates for limited-service restaurants significantly differed from those of full-service restaurants. The F test statistic was 12.39 and statistically significant at a 1% significance level ( $= ((0.7153 - (0.2621 + 0.3486))/5) / ((0.2621 + 0.3486) / ((106 + 208) - (2 \times 5)))$ ). Therefore, the results strongly indicate that the effects of operating expenses on returns on sales for the limited-service restaurant group significantly differed from the effects on full-service restaurant group. This result indicates that the two groups should be examined separately even though they both belong to the same industry. Among the resulting parameter estimates, food (F(10.01, p<0.01)), salary (F(16.32, p<0.01)), and advertising (F(40.68, p<0.01)) expenses significantly differed between the two groups but SG&A expenses (F(0.35, p>0.1) did not.

#### *4.3. Effects of operating expenses on profitability*

As presented in Table 5, the fixed-effect panel data analysis provided the relative efficiency of each operating expense on profitability. Across all restaurant

firms, salary expenses (-1.16, p-value<0.01), followed by food costs (-1.11, p-value<0.01), and then SG&A expenses (-1.05, p-value<0.01) had the greatest negative impact on profitability. However, advertising expenses (-0.41, p-value>0.10) did not significantly influence firms profitability.

More specifically, for limited-service restaurant firms SG&A expenses (-1.14, p-value<0.01) were the most inefficient operating expense in terms of profitability, with a coefficient lower than -1. In contrast, the coefficients of salary expenses (-0.98, p-value<0.01) and food costs (-0.87, p-value<0.01) were both higher than -1. The coefficient is -1 (a 1% decline in ROS) if a firm increases an operating expense by 1% but does not increase sales at all. Thus, the results indicated that when a limited-service restaurant firm increases their SG&A expense ratio by 1%, its ROS decreases by 1.14% while holding other expense ratios constant. In other words, increased SG&A expenditures have a detrimental effect on generating sales. In contrast, increased salary expenses and food costs did increase sales somewhat because the coefficients were higher than -1. Similar to the overall restaurant firm results, an increase in advertising expenses (-0.04, p-value>0.10) did not have a significant negative effect on ROS for limited-service restaurants. This may be because limited-service restaurants can increase sales enough to cover the costs of increased advertising expenses. In this regard, advertising expenses and food costs were beneficial for generating revenue, but SG&A expenditures were not for limited-service restaurants.

On the contrary, all operating expenses had significant negative effects on full-service restaurant firms' profitability. Among them, salary expenses (-1.29, p-value<0.01) had the largest negative influence and, thus, were deemed the most inefficient operating expense. Food costs (-1.23, p-value<0.01) were the second most

inefficient cost. The coefficients for SG&A expenses (-1.16, p-value<0.01) and even advertising expenses (-1.04, p-value<0.05) were also lower than -1, which suggests that even enhanced marketing efforts would hardly increase full-service restaurant firms' profitability. Therefore, it seems obvious that full-service restaurant managers should pay careful attention to any increase in operating expense ratios. In other words, full-service restaurateurs need to understand that the best way to enhance their profitability is reducing operating expenses. Practically speaking, firms need to consider ways to reduce salary expenses first and then food costs. However, in order for the firm to survive in the long-term they should only be reduced up to a point that does not jeopardize the level of service quality.

(Insert Table 5 here)

For further analysis, this study added interaction terms within each restaurant segment to identify the moderating role of firm size on profitability as in equation (2). As shown in Table 6, for limited-service restaurants firm size played a significant positive moderating role (0.17, p-value<0.05) on the relationship between SG&A expenses and profitability. However, firm size had a significant negative interaction effect (-0.32, p-value<0.01) between advertising expenses and profitability. The results indicate that for limited-service restaurants SG&A expenses were more inefficient for smaller firms, but the inefficiency decreased as firm size increased. On the contrary, the inefficiency of advertising expenses was greatest for larger limited-service restaurants than their smaller counterparts. Nonetheless, this study did not find that firm size had any significant moderating effect on either food costs or salary expenses in the limited-service restaurant segment.

For full-service restaurants, firm size exhibited a significantly positive interaction effect only for food costs (0.15, p-value<0.10), which implies that the inefficiency of food costs is more severe for small full-service restaurants. Therefore, it can be concluded that firm size does not have a substantial moderating effect on operating efficiency in full-service restaurants. The only exception is food costs, which may be due to high levels of inefficiency in managing them.

(Insert Table 6 here)

## **5. Conclusions and discussion**

### **5.1. Summary of findings**

This study investigated restaurant firms' operating expenses and their comparative efficiencies in terms of firm profitability enhancement. First, this study found that limited-service restaurant firms have 8.55% lower prime costs (food costs plus salary expenses) than full-service restaurant firms (limited: 63.29% vs. full: 71.84%). In particular, salary expenses differed by quite a bit (6.65%) between the two segments (limited: 23.87% vs. full: 30.52%), which seems to reflect the varied nature of these two types of businesses. The results of the Chow test also confirmed that the limited-service restaurant group had significantly different features in terms of operating expense efficiency than the full-service restaurant group. As a whole, the current status of full-service restaurants seems problematic in terms of profitability because the average margin after prime costs (and *before* SG&A and advertising expenses) was only 28.16% with a 0.9% net profit.

Second, despite low profitability, large restaurant firms seem to enjoy economies of scale in operating expenses in both restaurant segments (see Tables 4). Prime costs accounted for 68.98% of sales at small limited-service restaurants,

57.60% at large limited-service restaurants, 73.58% at small full-service restaurants, and 70.10% at large full-service restaurants, as shown in Table 4. Nevertheless, only large limited-service restaurants had prime costs lower than 60%, while all others were around 70% or higher. The figures clearly reveal the fundamental weakness of small restaurant firms in terms of profitability or menu pricing. Specifically, the food costs of small full-service restaurants are problematic (44.43%).

Third, this study revealed that SG&A expenses are the most inefficient operating expense for limited-service restaurants, while advertising expenses are the most efficient. Among all operating expenses, advertising expenses and food costs are beneficial for generating sales, while SG&A expenses are not helpful. That is, limited-service restaurant firms could increase their profitability by enhancing advertising or food quality but may harm profitability by spending more on SG&A. It should be noted that advertising expenses could contribute to increased sales and, thus, support profitability enhancement for limited-service restaurant firms.

Fourth, in contrast full-service restaurant firms' profitability did not increase when any of the operating expenses increased. Specifically, salary expenses were the most inefficient operating expense for full-service restaurants. Therefore, managers of full-service restaurant firms have to consistently and vigilantly monitor human resource management practices.

Fifth, this study confirmed that firm size has a significant negative moderating effect on the relationship between advertising expenses and a firm's profitability (ROS) for limited-service restaurant firms. However, it has a significant positive moderating effect on the relationship between SG&A expenses and profitability (ROS). Therefore, advertising expenses can play an important role in terms of profitability enhancement for large limited-service restaurants.

Last, but not least, firm size had a significant positive moderating effect on the relationship between food costs and profitability (ROS) for full-service restaurants. In other words, food costs at smaller full-service restaurants have a significant detrimental effect on profitability and, thus, are problematic for small full-service restaurants. Therefore, managers of small full-service restaurants have to pay more attention to changes in food costs along with salary expenses.

In sum, this study confirmed that cost management practices at full-service restaurants appear to be more inefficient than those at limited-service restaurants, which is consistent with previous studies (e.g., Assaf et al., 2011; Alonso & Krajsic, 2014). In particular, even if full-service restaurants spend more on operating expenses to enhance food quality, employee satisfaction, or marketing efforts they still will barely increase either their revenue or bottom line. In contrast, limited-service restaurants have some flexibility to spend more on operating expenses for food costs and advertising expenses to improve profitability. The findings suggest a couple key components for enhancing profitability at full-service restaurants. First, sophisticated cost retrenchment skills are required to balance productivity and revenues while minimizing quality deterioration. Second, it is important to increase firm size to obtain economies of scale for food costs. Managers of limited-service restaurants, especially large firms, have to consider improving food quality to maximize profits and make an effort to reduce advertising expenses.

## 5.2. Theoretical implications

This study examined restaurant firms' cost management practices and their effect on profitability by using accounting information. In this sense, this study links managerial accounting with firm performance rather than customer survey data for the



first time. Considering the lack of research in managerial accounting, this study provides a valuable benchmark for restaurant managers to understand the weaknesses and strengths of their cost structures. The majority of consumer behavior literature proposes that food quality and service quality have a significant positive effect on customers' satisfaction or behavioral intentions (Chow et al., 2007; Namkung & Jang, 2008). However, the practical implications of these results have critical limitations because cost and price effects were not considered in the models. Consequently, previous studies did not account for the effect of cost and price increases to improve food and service quality on customer satisfaction or behavioral intentions.

According to the Mean-end theory (Zeithaml, 1988), customers evaluate products based on their perceptions of price, quality, and value, but their product choice is constrained by price (Sweeney et al., 1996). If there was no negative relationship between price and value, then the operational performance of full-service restaurants should always be better than that of limited-service restaurants since, in general, they have higher food and service quality. However, this study's results revealed exactly the opposite. This study also posed the importance of considering cost and prices in developing consumer behavior models. Therefore, this study provides complementary theoretical and empirical evidence for the effectiveness of food and service quality on operational performance in restaurant business settings. In addition, this study found evidence that the relationship between quality and profitability varies by different business segments.

## **6. Limitations and future research**

This study presents several important barometers for operating efficiency and suggests practical implications for both limited-service and full-service restaurant

firms. However, this study is not entirely free from limitations. The purpose of the study was to examine the comparative efficiencies of operating expenses on firm profitability within different restaurant business segments. However, this study did not consider the long-term effects of operating expenses on intangible value. For instance, a restaurant firm's food quality, various marketing strategies, and human resource management can contribute to intangible value that may affect firm performance in the long run. In this respect, it is plausible to assume that each expense could also have long-term effects on firm value. In addition, this study only included publicly traded restaurant firms although many private restaurants are much smaller. However, private restaurants are beyond the scope of this study and we propose this issue for future studies.

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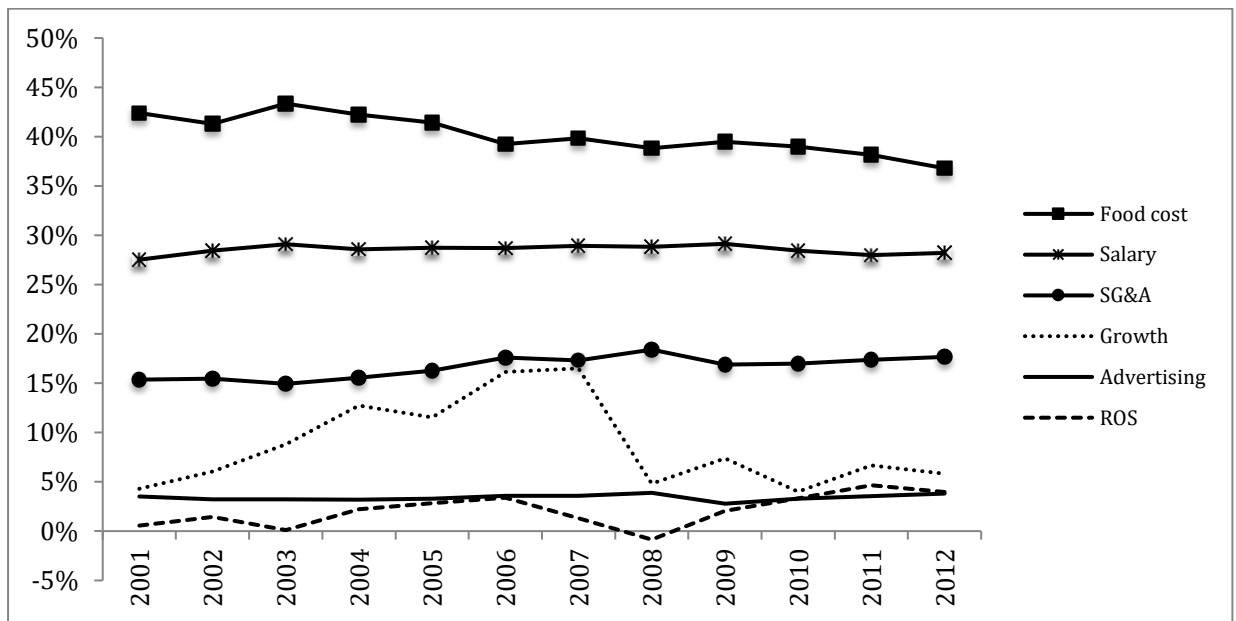
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**Figure 1. Operating expense ratios in restaurant firms**



Note: Food cost =  $\text{Food cost}_t / \text{Sales}_t$ ; Salary =  $\text{Salary expense}_t / \text{Sales}_t$ ; SG&A =  $\text{SG\&A expense}_t / \text{Sales}_t$ ; Growth =  $(\text{Sales}_t - \text{Sales}_{t-1}) / \text{Sales}_{t-1}$ ; Advertising =  $\text{Advertising expense}_t / \text{Sales}_t$ ; ROS =  $\text{Net Income}_t / \text{Sales}_t$ .

**Table 1. Descriptive information on operating expenses of restaurant firms**

		Sales growth	Food cost	Salary	SG&A	Advertising	ROS	Total Assets
<b>ALL</b> - Observations (372)	Mean	0.0868	0.4048	0.2759	0.1688	0.0351	0.0220	1,975
	Std. D.	0.1832	0.0817	0.0615	0.0697	0.0257	0.0725	5,602
	Min	-0.4480	0.1609	0.1043	0.0526	0.0032	-0.3494	6
	Max	0.8599	0.6092	0.3918	0.5441	0.2023	0.2085	35,387
<b>Limited -service</b> - Observations (164)	Mean	0.0765	0.3942	0.2387	0.1733	0.0495	0.0376	4,146
	Std. D.	0.1549	0.0820	0.0539	0.0488	0.0296	0.0783	7,925
	Min	-0.3853	0.1609	0.1455	0.0830	0.0138	-0.3341	7
	Max	0.7443	0.6092	0.3528	0.3186	0.2023	0.2055	35,387
<b>Full -service</b> - Observations (208)	Mean	0.0950	0.4132	0.3052	0.1653	0.0237	0.0097	262
	Std. D.	0.2027	0.0797	0.0504	0.0825	0.0141	0.0652	310
	Min	-0.4480	0.1726	0.1043	0.0526	0.0032	-0.3494	6
	Max	0.8599	0.5993	0.3918	0.5441	0.0561	0.2085	1,209

Note: Sales growth =  $(Sales_t - Sales_{t-1}) / Sales_{t-1}$ ; Food cost =  $Food\ cost_t / Sales_t$ ; Salary =  $Salary\ expense_t / Sales_t$ ; SG&A =  $Sales,\ general,\ and\ administrative\ expense_t / Sales_t$ ; Advertising =  $Advertising\ expense_t / Sales_t$ ; ROS =  $Net\ Income_t / Sales_t$ ; Total assets is book value of assets in million dollars.

**Table 2. Comparisons of mean operating expense between the limited-service and full-service restaurant segments**

Operating expenses	Limited-service Restaurants	Full-service Restaurants	t-test
Food cost	0.3942 (0.0064)	0.4132 (0.0055)	-2.2411**
Salary	0.2387 (0.0042)	0.3052 (0.0035)	-12.1588***
SG&A	0.1733 (0.0038)	0.1653 (0.0057)	1.1646
Advertising	0.0495 (0.0023)	0.0237 (0.0010)	10.2943***

Note: Food cost =  $Food\ cost_t / Sales_t$ ; Salary =  $Salary\ expense_t / Sales_t$ ; SG&A =  $Sales,\ general,\ and\ administrative\ expense_t / Sales_t$ ; Advertising =  $Advertising\ expense_t / Sales_t$ ; Bracket is standard error; \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

**Table 3. Comparisons of mean operating expense between the limited-service and full-service restaurant segments by firm size**

Operating expenses	Limited-service Restaurants			Full-service Restaurants		
	Small	Large	t-test	Small	Large	t-test
Food cost	0.4284 (0.0101)	0.3600 (0.0059)	5.8677***	0.4443 (0.0061)	0.3821 (0.0082)	6.0937***
Salary	0.2614 (0.0063)	0.2160 (0.0044)	5.9381***	0.2915 (0.0057)	0.3189 (0.0036)	-4.0747***
SG&A	0.1700 (0.0061)	0.1765 (0.0046)	-0.8516	0.1841 (0.0098)	0.1464 (0.0053)	3.3819***
Advertising	0.0576 (0.0043)	0.0414 (0.0012)	3.6400***	0.0213 (0.0014)	0.0260 (0.0013)	-2.4486**

Note: Food cost = Food cost<sub>t</sub>/Sales<sub>t</sub>; Salary = Salary expense<sub>t</sub>/Sales<sub>t</sub>; SG&A = Sales, general, and administrative expense<sub>t</sub>/Sales<sub>t</sub>; Advertising = Advertising expense<sub>t</sub>/Sales<sub>t</sub>; Bracket is standard error; \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

**Table 4. Linear regressions for Chow test**

	<b>All Restaurants</b>	<b>Limited-service Restaurants</b>	<b>Full-service Restaurants</b>
	<b>SS</b>		
Model	1.2366	0.7382	0.5317
Residual	0.7153	0.2621	0.3486
Total	1.9519	1.0003	0.8803
<b>Dependent Variable: ROS</b>	<b>All Restaurants</b>	<b>Limited-service Restaurants</b>	<b>Full-service Restaurants</b>
Food cost	-0.7202*** (0.0357)	-0.7046*** (0.0479)	-0.9363*** (0.0554)
Salary	-0.7647*** (0.0421)	-0.7515*** (0.0597)	-1.2025*** (0.0947)
SG&A	-0.7178*** (0.0422)	-0.9163*** (0.0804)	-0.9792*** (0.0701)
Advertising	-0.7494*** (0.0989)	-0.2749** (0.1151)	-2.0265*** (0.2510)
Constant	0.6720*** (0.0268)	0.6671*** (0.0313)	0.9734*** (0.0596)
<b>Observations</b>	372	164	208
<b>R<sup>2</sup></b>	0.63	0.74	0.60

Note: Dependent variable is  $ROS = \text{Net Income}_t / \text{Sales}_t$ ; Food cost =  $\text{Food cost}_t / \text{Sales}_t$ ; Salary =  $\text{Salary expense}_t / \text{Sales}_t$ ; SG&A =  $\text{Sales, general, and administrative expense}_t / \text{Sales}_t$ ; Advertising =  $\text{Advertising expense}_t / \text{Sales}_t$ . Bracket is standard error; \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

**Table 5. The effects of operating expenses on profitability by restaurant segments**

<b>Dependent Variable: ROS</b>	<b>All Restaurants</b>	<b>Limited-service Restaurants</b>	<b>Full-service Restaurants</b>
Food cost	-1.1086*** (0.1398)	-0.8710*** (0.2614)	-1.2288*** (0.1659)
Salary	-1.1602*** (0.1540)	-0.9794*** (0.2000)	-1.2910*** (0.2095)
SG&A	-1.0526*** (0.1134)	-1.1371*** (0.3298)	-1.1583*** (0.1372)
Advertising	-0.4092 (0.2956)	-0.0414 (0.5200)	-1.0361** (0.4730)
Firm size	-0.0082 (0.0062)	0.0000 (0.0097)	-0.0167** (0.0067)
CPI	0.0009 (0.0011)	-0.0016 (0.0022)	0.0031** (0.0014)
GDP	0.0009 (0.0013)	-0.0010 (0.0018)	0.0020 (0.0017)
Constant	1.0232*** (0.1145)	0.8208*** (0.1783)	1.1947*** (0.1532)
<b>Observations</b>	372	164	208
<b>R<sup>2</sup></b>	0.50	0.57	0.49

Note: Dependent variable is  $ROS = \text{Net Income}_t / \text{Sales}_t$ ; Food cost =  $\text{Food cost}_t / \text{Sales}_t$ ; Salary =  $\text{Salary expense}_t / \text{Sales}_t$ ; SG&A =  $\text{Sales, general, and administrative expense}_t / \text{Sales}_t$ ; Advertising =  $\text{Advertising expense}_t / \text{Sales}_t$ ; Firm size is natural log of total assets; CPI = customer price index; Bracket is robust standard error; \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

**Table 6. Moderating effects of firm size on the relationship between operating expenses and profitability by restaurant segments**

<b>Dependent Variable: ROS</b>	<b>Limited-service Restaurants</b>	<b>Full-service Restaurants</b>
Food cost	-1.0298*** (0.1988)	-1.8925*** (0.4090)
Salary	-1.0992*** (0.2855)	-1.7891** (0.7704)
SG&A	-2.0293*** (0.3693)	-1.7235*** (0.4501)
Advertising	1.0428* (0.5297)	-1.2493 (1.7705)
Firm size	-0.0419 (0.0327)	-0.1329 (0.0840)
Food cost*Firm size	0.0243 (0.0269)	0.1508* (0.0762)
Salary*Firm size	0.0408 (0.0690)	0.1010 (0.1642)
SG&A*Firm size	0.1741** (0.0667)	0.1458 (0.0902)
Advertising*Firm size	-0.3180*** (0.0855)	0.0702 (0.4532)
CPI	-0.0023 (0.0020)	0.0026* (0.0013)
GDP	-0.0003 (0.0016)	0.0021 (0.0017)
Constant	1.0645*** (0.2171)	1.7165*** (0.4323)
<b>Observations</b>	164	208
<b>R<sup>2</sup></b>	0.60	0.51

Note: Dependent variable is ROS = Net Income<sub>t</sub>/Sales<sub>t</sub>; Food cost = Food cost<sub>t</sub>/Sales<sub>t</sub>; Salary = Salary expense<sub>t</sub>/Sales<sub>t</sub>; SG&A = Sales, general, and administrative expense<sub>t</sub>/Sales<sub>t</sub>; Advertising = Advertising expense<sub>t</sub>/Sales<sub>t</sub>; Firm size is natural log of total assets; CPI = customer price index; Bracket is robust standard error; \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.