

Holey molely guacamole! Understanding foreign currency exposure

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Abstract

International financial management refers to the investment and financing decisions that managers of a multinational company face in the international context that they engage in in business. Breuer and Ruiz de Vargas (2021) highlight the high demand for practical applications in this area. The purpose of the current work is to introduce undergraduate students to the concept of currency risk and hedging through a case study on currency risk of the firm Holey Moley Guacamole. Students analyze the benefits and drawbacks of different hedging alternatives for the firm's operating currency exposure. The exercise here developed is geared towards the introduction of the topic of currency risk to undergraduate students in a finance cases class, upper level financial management class, or international financial management class. In addition to developing this exercise and implementing it in class, student learning is assessed.

Keywords: *International financial management; operating currency exposure; hedging strategies.*

1. Introduction

International financial management refers to the investment and financing decisions that managers of a multinational company face in the international context that they engage in in business. Breuer and Ruiz de Vargas (2021) talk about the importance of International Financial Management as a special discipline in the broader finance field and they bring to light the fact that this is an area of ongoing research with a high demand for practical applications.

One of the most challenging topics for undergraduate students to grasp in international financial management is currency risk. This topic is very important in the context of a company's international financial management because it has been proven that currency exposure hedging adds value to a firm (Geyer-Klingeberg et al.; 2020). In addition, existing finance applications or cases on this topic are dated and geared towards graduate students (see for example: Porsche Exposed, 2004; BMW Currency Hedging, 2007; and Foreign Exchange Hedging Strategies at General Motors: Competitive Exposures, 2005). The most recent example is McCarthy (2016), also geared towards graduate students.

The purpose of the current work is to introduce undergraduate students to the concept of currency exposure and hedging through a case study on currency exposure. Specifically identifying and proposing different hedging alternatives for a firm's operating currency exposure and analyzing the benefits and drawbacks of each alternative. The exercise here developed is geared towards the introduction of the topic of currency risk to undergraduate students in a finance cases class, upper level financial management or international financial management class. In addition to developing this exercise and implementing it in class, student learning is assessed.

2. Currency Exposure

Most International Financial Management textbooks (see for example Madura, 2016 and Eun and Resnick, 2021) and studies on firms' foreign currency exposure identify three types of currency exposure: transaction exposure, economic exposure and translation exposure.

Transaction exposure is defined as the sensitivity of a firm's contractual cash flows on a foreign currency to unexpected changes in those foreign currencies. This type of exposure occurs because contracts are set at a fixed price and exchange rates change in time, causing the value of these set contracts to increase or drop based on changes in the exchange rates.

Economic exposure refers to changes in the value of a firm based on unanticipated exchanges in exchange rates. Changes in exchange rates can affect a firm's operating cash flows as well as the value of the firm's assets and liabilities such a firm's receivables, payables and foreign

currency loans. This is why transaction exposure is many times considered a specific form of economic exposure.

Lastly, translation exposure refers to the potential effect that unanticipated changes in exchange rates can have on a firm's consolidated financial statements. Where consolidated financial statements refer to the translation of all foreign subsidiaries financial statements from local currencies to the parent's home currency. This is, when a foreign subsidiary's assets and liabilities denominated in foreign currencies change from the perspective of a parent company, due to unanticipated changes on exchange rates.

2.1. Operating Currency Exposure

The focus of this current exercise is on identifying and hedging operating exposure, an extremely important part of economic exposure, and the most challenging type of currency exposure to identify and to hedge in a firm. Operating exposure or exposure from its operations is defined as the impact of unanticipated changes in the value of foreign currencies on a firm's operating cash flows. Operating exposure is much more challenging to identify than exposure on a firm's assets and liabilities. In addition, it cannot be readily obtained as a line in a financial statement but must first be estimated. This is, operating exposure depends on a firm's competitive position in the market in which it sells its product and sources its inputs as well as the firm's ability to reduce the currency change impact by adjusting markets in which it sells its product, its product mix, and its sources of inputs. In sum, the more sensitive a firm's costs and/or sales are to exchange rate changes the higher the degree of operating exposure that a firm faces.

It is important to note that changes in exchange rates may not always cause operating exposure. When changes in exchange rates are offset by the inflation differential between two currencies, this change in the exchange rate will not cause operating exposure. In this case, we say purchasing power parity holds or the change in the exchange rate is exactly offset by the inflation differential.

2.2. Managing Operating Currency Exposure

A firm can use operational or financial hedging strategies to reduce or eliminate their operating exposure. Financial hedging strategies would include using contracts such as forwards, futures, options or swaps on foreign currencies. For example, if a firm incurs costs in a foreign currency, as the foreign currency appreciates those costs will increase. A firm could set up a forward contract hedge in which they sell the foreign currency forward, such that as the foreign currency appreciates, they will lose net cash flow (NCF) but gain in their forward contract position offsetting the NCF loss. The challenge of setting up a financial hedge is determining the date for which to hedge as well as the amount of foreign currency that needs to be hedged. In the case of operating exposure the challenge of identifying these

two variables many times lead companies to use operational hedging strategies. In addition, since currency exposure in a firm's operations is ongoing, in these circumstances financial hedges are not a one time deal such as in the case of transaction exposure, but need to be constantly rolled over or reset to continue to hedge the company's operating currency risk.

Operational strategies refer to strategies that help firms match assets and liabilities in the same or correlated currencies to eliminate or reduce the firm's operating exposure. This is, by matching exposure of inflows and outflows in the same or correlated currencies, or reducing that inflow and/or outflow in the foreign currency, we are effectively canceling out or reducing the effect of the foreign currency change on our cash flows. For example, if a firm's source of operating exposure are sales in a foreign currency, the firm could reduce this exposure by increasing or starting production of goods in that foreign currency such that the expenses in the foreign currency offset the revenues in the currency thereby reduce or eliminate the currency exposure. Our focus in this example will be on operational strategies that help reduce or eliminate the firm's operating currency exposure. This will become much clearer through our example of Holey Moley Guacamole.

3. The Exercise: Holey Moley Guacamole!

The objective of this exercise is to determine in which areas of the firm's cash flow Holey Moley Guacamole has exposure to foreign currency risk and discuss how they can reduce this exposure.

Assume you are the owner of Holey Moley Guacamole, a firm that produces and sells guacamole in the U.S... Your main input are avocados, which you import from Mexico. You have been operating for 12 years.

Your guacamole sells in major U.S. supermarkets for a price of 6.5 USD for each 8 oz. guacamole tub. Each avocado crate containing 25 lbs. of avocado costs 800 Mexican Pesos (MXN). Thus, your guacamole production cost is 64 MXN per guacamole tub, or approximately the cost of 2 lbs. of avocados. You sell Holey Moley Guacamole only in the U.S... Your current sales of guacamole are 1,000,000 tubs annually.

Besides the avocados you import from Mexico, you incur an additional 300,000 USD cost of materials to produce the 1,000,000 tubs guacamole which include other vegetables and spices needed to make the guacamole and its packaging, among other items. In addition, other operating expenses include a fixed cost of 100,000 USD and a variable cost of 10% of sales. Your depreciation expenses are 175,000 USD a year. You currently have 5,000,000 USD worth of debt that charges a 3.25% interest annually, and your corporate tax rate is 21%. Lastly, the elasticity of demand for Holey Moley Guacamole is minus 1.5. This is, a one

percent increase in price of Holey Moley Guacamole, decrease the quantity demanded by 1.5%.

To study the sensitivity of Holey Moley Guacamole's net cash flow (NCF) to changes in the value of the MXN, we look at the net cash flow assuming the MXN appreciates against the USD from 0.5 USD/MXN to 0.7 USD/MXN, a 40% appreciation. With this information, we construct the firm's net cash flow under the base case scenario and develop alternative strategies to reduce the firm's operating currency exposure.

3.1 Identifying Operating Currency Exposure

As we can see in the base case, the net cash flow changes from 1.685 million USD to 674,675 USD when the MXN appreciates from 0.5 USD/MXN to 0.7 USD/MXN. As the peso appreciates against the dollar, we observe net cash flow decreases. No other items except the exchange rate between the MXN and the USD change in the base case. We can observe that the increase in our cost of materials incurred in MXN is the source of the lower NCF. Although we continue to produce and sell the same amount of guacamole, the appreciation of the MXN causes an increase in the cost of production thereby reducing the NCF by 60%! This is a clear sign of operating currency exposure. How can we reduce or eliminate this type of currency exposure?

In the case of Holey Moley Guacamole, the firm's operating exposure is in its production expenses, which is a negative cash flow since it represents a cost for the firm. We will analyze different ways in which Holey Moley can reduce or eliminate their operating exposure.

appreciates, our cash flows drops by only 30% compared to the 60% drop in NCF in the original scenario. Thus, substituting 50% of our avocados from Mexico with U.S. avocados reduces our exposure to the MXN by 30% and decreases the fluctuation in our net cash flow.

3.2.2. Pass on 50% of the Cost Increase to Consumers via a Higher Guacamole Price

The company's ability to pass on the higher cost of producing guacamole to consumers via a higher guacamole price will depend on the price elasticity of demand for Holey Moley. We assume that demand elasticity of Holey Moley is -1.5. This is, a 1% increase in the price of guacamole reduces the quantity demanded by 1.5%. Given an MXN appreciation of 40% (from 0.5 USD/MXN to 0.7 USD/MXN), if we pass 50% of this increase in cost to consumers, and given a price elasticity of -1.5, the price of guacamole would increase by 20% from 6.5 USD to 7.8 USD per guacamole tub, and the quantity demanded would drop by 30% ($-1.5 = \Delta Q_d / 20\%$). Thus demand for guacamole will be 700,000 tubs instead of the original 1 million tubs. However, the price per tub in USD will increase to 7.8 USD. Therefore, total sales in USD are expected to be 5,460,000 USD. This is 1,040,000 USD less than in our base case scenario. To produce 700,000 guacamole tubs at 2 lb. of avocado per tub priced at 64 MXN per every 2 lb., the cost of Mexican avocados is 44,800,000 MXN, or in USD at an exchange rate 0.07 USD/MXN, 3,136,000 USD ($44,800,000 \text{ MXN} \times 0.07 \text{ USD/MXN}$). Assuming the rest of the costs remain constant, with the exception of the variable cost which is 10% of sales, our NCF drops by 41% in this alternate scenario. This compares to an NCF drop of 60% in the base case scenario at an exchange rate 0.07 USD/MXN.

When passing on higher costs of production to consumers, the price elasticity of demand plays a very important role in the outcome. If the price elasticity of demand were lower, the reduction in quantity demanded due to the higher prices would also be lower .

3.2.3. Sell Guacamole in Mexico

If it makes sense for the firm's overall business, they could generate a positive cash flow in MXN by selling guacamole in Mexico and offset the negative cash flow in MXN from importing avocados. Assume Holey Moley can sell guacamole in Mexico at the same price than in the U.S. Also, assume they can generate 10% of U.S. sales in Mexico. Suppose they will need to increase production by 10% to meet additional demand for guacamole. In this scenario, we observe the NCF drops by 54% as compared to a drop of 60% in the base case. In the same vein, exposure to the MXN decreases only slightly from 4.480m USD in the base case with 0.07 USD/MXN to 4.278m USD in this scenario, given that we would need to import more avocados from Mexico. Thus, the effort to offset inputs from Mexico with sales in Mexico is thwarted by the need to import more avocados from Mexico to produce the added guacamole.

3.2.4. Pass on 50% Cost Increase to Consumers via Higher Guacamole Price and Substitute 50% of Mexican Avocado Imports with California Avocados

Just like the second scenario, passing on 50% of this increase in price to consumers, and given a price elasticity of -1.5, increases the price of guacamole by 20% (from 6.5 to 7.8 USD per guacamole tub). Quantity demanded drops by 30% and the demand for guacamole will be 700,000 tubs instead of the original 1 million tubs. Total sales in USD are expected to be 5,460,000 USD. Moreover, to produce 700,000 guacamole tubs Holey Moley will import half of the avocados needed from Mexico and source the other half from the U.S. They need 700,000 lb. of avocado from the U.S. at 1.6 USD per lb. for a cost of 1.12m USD; and 700,000 lb. of avocado from Mexico at a cost of 32 MXN per lb. or 1.568m USD at the 0.07 USD/MXN exchange rate. In this scenario NCF drops 20% and the exposure to the MXN is -1.568m USD.

3.2.5. Substitute 50% of Mexican Avocado Imports with California Avocados and Sell Guacamole in Mexico

Assume you have 10% additional guacamole sales coming from Mexico and 50% of your avocado comes from the U.S. The avocado price in the U.S. is 1.6 USD per lb. of avocado and Mexican avocados are 32 MXN per pound. We increase avocado inputs to account for the additional production needed to sell guacamole in Mexico. Thus, Holey Moley generates 7.15m USD in sales: 6.5m USD in U.S. sales and 0.65m USD in Mexico sales. Avocado inputs are 2.2m lb. of avocados needed to produce 1.1m guacamole tubs: 1m tubs in the U.S. and 0.1m tubs in Mexico. Half of the avocados come from Mexico and half from the U.S... In this scenario, NCF drops by 21%. The second smallest drop in all scenarios analyzed here, and second lowest MXN exposure (1.8m USD) out of all scenarios. Overall, the fourth and fifth scenarios seem to be the best alternatives. They show the smallest drop in NCF and the lowest MXN exposure out of the five scenarios analyzed.

4. Student Learning

Students worked on a set of two pre and post exercises on economic exposure. The first exercise in each set was moderately difficult (#1) and the second was difficult (#2). Students answered the pre-exercises after discussing theory and examples on the topic in class. Then students worked on the Holey Moley Guacamole Case. Lastly, they worked on the post exercises. In the pretest, 92% and 28% of students got the correct answer on problems #1 and #2, respectively. In the post-test, 48% of students got the correct answer on #1 and 76% obtained the correct answer on #2. This is, students' scores for the difficult question improved considerably from the pre to the post-test; however, scores for the moderately difficult question fell. Thus, overall results from the pre and post-tests are mixed. Further feedback from students may lead to more clarity in this outcome. Still, cases have shown they add

value beyond traditional lectures. Kester et al. (2005) points out traditional teaching methods like lectures, may be more efficient in transmitting knowledge. However lectures are not effective in helping student learn to deal with the unstructured problems they will face in their professional careers, as cases do. Moreover, Trahan (1993) suggest integrating lecture and cases into the same courses combines the strengths of both methods and may be superior to each method individually. Perhaps here lies the answer.

5. Conclusion

Students learn about operating currency exposure through the analysis of scenarios in the Holey Moley Guacamole case. Results on the effectiveness of using cases vs. lecture are mixed. Gathering further student information may clarify this issue.

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