

Daniel Kloner

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1.Introduction

Throughout the course of this paper, the risk factor surrounding McDonald's business ventures and processes will be analytically determined and mathematically analyzed. McDonalds, a known business worldwide, is an international fast food chain with restaurants in many different locations. Therefore, they produce food for people all over the world, leading to McDonalds sourcing all their food and beef from independent food providers across the world. Because they have stores and get goods from all over the world, one risk they have is exchange rate risk in currency between different countries. This means that their profit can possibly fall when the value of some foreign currency compared to their base currency, the US dollar, falls. McDonalds is currently in many different lines of business to get people food, including new and hopefully expanding digital ordering in the US, allowing customers to get orders made before getting to the store. There is also a big delivery option and drive foods at many McDonalds across the world. Lastly, McDonalds is trying to expand their loyalty program, further expanding into the digital world. This could come with some risk if they get more digital, because they could lead to more breakdowns with the technology, leading to lost business for the company.

There are two different ways McDonalds are owned and operated, a development license or Affiliate or a Conventional franchise. In a developmental license or affiliate, licensees are responsible for managing the business, providing capital and developing and opening new restaurants. This can definitely lead to some risk if people operating under this type of agreement do not live up to their end of the agreement. Under a conventional franchise model, McDonalds is

responsible for getting the land and building, but the franchisee pays for equipment, leading to risk that the franchisee may not get the right equipment or update in time.

In conclusion, a few of the many types of risk McDonalds face that will be talked about in this paper include operational risk, which occurs when restaurants do not operate to max efficiency, foreign exchange risk between international markets, and risk that products they make do not live up to expectations. However, when a business is as big as McDonalds, many other different factors of risk exist.

2. Market risk

With the overall reach across the globe that McDonalds restaurants have, they are exposed to a lot of different risks within their business process. While there are many factors in risk the company can have when it comes to the operation of specific McDonalds franchises individually, the main risk that McDonalds face in terms of dollar amounts is risk to foreign exchange and risk to changes in the prices of the raw materials they are getting to make the food in their stores. Changes within these go from month to month and year to year can have a huge impact on McDonald has a business if they do not account for it.

2.1 Foreign exchange risk

McDonalds has its 34,000 restaurants spread across 118 different countries, so for the purpose of the foreign exchange risk, we will be looking at five different currencies, representing five different regions where McDonalds are located. All of these will be compared to the base currency of US dollars, for which all of McDonalds reporting are in.

For this analysis, we have the Euro representing the European countries, the Japanese Yen representing the Asian countries and the few McDonalds with Africa, as there were not enough McDonalds in Africa to warrant giving its own currency to. Then, there is the Canadian dollar, representing all North American countries that are not the US, as the US is the base currency. Then the Brazilian Real represents South America and the Australian dollar represents all Oceania countries. All the data for the foreign exchange risk was found by taking the exchange rate of a given currency to USD from March 16, 2020 to March 6, 2025, with some data for days being skipped as not all of the needed data was available. With all of these categories, we ended up with a breakdown of foreign exchange risk for McDonalds being : 31% Euro, 47% Japanese Yen, 9% Brazilian Real, 9% Canadian dollar, and 4% Australian dollar. This breakdown was simply found by taking the number of restaurants in the given region a currency represent, and dividing it by the total number of restaurants. From there, the rate of retention, which is the change day of day, was calculated for each of the exchange rates. This is done by taking an exchange rate of time period $t-1$, divide it by the one at the current time period, and then subtract one. This was then used to make a covariance matrix between the five currencies. Then, the covariance matrix multiplied by the weights mentioned earlier gave us a variance of the risk, and therefore a standard deviation. For this calculation, we found a variance of .000086, which leads to a standard deviation on .00927. Since McDonalds is approximately exposed to 15.51 billion US dollars in sales with their profits, their 1 day 95 percent value at risk is .237 billion dollars, which corresponds to a 1.11 billion dollars value at risk for 1 month and 3.75 billion dollars value at risk for one year. Value at risk is a measure that figures out how much a company

can lose to a risk over a given period of time. Because we had the risk at 95 percent, we can be 95 percent confident that McDonalds will not lose more than .237 billion dollars over a day due to foreign exchanges, and no more than 1.10 billion over a month, and no more than 3.75 billion over a year. These numbers are on average and can change from day to day, that is why it is important to have measures against foreign exchange risk. The analysis for the foreign exchange risk was done by taking the exchange rate day over day for each of the five currencies in our model to the US dollar over the course of the last five years.

2.2 Commodities Risk

Another big factor into some of the risks that McDonalds encounters is risks when getting their goods to make food. As mentioned before, McDonalds gets most of their goods from local farms in the US, there could be some change in the market price of the goods that affects that if they do not have a set contract with these farms. Even if that was the case, there is still risk as the price could go down over time, as if they are in a contract and the price goes down, that will hurt them. To try to figure out how much McDonalds is exposed to commodity risks, a regression analysis was done of the change of earnings for the company on the change in price of their commodities used for every quarter. In this analysis, the main commodities at McDonalds are beef, fish, potatoes and coffee, as those are the main goods that are specified on their website they get from local farms. The data obtained for this analysis was by quarter from quarter 1 in 2009, to quarter 4 in 2024. As for the results of the regression analysis, the coefficient of beef was around .073, the coefficient for fish was -.0034, the coefficient for potatoes was .041, and the coefficient

for coffee was .241. This means that costs went up when prices went up for beef, coffee and potatoes, holding everything else constant, but went down for fish. This does not make much sense logically as when costs go up, all values should go up, so maybe the data for potatoes is not important to their cost or a different metric needs to be investigated. However, it should be mentioned that the model as a whole, and all variables aside from coffee, were nowhere close to significant at a 95 percent confidence level. Therefore, all the variables in the model could counteract each other, making none of them significant. Also, since McDonalds is such a big business with high revenue, small changes in costs of goods may not affect them as much. As far as the value at risk, we used coefficients found in the regression analysis and a covariance matrix of the four commodities to find a variance, and therefore a standard deviation. Multiplying the coefficients and the covariance matrix together lead to the analysis finding a variance of .000072, which then leads to a standard deviation of .0269. With this information and the fact that McDonalds had earnings of 5.872 billion for the last quarter in the dataset, we can determine that McDonalds has a 95% one quarter value at risk of .260 billion, and a one year value at risk of .520 billion. This means that based on this data, we can say with 95% confidence that McDonalds will not lose more than .260 billion a quarter and .520 billion a year due to changes in prices in their commodities, at least for the four main ones present in this analysis.

3 Credit Risk

3.1 Assessment of credit risk based on rating

In April of 2024, McDonalds was given a BBB+ credit rating by Standard and Poor rating agency. This means that McDonalds credit on loans will have a good chance of being paid back as this is a pretty stable credit rating. Standard and Poor only has three higher credit ratings, AAA, AA and A, so therefore McDonalds credit is viewed relatively highly in the grand scheme of the market. Also according to Standard and Poor rating agency, BBB bonds had a 11% annual default rate of 2023, but that value has moved from 0% to even having a rate of 100% in 2002, so the credit defaults can change a lot based of economic conditions, so it is important to know average results. It should also be noted that since McDonalds has a BBB+ rating, and these numbers are BBB ratings, that the probability of default for McDonalds is slightly lower and BBB+ ratings are considered better than BBB. With that being said, BBB bonds have a weighted long run average default rate of 11 percent, according to Standard and Poor calculations.

3.2 Merton model and Swap Contracts

The Merton model allows for the one year probability of a company defaulting on a certain loan given the time and yield to maturity of the loan, volatility of the company, the capital equity and debt of the company, and the risk free rate currently in the market. This all leads to us getting a call price and put price, which allows us to find one you default probability. In the case of McDonalds, they have an equity capital value of 222.6 billion, and an equity debt value of 51.94 billion. While looking at a bond that expires on October 15th 2037, the yield to maturity is 5.45%. McDonalds does not typically do time period bonds, so this is why this bond had to be used in calculations, which is roughly 8.5 years in time, which is the number used in calculating.. Therefore, minimizing the

difference between the probability of exercising the call to probably of no default in the 8.5 years of the bond, the calculations resulted in a one year default risk of 2.3% for McDonalds, when the call price goal sought to the equity value of the company. This is a lower amount than the long run average suggested by Standard and Poor, possibly suggesting that McDonalds is less risky in terms of credit compared to other loans within its credit rating. This could be due to the fact that McDonalds is a worldwide company with goods whose demand does not change that much, possibly leading to them being less volatile than other companies. Overall, it seems like McDonalds has relatively low credit risk and has a relatively low probability of default on loans. This leads to a two year swap contract spread of 4.2%. The spread indicates that McDonalds will need to pay for protection on credit risk. This was done with a recovery rate of 57%, as McDonalds has a higher than average recovery rate as they are a really big company. Overall, McDonalds credit risk is relatively safe as they are a big company in an industry that is not going to be going anywhere anytime soon, as there will always be demand for fast food.

4. Operational Risk

Since McDonalds has a lot of different steps that go into their business process. Therefore, there are many different points where that process can either cost more, take more time than expected, or be able to produce less, causing operational risk at that step and all future steps. Operational risk is the risk a company faces loss of profit due to unexpected events. For example, if there is less demand for a new McDonald's product than McDonalds projected, then more goods will be bought than those sold, causing

McDonald's some money. The same can be said for the process of getting the goods. If demand is undershot, McDonalds will lose money as they will not be able to sell as much. Also, if they have issues getting goods, they will then have less goods to sell. It is important for McDonalds to reduce this risk in order to minimize their lost costs.

One of the operational risks of McDonalds is issues with supply chains lower profits. As mentioned earlier, McDonald's gets most of their goods from local farmers, so if those farmers have supply issues, their sources to get goods go down, so their profits will go down. Next, McDonalds can have some technology failures. As mentioned in the introduction, McDonalds has a high portion of their business tied up in online order and drive through order, and they plan to expand those services more. Because of this, if the technology that is needed to complete these orders goes down, McDonalds can lose some orders, as some people who were going to order online, might not order anymore, causing profits. Finally, McDonalds will have some operational risk with the possibility of franchises not running the store properly, leading to some of their stores looking subpar, which could cause them some business and therefore profit. As seen with all of these examples, McDonald's has a lot of ways they can potentially lose money unexpectedly, and therefore they need to have ways to protect against this. Fortunately for McDonalds, they have many systems in place to manage their supply chain and technology to minimize their risk.

5. Conclusion

Overall, McDonalds has many different ways for which they experience risk and therefore could experience unexpected losses to their profit. This is why it is important for them to try to properly calculate their value at risk for commodities and foreign

exchange risk, so they only have a smaller chance of losing money than expected from their calculations. Especially with the amount of foreign currencies and commodities a major business like McDonald's is exposed to, these numbers are important for them to have to help their business. Next, it is important for them to know operational risk for the same reason, as not knowing them can cause them money and profits. For all of these methods, McDonalds will have some way to minimize risk, either by hedging, which is taking the position of another market to offset another. Also, they can spread across many different sectors and countries, as well as possibly transferring risks onto other parties with credit swaps. To sum up, while McDonald's do have a lot of risk present as there is a huge company with a lot of different ventures, they have a lot of measures in place through their business operations to try to minimize their risk within their company.

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