



LISBON  
SCHOOL OF  
ECONOMICS &  
MANAGEMENT  
UNIVERSIDADE DE LISBOA

# **MASTER FINANCE**

## **MASTER'S FINAL WORK PROJECT**

**FIVE GUYS: FROM CUSTOMER TO INVESTOR**

**CAROLINA MADEIRA GONÇALVES**

**OCTOBER – 2020**

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SUPERVISION:  
PROFESSOR ANA ISABEL ORTEGA VENÂNCIO

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## **Abstract**

This project features a case study on the franchise of an American fast-food chain – Five Guys. Before building the case study, a thorough literature review is fundamental, both on the subject of the project, and on how to develop it.

The challenges in building a case study are highlighted, as there is not a default template to build them. Each paper is unique in that each is adapted to best fit its purpose, scope and target audience. The present case targets students of the financial area, touching topics of corporate finance, such as investment appraisal and risk analysis.

Entering the franchise subject, the case is developed around the idea that Carolina, a newly graduated master in Finance, must choose what her next step should be. Between accepting a position in the Ministry of Finance or following her entrepreneurial dream of opening a Five Guys franchise in Lisbon, she must analyze all trade-offs involved.

**JEL codes:** A230, G300, G310, G320, G390, L260, M100, Y400

**Keywords:** franchise, entrepreneurship, project appraisal, risk analysis, corporate finance, COVID-19

## **Summary**

This project aims to develop a case study on the franchise of an American fast-food chain. The first thing that is needed is to set a template for the case study. This is achieved by following guidelines of Harvard Business School, looking at examples available at SAGE, and adapting it to the purpose of this project, which is to be applied by students in the financial area.

The case study aims to analyze the viability of opening a Five Guys franchise in Lisbon. To do such analysis, it begins by analyzing the company in question to understand how its product would fit the Portuguese market. It follows that the Portuguese burger industry must also be analyzed. This is done through the interpretation of statistical data, as well as the application of a survey to the population residing in and around Lisbon to evaluate their adherence.

Having these components, and through proposed discussion questions, the investment appraisal of this franchise is possible through the calculation of its Net Present Value, considering present restrictions and risks and the uncertainty of the future.

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## **Introduction**

To begin developing this project, a first research is carried out on how to build a case study. After going through multiple sources, it is clear that case studies do not have a default format but, instead, are adjusted as needed to capture the purpose and scope of such case.

This case study touches topics like corporate finance, investment appraisal and risk analysis. With the purposes of being applied by students in courses of Finance, the project was developed based on guidelines of Harvard Business School and examples made available by SAGE Business Cases.

Reaching the desired template, the case begins exploring the franchise in study – Five Guys franchise. Before deepening the franchise conditions, we take a look at the company itself and how it would be differentiated in the Portuguese market. This investigation is then extended to the Portuguese market, analyzed through empirical data from an applied survey, as well as public statistical data.

Expanding to the franchise, a public Franchise Disclosure Document contains all the information needed on the matter, from the estimated initial investment and additional fees to the franchisor, to the required training of personnel and necessary supplies.

Finally, four discussion questions are proposed to reach a conclusion on the profitability of this investment in Lisbon, while comparing it against the possibility of accepting a job offer at the Ministry of Finance.

## **Literature Review**

When developing a case study, it is essential to define its purpose, as well as its target audience. Case studies are an effective tool in education, as they challenge students to apply their knowledge to a new and unfamiliar situation. When solved in groups of students, they stimulate debate and further research and discussion of the topic in study, allowing better knowledge of the latter. Harvard Business School defines two main types of cases – field cases, based on a “hands-on” research approach, and library cases, based only on public documents.

Deciding upon what type of case to build, the desired discussion questions are defined in order to collect the most appropriate and necessary data to solve such questions. The case, however, should not contain all data collected. Data should be deliberately left out as to encourage further research by students.

The case should be carefully written, in an encouraging and engaging narrative. It should, however, be short and to the point so that students do not lose interest.

Once the case is defined, a proposed solution should be developed and included in the teaching note. There, the purpose and scope of the case must also be set, as well as a proposed strategy for solving it, that is, for example, in groups of students. It is also common to include a brief topic revision. Finally, and after mentioning all used sources and references, appendixes may be attached with essential information to provide to the students.

## **A. Case-Study**

### **Abstract**

This case reflects the challenges faced by an entrepreneur, Carolina, when opening a franchise restaurant, Five Guys, in a new country, Portugal. To implement her idea, Carolina started by reviewing the Franchise Disclosure Document, launching a questionnaire and gathering information on the burger industry.

The case highlights the steps required to evaluate a new investment, namely forecasting cash-flows, identifying the associated risks, analyzing the industry and evaluating the financing options. With no official data of Five Guys in Portugal, the forecasted cash-flows in this case are based on assumptions, as well as on data of existing Five Guys' establishments in other countries and of peer companies operating in the Portuguese fast food industry.

Carolina had to decide whether to open a new franchise store or accept a job offer. Carolina is unsure of the investment viability and the risks associated with the project and with the COVID-19 outbreak. Weighing in her decision are also the financing options available to her – she may raise money from family or raise debt.

**Keywords:** franchise, project appraisal, risk analysis, corporate finance, COVID-19

### **Learning Outcomes:**

After reading and analyzing the case, students should be able to:

- Understand how to estimate the cash-flows of a project
- Understand how the capital structure affects the value of a project
- Discuss the mechanisms to mitigate the risks of carrying out a new project
- Assess the risks of the project and determine its impact on project evaluation

### **1. Introduction<sup>1</sup>**

After finishing her Master in Finance, Carolina was inclined to pursue her entrepreneurial dream and open a Five Guys franchise store located in Lisbon, Portugal. Being a big decision and a different path from what was predetermined for her career, she consulted with her parents.

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<sup>1</sup> This case is based on a real-life situation. The data is real and obtained exclusively from public sources, nevertheless the situation outlined and the characters' names are fictional.

Carolina's father was puzzled by her career decision. "Carolina, are you sure that you want to start your own company, particularly now that the world is facing the COVID-19 outbreak? Why don't you accept the job offer from the Ministry of Finance as the rest of your colleagues and then when you get experience you can start your own business..." suggested her dad. Her mother, on the other hand, although having the same concerns about the timing, thought it might be a good idea.

Although the job position at the Ministry of Finance was tempting, with a monthly salary of €1,200 and the offer of a secure and evolving career, Carolina knew that if she were to do this, it had to be now – "Dad, this is the right time to try my chances as an entrepreneur. Sooner or later, someone will open a Five Guys franchise and we will lose this opportunity. It is going to be very exciting to run my own business but do not worry, before I dive into this entrepreneurial adventure, I will assess the project to see if it is feasible and worthwhile. On top of that, I still have some time to decide about the job offer" Her dad was not convinced, "Alright, let us first see the viability of the project and then you decide."

A mixture of thoughts filled Carolina's head with these opposite opinions, and at that moment, she was determined to gather all the necessary information to make a proper decision as to whether she should pursue her entrepreneurial dream or accept the job offer. With a wide range of burger chains already existing in the Portuguese food industry, a thorough analysis had to be done to assess the viability of the investment.

## **2. Stumble upon Five Guys**

During her Master in Finance's trip to Frankfurt, between April 24<sup>th</sup> and 28<sup>th</sup>, 2019, Carolina came across Five Guys burger chain for the very first time. She had never heard of the brand, but she quickly became aware of its dimension, considering her friends had already been to Five Guys restaurants in countries like Spain, England and France. As she tried their veggie sandwich, her friends told her all about it.

"Carolina, you never heard about Five Guys?", said Maria, "They are known worldwide mostly due to being former President Barack Obama's favorite burger chain." It was this sort of publicity that led her to try Five Guys, and it surely lived up to her expectations. She was

delighted by the whole experience – the fresh ground beef burgers with a side of French fries cooked in peanut oil, and a pleasant bonus of free peanuts.

Carolina immediately became a fan herself and during the trip she ended up eating mostly at Five Guys. She was amazed at all the details put into the brand, from the typical American diner design to the delicious and unique French fries and the variety of items on the menu. Five Guys also offers hot dogs, sandwiches, vegetarian options, and milkshakes.

At the end of the trip, Carolina could not wait to eat at Five Guys again. “Where are they located in Lisbon?” she asked. Maria replied, “Although they are spread throughout Europe, they have not yet reached Portugal.”

### **3. The Story behind the Five Guys Empire**

Before diving into the franchise, Carolina wanted to know more about the company itself. She found that Five Guys started as just a small burger shack in Arlington County, Virginia, founded by Jerry and Janie Murrell, in 1986. With four sons at the time, the name Five Guys originally came from the five “guys” in the family – the four sons and their father. It was only after the fifth son was born that the name began referring to the five sons of the couple.

In its early years, the company’s focus was on perfecting their method and it soon became the place to go for the perfect burger. However, it was not only the burgers that won customers over, but also the fresh, hand-cut fries cooked in pure peanut oil. Five Guys quickly expanded, opening four new restaurants locally, but only in 2003 did it start offering the opportunity to franchise. The demand for franchising contracts was overwhelming in that in just the first two years, Five Guys had sold approximately 300 franchising options.

In 2001, it opened the first location in Canada, but it was in 2009 that the brand’s popularity took a turn. It was in that year that Barack Obama was elected President of the United States and his food preference became publicly known. Obama loves burgers, and his favorite chain of all time is Five Guys. The chain’s popularity inevitably boomed and, thus, demand grew and by 2012 it had 1,000 locations in North America.

In 2013, Five Guys finally made its way to Europe, starting with one restaurant in London. By 2016, it was already considered the United Kingdom’s most popular fast-food chain. Today,

there are 30 locations just in London, and 105 in the whole United Kingdom. Nowadays, Five Guys has more than 1,500 locations worldwide and has maintained quality as a priority. Its price-quality relation has allowed Five Guys to survive and thrive in the burger chains' competitive market.

#### 4. The Five Guys' Franchise

Beginning her research, Carolina quickly found Five Guys' Franchise Disclosure Document (FDD). The first and most important thing that she needed to know was the required initial investment.

“Oh my god... After considering the initial costs and fees, I will need to invest between \$306,200 and \$641,250” said Carolina to her friend Maria while she inputted the discriminated values of the estimated initial investment presented in Table I in her spreadsheet. Maria asked her “Why does the number vary so much? Do you have such amount of money?”

Table I – Estimated Initial Investment

<b>Initial Franchise Fee</b>	\$25,000
<b>Development Fee</b>	\$50,000
<b>Leasehold Improvements</b>	\$100,000 to \$300,000
<b>Lease Payments and other rental expenses</b>	\$7,500 to \$20,000
<b>Equipment</b>	\$55,000 to \$105,000
<b>Signage</b>	\$6,500 to \$20,000
<b>Initial Inventory</b>	\$10,000 to \$15,000
<b>Architectural/Engineering</b>	\$7,000 to \$25,000
<b>Electronic Cash Register System with Modem</b>	\$15,000 to \$25,000
<b>Facsimile Machine</b>	\$350 to \$500
<b>Travel, lodging and meals for initial training</b>	\$100 to \$5,000
<b>Business Supplies</b>	\$4,000 to \$8,500
<b>Business Licenses, permits, etc.</b>	\$5,000 to \$15,000
<b>Delivery and catering expenses</b>	\$0 to \$1,000
<b>Insurance deposits and premiums</b>	\$750 to \$1250
<b>Additional Funds for first 3 months</b>	\$20,000 to \$25,000
<b>Total</b>	\$306,200 to \$641,250

Source: Five Guys' FDD

“I only have €10,000 in savings. I will have to look for a bank loan or raise money from my family!” said Carolina. Next, she explained that the interval of values of the estimated initial investment are due to the varying price of various elements, such as the rent, for which there

is an accounted budget ranging from \$7,500 to \$20,000, monthly. The rent of the restaurant would vary depending on the size and location.

“I will have to consider very carefully the location options for the store” said Carolina to Maria. “Five Guys recommends places with a lot of movement with an area ranging from 2,000 to 3,000 square feet, such as shopping centers, but are willing to consider, as well, train stations and even airports. In Lisbon, the main and most popular shopping centers are Centro Colombo and Amoreiras.” “Yes, but I have the idea that it is really hard to find a space in these shopping centers. Did you take into account the current COVID-19 outbreak? If I were you, I would also consider locations with large movement but outside shopping centers, such as Chiado and Avenidas Novas.” argued Maria. “Good idea! I will evaluate those locations as well.” answered Carolina.

As Maria had predicted, there was no space large enough available at the shopping centers with which Carolina spoke. She found the same problem in Chiado and Avenidas Novas, as the minimum area required is larger than most stores, so she widened her search. Finally, she found the perfect place in Santos-o-Velho. “I have found a great option, Maria, a two-story store with an area of 2,600 square feet, for €6,000 monthly.” Maria enthusiastically responded “A store in Santos-o-Velho would be great Carolina! It is near the universities ISEG and IADE, as well as the headquarters of EDP and the Assembly of the Republic.”

Apart from the rent, other costs may also vary, namely store improvements. The store that Carolina found in Santos-o-Velho is located in an old building, so in order to prepare the space for the restaurant, Carolina will need to account for an approximate cost of €120,000. The equipment and inventory, for example, will vary depending on the chosen vendor. “Look Maria, the estimated initial investment already accounts for the training of the main person responsible for the business, the general manager and an assistant manager. For the expenses of traveling, lodging and meals during the 10 days of training, the considered amount ranges from \$100 to \$5,000, depending on the chosen suppliers.” Maria replied “That sounds perfect!” Carolina continued “And if I wish that any additional staff be trained by Five Guys, I will incur in an additional cost of \$1,500 per person!”

In terms of licensing and associated costs, none are considered due to a new program approved by the Portuguese government - Licenciamento Zero. With this policy, an entrepreneur does not have to incur in any costs of licensing when opening a restaurant.

On top of the initial investment, Carolina had also to account for additional fees (below), as well as an income tax of 21%.

Table II– Additional Fees

<b>Royalty Fee</b>	6% of Gross Sales	Weekly
<b>Creative Fund</b>	2% of Gross Sales	Weekly
<b>Local Advertising</b>	2% of Gross Sales	Annually

Source: Five Guys' FDD

“Have you noticed that you will lose 10% of the sales? And do you have information on the gross margin?” said Maria. “There is no predetermined gross margin because that will depend on the chosen supplier and price to be charged” explained Carolina, “Five Guys gives the liberty to find suppliers, within the options they offer, and the freedom to choose the prices to be applied.”

Carolina noted that Five Guys Franchisor ensured the store’s competitive position in the market, assuring that the brand is well placed in the burger industry. Restaurants must keep pace with the ongoing changes in the market, such as fluctuations in the economy, changes in consumer preferences or seasonal fluctuations of the population. This position is secured by Five Guys’ attractive format and food products, with a wide range of menu options. From beef to vegetarian options, milkshakes to soft drinks and two types of French fries to choose from, the chain is able to satisfy a sizable portion of the population with very different tastes and preferences.

## 5. The Burger Industry in Portugal

“Dad, do you know by how much the burger industry has grown in Portugal?” Carolina went on to explaining to her father that over the course of ten years, from 2008 to 2018, the fast-food restaurant industry<sup>2</sup> has grown promptly in Portugal, especially in Lisbon. “Look at Table III, Lisbon has maintained over 50% of the country’s total volume of sales of the fast-food

<sup>2</sup> Fast-food restaurant industry is represented by industry code 56103 according to Classificação de Atividades Económicas, Revisão 3 (CAE Rev 3).

industry. In 2008, the industry had an annual volume of sales of €370 million; as of 2018, this value had reached €589 million, exhibiting a growth of 59.24%.” said Carolina.

Table III – Volume of Sales

<b>Year</b>	<b>Portugal</b>	<b>Lisbon</b>	<b>Portion of Lisbon's sales on overall Portuguese volume of sales</b>
<b>2008</b>	€ 369,629,598	€ 193,009,914	52.22%
<b>2009</b>	€ 394,711,755	€ 212,562,479	53.85%
<b>2010</b>	€ 417,140,649	€ 222,890,451	53.43%
<b>2011</b>	€ 409,050,323	€ 220,680,544	53.95%
<b>2012</b>	€ 367,504,075	€ 201,380,209	54.80%
<b>2013</b>	€ 371,611,021	€ 209,210,180	56.30%
<b>2014</b>	€ 392,871,021	€ 215,323,388	54.81%
<b>2015</b>	€ 395,811,929	€ 209,532,718	52.94%
<b>2016</b>	€ 423,421,319	€ 219,057,129	51.74%
<b>2017</b>	€ 514,094,443	€ 278,199,194	54.11%
<b>2018</b>	€ 588,597,778	€ 308,605,822	52.43%

Source: INE Statistics

“The industry, however, did not always flourish.” said her Dad. “Due to the economic and financial crisis<sup>3</sup>, between 2010 and 2012, the industry took a downfall of around 12%. I bet that the restaurant industry is taking a huge blow due to COVID-19 outbreak and most of them are changing their business models to take-out and deliveries. Did you look at the numbers in tourism? Your restaurant would be ideal not only for the Lisbon residents, but also for tourists. Yet, the flow of tourists has become very reduced, decreasing at a reasonable rate the movement of these places and, consequently, the revenues from sales.”

The burger industry includes two distinct segments: fast-food and “better burger”. The fast-food segment refers to chains where priority is given to the quick service and cheap ingredients, which lead to a cheap, fast-delivered, final product. The “better burger” segment applies to restaurants that prioritize ingredients of good quality, as well as good service. This inevitably leads to a higher price and waiting time than those of fast-food chains. Notwithstanding, more environmental and health-conscious recent generations tend to choose “better burgers” over

<sup>3</sup> From 2011 to 2014, Portugal asked for financial aid to surpass the economic and financial crisis – the Subprime crisis. This assistance was brought by Troika, a committee constituted by members of the European Commission, the European Central Bank and International Monetary Fund.

fast-food burgers. As a result, the “better burger” industry has gained popularity over the past years.

Although Five Guys is considered to be a fast-food chain, it is also able to compete with what are considered the “better burger” chains. In fact, it is fair to say that Five Guys is somewhere in between the two categories – although its service is fast, the ingredients used are of high quality, thus the price charged for this is inevitably not as cheap as most fast-food joints, but not as expensive as “better burger” restaurants. For this reason, Five Guys’ place in the market, internationally, is very well set.

To get a better idea of how Five Guys would be received by the Portuguese market, Carolina paid €5,000 for a market survey (see Appendix 1). The survey targeted individuals aged between 18 and 65 years old who reside in and around Lisbon. From 325 responses (see Appendix 2), the great majority (82%) claimed to attend burger restaurants but only 48% knew the brand Five Guys. Once the concept was explained, 95% said they would be willing to try it, mainly due to the quality of the product offered (51%) and the reputation of the brand (25%). From those that would be willing to dine at Five Guys, the bulk of responses of how many meals they would have were of “less than one per week” (69%), followed by one meal per week (25%).

As the survey was conducted at the beginning of the research, it did not account for the pandemic outbreak. With COVID-19, Carolina had to drill down the number of meals sold. Furthermore, without a vaccine, individuals are avoiding eating at restaurants, let alone travel. According to INE (2020), by now, tourism in Portugal has reduced by 47%.

In terms of the price per menu, most of the individuals surveyed responded they would be willing to pay €10.00, at most. Looking at the prices practiced by Five Guys in Spain (average menu price of €15.89) and taking into account the living conditions of both countries, a fair price to apply in Portugal would be of approximately €14.00 (see Appendix 3).

After studying the practiced prices by possible suppliers, Carolina estimated the cost per menu of €1.23 and the sales margin per menu of €8.77 (87.7%). For the first year, Carolina forecasted utility expenses from existing suppliers of €47,348.

Next, Carolina sought for the best funding option. “I will have to see if I can raise money from my parents or ask for a bank loan”, she thought. She discovered that her best loan option would be at Millennium Bank, where she could get a 5-year loan, of a maximum of €250,000, to fund her project at an annual effective rate of 3.738%, paid yearly in equal installments.

Today, October 30<sup>th</sup>, 2020, is the due date to reply to the Ministry of Finance about the job offer. Carolina is ready to make a decision and update her parents on the matter. “Dad, I have finally gathered all the information to make a proper decision on the project. I really believe that bringing Five Guys to Lisbon is...”

## 6. Discussion Questions

1 – Estimate the Net Present Value (NPV) of the project at October 30<sup>th</sup>, 2020. Be sure to identify the main assumptions, project the cash-flows, and estimate the cost of capital. Consider that Carolina raises money from her parents to finance the initial investment. *Hint: If the risk-free rate is negative, assume a value of 2%.*

2 – Assume that Carolina will finance her project by raising a debt loan for 50% of the initial investment, raising the other 50% from her parents. Does the NPV change?

3 – What are the main risks involved in this investment? Considering that Carolina finances the project with money from her parents, how would the NPV change if these risks were considered? What should Carolina do? (Follow her entrepreneurial dream or take the job offer at the Ministry of Finance.)

4 – Should Carolina proceed with Five Guys Franchise? Should she delay the project because of the COVID-19 outbreak? Consider that Carolina finances the project with money from her parents and that the probability of having a vaccine for COVID-19 next year is of 50%.

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## **B. Teaching Note**

### **1. Case Study Summary**

This case deals with the challenges faced by Carolina, a recent graduate in Finance, that wants to open a franchise of an international burger chain. On her master's trip to Frankfurt, Carolina tried Five Guys for the first time. Finding out that it had not yet reached Portugal, the idea of opening a Five Guys franchise in Lisbon filled her head.

At the same time, Carolina has also received a job offer at the Ministry of Finance and has limited time to inform them of her decision. Facing this dilemma, of whether to follow her entrepreneurial dream or accept a job position in her area of studies, she decided to analyze the project's viability.

For this, Carolina reviewed the Franchise Disclosure Document and the required initial investment. She then launched a survey to see how individuals respond to the Five Guys brand. Carolina also evaluated the funding options. She had two options: raise money from her parents or ask for a bank loan. She has to take into account the impact of each funding option on the value of the project, as well as the risks and costs associated with the project. While doing her research, the pandemic outbreak of COVID-19 occurred. Hence, Carolina has also to equate if now is the right time to go forward with the project or if she should wait.

The case highlights the steps required before undertaking a new project. In addition to projecting the future cash flows of the investment, Carolina also has to take into account the funding options and the risks she will face. Accordingly, she will have to evaluate the trade-offs of letting go of the position at the Ministry of Finance and going forth with the franchise. In addition, real options will be useful to equate if the project should be implemented at this time or later, due to the obstacles created by the pandemic outbreak.

### **2. Teaching Objectives**

After analyzing this case study, students should be able to:

- Demonstrate knowledge on project appraisal, corporate finance and risk analysis;
- Estimate the net present value (NPV) of the project, identifying the main assumptions and projecting the cash-flows and cost of capital;
- Demonstrate knowledge of how the capital structure of a project affects its value;

- Assess the risks of the project, applying risk analysis techniques: sensitivity analyses or Monte Carlo simulation;
- Determine the value of the project under real options, namely delay a project.

### **3. Target Audience**

This case can be used for the Master of Business Administration (MBA) and also for the Master in Finance, as well as for executive training courses on corporate finance and project appraisal. Furthermore, it can be an important pedagogical tool for degrees such as corporate finance and investment appraisal.

The case should be applied after having taught or revisited the different tools to evaluate new projects (investment appraisal topics) and, therefore, may be used for practical training of courses like Corporate Finance and Investment Appraisal. The case can also be used at the end of the course as it requires students to construct a spreadsheet and estimate the value of a new project. Its intention is also for students to identify not only the value drivers of the new project but also the possible risks and problems and then propose solutions to minimize them. When undertaking this case-study, students are expected to do the following tasks:

- Project the future cash-flows of the project
- Identify the most suitable method for assessing the value of the project;
- Estimate the appropriate cost of capital to update cash flows, thus it requires students to estimate the company's beta ( $\beta$ ), the risk-free interest rate, risk premium and determine the most appropriate of cost of debt;
  - Determine the value of the new project;
  - Undertake a sensitivity analysis or Monte Carlo simulation, allowing students to assess the impact of risks on estimated value;
  - Evaluate the impact of delaying the project.

The case presents several references that students can use to guide their discussion. Students may need to collect additional information in order to estimate both cash flows and cost of capital.

### **4. Materials**

The following material is an integral component of this case:

- An auxiliary spreadsheet with the information on the estimated initial investment, additional fees and market information;

- A spreadsheet with the author’s proposed solution based on the data provided in the case and assumptions made (forecasted cash-flows, risk-free interest rate, beta, cost of debt, cost of equity, a Monte Carlo simulation and sensitivity analysis);
- Teaching Notes.

Students should only have access to the case study text and auxiliary spreadsheet.

### 5. Suggested Teaching Strategy

Due to the fact that for many students the concepts are potentially unfamiliar, this case is most suitable for use as a group assignment at the end of the term, or after being lectured on project appraisal. Students should organize themselves in small groups of three to five elements. By working in groups, students are more likely to study together and engage in broader dialogue, and thus achieve a better understanding of the complexity of estimating cash-flows and applying risk analysis techniques.

The case should be distributed at the beginning of the course and the teacher should encourage students to solve the case after the lecture on project appraisal. Fifteen minutes of the next class should be reserved to answer any questions related to the case. Before moving on to the next topic of the syllabus, students should present their solutions to the rest of the class.

Through the case work, students must apply their knowledge on various subjects of finance – corporate investment appraisal, corporate financing, corporate planning, entrepreneurship, industry analysis and financial forecasting.

### 6. Topic Revision

The Net Present Value (NPV) is the most commonly used method in project appraisal and considered by many as the most correct criteria for investment decisions. The NPV of an investment is defined as the present value of all its future cash flows, as shown in the equation below. Accordingly, the NPV shows how much those cash flows represent in cash today. Its value may be positive, negative or null, that is, if the inflows outweigh the outflows, if the outflows outweigh the inflows, or if they are equal, respectively.

$$\begin{aligned}
 NPV &= PV(\text{cash inflows}) - PV(\text{cash outflows}) = PV(\text{all future cash flows}) \\
 &= \sum_{t=1}^n \frac{\text{all future cash flows}}{(1+i)^t}
 \end{aligned}$$

The NPV decision rule dictates that the project with the highest NPV should be undertaken when choosing between two or more investment opportunities. For stand-alone projects, the criteria to adopt is to accept if the NPV is positive, because accepting it is proportional to receiving such amount today. It follows that if the NPV is null or negative, the project should be rejected, given that the value added by the project would be null or negative.

It is fundamental that the cash flows included in the NPV are appropriate for such calculation. In an investment such as the present (franchising a restaurant), the inflows to the investment are simple, they are merely the revenues from the sales to customers. Contrarily, the costs to be included must be considered with caution, as not all costs incurred contribute to the value of the project.

The main costs include cost of sales, rent, utility expenses, wage expenses, as well as tax expenses and additional fees to the franchisor. Other types of costs must be considered more carefully, such as sunk costs. **Sunk costs** are those that have been incurred and cannot be recovered, that is, whether undertaking the project or not. For this reason, these costs are not to be included in the NPV of a project.

On top of the main revenues and costs, working capital must be considered as well. **Working Capital** represents the financial needs of the day-to-day operations of a business. It is calculated by taking the Account Receivables, adding Inventories and subtracting Account Payables.

In addition to the proper cash flows, it is equally essential to obtain a proper cost of capital to discount the future cash flows to their present value. The **cost of capital** may be computed in a number of ways, of which the most commonly used is the CAPM (Capital Asset Pricing Model) model. **CAPM** determines the minimum return demanded by investors for a given level of risk. It does so by taking the risk-free rate in a given country and adding the risk premium multiplied by the beta –  $r = r_f + \beta(r_m - r_f)$ .

The risk-free rate is given by the government bond yield, as it is considered to be a default-free instrument, minus the country risk premium. The risk premium is the expected market return

minus the risk-free rate, while the beta considered is a measure of market risk, as it captures the level of response of a stock or, in this case, the value of a project, to changes in the market. It follows that a different beta must be used in valuating different investments, given, for example, the industry in which it is inserted.

To determine the beta of an investment, the following equation is used  $\beta_u = \frac{\beta_L}{1 + \frac{D}{E}(1-t)}$ , where  $\beta_u$  is the beta unlevered,  $\beta_L$  is the beta levered, D is the Debt of the firm, E is the Equity, and  $t$  is the tax rate. It is common to calculate a bottom-up beta, that is, take comparable peer companies, calculate their betas and compute their average to reach your wanted beta.

The **Capital Structure** of a project is the combination of equity and debt that will be used to finance it. Modigliani and Miller (1958) debated that, in a perfect market, the choice of capital structure should be irrelevant. As we do not have a perfect market, we see that this is not verified, so financing a project with debt or with equity will have different impacts on the forecasted value of a project.

As seen previously, when a project is financed with equity alone, a simple Discounted Cash Flow (DCF) model is used (Flow to Equity). When valuing a project that is financed with debt, a possible method to use is the Adjusted Present Value (APV) method. The **APV** method takes the unlevered value of the project, that is, calculated as financed only with equity, and adds the present value of the interest tax shield.

$$V^L = V^U + PV(\text{Interest Tax Shield})$$

The interest tax shield is the reduction in income taxes caused by the deduction in the taxable income of a company due to its interest expenses. This way, it is possible to reach the levered value of the project.

It follows that a number of periods must be set to forecast cash flows, that is, through its **useful lifetime**. If a project is set to last for a finite number of periods, assuming its liquidation at the end of those periods, then a residual value must be considered at the end of its lifetime and respective forecasted cash flows. Assuming that an investment will continue to operate for the

foreseeable future, then one should forecast the cash flows for the first years, usually the first 5 years, and add a perpetuity to account for the continuity of the project.

There is always uncertainty to a project. If we are able to find the source or sources of this uncertainty, we can apply a Monte Carlo simulation to calculate different scenarios, given changes in such variables. **Monte Carlo simulation** is commonly used to price derivative securities, but it is also useful in the case of project valuation, as it calculates a full distribution of possible outcomes. This is done through software applications such as CrystalBall or @RISK, simulating as much outcomes as you choose, in a matter of moments.

Undertaking an investment does not need to be a “now or never” decision – we may not want to risk it today but instead delay our decision until a future date. We must, however, estimate a possible outcome for that future date, accounting for the uncertainty allocated to such scenario, in order to make a decision today as to whether or not we should invest today. **Real options** exist for this purpose, that is, they attach to the project, and thus to its value, the option to expand, change or delay an investment.

## 7. Suggested Answers for Discussion Questions

**1 – Estimate the Net Present Value (NPV) of the project at October 30<sup>th</sup>, 2020, assuming it will maintain operations for the foreseeable future. Be sure to identify the main assumptions, project the cash-flows, and estimate the cost of capital. Consider that Carolina raises money from her parents to finance the initial investment. *Hint: If risk-free rate is negative, assume a value of 2%.***

The following assumptions were made to forecast the future cash flows of the project and respective NPV.

- **Initial investment: € 328,887**
  - Based on the elements of the predetermined initial investment, Carolina has estimated an initial investment amount of € 328,887, discriminated below, from which she excludes rent, since she's decided to account for it in the yearly utility expenses, as it is a recurrent cost.
  - Note that the money that Carolina spent on the market survey (€5,000) is not accounted for in the value of the project, as it is a sunk cost.

Table IV – Initial Investment

<b>Initial Franchise Fee</b>	€	21,876
<b>Development Fee</b>	€	43,752
<b>Leasehold Improvements</b>	€	120,000
<b>Equipment</b>	€	70,004
<b>Signage</b>	€	11,594
<b>Initial Inventory</b>	€	2,005
<b>Architectural/Engineering</b>	€	14,001
<b>Electronic Cash Register System with Modem</b>	€	17,501
<b>Facsimile Machine</b>	€	372
<b>Travel, lodging and meals for initial training</b>	€	1,750
<b>Business Supplies</b>	€	5,469
<b>Insurance deposits and premiums</b>	€	875
<b>Additional Funds for first 3 months</b>	€	19,688
<b>Total</b>	€	<b>328,887</b>

- **Store improvements: €120,000**

- **Training related costs: € 1,750**
  - Lodging for 3 individuals: €1,000
  - Meals (2 per day, for 10 days, at €10 each): €600
  - Transportation: €150
- **Rent: € 6,000 (monthly)**
- **Utility expenses: € 3,946 (monthly)**
- **Wage expenses: € 19,600 (monthly)**
  - 28 employees with a €700 monthly wage

Table V – Employee planning

	<b>Work station</b>	<b>Number of employees</b>
<b>Cash registers (4)</b>		4
<b>Kitchen (400 sqr feet)</b>	Grill	2
	Fryer	2
	assembly	3
	milkshakes	1
<b>Total employees needed per shift</b>		12
<i>2 shifts (9h00-17h00; 17h00-01h00)</i>		
<b>Employees needed daily</b>		24
<b>Each employee has 2 days off per week</b>	additional	4
<b>Total employees needed</b>		<b>28</b>

- **Meals first year: 57,501,550**
  - From the 309 individuals who claimed to be willing to dine at Five Guys and respective frequency per week (see Appendix 2), meals per month added up to 777. That is, assuming that “less than one per week” is equivalent to 1 meal per month, as shown below.

Table VI – Forecasted meals

<b>Frequency per week</b>	<b>&lt; 1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
<b>Number of answers</b>	213	80	9	3	1	1	0	0	0	0	0	0	1	1	0
<b>Equivalent meals per month</b>	213	320	72	36	16	20	0	0	0	0	0	0	48	52	0
<b>Total meals per month</b>	777														

- With a reduction of 30% due to COVID-19 and consequent reduced flow of customers, meals per month will be of 544, for a sample of 325.
- Lisbon's population is currently of 2,863,272 people.
- We then forecast that, for Lisbon's population, 4,791,796 meals will be sold per month  $((544 * 2,863,272) / 325)$ .
- Altogether, the number of meals for the first year in Lisbon will be of 57,501,550  $(4,791,796 * 12)$ .
- **Sales' growth rate: 6.70%**
  - Historical average sales growth rate for the industry by Damodaran (2020).
- **Price per meal: € 10.00**
  - Note that the average price for a menu at fast food chains in Portugal is around € 7.00.
- **Cost per meal: € 1.23**

Table VII – Cost per meal

Beef per burger (grams)		94
Cost per kg of beef	€	4.50
<b>Cost per burger</b>	<b>€</b>	<b>0.42</b>
Serving of fries (grams)		411
Cost per kg of potatoes	€	0.50
<b>Cost per serving of fries</b>	<b>€</b>	<b>0.21</b>
Drink per menu (ml)		500
Cost per L of soft drinks	€	0,80
<b>Cost per regular drink</b>	<b>€</b>	<b>0.40</b>
<b>Cost per bun</b>	<b>€</b>	<b>0.20</b>
<b>Cost per menu</b>	<b>€</b>	<b>1.23</b>

- **Useful life of equipment: 5 years** (straight-line depreciation)
- **Income Tax rate: 21.00%**
- **Cost of capital: 9.651%**
  - The cost of capital was obtained using the Capital Asset Pricing Model (CAPM) formula:  $r = r_f + \beta(r_m - r_f)$ .
  - The risk-free rate ( $r_f$ ) is the interest rate of the Portuguese government bonds with 10-year maturity (0.810% - Banco de Portugal) minus the country risk premium (3.230% - Damodaran, 2020). Since it gives a negative value, for calculation purposes, the risk-free rate is assumed to be 2%.

- The risk-premium is the sum of the equity risk premium (8.460%) and the default spread (3.230%) made available at the Damodaran website, giving a risk premium of 10.075%.
- Lastly, three peers were used to calculate a bottom-up beta, using the equation  $\beta_u = \frac{\beta_L}{1 + \frac{D}{E}(1-t)}$ , as shown in the table below. Five Guys franchise project does not have any debt, so its beta unlevered would be the average of unlevered betas of the peers used (0.879). To attain a more accurate value, this value is averaged with Damodaran's (2020) unlevered beta for the industry in Europe (0.64). Finally, the unlevered beta for Five Guys is 0.759.

Table VIII – Beta calculation

Brand	BetaL	Equity (Market Value) (as of 5th Aug 2020)	Debt	D/E	Tax	BetaU
<b>Burger King</b>	1.38	\$ 17,231,070,586	\$ 18,101,000,000	1.05	23.50%	0.767
<b>Shake Shack</b>	1.54	\$ 1,683,592,786	\$ 646,283,000	0.38	12.30%	1.152
<b>Wendy's</b>	1.23	\$ 4,993,692,324	\$ 4,478,170,000	0.90	20.10%	0.717
<b>Five Guys</b>	0.88				21.00%	0.879

- Plugging these values into the CAPM formula, we achieve a cost of capital of **9.651%**.

From these assumptions, the cash flows in the following tables were forecasted.

Table IX – Forecasted Cash Flows

<b>Year</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
<b>Period</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Initial investment</b>	-€ 328,887					
<b>Sales revenues</b>	€ -	€ 575,015,498	€ 613,541,537	€ 654,648,819	€ 698,510,290	€ 745,310,480
<b>Cost of sales</b>	€ -	€ 70,640,654	€ 75,373,578	€ 80,423,607	€ 85,811,989	€ 91,561,392
<b>Rent</b>	€ -	€ 72,000	€ 72,000	€ 72,000	€ 72,000	€ 72,000
<b>Utility expenses</b>	€ -	€ 47,348	€ 50,520	€ 53,905	€ 57,516	€ 61,370
<b>Wage expense</b>	€ -	€ 235,200	€ 250,958	€ 267,773	€ 285,713	€ 304,856
<b>Operating Expenses</b>	€ -	€ 354,548	€ 373,478	€ 393,677	€ 415,230	€ 438,226
<b>Additional Fees</b>	€ -	€ 57,501,550	€ 61,354,154	€ 65,464,882	€ 69,851,029	€ 74,531,048
<b>Depreciation</b>	€ -	€ 14,001	€ 14,001	€ 14,001	€ 14,001	€ 14,001
<b>EBIT</b>	€ -	€ 446,504,746	€ 476,426,326	€ 508,352,652	€ 542,418,042	€ 578,765,813
<b>Tax Expense</b>	€ -	€ 93,765,997	€ 100,049,528	€ 106,754,057	€ 113,907,789	€ 121,540,821
<b>Unlevered Net Income</b>	€ -	€ 352,738,749	€ 376,376,798	€ 401,598,595	€ 428,510,253	€ 457,224,992
<b>Depreciation</b>	€ -	€ 14,001	€ 14,001	€ 14,001	€ 14,001	€ 14,001
<b>Change in Working Capital</b>	€ -	-€ 57,856,097	-€ 3,871,535	-€ 4,130,927	-€ 4,407,699	-€ 4,703,015
<b>Free Cash Flow</b>	<b>-€ 328,887</b>	<b>€ 410,608,848</b>	<b>€ 380,262,333</b>	<b>€ 405,743,523</b>	<b>€ 432,931,953</b>	<b>€ 461,942,008</b>

Table X – Expenses' Growth

<b>1st year</b>	<b>% of sales</b>
<b>Utility Expenses</b>	0.0082%
<b>Wage Expenses</b>	0.0409%

Table XI – Payment Schedule

	(months)
<b>Payment to Suppliers</b>	1
<b>Payment from Customers</b>	0

Table XII – Forecasted Additional Fees

Year	0	1	2	3	4	5
<b>Royalty Fee (6% sales)</b>	€ -	€ 34,500,930	€ 36,812,492	€ 39,278,929	€ 41,910,617	€ 44,718,629
<b>Creative Fund (2% sales)</b>	€ -	€ 11,500,310	€ 12,270,831	€ 13,092,976	€ 13,970,206	€ 14,906,210
<b>Local advertising (2% sales)</b>	€ -	€ 11,500,310	€ 12,270,831	€ 13,092,976	€ 13,970,206	€ 14,906,210
<b>Total additional fees</b>	€ -	<b>€ 57,501,550</b>	<b>€ 61,354,154</b>	<b>€ 65,464,882</b>	<b>€ 69,851,029</b>	<b>€ 74,531,048</b>

Table XIII – Working Capital

Year	0	1	2	3	4	5
<i>Current Assets</i>						
<b>Accounts Receivable</b>	€ -	€ -	€ -	€ -	€ -	€ -
<b>Inventories</b>	€ 2,005	€ 70,640,654	€ 75,373,578	€ 80,423,607	€ 85,811,989	€ 91,561,392
<i>Current Liabilities</i>						
<b>Accounts Payable</b>	€ 2,005	€ 128,496,751	€ 137,101,210	€ 146,282,167	€ 156,078,248	€ 166,530,667
<b>Net Working Capital</b>	€ -	-€ 57,856,097	-€ 61,727,632	-€ 65,858,559	-€ 70,266,259	-€ 74,969,274
<b>Change in Net Working Capital</b>	€ -	-€ 57,856,097	-€ 3,871,535	-€ 4,130,927	-€ 4,407,699	-€ 4,703,015

Table XIV – Inventories

Year	0	1	2	3	4	5
Forecasted meals sold	0	57,501,550	61,354,154	65,464,882	69,851,029	74,531,048
Inventory Needs	€ 2,005*	€ 70,640,654	€ 75,373,578	€ 80,423,607	€ 85,811,989	€ 91,561,392

\*Initial inventory equivalent to approximately 3 months of meals (544 (meals per month) \* €1,23 (cost per meal) \* 3 (months)).

- **Continuation Value:** Assuming that the franchise will maintain operations for the foreseeable future, we must include such cash flows. For this, we calculate the PV of a perpetuity, or Continuation Value (CV), at the time of the last forecasted cash flow (year 2025).
  - $CV_{2025} = \frac{CF_{2025} * (1+g)}{r-g}$ , where r is the cost of capital and g is the growth rate of cash flows.
  - The average growth rate of the Portuguese GDP of the last ten years is of 1,350%, according to INE (2020), so we will consider a value of 1% for the growth rate of the perpetuity.
  - We reach a value of €5,393,456,262 ((€ 461,942,008\*(1+1%))/(9.651%-1%)).

After discounting the cash flows to their present value at the cost of capital, we reach an NPV of approximately 4,992 million euros, as shown below.

Table XV – Net Present Value

Year	0	1	2	3	4	5	CV (2025)
Free Cash Flow	-€ 328,887	€ 410,608,848	€ 380,262,333	€ 405,743,523	€ 432,931,953	€ 461,942,008	€ 5,393,456,262
Discounted FCF	-€ 328,887	€ 374,470,534	€ 316,272,916	€ 307,765,290	€ 299,486,348	€ 291,429,959	€ 3,402,623,507
NPV	€ 4,991,719,667						

**2 – Assume that Carolina will finance this project by raising a debt loan for 50% of the initial investment, raising the other 50% from her parents. Does the NPV change?**

To calculate the NPV of a project financed with debt, we need to use the APV (Adjusted Present Value) method. According to this method, the levered value of a project is equal to the unlevered value plus the present value of the interest rate tax shield.

$$V^L = V^U + PV(\text{Interest Tax Shield})$$

Firstly, you need to account for the yearly interest expense. This is possible by assembling an amortization schedule, from which you can separate the interest expense from the principal repayment within each payment.

- Taking a loan of 50% of the initial investment (€ 164,443) with a maturity of five years and an interest rate of 3.738%, Carolina’s yearly payment is € 36,667.

$$\text{Yearly payment} = \frac{\text{€ } 164,443 * 3.738\%}{1 - \frac{1}{(1+3.738\%)^5}} = \text{€ } 36,667$$

- With the outstanding debt in each period, we are able to calculate the interest expense for every year by multiplying the outstanding debt by the interest rate (e.g. €164,443\* 3.738% = €6,167).

Table XVI – Amortization Schedule

	Period	Yearly payment	Interest expense	Principal payment	Outstanding debt
<b>Year 0</b>	0	€ -	€ -	€ -	€ 164,443
<b>Year 1</b>	1	€ 36,667	€ 6,147	€ 30,520	€ 133,923
<b>Year 2</b>	2	€ 36,667	€ 5,006	€ 31,661	€ 102,262
<b>Year 3</b>	3	€ 36,667	€ 3,823	€ 32,844	€ 69,418
<b>Year 4</b>	4	€ 36,667	€ 2,595	€ 34,072	€ 35,346
<b>Year 5</b>	5	€ 36,667	€ 1,321	€ 35,346	€ -

From there, we are able to estimate the interest tax shield and respective PV. Note that corporate tax is 21%.

$$\text{Interest Tax Shield}_t = \text{Interest}_t * \text{Corporate Tax}$$

Table XVII – Interest Tax Shield

<b>Year</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interest expense</b>	€ -	€ 6,147	€ 5,006	€ 3,823	€ 2,595	€ 1,321
<b>Interest Tax Shield</b>	€ -	€ 1,291	€ 1,051	€ 803	€ 545	€ 277
<b>Discounted Interest Tax Shield</b>	€ -	€ 1,177	€ 874	€ 609	€ 377	€ 175
<b>PV(Interest Tax Shield)</b>	<b>€ 3,212</b>					

Finally, if Carolina finances the franchise with 50% debt, considering she repays it in the five years set and that we she will not raise additional debt, her NPV ( $V_L$ ) will be:

$$V_L = € 4,991,719,667 + € 3,212 = € 4,991,722,879$$

**3 – What are the main risks involved in this investment? Considering that Carolina finances the project with money from her parents, how would the NPV change if these risks were considered? What should Carolina do? (Follow her entrepreneurial dream or take the job offer at the Ministry of Finance.)**

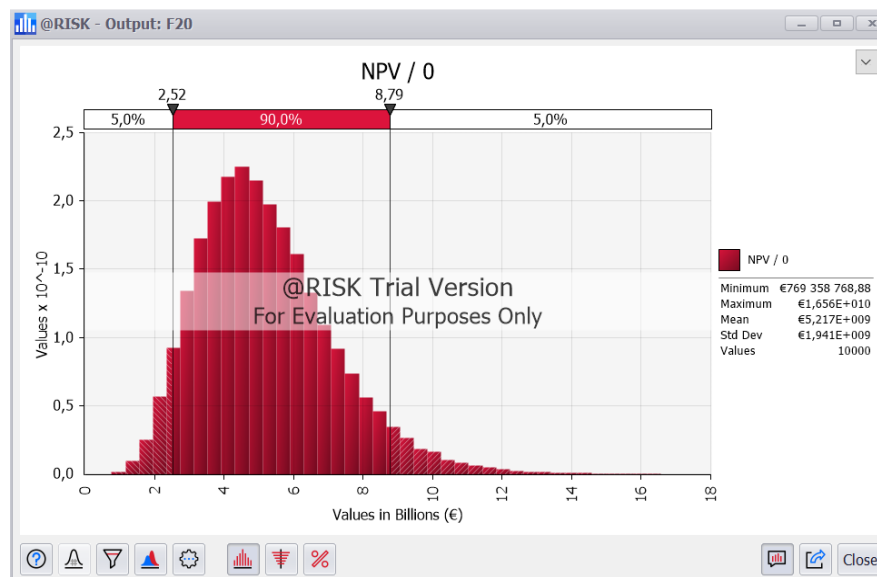
To discuss the main risks associated to the Five Guys franchise in Lisbon, we look at the brand’s strengths and weaknesses in the context of the Portuguese market. For this, it is useful to apply a SWOT analysis.

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>▪ Fresh ingredients All ingredients used are fresh and of high quality</li> <li>▪ Unique design The typical-American-diner design provides an appealing environment</li> <li>▪ Unique experience Create your own sandwich with all the toppings you desire and enjoy a free side of peanuts</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>▪ Visibility in the Portuguese market</li> <li>▪ Price range The price range of products is higher than that of already established fast food chains</li> <li>▪ Lack of managerial and founding skills of the founder</li> <li>▪ Unknown suppliers</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>▪ Internationally known brand Popular foreign brand would generate curiosity</li> <li>▪ Vegetarian options Offers multiple options in an industry that usually offers few to none</li> <li>▪ Innovative menu items Offers products that are not common in burger chains in the Portuguese industry (e.g. hotdogs, sandwiches, milkshakes)</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>▪ Consumer bias for known brands Consumers may stick to the chains they are familiar with</li> <li>▪ Current state of the economy Fragile due to COVID-19 outbreak</li> <li>▪ Reduction of sales Due to reduction of tourism and frequency of residents dining out</li> <li>▪ Increase in price of supplies</li> </ul>

Considering all of the features above, we see that, although Five Guys has reasonable international visibility and credibility, it may be challenging to conquer Portuguese consumers, especially during the current outbreak. The risk of inertia of consumers (switching costs) is immense in the sense that it may be difficult for the latter to try a new, unfamiliar chain with a price that is relatively higher than what they are used to in fast food restaurants. This risk is aggravated at the moment, since so many households are having financial troubles due to the COVID-19 outbreak and consequent layoff and even unemployment in some cases, reducing their disposable income to eat in restaurants. In addition, health risk of going to restaurants should also be considered.

The risk of consumers not adhering to the franchise would impact the quantity of menus sold. In addition, cost of sales may increase, due to the difficult situation of the economy. It gives that costs will have a greater weight on the NPV. To estimate this impact on the NPV, it is useful to carry out a Monte Carlo simulation to calculate possible deviations. The input variables to be used in this case shall be sales revenues growth and cost per meal.

The following graph represents the probability distribution of the project's NPV, given changes in the sales revenues' growth and in the cost of sales, executed through a Monte Carlo simulation with @RISK software.



The Monte Carlo simulation indicates a minimum and a maximum NPV of approximately € 769 million and €16,560 million, respectively. It is clear that the NPV is highly volatile and exposed to the risks mentioned, regardless, it is always positive and between € 2,520 million and € 8,790 million with 90% probability.

There is yet another scenario to consider, the possibility that Carolina accepts the job offer at the Ministry of Finance. To compare this possibility to the NPV of the franchise, assuming this option enables Carolina to have a stable and long-lasting career, we calculate a perpetuity with the offered wage (€1,200), with a growth rate ( $g$ ) of 1% (average inflation of the past 10 years – Table XVIII), discounting at the risk-free rate set previously (2%), since the employer is the State. Plugging these values into the formula of the present value of a perpetuity ( $PV(\text{Perpetuity})$ ), we reach the value of €120,097, as shown below.

$$PV(\text{Perpetuity}) = \frac{CF * (1 + g)}{r - g} = \frac{€1,200 * (1 + 0.01)}{0.02 - 0.01} = € 120,097$$

Table XVIII – Inflation

<b>Year</b>	<b>Inflation</b>
<b>2009</b>	-0.800%
<b>2010</b>	1.400%
<b>2011</b>	3.700%
<b>2012</b>	2.800%
<b>2013</b>	0.300%
<b>2014</b>	-0.300%
<b>2015</b>	0.500%
<b>2016</b>	0.600%
<b>2017</b>	1.400%
<b>2018</b>	1.000%
<b>2019</b>	0.300%
<b>Average</b>	<b>1.0%</b>

Source: INE Statistics

It is clear that the NPV of the project is highly volatile and highly influenced by the risks it faces. Nevertheless, the project exhibits a positive NPV in every scenario calculated. The investment decision will, therefore, remain the same regardless of the risks considered, that is, the investment decision should always be to accept the project. Comparing to the possibility of taking the job at the Ministry of Finance, even the smallest estimated NPV is higher than the present value of the latter. Hence, even considering all risks involved, Carolina should choose to undertake the project instead of accepting the job at the Ministry of Finance.

**4 – Should Carolina proceed with Five Guys Franchise? Should she delay the project because of the COVID-19 outbreak? Consider that Carolina finances the project with money from her parents and that the probability of having a vaccine for COVID-19 next year is of 50%.**

After seeing the impact of the COVID-19 outbreak on the economy, Carolina had to reduce her initial sales' forecast. To decide whether she should proceed with the project or delay it, we must compare the NPV of both scenarios, given the probability that the pandemic situation will recover or not, that is, having a vaccine or not.

- If there is not a vaccine by 2021, the sales forecasted will be the ones forecasted in the previous questions, as they will continue to be impacted by the pandemic. The NPV of this scenario will be as in Question ( $NPV_1 = € 4,991,719,667$ ).
- Considering there is a vaccine in 2021, it is assumed that sales will be the initially forecasted from the survey responses with the recovery of the economy. The NPV in this case will be € 7,306,651,611 ( $NPV_2$ ), as shown in the next Table XIX.

There is uncertainty to each of this scenario, that is, presently, it is not known if there will be a vaccine for COVID-19 in 2021 or not. Assuming a probability of 50% for each scenario, if Carolina chooses to delay this project, her expected NPV will be:

$$NPV = NPV_1 * 0.5 + NPV_2 * 0.5$$

$$NPV = € 4,991,719,667 * 0.5 + € 7,306,651,611 * 0.5$$

$$NPV = € 6,149,185,639$$

If Carolina proceeds with the Five Guys Franchise today, the project's NPV is lower than if she chooses to delay it ( $€ 4,991,719,667 < € 6,149,185,639$ ). Carolina should, therefore, delay undertaking this investment.

Table XIX – Net Present Value Scenario 2 ( $NPV_2$ )

	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	
<b>Year</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
<b>Initial investment</b>	-€ 329,986						
<b>Sales revenues</b>	€ -	€ 821,450,712	€ 876,487,909	€ 935,212,599	€ 997,871,843	€ 1,064,729,257	
<b>Cost of sales</b>	€ -	€ 100,915,220	€ 107,676,540	€ 114,890,868	€ 122,588,556	€ 130,801,989	
<b>Rent</b>	€ -	€ 72,000	€ 72,000	€ 72,000	€ 72,000	€ 72,000	
<b>Utility expenses</b>	€ -	€ 47,348	€ 50,520	€ 53,905	€ 57,516	€ 61,370	
<b>Wage expense</b>	€ -	€ 235,200	€ 250,958	€ 267,773	€ 285,713	€ 304,856	
<b>Operating Expenses</b>	€ -	€ 354,548	€ 373,478	€ 393,677	€ 415,230	€ 438,226	
<b>Additional Fees</b>	€ -	€ 82,145,071	€ 87,648,791	€ 93,521,260	€ 99,787,184	€ 106,472,926	
<b>Depreciation</b>	€ -	€ 14,001	€ 14,001	€ 14,001	€ 14,001	€ 14,001	
<b>EBIT</b>	€ -	€ 638,021,872	€ 680,775,100	€ 726,392,793	€ 775,066,873	€ 827,002,115	
<b>Tax Expense</b>	€ -	€ 133,984,593	€ 142,962,771	€ 152,542,487	€ 162,764,043	€ 173,670,444	
<b>Unlevered Net Income</b>	€ -	€ 504,037,279	€ 537,812,329	€ 573,850,307	€ 612,302,829	€ 653,331,671	
<b>Depreciation</b>	€ -	€ 14,001	€ 14,001	€ 14,001	€ 14,001	€ 14,001	
<b>Change in Working Capital</b>	€ -	-€ 183,414,839	-€ 12,283,970	-€ 13,106,996	-€ 13,985,165	-€ 14,922,171	<b>CV (2025)</b>
<b>Free Cash Flow</b>	-€ 329,986	€ 687,466,118	€ 550,110,300	€ 586,971,304	€ 626,301,995	€ 668,267,843	€ 7,802,436,927
<b>Discounted FCF</b>	-€ 329,986	€ 626,961,173	€ 457,539,371	€ 445,230,504	€ 433,252,607	€ 421,596,794	€ 4,922,401,148
<b>NPV</b>	€ 7,306,651,611						

## **Appendixes**

### **Appendix 1 – Survey**

Survey applied (translated to English)

**This survey is applied as a part of a case study in the scope of the Masters' Final Work of the Master in Finance at ISEG--Lisbon School of Economics & Management of the University of Lisbon, accomplished by Carolina Gonçalves, under the supervision of Professor Ana Venâncio.**

**The survey is to be answered by residents in and around Lisbon, who regularly dine at burger restaurants. It is anonymous and the results obtained will be used for academic purposes only, with the aim to analyze the Portuguese burger industry and its possible adherence to an American chain franchise.**

**Thank you for your collaboration.**

#### **Question 1 – Gender**

- Female
- Male

#### **Question 2 – Age**

- Less than 24
- 24 to 34
- 35 to 44
- 45 to 54
- 55 to 65
- More than 65

#### **Question 3 – Nationality**

- Portuguese
- Other

**Question 4** – Do you usually go to burger restaurants? In case you choose “No”, you will be directed to Question 7.

- Yes
- No

**Question 5** – How many meals per week do you usually have in burger restaurants?

- |   |                             |
|---|-----------------------------|
| <input type="checkbox"/> Less than 1 per week | <input type="checkbox"/> 8  |
| <input type="checkbox"/> 1                    | <input type="checkbox"/> 9  |
| <input type="checkbox"/> 2                    | <input type="checkbox"/> 10 |
| <input type="checkbox"/> 3                    | <input type="checkbox"/> 11 |
| <input type="checkbox"/> 4                    | <input type="checkbox"/> 12 |
| <input type="checkbox"/> 5                    | <input type="checkbox"/> 13 |
| <input type="checkbox"/> 6                    | <input type="checkbox"/> 14 |
| <input type="checkbox"/> 7                    |                             |

**Question 6** – What is the main reason that leads you to go to burger restaurants? You will be directed to Question 8.

- |   |  |
|---|--|
| <input type="checkbox"/> Price                  | <input type="checkbox"/> Environment of the restaurant |
| <input type="checkbox"/> Quality of the service | <input type="checkbox"/> Location                      |
| <input type="checkbox"/> Speed of the service   | <input type="checkbox"/> Convenience/easy access       |
| <input type="checkbox"/> Quality of the product | <input type="checkbox"/> Other                         |

**Question 7** – What is the main reason that leads you not to go to burger restaurants?

- |   |  |
|---|--|
| <input type="checkbox"/> Price                  | <input type="checkbox"/> Environment of the restaurant |
| <input type="checkbox"/> Quality of the service | <input type="checkbox"/> Location                      |
| <input type="checkbox"/> Speed of the service   | <input type="checkbox"/> Convenience/easy access       |
| <input type="checkbox"/> Quality of the product | <input type="checkbox"/> Other                         |

**Question 8** – Which of the following fast-food chains do you know?

- |                                      |   |
|--------------------------------------|---|
| <input type="checkbox"/> McDonald's  | <input type="checkbox"/> Five Guys      |
| <input type="checkbox"/> Burger King | <input type="checkbox"/> Hardee's       |
| <input type="checkbox"/> Wendy's     | <input type="checkbox"/> Carl's Jr.     |
| <input type="checkbox"/> Denny's     | <input type="checkbox"/> Subway         |
| <input type="checkbox"/> Shake Shack | <input type="checkbox"/> Steak 'n Shake |

**Question 9** – Have you heard of the brand Five Guys?

- Yes
- No

Five Guys is an America burger chain, present in countries like Spain, England and Germany. The chain is known for its typical American design and high-quality fresh ingredients. Besides the free peanuts, Five Guys stands out for its fresh burgers French fries cooked in peanut oil. The freshness of the ingredients is guaranteed by the absence of freezers at the locations. Five Guys offers a variety of choices, such as sandwiches, hotdogs, milkshakes, different types of French fries and vegetarian options.

**Question 10** – In the event that Five Guys opens a location in Lisbon, would you be willing to try it? In case you choose “No”, you will be directed to Question 12.

- Yes
- No

**Question 11** – How many meals per week would you be willing to have at Five Guys?

- |   |                             |
|---|-----------------------------|
| <input type="checkbox"/> Less than 1 per week | <input type="checkbox"/> 8  |
| <input type="checkbox"/> 1                    | <input type="checkbox"/> 9  |
| <input type="checkbox"/> 2                    | <input type="checkbox"/> 10 |
| <input type="checkbox"/> 3                    | <input type="checkbox"/> 11 |
| <input type="checkbox"/> 4                    | <input type="checkbox"/> 12 |
| <input type="checkbox"/> 5                    | <input type="checkbox"/> 13 |
| <input type="checkbox"/> 6                    | <input type="checkbox"/> 14 |
| <input type="checkbox"/> 7                    |                             |

**Question 12** – What would lead you to try Five Guys?

- Price
- Location
- Quality of the service
- Quality of the product
- Reputation of the brand
- Other

**Question 13** – Having in mind the quality of the ingredients and of the service, what price would you be willing to pay for a menu?

\*menu = burger/hot dog/sandwich + French fries + drink/milkshake

- €8.00 to €10.00
- €10.00 to €12.00
- €12.00 to €14.00
- €14.00 to €16.00
- More than €16.00

**Question 14** – Where would you preferably go to a Five Guys restaurant?

- Centro Colombo
- Amoreiras
- Centro Vasco da Gama
- Lisbon airport
- Armazéns do Chiado

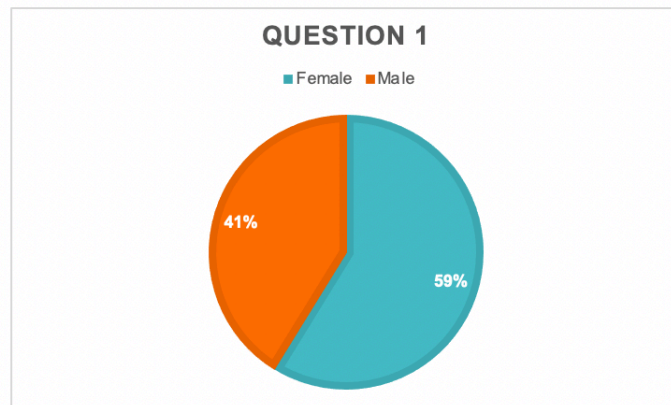
## Appendix 2 – Survey Results

Survey results obtained (translated to English)

Sample: 325

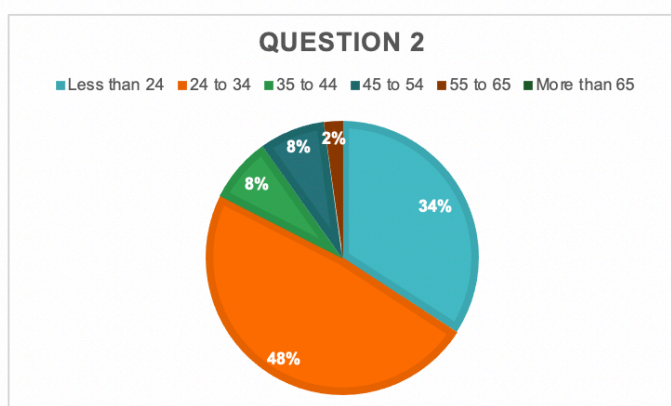
### Question 1 – Gender

Female	191
Male	134
Total	325



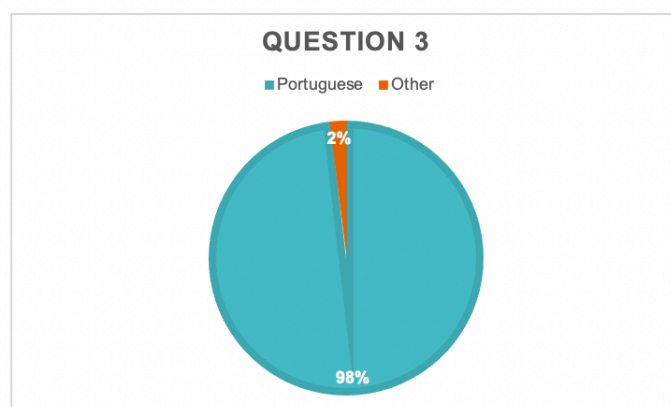
### Question 2 – Age

Less than 24	111
24 to 34	157
35 to 44	25
45 to 54	25
55 to 65	7
More than 65	0
Total	325



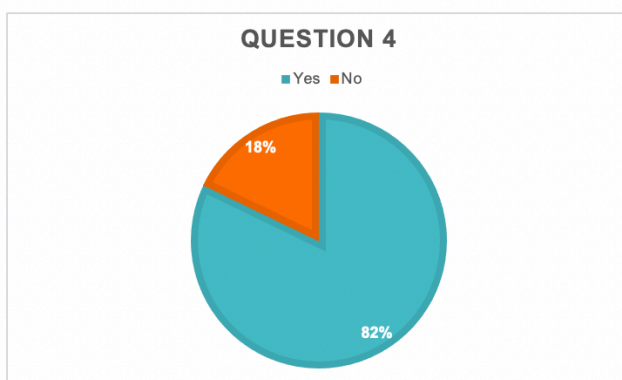
### Question 3 – Nationality

Portuguese	319
Other	6
Total	325



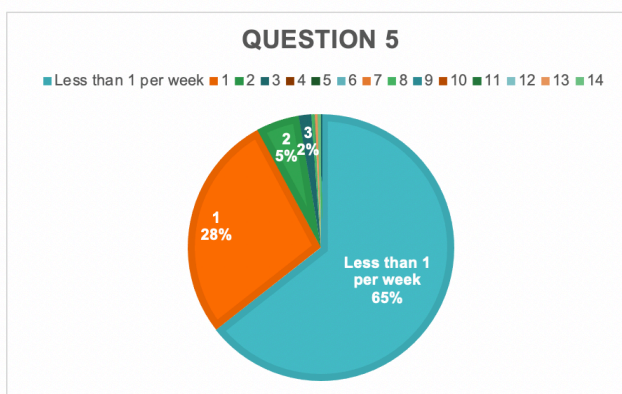
**Question 4** – Do you usually go to burger restaurants? In case you choose “No”, you will be directed to Question 7.

Yes	267
No	58
Total	325



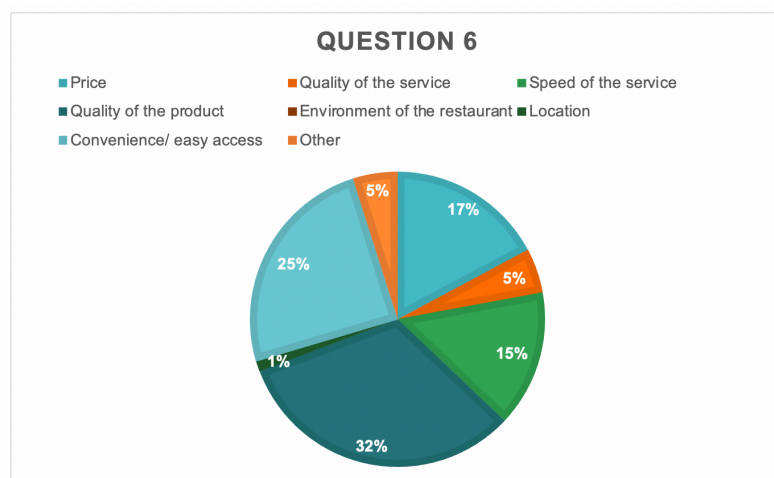
**Question 5** – How many meals per week do you usually have in burger restaurants?

Less than 1 per week	172
1	74
2	14
3	4
4	0
5	0
6	0
7	0
8	1
9	0
10	0
11	0
12	0
13	1
14	1
Total	267

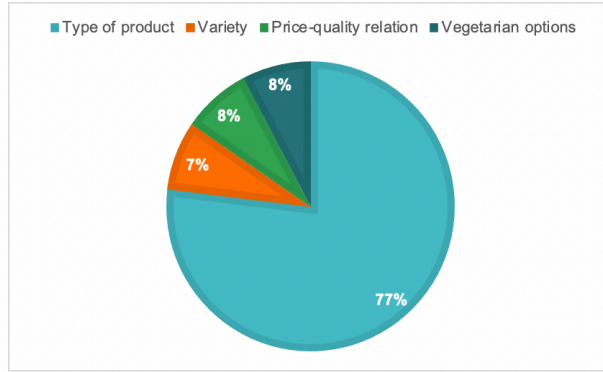


**Question 6** – What is the main reason that leads you to go to burger restaurants? You will be directed to Question 8.

Price	46
Quality of the service	13
Speed of the service	40
Quality of the product	86
Environment of the restaurant	0
Location	3
Convenience/ easy access	66
Other	13
Total	267
Total Responses	267

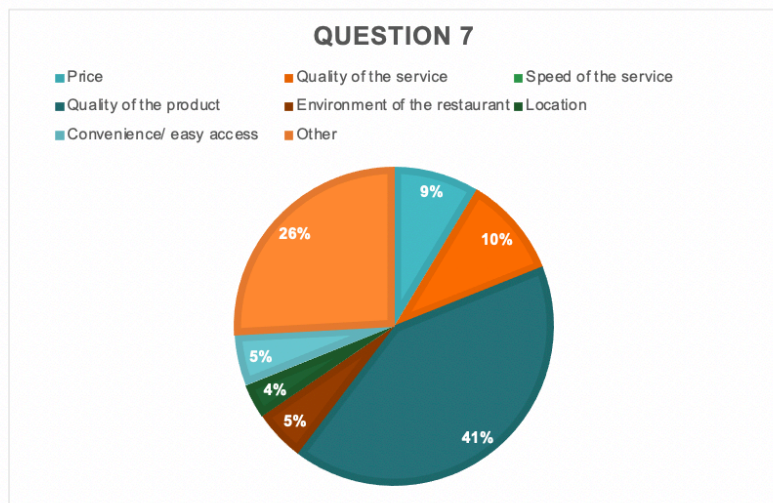


Other	
Type of product	10
Variety	1
Price-quality relation	1
Vegetarian options	1
Total	13

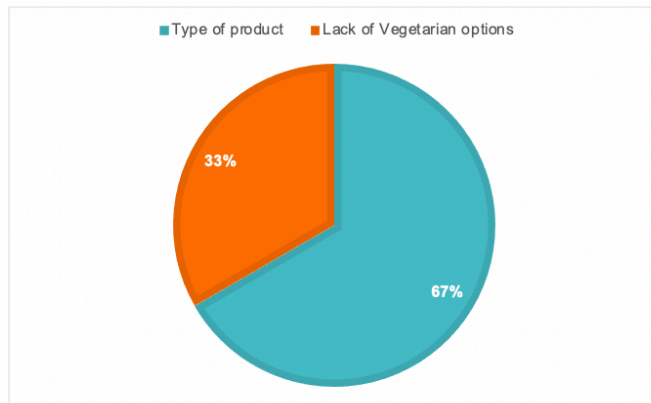


**Question 7 – What is the main reason that leads you not to go to burger restaurants?**

Price	5
Quality of the service	6
Speed of the service	0
Quality of the product	24
Environment of the restaurant	3
Location	2
Convenience/ easy access	3
Other	15
Total	58
Total Responses	58

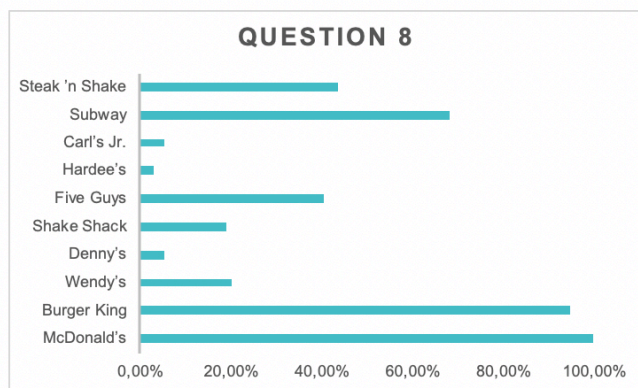


Other	
Type of product	10
Lack of Vegetarian options	5
Total	15



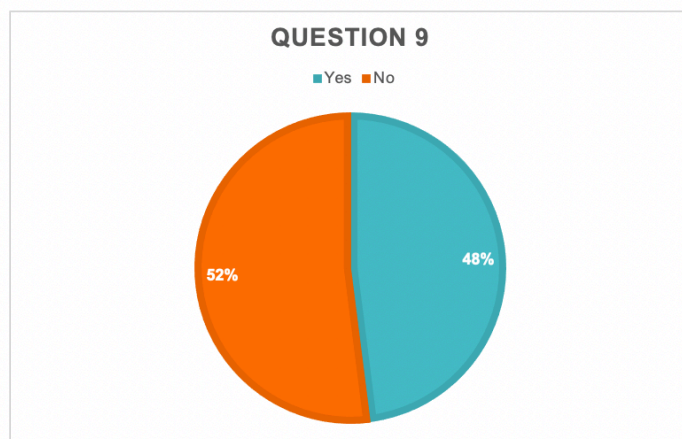
**Question 8** – Which of the following fast-food chains do you know?

McDonald's	324	99,69%
Burger King	308	94,77%
Wendy's	65	20,00%
Denny's	17	5,23%
Shake Shack	62	19,08%
Five Guys	131	40,31%
Hardee's	10	3,08%
Carl's Jr.	17	5,23%
Subway	222	68,31%
Steak 'n Shake	142	43,69%
	nr.	%



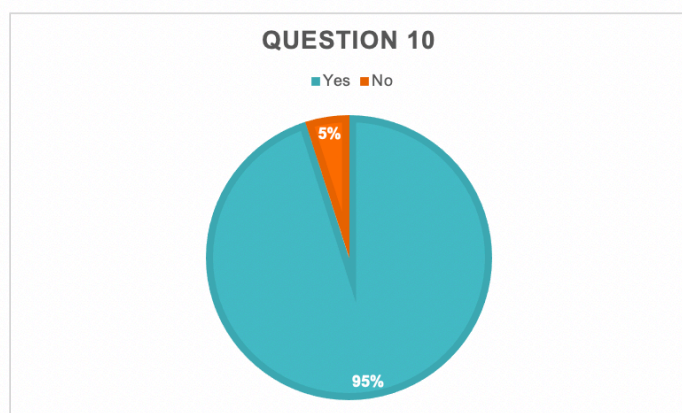
**Question 9** – Have you heard of the brand Five Guys?

Yes	156
No	169
Total	325



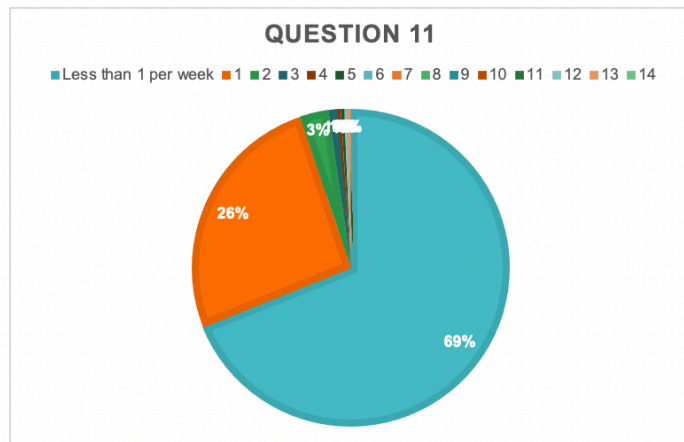
**Question 10** – In the event that Five Guys opens a location in Lisbon, would you be willing to try it? In case you choose “No”, you will be directed to Question 12.

Yes	309
No	16
Total	325



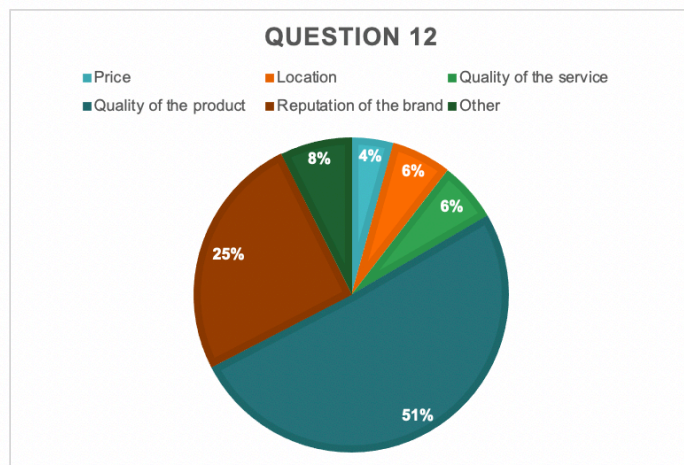
**Question 11** – How many meals per week would you be willing to have at Five Guys?

Less than 1 per week	213
1	80
2	9
3	3
4	1
5	1
6	0
7	0
8	0
9	0
10	0
11	0
12	1
13	1
14	0

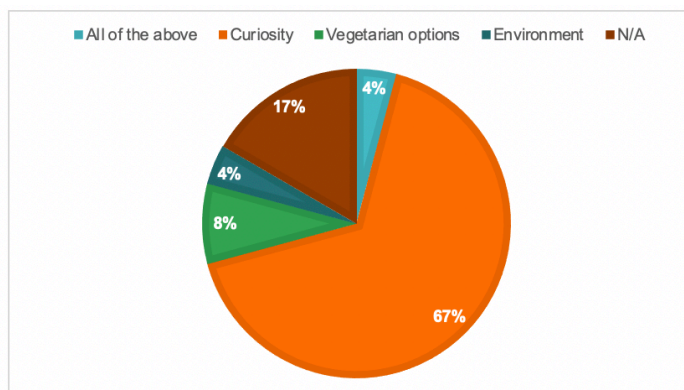


**Question 12** – What would lead you to try Five Guys?

Price	14
Location	20
Quality of the service	20
Quality of the product	165
Reputation of the brand	82
Other	24
Total	325



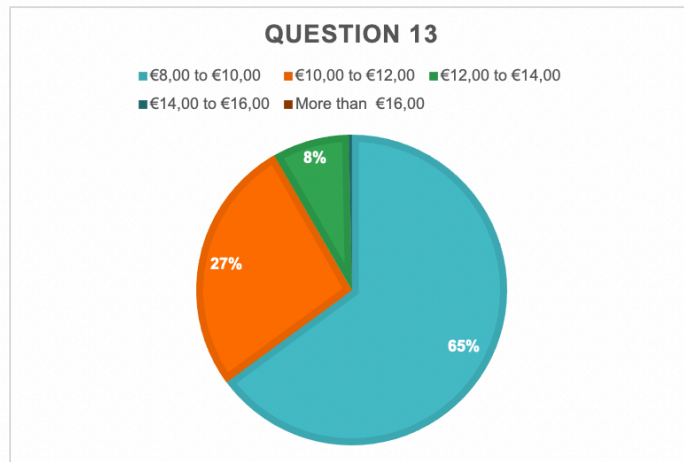
Other	
All of the above	1
Curiosity	16
Vegetarian options	2
Environment	1
N/A	4
Total	24



**Question 13** – Having in mind the quality of the ingredients and of the service, what price would you be willing to pay for a menu?

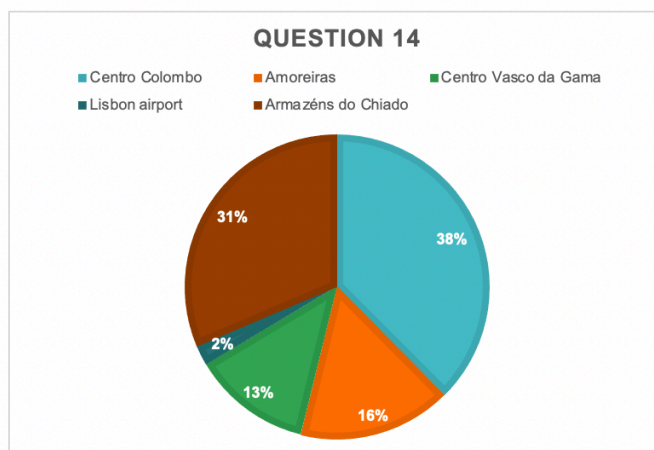
\*menu = burger/hot dog/sandwich + French fries + drink/milkshake

€8,00 to €10,00	211
€10,00 to €12,00	87
€12,00 to €14,00	26
€14,00 to €16,00	1
More than €16,00	0
Total	325



**Question 14** – Where would you preferably go to a Five Guys restaurant?

Centro Colombo	122
Amoreiras	53
Centro Vasco da Gama	41
Lisbon airport	7
Armazéns do Chiado	102
Total	325



### Appendix 3 – Average Menu Price

	<b>Purchasing Power adjusted to GDP per capita</b>	<b>Average menu price</b>
<b>Spain</b>	28300	€ 15.89
<b>Portugal</b>	24400	€ 13.70

<b>Responses to Question 13 of the survey</b>		
	<b>Number of Responses</b>	<b>Percentage of Responses</b>
<b>€8.00 to €10.00</b>	211	64.92%
<b>€10.00 to €12.00</b>	87	26.77%
<b>€12.00 to €14.00</b>	26	8.00%
<b>€14.00 to €16.00</b>	1	0.31%
<b>More than €16.00</b>	0	0.00%
<b>Total</b>	325	100.00%

#### **Appendix 4 – Further Topic Revision**

In alternative to the NPV decision method to evaluate an investment, one can also apply the Internal Rate of Return (IRR) method or the Payback Rule. The **IRR** is the interest rate that brings the NPV to zero. It may, however, be interpreted as the average annual interest rate that would be earned whilst undertaking the investment opportunity under analysis. It follows that, according to the IRR Investment Rule, a project should be undertaken when it is higher than the cost of capital. This method, however, has pitfalls, namely not taking into account the order of cash flows or arriving, at times, to multiple IRRs and, other times, to no IRR at all.

The **Payback Rule** is based on the payback period of an investment, that is, how long a project will take to pay back the initial investment amount. It follows that a project should be accepted if the payback period is not beyond a specified period of time – the Payback Rule.

Due to its extreme simplicity, the payback method exhibits pitfalls. It does not take into account the time value of money, ignoring the cost of capital, and any cash flow that occurs after the payback period is ignored, making it automatically not faithful to the true investment and not trustworthy for an investment decision. Lastly, the threshold of time to decide on whether to accept or reject a project is subjective and particular to each case, , which makes it not comparable nor reliable.

To reach the NPV of a project that is financed with debt, other than the APV, the **WACC** (Weighted Average Cost of Capital) method may be used. In this case, the levered value of the investment is calculated by adjusting the cost of capital that is used to discount future cash flows to their present value. The cost of capital would then be the weighted average between the cost of equity and the cost of debt. With WACC, the decision to accept a project shall be made if the NPV is positive, that is, if the IRR is higher than WACC.

Caution when forecasting cash flows is fundamental, especially when it comes to costs, as some costs are tricky to account for but required, while others may seem clear but do not impact the value of a project. This is the case of sunk costs, opportunity costs and externalities. As seen before, as sunk costs are unrecoverable and incurred whether the project is undertaken or not, they are not to be considered in the value of the project. Contrarily, opportunity costs and externalities must be included.

**Opportunity costs** are those associated with undertaking a project instead of applying it alternatively. **Externalities** represent the impact that an investment will have on other operations of a company. These impacts may be positive or negative, such as synergies or cannibalization, respectively. Synergies occur when a new project causes the sales of another product of the company to increase. Cannibalization is the opposite, that is, it occurs when a new product causes the sales of other products of a company to decrease. These types of costs are usually considered in already established companies and not in stand-alone projects.

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