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Determinants of commodity price risk exposure in the restaurant industry: An analysis by commodity price cycles

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ABSTRACT

The objectives of the present study were to (1) investigate the level and the extent of commodity price risk exposure in the restaurant industry and (2) identify the determinants of risk exposure. The risk exposure was estimated by 60-month rolling regressions based on equity returns. The determinants of equity risk exposure were proposed based on a discounted cash flow model. The results found that 35.39% of sample restaurant firms are exposed to commodity price risk. The level of equity risk exposure was estimated to be 1.148 during commodity price booms and 1.031 during slumps. Empirical testing was consistent with the model prediction that operating leverage and financial leverage are effective tools in managing risk exposure, but the effects are asymmetric during commodity price booms and slumps. Financial leverage was found to be more effective than operating leverage.

1. Introduction

Commodity prices are considered to be a major source of business risk (Bartram, 2005). This is especially true for the restaurant industry because food costs on average accounts for 33% of the revenue (Food Prices and Small Businesses, 2008) and agricultural commodity prices have been rising and becoming volatile in recent years. Food prices have increased by 2.8% per year on average for the past 10 years (Dreibus et al., 2014) and agricultural commodity prices are becoming volatile due to climate change, disease, and rising global demand (Thorn, 2014). Considering that the revenue of the U.S. restaurant industry is estimated to be $683 billion in 2014 (National Restaurant Association, 2014), a one-percent increase in food commodity prices would lead to more than $2.25 billion additional cost for the industry. Commodity price is likely continue to be a major issue for restaurateurs given that approximately one billion people are moving from poverty into the world of consumerism (Woolley, 2010). While many restaurant companies have acknowledged commodity price risk as one of the major risk factors, the industry has little leeway to increase average check under unfavorable employment and economic environments (Jargon and Spector, 2011). When increasing prices is not an option, managing variable costs such as food cost proves to be a better profit lever compared to cutting fixed costs or pumping up volume (Marn and Rosiello, 1992).

The restaurant industry has a wide range of strategies to manage food cost, from inventory control to menu design and financial hedging. However, it is challenging to identify a strategy that works for all types of restaurants due to the inherently diverse nature of the restaurant industry. For example, smaller or independent restaurants can quickly revise their recipes and menu to avoid using costly ingredients, but it would be a logistical nightmare for large chains like McDonald's. Financial hedging, for another example, is not applicable to all restaurants. For example, Starbucks can use coffee futures to hedge away coffee bean price uncertainty, but Buffalo Wild Wings cannot adopt the same strategy because there is no financial derivative for bone-in chicken wings (Jannarone, 2011).

Although the risk is imminent and the impact is substantial, commodity price risk has not attracted much attention from hospitality management researchers (Hesford and Potter, 2010). In the hospitality management field, there have been studies on interest rate risk (Singh, 2009), exchange rate risk (Lee and Jang, 2011), and real estate risk (Lee and Jang, 2012), but as of yet there has been no commodity price risk study. In the financial risk management literature, most studies are based on financial risks such as interest rate risk and exchange rate risk (Bartram, 2005). These studies' implications for commodities risk management are limited because commodity price risk is closely tied to operating activities rather than financial decisions. Commodity prices are also more volatile than exchange rates, interest rates, and stock market indices (Bartram, 2005). Commodity price risk appears to be an

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important issue in the restaurant industry that deserves a thorough investigation.

Among the few existing commodity price risk studies, most focused on asset-induced risk exposure. For example, gold mining companies are exposed to gold prices because they own gold mines (Tufano, 1998). Few of the studies (Carter et al., 2006; Loudon, 2004) looked at operating activities-induced risk exposure (e.g., airline companies' exposure to jet fuel price). However, the findings of these studies may not be readily applicable to the restaurant industry for two reasons. First, empirical evidence has shown that commodity price risk exposure is contingent on the type of commodity and the nature of the industry (Bartram, 2005). Second, existing theoretical models (Brennan and Schwartz, 1985; Tufano, 1998) treat commodity price risk as an output risk that affects revenue and asset value. But commodity price risk is an input risk that affects costs. For example, in gold mining firms, the output is gold. The volatility of gold prices affects the revenue and the value of the gold mines. In the restaurant context, food commodities, such as beef and flour, are inputs of the production. Input risks are different from output risks in that cash flow volatility could be affected by operating activities even after financial hedging. For example, a burger chain can use beef futures to financially hedge beef price risk. But the cash flows from selling burgers are still affected by operating activities such as contract price, production waste and pricing. As production process is industry specific, industry-specific studies can provide relevant and accurate information to industry practitioners (Loudon, 2004).

When a company identifies a commodity price risk management strategy, the effectiveness of the strategy is likely to vary with the economic environment. Studies (e.g., Fabozzi and Francis, 1978; Jagannathan and Wang, 1996) showed that systematic risk is time varying. Since commodity futures price is a function of commodity cash price and systematic risk (Bailey and Chan, 1993), commodity price risk exposure could be time varying as well. In order to account for this time-varying nature, the present study investigated the exposure to commodity price risk by commodity price cycles.

This study aims to contribute to the literature by (1) assessing the extent and level of commodity price risk exposure (the risk exposure hereafter) in the restaurant industry and (2) developing and testing an economic model that describes the effects of cost structure on the risk exposure. The present study focuses on equity risk exposure because corporate decisions should be made for the purpose of creating shareholder wealth (Ross et al., 2013), and strategies that affect equity value are most likely to be implemented. Given that commodity price risk is closely related to operating activities, the present study is expected to contribute to the literature by providing guidelines in using operating leverage to manage the exposure to commodity price risk.

2. Theoretical background and model development

In economics, commodity is defined as a class of goods that have no qualitative differentiation across a market. Commodities that have related financial derivatives traded in exchanges and over-the-counter include agriculture (e.g., corn), non-precious metals (e.g., aluminum), precious metals (e.g., gold), and energy (e.g., crude oil; Bartram, 2005). In this study, the term "commodity" refers to agricultural commodities that are commonly used in restaurants.

2.1. Commodity price risk exposure in the restaurant industry

Risk exposure is different from risk. Risk exposure is "what one has at risk" (Adler and Dumas, 1984, p. 42). In the commodity price context, risk is the volatility of commodity prices and risk exposure is a firm's value sensitivity to price changes. Technically, commodity price risk could be measured by the standard deviation of commodity price. Exposure to commodity price risk is commonly represented by the coefficient of regressing a firm's stock returns on commodity price changes.

Restaurants are in the business of using agricultural commodities to produce food to serve customers, so commodity prices would affect the production cost. If restaurants could raise the prices immediately to offset the increase in food cost without losing customers, the risk is passed to the customers. Restaurants would not be exposed to the price risk. In reality, no restaurant can completely pass cost increases to customers without sacrificing the market share. This leads to a situation that restaurants' food cost tracks the changes of commodity prices quickly but the selling price reacts slowly, or not at all. This asymmetric response speed of food cost and selling price creates exposure to commodity price risk (Blake and Mahady, 1991; Jargon, 2012). This nature makes restaurants very different from commodity producers (e.g., gold mining firms), whose production cost is not necessarily tied to the commodity price. Commodity producers are exposed to commodity price risk through their assets (e.g., gold mines).

To manage risk exposure, a restaurant can resort to financial hedging or operational hedging. Financial hedging aims to mitigate the effect, not the source, of the risk exposure. Starbucks' use of coffee futures to lock in the coffee price (Jargon, 2011) is an example of financial hedging. In contrast, operational hedging addresses the risk exposure directly. For example, revenue management based on local currencies can reduce the risk exposure to the foreign exchange rate in a multinational hotel company (Chang, 2009). Both financial hedging and operational hedging could be considered as the efforts to align the response speeds of revenues and costs. For instance, marketing initiatives that reduce customers' price sensitivity could speed up revenue responses. Financial hedging or fixed price contracts could slow down cost responses.

For small firms, financial hedging may not be feasible due to the lack of expertise, financial resources, and economy of scale (Haushalter, 2000). As a result, most restaurants resort to operational adjustments to absorb or reduce the impact of commodity price risk. Operational hedging, in addition to financial hedging, could be an effective risk management tool for restaurants for three reasons. First, commodity price risk is an input risk. There are many opportunities to manage the risk exposure in the production and selling processes. Second, the firm's expertise in the operation could help it to manage the risk exposure arising from its operations (Bartram, 2005). Third, financial hedging cannot address demand uncertainty and is very costly for long-run risk exposure (Chowdhry and Howe, 1999).

Given the above reasons, operational hedging becomes an attractive alternative for firms with limited resources and financial expertise. Miller (1992) summarized operational hedging strategies into the following: (1) vertical integration by acquiring vendors, (2) increasing bargaining power against suppliers, and (3) cooperation with vendors through long-term contractual agreements. Increasing the flexibility in sourcing (e.g., multiple suppliers) also allows the firm to be more resilient to fluctuations of input prices (Aaker and Mascarenhas, 1984) and indirectly contributes to the bargaining power. However, the above categorization did not consider direct adjustments of operational activities as a way to manage the exposure to risk sources. For firms whose risk sources are closely tied to the operation, such as commodity price risk to restaurants, operational hedging could be an effective approach because operators can leverage their expertise in operational activities. Among all possible operational adjustments, this study aims to investigate the effect of operating leverage and financial leverage on the exposure to commodity price risk.