ISCTE ◈ Business School
INSTITUTO UNIVERSITÁRIO DE LISBOA

THE IMPACT OF NEGATIVE INTEREST RATES ON A
FIRM'S FINANCING COSTS

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Project submitted as partial requirement for the conferral of
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Abstract

In this project we want to find out to what extent the adoption of negative interest rates (specifically the Deposit Facility Rate) by the European Central Bank has affected the financing costs of a non-financial firm, providing a real example. We compute two different interest rates – one contracted with the bank (theoretical) and one resulting from the balance sheet and income statement (practical), the former representing what the firm expects to pay over the loan, and the latter encompassing the indirect costs of borrowing – and compare them between periods. We set the break between periods on June 2014, when the European Central Bank cut its Deposit Facility Rate into negative grounds, and find that the contracted interest rate dropped, and the overall interest rate increased, with the increase being caused not only by an increase in risk exposure, but also by a generalized increase in taxes, commissions and fees.

Resumo

Queremos com este projeto descobrir qual o impacto da política de taxas de juro negativas impostas pelo Banco Central Europeu (nomeadamente a taxa de Facilidade Permanente de Depósito) sobre os custos de financiamento numa empresa não financeira. Calculámos duas taxas de juro diferentes – a contratada ao banco (teórica), e uma resultante do balanço e demonstração de resultados (prática), a primeira representando o que a empresa espera pagar sobre o empréstimo, e a segunda que engloba os custos indiretos do financiamento – e comparámo-las entre períodos. A divisão entre períodos é feita em Junho de 2014, altura em que o Banco Central Europeu baixou a sua taxa de Facilidade Permanente de Depósito para valores negativos, concluímos que a taxa contratada desceu, e a taxa prática subiu, sendo esta subida causada não só pelo aumento da exposição ao risco, mas também pelo aumento generalizado de impostos, taxas e comissões.

Palavras-chave: taxas de juro negativas, custos de financiamento, empresas Portuguesas, política monetária

Classificação JEL: E52, G32

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Finally, I want to thank my family and friends, for the support shown throughout the elaboration of this project.

I consider this work my academical *magnum opus*, and it would not have been possible without the contribution of all the above-mentioned people – to them, a sincere thank you.

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List of Acronyms

APP – Average Payment Period

APR – Annual Percentage Rate

B2B – Business-to-business

B2C – Business-to-consumer

BoD – Bank of Denmark

bp – basis point

CFO – Chief Financial Officer

CIEC – Código dos Impostos Especiais de Consumo

CISS – Composite Indicator of Systemic Stress

COGS – Cost of Goods Sold

DGS – Deposit Guarantee Schemes

Directive 2014/49/EU – Directive of the European Parliament and of the council, of 16 of April 2014

DL 73/2010 – Decreto-Lei number 73/2010, from 21 of June 2010

DFR – Deposit Facility Rate

EBITDA – Earnings Before Interest, Taxes, Depreciations and Amortizations

ECB – European Central Bank

EOEP – Estado e Outros Entes Públicos

EU – European Union

EURIBOR – Euro Interbank Offered Rate

HICP – Harmonized Index of Consumer Prices

IMF – International Monetary Fund

MRO – Main Refinancing Operations

NIR – Negative Interest Rate

NIRP – Negative Interest Rate Policy

QE – Quantitative Easing

SME – Small and Medium Enterprises

TAEG – Taxa Anual dos Encargos Globais

TAN – Taxa Anual Nominal

UMP – Unconventional Monetary Policy

US – United States

VAT – Value Added Tax

vs. - versus

WACC – Weighted Average Cost of Capital

WHO – World Health Organization

ZLB – Zero Lower Bound

Section 1 – Introduction and Review of Literature

In this dissertation we want to explore and assess to what extent negative interest rate policies (NIRPs), like ones we are experiencing presently, can influence the way a non-financial firm finances itself. Namely, and this is our main concern, we want to compare a financing scenario made now, with one made in a pre-negative rate environment, and find out what is the impact of this interest rate climate; that is, if we have access to cheaper (versus costlier) financing.

We tried to position ourselves in the shoes of the firm's CFO – or the person who analyzes the financial data and costs. This way, we perform a backwards-looking exercise and examine the data; concluding if the imposition of a negative interest rate by the central bank affected our costs. Hopefully, in the end of this exercise, we will be able to say if this seemingly shocking decision affected us in our financing costs or not, and if it did, did we achieve the financing we needed at a higher or lower cost than before, and why. Expectedly, having knowledge about the possible existence and magnitude of a rate cut into negative, will grant us with valuable information on how to proceed, if such measures were to happen again in the future, as well as what should we should expect regarding market conditions – namely the behavior of some key indicators, for example the EURIBOR or the inflation rate.

In this case we can pose the question if this work is considered a dissertation or a case study. We present the situation with theoretical views and concepts, but we also provide testing applied to a real firm. Because we are conducting an analysis on a real firm, the results of the analysis constitute the confirmation or denial of our hypothesis, and we know that the same analysis performed on another firm might yield different results, but it would be based on the same theoretical concepts. And we try to give more emphasis to the underlying mechanisms behind the results, than to the results themselves. For these reasons we believe our work constitutes a dissertation, and not a case study, albeit it including a real case.

At first glance, it makes sense to charge a non-negative rate when forfeiting an asset, making the lower bound of interest rates 0%, the so called "zero lower bound"

(ZLB). This idea remained popular in the literature (Robinson and Stone, 2005), not even central bankers believing that they could set a negative policy rate (Jobst and Lin, 2016). However, recently we have been dealing with negative interest rates on the market.

On a personal note, one of the first concepts, and the one that most stuck with the author, was that, in finance there is time value in money – meaning in its simplest form that one unit of currency today is more valuable than that same unit tomorrow. The rationale behind this thought process is that, at least in theory, one can deposit that unit of currency for one day and obtain more than what was deposited the following day. Here the underlying assumption is evidently that the deposit earns positive interest; faced with a negative rate, one would deposit one unit of currency and would only be able to withdraw less than what was deposited initially. Thus, the author finds that the establishment of negative interest rates can be viewed almost as a paradigm shift, where one of the most basic concepts of finance does not apply.

When dealing with negative interest rates, it is important to distinguish between a nominal negative rate or a real negative rate: a nominal negative rate offers a strictly negative return, whereas a real negative rate can result from the inflation adjustment for that specific period – meaning that if for a given period the inflation rate is higher than the nominal rate (both being positive), there was loss of purchasing power – the prices increased more than the obtained return through interest, giving us a negative real rate; thus, we will be addressing nominal rates – although the observed real rates also suffered a drop into negative territory (Hall, 2017).

As mentioned above, the main issue we want to tackle is whether a given firm can finance itself at a lower cost than before the establishment of negative rates. And we will contribute by providing a tested example about one concern very relevant to any firm – its financing costs, and also by providing an illustration of what to expect if the rates behave similarly in the future.

From now on in this section, we will cover the history of negative interest rates, focusing, naturally, on the European economy, describing why some central banks decided to adopt these rates; we will also argue the theoretical motivations, concerns

and consequences of their imposition. Finally, we list some other academical works related with this phenomenon, as well as their respective findings.

1.1 Historical Framework

The first cut into negative territory was made by the central bank of Sweden (Sverige Riksbank) on July 2009 when they cut their repo rate in 25 basis points (bp) – from 0,5% to an historic low of 0,25% - causing their deposit rate to also drop by that amount (from 0% to -0,25%), seeing that specific central bank, aiming at regulating the Swedish economy liquidity, usually keeps its deposit rate 50 basis points below its repo rate. This cut signaled the intention of the central bank to keep interest rates close to zero, waiting for the economy to recover, at least somewhat, from the crisis of 2008.

On July of 2012, the central bank of Denmark (BoD) instituted a negative interest rate, when it cut the main bank deposit rate – the certificate of deposit rate in 25 basis points, lowering it from 0,05% to -0,20%. This rate cut was meant to keep the exchange rate between euro and the Danish krone within a narrow band (the krone was and still is pegged to the euro), since the euro was facing growing uncertainty due to the deepening effects of the 2008 crisis. This uncertainty resulted in a negative effect on the euro, meaning that a significant number of investors were fleeing euro denominated investments and investing in other currencies (such as the Danish krone). This sudden search to find alternative currencies to invest in increased the demand for the krone, which made the BoD worry about the future, since it could result in an unwanted appreciation of the krone. This rate was kept in the negative until April 2014, returning to negative territory in September of the same year.

On June 2014, it was the European Central Bank (ECB) who decided to cut the deposit facility rate to -0,10% (meaning that banks that held more money in central bank deposits then their required reserves would be losing money), in line with the

ECB's target inflation objective – close but below 2%, and to impose an expansionary monetary policy[1], hoping to increase credit supply.

Since then, several other central banks have adopted negative rates, for example Switzerland (January 2015), Norway (September 2015) and even Japan (February 2016)[2]. In the Swiss case, like in the Danish situation, the goal was to protect an exchange rate parity (the Swiss franc is no longer pegged to the euro), but between the euro and the Swiss franc, meaning that, unlike the ECB case, the objective was not an expansionary monetary stimulus (Danthine, 2016).

Seeing that this Negative Interest Rate (NIR) environment could be considered recent, the resulting literature is also relatively recent. For this reason, and duly noted by the authors, some empirical studies have limited results, seeing that almost surely, the most significant impacts from these policies are not yet felt in the economy, and they will be delayed; meaning that the true magnitude can only be assessed in the future – persistent negative rates throughout time might diminish profits, although only being felt after a long period of time, and likely offset by improved macroeconomic conditions (Altavilla, Boucinha and Peydró, 2017). We observed the immediate and short-term shocks and changes that were brought by the negative rates, however, for the sake of economic stability and growth we must look at the long-term effects, and for that, we have to wait; still uncertain about which values our variables will stabilize themselves around, when we are no longer influenced by the most recent volatility spike brought by the 2008 crisis.

1.2 Reasoning behind NIRP

Under a negative interest rate imposed by a central bank, a bank with excess reserves in the central bank will be paying a tax, effectively incurring in a cost, instead of gaining interest on the deposit, since – theoretically - at the very least, it could just store the money in its vaults earning zero interest. The question then is why would a

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[1] Eggertsson, Juelsrud, and Wold (2017, p.32) find that negative rates from central banks are not expansionary

[2] For more detail see Hong and Kandrac (2018)

bank accept to pay a fee to keep the deposit. The lack of safe alternatives to invest the excess reserves could be the explanation; in fact, the extent of how negative these rates on excess reserves can go, is determined by the cost of the alternatives to a central bank deposit (Coeuré, 2014).

Seeing that holding physical cash yields a zero-nominal return (at least at first glance it seems to be so, since we get no interest gains if we keep our money under the mattress), when one is faced with negative nominal rates in the market, holding banknotes and coins will at some point dominate holding assets whose nominal yield is negative (Coeuré, 2016). Following this thought process, one might fear that imposing negative rates will induce the economic agents in preferring holding physical cash instead of bank deposits, which could pose a threat to bank liquidity if every household wanted to immediately withdraw their funds – which could be a serious threat to both banks and depositors, since banks do not guarantee deposits over 100.000 € – for these reasons, banks operating in the EU have Deposit Guaranteed Schemes (DGS), whose purpose is to guarantee the reimbursement of bank deposits up to the aforementioned limit in case of bank failure, funded exclusively by banks, and never by taxpayers[3].

When we take this reasoning and apply it to a bank, who might prefer holding a very substantial amount of cash earning a zero return instead of holding that amount in a deposit earning a negative return, we realize that holding large amounts of cash is not at all costless, we should take into account costs with safe storing, handling and also doing transactions in cash – such as vaults, security and insurance – which can be significant.

These costs imply that holding physical cash actually also yields a negative nominal return, meaning that the zero lower bound does not apply, giving place to a "physical lower bound" or "economic lower bound" (Danthine, 2016; Grasselli and Lipton, 2018), which is negative because it takes into account the storage costs.

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[3] For more detail, see the current directive in effect – Directive 2014/49/EU

1.3 Concerns and Consequences from NIRP

Banks fear that households will engage in a cash hoarding behavior, withdrawing their funds and avoiding the offered negative rates (assuming banks would pass the negative rates through to their clients). Some solutions have been presented to avoid this unwanted cash hoarding behavior, for example the direct abolishing of paper currency, or a more moderate solution, the imposition of an exchange rate between paper and electronic currency (Agarwall and Kimball, 2015). These suggested solutions are in line with the idea that cash demand constraints through central policies are a very relevant complement to the imposition of negative interest rates (Rognlie, 2015).

Other concerns have been expressed, mainly the risk shifting that banks may engage in - lower lending standards - which increase the riskiness of credit, without full compensation (Heider, Saidi and Schepens, 2017); or a "reach for yield" among investors, in which the demand for high-yielding (riskier) assets increases disproportionately in a low yield environment (Rajan, 2013).

Hannoun (2015) lists several concerns and potential dangers of negative rates, both in the shorter and longer run for financial stability and growth, emphasizing the "three dominance risks" – financial, exchange rate and fiscal.

When banks see their earnings shrinking continuously, there are several levers at their disposal, to counteract this – longer term loans and investments, investing in riskier assets, searching for new income sources (commissions and fees), cutting costs – these levers, however, have limited effectiveness (Dombret, 2017).

There is also the concern about the low rates becoming self-validating, that is, over relying on monetary policy while ignoring the underlying issues; as well as the spillover effect, in which economies less affected directly by the financial crisis are subject to consequences through their ties with advanced economies who suffered its core effects (Caruana, 2016).

1.4 Empirical studies and findings

Nucera, Lucas, Schaumberg and Schwaab (2017) investigate the impact of increasingly negative interest rates in the risk of a bank becoming undercapitalized in a crisis, they use the 'SRisk' measure; and if a rate cut into negative ground has different impact from a regular rate cut within positive territory. Firstly, they find that not all banks are considered riskier, the result depending on their business model and, importantly, on how diversified their income stream is, greater income diversification even made some banks less risky. Secondly, they conclude that a cut into negative territory has a different impact from a cut within positive value.

Another approach was taken by Kurowski and Rogowicz (2017), in which the authors use the Composite Indicator of Systemic Stress (CISS)[4] to test if the NIRP imposed by central banks results in higher market stress. They conclude that the contribution to higher market stress has been limited, and mostly concerns the bond market.

Since Unconventional Monetary Policies (UMP) such as negative interest rates and Quantitative Easing (QE) programs have been imposed with the purpose of providing a stimulus to the economy, it is very relevant finding out, for example, how low can we go with negative rates, without jeopardizing the initial goal of economic growth. According to Brunnermeier and Koby (2018), there is a certain point in which a rate is so low (usually negative), that it becomes counterproductive, hindering economic growth instead of promoting it – the reversal rate. This reversal rate represents the true lower bound (instead of the zero-lower bound, or the physical lower bound), without being necessarily negative; and it is formed by banks' net interest income decreasing more rapidly than the recapitalization gains obtained from their balance sheets.

Regarding the cash hoarding concern, Bech and Malkhozov (2016) investigate four central banks – European, Danish, Swedish and Swiss – and find no evidence of

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[4] First proposed by Hollo, Kremer and Lo Duca (2012) – its main advantages as a stress indicator are enabling real time stress monitoring and possible use in early warning signal models.

abnormal increase in cash demand in these economies, possibly due to banks not passing the negative rates through to its retail depositors.

It is also relevant to consider the Firm's capital structure, as well as important ratios like the Debt-to-Equity and the Debt-to-Assets. These informations will grant us with additional comparing power, when we look at other firms in the same industry. Leary and Roberts (2010) find that firms are not alone when making their financing decisions, they are peer influenced – financing decisions made by peer firms affect our own financing decisions. We will take this knowledge into consideration when we look at the capital structure.

Not only do we know the financing policy of a given firm is peer influenced, we also know that most Small and Medium Enterprises' (SME) capital structure can be explained by the main capital structure theories: Fiscal Theory, Trade-Off Theory and the Pecking Order Theory (Mira, 2001), although not unanimously (Frank and Goyal, 2007). This result was obtained from an analysis regarding many Spanish non-financial SME, which increases its relevance, since the Firm we will study is a non-financial SME, and is based in Portugal, a market closely related with the Spanish one.

Regarding the relation between corporate financing and credit supply changes, we know that the credit contractions, such as ones caused by financial crisis, and felt in the aftermath, alter the financing behavior of firms (Lemmon and Roberts, 2007).

This project is organized as follows: Section 2 is where we will describe the tobacco industry as a whole, as well as the Firm under analysis; Section 3 presents the Data and Methodology used; Section 4 consists in the establishment of a backdrop of analysis, from a monetary policy point of view, focusing on the EU; Section 5 encompasses the Results and Discussion of the Data analysis; finally, in Section 6 we have the conclusions.

Section 2 – The Tobacco Industry

In this section we will describe not only the firm under analysis, but also the industry where it is included, because, as we will see below, it encompasses some relevant particularities, which can influence the results and interpretation. Firstly, we describe the industry where the firm operates; secondly, we describe the particular case of this industry in Portugal, regarding mainly the legislation; finally, we describe the firm itself.

2.1 The Global Tobacco Industry

The tobacco industry is one of the most regulated industries worldwide, due to the detrimental health effects it causes, and also, due to a fundamental characteristic of its products – they contain an addictive substance – this fact combined with the aforementioned harmful consequences of its consumption, means that tobacco and its derivative products have to be closely monitored, since no government or world organization wants to bear the burden of lowering the quality of life of its population.

One could argue that although smoking is a personal choice, smokers put a burden on society, not only through second-hand smoking, but also by putting the health system through additional strain, via costly and avoidable medical procedures and treatments. This reasoning originates the concept of overtaxing tobacco products, as a mean of trying to even out the impact of smoking in society.

This means that tobacco suppliers have somewhat of an upper hand regarding other non-addictive, fungible products, seeing that, for example, a smoker cannot easily replace his smoking habit – or rather, addiction. This makes it so that the typical customer of this industry has less power than a customer of other industry, say for example, the clothing industry. If a customer is dissatisfied with a clothing piece, he can more or less easily avoid the same item or even the brand. In the tobacco case, if the customer is dissatisfied with the product, chances are he will try out a new brand or

another substitute that includes nicotine, being the remote (and difficult) option to quit his addiction.

From a corporate standpoint, a customer changing brands is not as serious as it might be in other industries, since almost all worldwide brands belong to a select few big manufacturers – for example Phillip Morris or British American Tobacco. This market structure reflects the way the big manufacturers operate – when they want to enter or reinforce their presence in a new region they aggressively bid and buy smaller manufacturers, this is especially true for British American Tobacco, who always buys the majority of shares, often buying all of them.

Because of these characteristics and the aforementioned burden on society, the regulators – the government – opt to aggressively tax these kind of substances – tobacco, alcohol, high-sugary products. This taxation policy acts as both a disincentive for the purchase of these products, and as added government revenue. This way, the government makes it more expensive to hold a habit such as smoking, seeing that it carries a financial and health burden to the government itself and its taxpayers, through medical healthcare and medicine expenses directed towards the treatment of smoking related illnesses.

The governments' and organizations', such as the World Health Organization (WHO), goal is to help people quit smoking, however, being a difficult task to accomplish, and knowing the reluctance of many smokers to quit, as well as possible relapses, this heavy taxation also acts as a way of obtaining additional government revenue. These taxes can afford to be considerably high without public outrage because, in principle, they are not mandatory – they serve as punishment to people who choose to smoke, they are a disincentivizing measure.

At European level, governments are influenced not only by the World Health Organization, but also by the European Parliament's directives, the most recent and active one being the Directive 2014/40/EU.

Following the communitarian directives, Portugal has its specific legislation, through the DL 73/2010 – the CIEC (Código dos Impostos Especiais de Consumo) – where are described constraints to tobacco suppliers and consumers, such as the aspect

of the final products' packaging, the physical specifications for each type of tobacco product (size, weight and wrapping differences between cigarettes and cigars), the places where tobacco consumption is allowed and its taxation, which is made of two distinct parts – specific and *ad valorem* – the specific part regards an exact taxation by unit (e.g. by weight or by thousand cigarettes), whereas the *ad valorem* part regards an exact taxation percentage over the final consumer price. The total percentage of taxes in the final consumer price of a pack of cigarettes is approximately 80%, according to Imperial Tobacco.

2.2 The Firm under analysis

The chosen firm to study is a SME: a tobacco retailer based in Lisbon[5]. The author worked in this firm, in its financial department, and the study and analysis of its financing costs, as well as its financing strategy originated the theme of the present project. This topic also appealed to him through the opportunity to analyze this industry. We described this industry above, but it is easily observable that tobacco prices are somewhat similar across all brands, and knowing that the tobacco market is heavily taxed, the profit margins are rather tight for every economic agent – from the producer to the final seller – making this practical example quite interesting in the sense that it allows us to understand a possible financing scheme of a firm inserted in such a tight industry, profit wise, and even opening the door to other possible empirical studies, for example, testing the correlation between the retailers' profit margin with their financing costs.

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[5] The author would like to state that by his decision, and the agreement of the firms' management, he does not intend to disclose in writing the name of the firms.

We have been referring to the firm simply as "Firm" so far; elaborating: we have collection of five firms, constituting a group – Firms "A" through "E", overseen by the group – "Group X". The five firms all operate in the tobacco industry, playing, however, different roles. We include a simplified organizational chart on Figure 1 that summarily describes the role of each Firm within the whole Group. These different roles are described in the following paragraphs, as well as the distinction between the Firms that do and do not contact with banks and take on loans.

As mentioned, Group X oversees the firms from a managerial point of view, being in charge of, for example, the payroll of the firms. Firms A, B and C all work in the smaller business-to-business (B2B) channel, wholesaling cigarettes and tobacco to businesses – mainly stationary shops, restaurants and minimarkets. These firms differ in several ways, such as their payment conditions, equity capital, founding date; also Firm C has some particularities: firstly, it is the only Firm not created by the Group, having been bought; secondly, it is the only Firm targeting directly and exclusively the northern Portuguese market (e.g. Oporto, Guimarães, Braga), although being based in the same place as the others – Lisbon.

Firms D and E are responsible for the product imports and distribution, respectively, while also selling through the B2B channel, to much bigger clients, such as supermarket chains, airports, and other tobacco retailors. Both firms are the only ones that deal with banks, borrowing money; through these two firms, the group finances itself, avoiding smaller and more frequent loans that would be obtained if each firm and group financed itself individually.

It should, however, be stated that Firms D and E have some specificities regarding their financing scheme. Whereas a "regular" firm – not in the tobacco industry - would contract a loan and use the acquired money for example to invest in new machinery, or to keep a certain level of working capital; these firms contract loans mainly to pay the special tobacco tax, making them particular cases, thus the interest rate spread charged by the bank is significantly lower than for "regular" loans.

Figure 1 - Simplified Organizational Chart
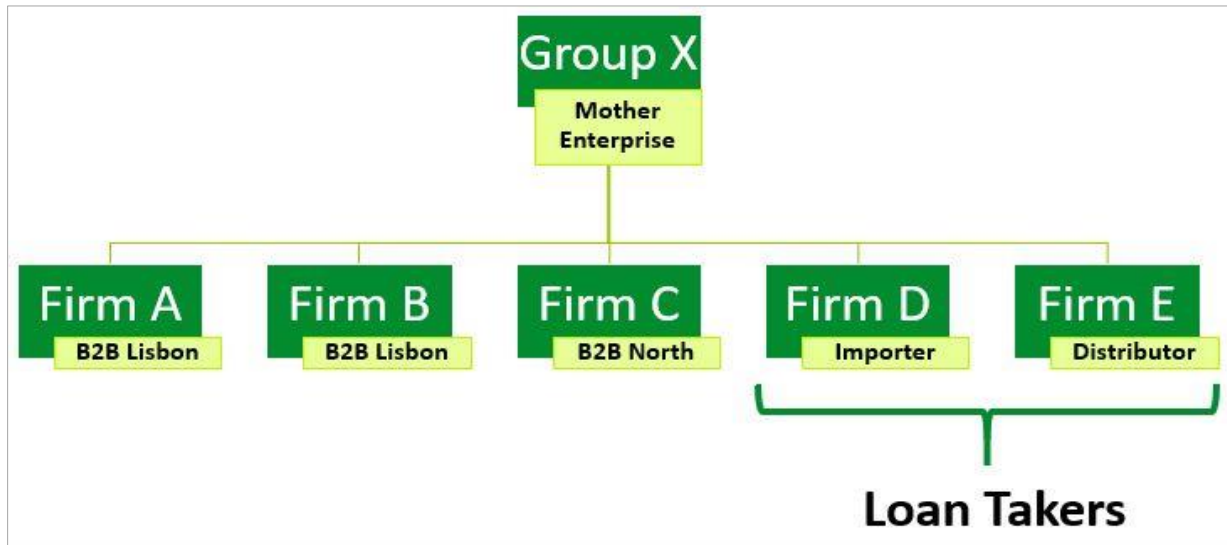
Source: Own construction

Section 3 – Data and Methodology

In this Section we describe the data we needed to gather to make our analysis including the data source and description, where we state the type and source of the data we gathered, and how it relates to the object of study. We also include in this section the Methodology subsection, stating the hypothesis formulation and the Methodology adopted.

Since we want to empirically test if the interest rate cuts into negative grounds have made it cheaper for a given firm to finance itself, the necessary data will have to be extensive enough to define at least two distinct periods for our analysis – before and after the imposition of negative rates by the ECB – in our case we have data from 2011 through 2017.

3.1 Central Bank data

The ECB publishes three different rates, which are revised (maintained or altered) and published every six weeks:

- The main refinancing operations rate (MRO) – rate at which banks can borrow from the ECB for one week, given that the banks provide the necessary collateral;
- The marginal lending facility rate – rate at which banks can borrow funds from the ECB overnight, banks also need to provide collateral to benefit from this rate, which is higher than the MRO rate;
- The deposit facility rate (DFR) – rate that the banks receive over their lent funds to the ECB, which has been negative since June 2014;

The reference rate used as a benchmark for a risk-free deposit is the DFR, since it reflects the deposit of cash in a central bank - a seemingly riskless investment. This will also be the interest rate considered when referring the rate cut into negative.

Both the main refinancing operations and marginal lending facility rates have been (and are) still positive. Meaning that the negative deposit facility rate being negative (banks having to pay interest to deposit money in the central bank) does not mean that the rates will also be negative when we invert the money flow's direction – banks still must pay interest when borrowing funds from the ECB, as well as provide the collateral deemed necessary.

On Figure 1 we plotted the evolution of the Deposit Facility Rate, and, apart from the extreme drop suffered as a consequence of the 2008 crisis, we see clearly the first rate cut into negative, as well as the following rate cuts even further below zero.

Figure 2 - Deposit Facility Rate
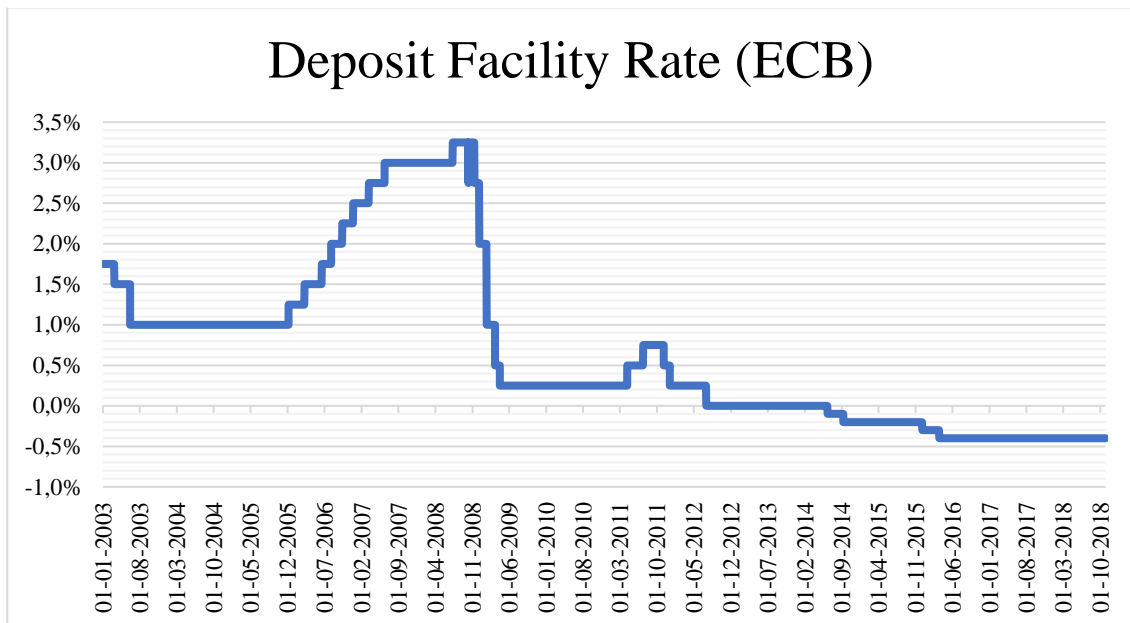
Source: ECB

3.2 Firm data

We gathered data regarding the firms' financing history – the contracted rate, as well as its type (fixed vs. floating), the maturity of the loan, the amount, the repayment scheme, as well as any specific clauses or agreements with the bank.

The firms' contract with the bank establishes several different rates to consider:

- Base rate – a rate which is indexed to the evolution of a certain external rate – in our case it is the EURIBOR 6 months;

- Interest rate spread – a value to be added to the base rate, which depends on the characteristics of the firm, as well as the banks' judgment and analysis on them, higher risk borrowers require a higher spread value, since the lender is exposed to a greater risk;

- Reserve rate – a fixed value rate that is only applied if the base rate reaches a certain low (negative) value, and guarantees a fixed interest rate for the lender, effectively acting as a floor for the rate, thus shielding the bank from a possible fall in the EURIBOR;

- Aggravated rate – this rate is considerably higher than any of the previous rates, and would only be applied in the case of non-compliance by the firm in the payments to the bank (as well as the immediate maturity of the loan);

Regarding the reserve rate, in our case, it was always the same value as the interest rate spread, meaning that the minimum interest rate the firm could theoretically pay over the loan was the pre-established spread. This is relevant in the sense that the bank shielded itself from the negative base rate – by imposing a lower bound restriction (floor), it guaranteed that the (perceived) improbable scenario of negative EURIBOR would not affect their risk compensation, because in the case of the base rate going negative and it could cannibalize the credit spread, the reserve rate will always be higher and thus will be the rate to be considered.

In the case of the aggravated rate, it should be noted that it is not very relevant, since the firm always complied with its loan and interest commitments, meaning that

this rate was never applied to the debt amount, and there was no immediate loan maturity, keeping the repayment scheme of debt intact.

Regarding the accounting information for the firms, we gathered both the balance sheets, as well as the income statements. We present a condensed version of these documents in Annexes A1 and A2.

3.3 Additional macro-economic data

We also gathered data about some indicators relevant to the establishment of a backdrop and comparison of the interest rate behavior, such as inflation rates (we took the Harmonized Index of Consumer Prices – HICP – meaning that the data from one country can be directly compared with the data of a different one, and, more importantly for us, we have a more homogenous and standardized value across the whole Euro area), amount of money in circulation in the Euro area (in millions of euros), and data about the average interest rate charged to firms in Portugal for new loan contracts (with a split in value for loan amounts below and over one million euros).

The timeframe for this backdrop is larger than the one for the analysis, beginning in 2003, and we establish it with the objective of getting a brief and general overview over some key financial indicators over a broader spectrum of time, and to try to observe if the true interest paid behaved in the same directions and why.

Both the inflation rates and the amount of money in circulation are broader in scope, since they encompass the Euro area, which means that they are more stable and less volatile than if they were national-level statistics; on the other hand considering the differences within the Euro area between banks within different countries, the average interest rate collected is only national-level. This rate, presented in Figure 2, is split by the amount of money borrowed (at one million euros), so that we can illustrate the differences between distinct realities in terms of borrowing scale.

Since this is the average rate applied by banks to new credit operations to firms (not personal credit), it is relevant to distinguish between small and large amounts borrowed. This distinction is made because from the firm's perspective we assume they

want to borrow as much as necessary; but from the banks' perspective loans are classified by amount, and a bigger loan is less risky than a smaller one. Although it is true that in a bigger loan a bank exposes itself more in terms of absolute money amount lent, we must assume that a bigger loan will only materialize in certain conditions, under which, no doubt, the bank will be favoured. Under normal conditions, a bank will analyze the potential borrowing firm, and determine if that firm has the capacity to repay the loan, as well as the interest within the stipulated calendar, and in case of noncompliance the bank will aggravate the interest rate, and, in a bankruptcy case, will have a priority claim over the firm's assets.

Figure 3 - Average Interest Rate in new lending operations in Portugal
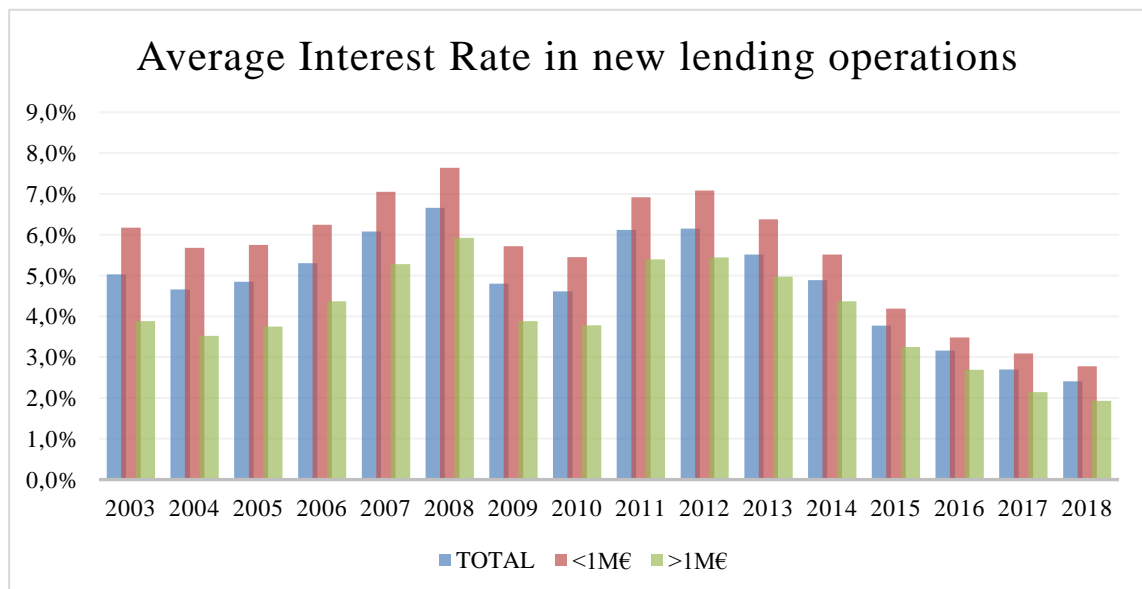
Source: Pordata

It makes sense to assume that a bank wants to avoid its borrower's bankruptcy, thus we can assume that the bank's credit control will only allow the bank to lend a safe amount of money to the firm. Following this reasoning, we assume that the firms that were granted a large amount (over one million euros) had the capacity and financial soundness to repay the loan, as well as its respective interest. So, we can argue that large loans are at least as safe as small ones – although it also makes sense to assume that large loan requests require more extensive and deep analysis from the bank and go

through bigger scrutiny before approval, reinforcing their safeness. Combining that with the probable loan length disparity between small and large amounts – smaller credits are repaid sooner – we see that we are in the presence of two different classes of loans, with remarkable average interest rate differences, so dividing the data to accommodate for these characteristics is relevant.

3.4 Hypothesis formulation and Methodology

3.4.1 Hypothesis formulation

The hypothesis we want to test is the following: The firm achieved cheaper financing after the imposition of negative interest rates – that is, after the interest rates (DFR) were set in negative grounds by the ECB, the firm was able to finance itself at a lower cost. Meaning that, if we observe a generally larger interest rate paid over the borrowed sum in the post rate cut period, we can consider the hypothesis to be true.

We must also present possible explanations for the possible costlier financing: the firm met its financing needs at a higher cost because there was an increase in risk exposure, translated in higher credit spreads; the firm adopted a longer financing scheme, in terms of loan duration; the firm registered an increase in its financing costs through an increase in commissions, fees and taxes; or even the combination of some or all these reasons.

When we say cheaper financing, we are taking into account both the direct and indirect costs of the loans, because if we consider the explicit interest rate alone, and considering a decreasing interest rate environment, the most recent loans will expectedly have a lower interest rate than the older ones, contracted in a higher interest rate period. We can also argue that the explicit rate is not the most complete indicator of the true cost of borrowing money, which leads us to try to capture all the indirect costs for a more thorough analysis.

Trying to verify if the hypothesis we formulated is true or not, we will treat the data as described in the next section.

3.4.2 Methodology

The methodology will consist in firstly separating the data into two categories – pre and after the cut into negative, identifying relevant contract renegotiations, if applicable. Then, for each year we will calculate two (expectedly) different rates:

- The contracted rate – the maximum between the sum of the base rate plus the interest rate spread, and the reserve rate - this is the rate the firm expects to pay over the loans;
- The overall rate – computed in a sort of all-in-cost logic, this rate will be calculated through the total amount of interest paid (not net of interest earnings) vs. the amount in debt, taking these values from the balance sheet and income statement – this rate will include the indirect costs of financing.

The contracted rate will be treated separately for both Firm D and Firm E, and it will provide us with insight about what these firms will expect to pay over their loans, once again taking the standpoint of a CFO, who would analyze proposals made by banks looking mainly at the credit spread offered, possibly neglecting the added and somewhat hidden costs.

The focus of our study, however, will be the analysis of the overall rate, and for this rate we will deal with the whole financing picture of Group X, that is, we will aggregate the financing costs of both firms when performing our computations and analysis. We will disaggregate this overall rate in its discernible components – base rate, spread, commissions and fees and taxes – this way, we will be able to observe the evolution of these separate components, as well as the contribution of each one in the total overall rate.

When faced with squeezed profit margins due to costlier financing and cheaper lending, and little room to change interest rates suitably due to intense competition, banks often find themselves in an unwanted situation – reduced supplier power. To face this unwanted situation, banks need to find alternative sources of profit, preferably unbeknownst to its clients.

Following this logic, the easiest way to obtain additional financial margin is through the imposition of commissions and fees, or their aggravation, in case they existed previously. This way, banks try to conceal costs from their clients, making their products more appealing, usually by presenting low interest rates when advertising credit concession. Banks advertise their interest rate (equivalent to the Portuguese TAN), which merely includes the interest remuneration of the lender; however, they conceal a more appropriate rate which is the APR (annual percentage rate, equivalent to the Portuguese TAEG), more appropriate because it better reflects the costs of the loan – including insurance costs, brokerage fees, among others – the indirect costs, which are not explicitly included in the presented interest rate, but are mandatory commitments to obtain the loan.

Then analyze and compare the differences between the obtained rates for a given period, and then, differences between the two rates – and here, the significance of the contracted rate will be in the comparison between what the firms expected to pay and what the firms ended up paying over their loans. Since we are computing nominal interest rates and comparing them directly by year, there is no need to isolate the inflation effect.

According to this methodology, and the data we gathered, we will produce monthly contracted rates, and yearly overall rates.

Due to the indirect financing costs, the overall rate is always higher than the contracted rate, and we would not be surprised if the overall rate became higher after the rate cut into negative: although the contracted rate will probably be lower due to the decrease in the base rate (EURIBOR 6 months), banks try to overcome the squeezing of their profit margins by searching for new sources of income – namely through commissions and fees.

Section 4 – Establishing a backdrop: Facts and figures of the EU monetary policy

In this section we will describe and analyze the recent macro-economic climate, regarding the monetary policies conducted by the EU, as well as presenting some key indicators that will help understand why we experience currently an environment with such low interest rates.

Inflation

Regarding inflation rates, as aforementioned, we took the HICP from the ECB, and as we can observe in Figure 3, there were some fluctuations. Firstly, we notice a sharp increase followed by a severe plummeting to negative values (reaching the value of -0,70% on July 2009), which coincides with the financial crisis of 2008 and its aftermath. In late 2011 and early 2012 the ECB launched two three-year longer-term refinancing operations totaling 1 trillion euros[6], wanting to smooth the effects from the crisis. Since around 2014 we are in a low inflation period, where the ECB has implemented several quantitative easing programs[7]. The current targeted rate is close to, but slightly below 2%[8]. We signal in Figure 3 significant historical events related with the EU, from macro-economic and political perspectives, such as the IMF bailouts.
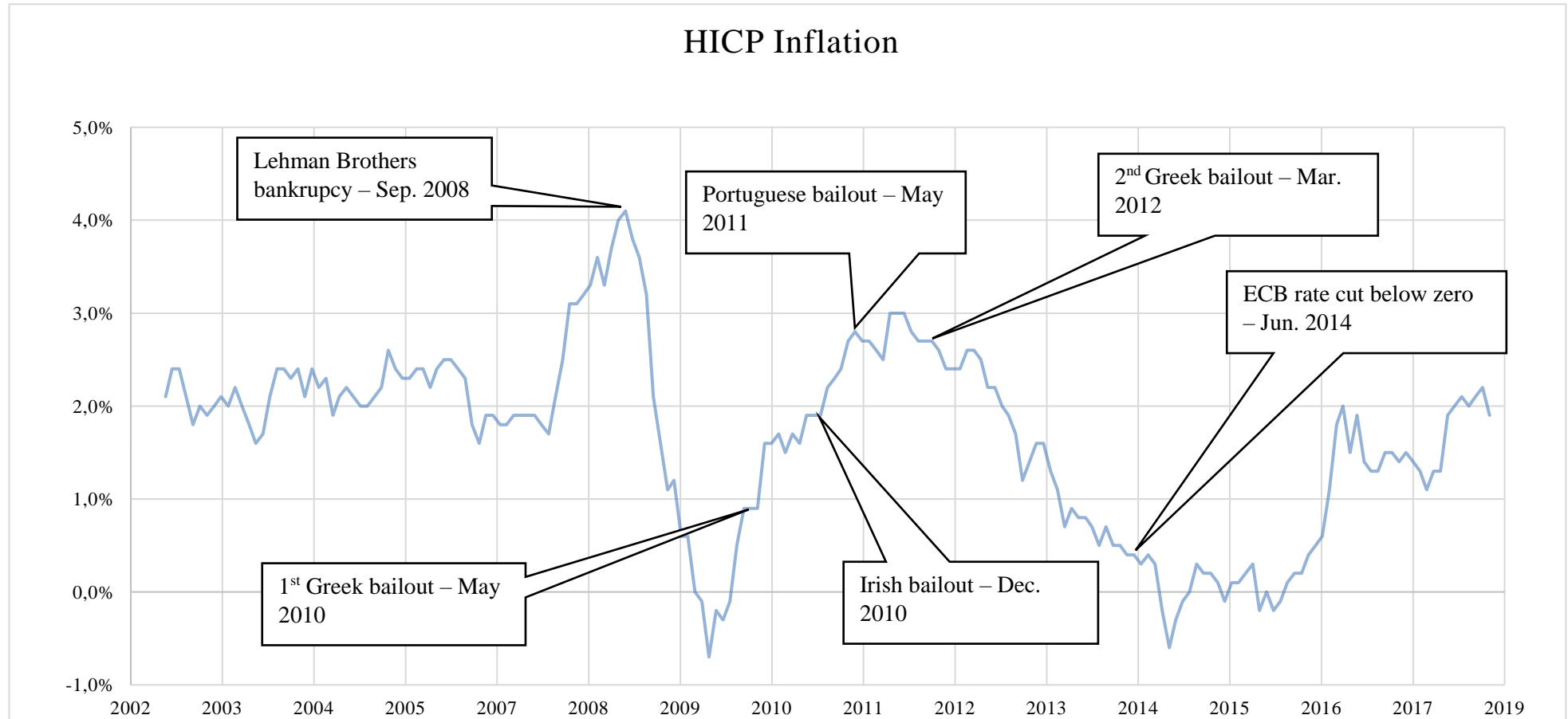
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[6] ECB press release from 6th October 2011
[7] See, for example, ECB press release from 22nd January 2015
[8] For more detail, see Vítor Constâncio's speech (May 2018)

Figure 4 - HICP Inflation rate Euro area

Source: ECB

Money supply

The amount of money in circulation represents the net circulation of banknotes and coins, that is, representing the value issued by the central banks, regardless of the holder being a bank or a household. This also means that this statistic subtracts the following values: banknotes and coins held awaiting authenticity and fitness checks; banknotes and coins returned from circulation; and banknotes and coins deemed unfit for circulation. This statistic also does not include a special denomination of cash known as euro collector coins, which are coins issued by any Member State of the euro area not intended for circulation, seeing that these coins do not have legal tender outside the issuing Member State, and as such, may not be accepted as a form of payment.

This statistic – net, instead of a total one - will give us a greater adherence to reality, seeing that this way we are only considered *true* money in circulation, and trying not to be biased by the banknotes and coins who are not acceptable means of payment described above.

We plotted in Figure 4 the natural log of the amount of money in circulation in the Euro area, we chose the natural log, because through this transformation, the relative evolutions (increases) of money in circulation are easier to observe. We observe an increasing trend, consistent with the continuous increase in cash demand, also observing slight spikes in regular intervals – December of each year - leading us to believe that the Christmas holiday is responsible for an increase demand of money, prompting the central bank to inject more money into circulation.

Figure 5 - Natural log of the amount of money in circulation in the Euro area
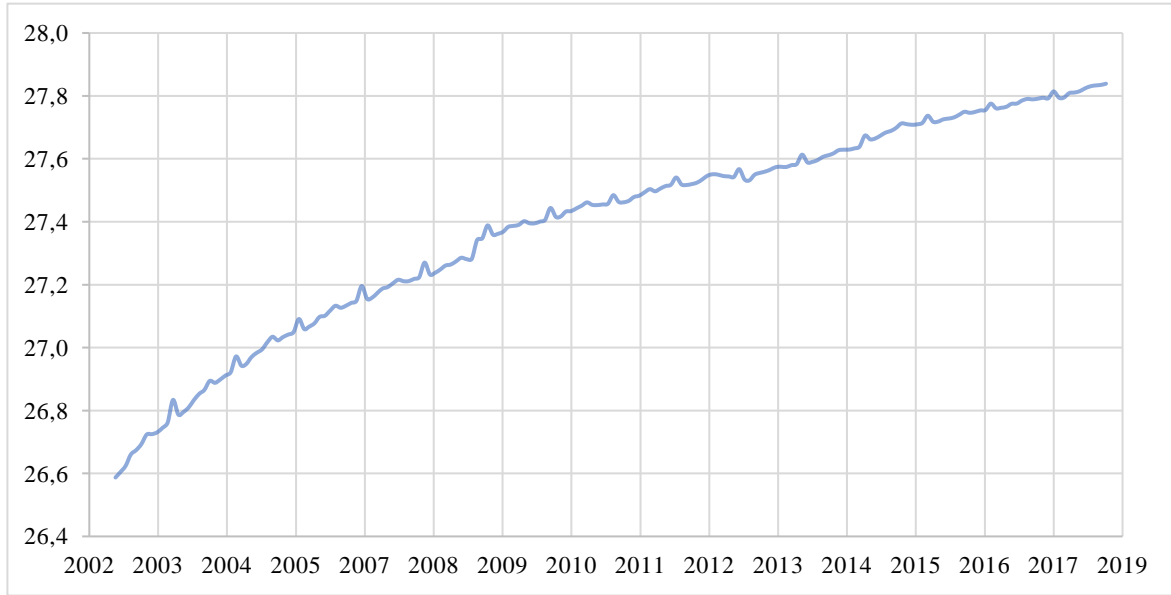
Source: ECB

Average interest rate in new operations

The Firms under study are Portuguese, and although they import from abroad, receive no different treatment when dealing with banks. We know the exact value of the contracted rates, so this measure provides us with a mean of comparison to the average interest rate charged to other firms in the same country. During the period analyzed, the analyzed firms systematically renewed yearly loan contracts, making the contracted rates directly comparable to the data in Figure 2 (page 17).

On a side note, because this data constitutes an average, it has some limitations typical of an average, most importantly, it does not capture correctly outliers, since the data appears condensed in a single number (for a given period). However, since this data regards the B2B loans, where competition is fierce - easily observable if, for example, we want to contract any kind of loan, the offered rates by different banks are remarkably similar, and we have no indication that the B2B market is different competition-wise from the business-to-consumer (B2C) market - it is safe to assume that even if there are outliers, they will be scarce, and likely an anomaly. Meaning that the possible, but

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improbable, existence of outliers does not bias the data and should not misinterpret reality.

As we can see in Figure 2, the average interest rates over and below one million euros behave identically, with the higher rate belonging to the lower amount loans and the larger loans benefiting from lower rates. We can observe an increasing trend in the first years, up until 2008, when the financial crisis effects were felt, and the rates dropped until 2010. The rates then rose once more until 2012, exhibiting a behavior similar to the inflation rate, and this increase was probably due to the increase in the maximum Portuguese VAT rate in late 2011, from 21% to 23%, as well as the VAT increase over electricity and natural gas from 6% to 23%, these measures constituted means of obtaining additional government revenue, at a time when Portugal was under intervention by the IMF; with the loans totaling less than one million euros registering an average interest rate above 7%, and for all loans reaching almost the same levels as the pre-crisis peak (an approximate difference of 0,5%). After the 2012 peak, we observe a decline consistent with the low interest rate environment we are in.

On Figure 5 we have the 6 month EURIBOR, which had a behavior similar to the average interest rate over new credit operations: an increase until 2008, followed by a more severe fall – as a consequence of the 2008 financial crisis, EURIBOR rates dropped due to policy rate cut expectations, as well as the announcement of government packs to aid financial institutions[9] - a new rise until late 2011, finally followed by a slow decay – caused mainly by the excess liquidity and the expectations of the duration of this excess liquidity[10] - even into negative values[11]. It should be mentioned, however, that the shorter maturity EURIBOR have been maintained at historically low values, whilst the longer maturity ones have been increasing (becoming less negative) from

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[9] ECB annual report from 2008.

[10] ECB annual report from 2012.

[11] For the shorter term EURIBOR, the cross into negative happened earlier – October 2014 for the 1-week EURIBOR. The longer the EURIBOR maturity, the later it crossed to negative territory – the 6-month maturity rate only became negative in December 2015, and finally, the 12-month EURIBOR only took negative values beginning in March 2016.

approximately the last three quarters of 2018, signaling market expectations about interest rate increases.

Figure 6 – 6-month EURIBOR
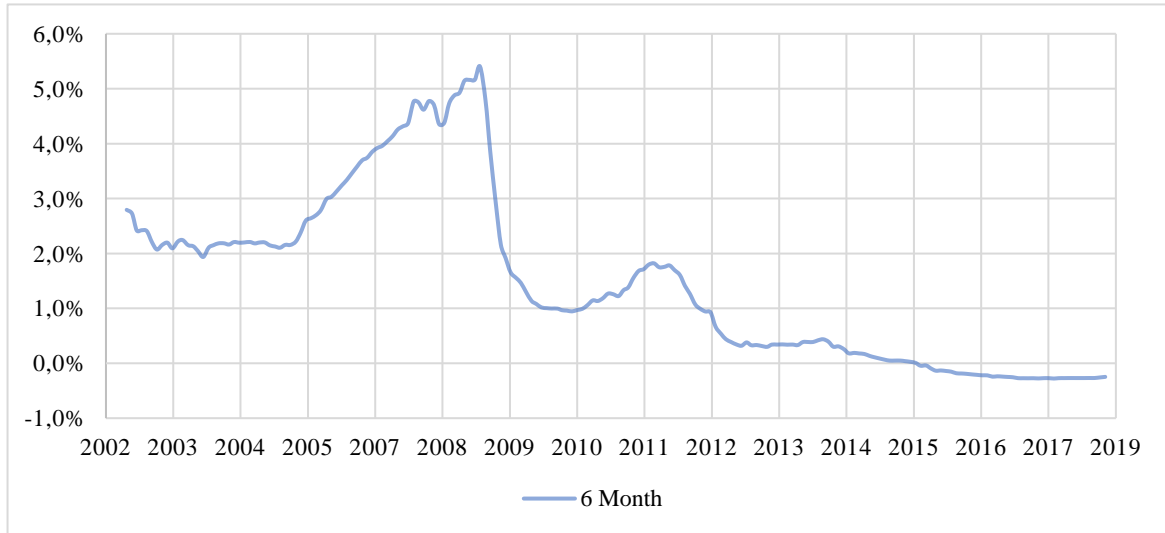
Source: Euribor-rates.eu

Section 5 – Results and Discussion

In this Results subsection we present the results we reached through our methodology. We divide this subsection in two parts, each for a different rate calculated – contracted and overall – like stated previously, we addressed the contracted rates separately for Firm D and Firm E, and we addressed the overall rate for the two firms combined.

5.1 Contracted Rate

We called contracted rate to the hypothetical rate the firm will have to pay over the borrowed sum – that is, the rate that is on the contract with the bank. This rate represents the cost a given firm would have to support when taking a loan, this rate, however, does not include indirect costs, which can sometimes embellish significantly the borrowing conditions, hiding a much steeper cost.

As observable in Figure 6, we have plotted the contracted rate for both Firms D and E, as well as the shaded vertical bar, which represents the moment the ECB cut its rate into negative grounds. We have monthly observations, where we add the respective EURIBOR to the credit spread set for the year, in the yearly contract revision.

It should be mentioned that Firm D has a much higher Debt amount, being well over tenfold the Debt of Firm E, with the exception of the last analyzed year (2017), when Firm E increased its Debt considerably to values nearer Firm D. These rates exhibit similar behavior prior to 2017. The fact they are indexed to the EURIBOR 6 months makes them behave in the same directions as that EURIBOR, differing in accordance to their respective spreads. Although the ECB rate cut happened in June 2014 (represented by the vertical red line), the EURIBOR 6 months declined for months, only reaching negative values in December 2015.

From the moment the EURIBOR went negative, the applicable rate was the reserve rate. This way, and as mentioned before, the bank shielded itself, making the firm pay the reserve rate, which coincides in value with the spread; and the contracted

rates behaved according to the annual credit spread revisions. This means that before the EURIBOR crossed the zero bound, the contracted rates exhibited a less stable behavior, varying monthly, in accordance to the EURIBOR. After this cross, however, the contracted rate became binded solely to the spread. This stabilizes the contracted rate, meaning it will always assume the value of the pre-determined reserve rate, that coincides with the credit spread. These contract revisions occurred in the beginning of each year, marked in Figure 6 by the dotted vertical black lines, and coincide with the contracted rate changes, especially visible in the period after June 2014.

Firm D, having more robust and consistent loan amounts, exhibits a rate stabilization towards the end of the observation period, due to the stabilization of the credit spread, registering only a change of 0,05% spread increase in the 2017 contract revision – although registering an increase in the loan amount in 2017, it managed to reduce its total liabilities (Annex A1).

Firm E registered a higher spread than Firm D, due to constituting a higher risk loan, having more total liabilities than Firm D, caused by a very large "Trade Payables" item, which consists in amounts due to suppliers - Firm D has a much lower amount standing in this accounting item, due to it being the importer, and having a very small APP, often having to pay upfront (Annexes A1 and A2). This way, Firm E often registered spread increases in contract revisions, with the most significant one happening in the beginning of 2017. Firm E increased the loan amount in a very significant way in 2017, prompting an increase in the credit spread. This behavior will be further analyzed in the "Discussion" section.

Figure 7 - Contracted Rate
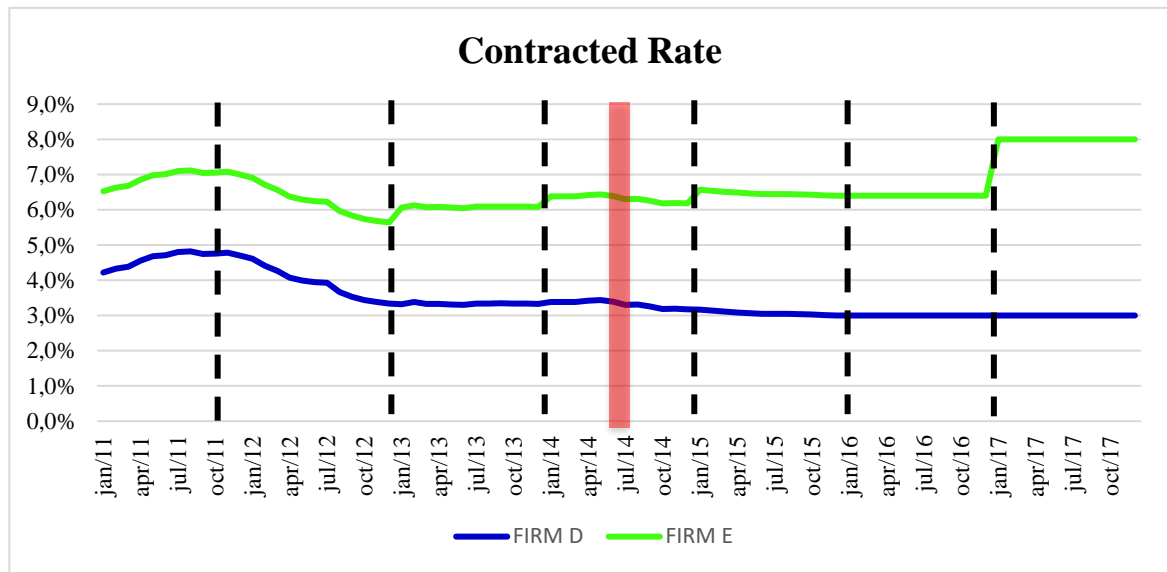
Source: Firms D and E

5.2 Overall Rate

We used the term "Overall Rate" to define a backwards-looking rate, calculated based on an accounting approach. That is, directly from the balance sheets. When we compute this rate, because we include all the financial costs of the year, through the income statement, we are sure the indirect financing costs are included, giving us a better representation of the true cost the firms supported to achieve their financing goals.

The direct costs are easily observable, as they consist in a base rate plus a spread, and are evident in a loan contract, and the resulting rate will be applied to the amount in debt, resulting in due interest. In the case of indirect financing costs, they are not so evident, some are compulsory, such as the stamp duty, and some are not – often times a bank will cross sell other products, and the subscription of these products is not mandatory, but will have certain advantages, such as a reduction in the credit spread.

In our case, the contract with the bank specifies some indirect costs (relative to the subscription of the products mentioned below, in order to benefit from a spread reduction), which will influence the total financing expenses – the examples presented below are the indirect costs included in the 2017 contract renewal:

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- Maintenance of a credit card with a monthly credit limit of 2500 €, and annual interest rate of 19%, as well as annual fee of 62,50 € – Firm E;

- Subscription of multi-purpose insurance, which is included in the business credit card, aggravating the rate from 15,5% to the mentioned 19% - Firm E;

- Subscription of international payment service, which amounts to 0,375% over the payment – Firm D;

We first calculated, for each year, the overall rate, through the financial costs, and the debt amount. Then we decomposed the obtained overall rates. The decomposition started by isolating the known components – EURIBOR and credit spread – then, knowing both these components and the total rate, we can extract the last component, which encompasses taxes, commissions and fees. We present below our results in two ways: first as standard stacked columns, where we can see the total contribution of each element in the overall rate – Figure 7; and then we also present a 100% stacked column where we can see the relative proportion each decomposed element had in the total overall rate – Figure 8.

Figure 8 - Contribution towards overall rate per component

Source: Own computations

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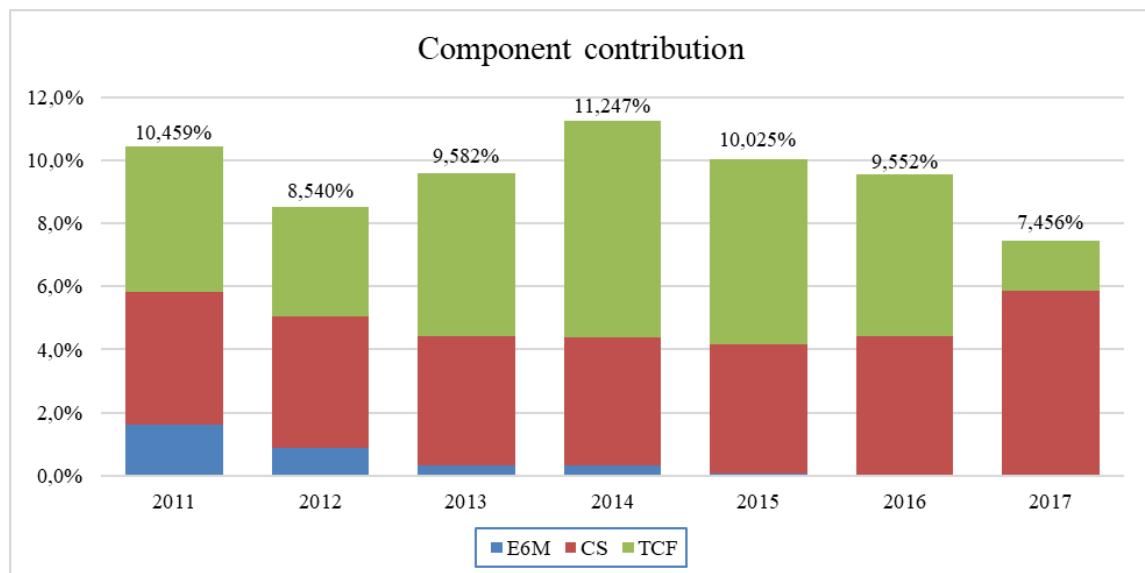
Figure 9 - Proportion on overall rate per component
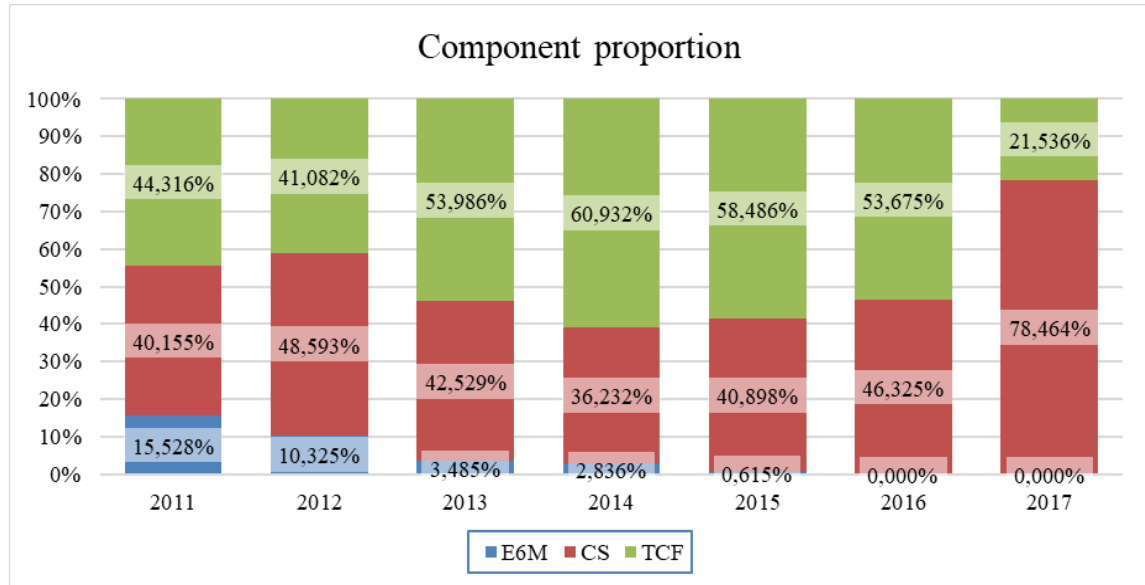
Source: Own computations

This description regards both Figure 7 and Figure 8. "E6M" represents the EURIBOR 6 Months; "CS" represents the Credit Spread; "TCF" represents the Taxes, Commissions and Fees. Figure 7 has one tick mark which represents the total overall rate value. Figure 8 has tick marks for each components proportion over the overall rate.

We observe the disappearance of the EURIBOR on the overall rate, which is an expected result – since the loan contracts establish a minimum interest rate in the case the base rate drops below a certain level, the EURIBOR going negative stops influencing the interest rate, and therefore has no presence from 2015 onwards.

We see a relatively stable behavior for the Credit Spread, which is consistent with the fact both Firms maintained stable borrowing amounts, not needing to increase them significantly – the exception lies in Firm E in the last year (2017) – when this Firm increased its borrowing demand, which influenced its financing costs through the aggravation of its credit spread, ultimately pushing the overall rate upward.

The Taxes, Commissions and Fees item registered its biggest contribution in 2014, possibly due to the disappearance of the EURIBOR, and the introduction of new added costs in the immediate wake of the 2014 rate cuts below zero. In the last year analyzed, this item represents a reduced proportion, caused by the aforementioned Credit Spread increase.

5.3 Discussion

In this subsection we firstly address the Firms, describing the most relevant differences between them regarding the different balance sheet and income statement compositions, and also present some information about the industry, regarding its risk – in a broader analysis we considered the retail industry and the whole world as an average, and then for a more focused analysis we considered the tobacco industry, and the European averages. Secondly we analyzed the behavior of the contracted rate. Then we move on to the overall rates, and try to explain the observed results, while also addressing the big loan increase undertook by Firm E. Finally, we compare the two types of rates and analyze the differences.

Differences between Firms and Industry averages

As mentioned above, the firms differentiate themselves in various manners, that way, the different firms will have different balance sheet profiles regarding the amount of assets, debt, and equity. Also, since only Firms D and E contact with the banks taking on loans, means the Group manages to finance itself by only engaging in two simultaneous loans, instead of as many different contracted loans as existing firms; Firms D and E will have much more debt than the remaining Firms. This is also the case for the size of the remaining elements of the balance sheet, and the income statement as well, Firms D and E have much larger values, but also a noticeable difference between these two firms – Firm E, the distributor has the largest balance sheet and income statement (Annex A2).

We present in Annex A3 some balance sheet information about the firms, from the last available year (2017). We easily observe the differences in size for each of the Firms – firstly, Group X, serving as the mother enterprise, not directly engaging in sales, expectedly has a smaller balance sheet, with the exception of Firm C. Firm C exhibits the smallest balance sheet and income statement, these facts are explained by two major factors – firstly, this Firm is the only one bought and not created by Group, which could explain the differences in performance; secondly, since this Firm operates in a smaller market when compared with the others (northern Portugal vs. central and southern

Portugal), and also has no physical presence in the area, which could negatively impact performance in ways such as lack of advertisement, and increased shipping costs, when compared to the rest of the Firms' primary and largest market – Greater Lisbon area.

Remarkably, Group X achieved a higher net income than Firms A through C. Group X is the entity that is in charge of the payroll for all the workers, meaning it is the only one that has staff costs in its income sheet – that would generate a lower net income than the remaining Firms. However, Group X has no COGS (Cost of Goods Sold) for its sales – which are residual in comparison, for example with the sales of Firm A (1,31 Million € vs. 41,36 Million € in 2017); these two opposing forces even out the EBITDA between Group X and Firms A and B – the biggest difference being registered between the EBITDAs of Group X and Firm B - approximately "only" 18.000 €. The items creating a bigger net income disparity are depreciations and amortizations, which affect Group X to a much lesser extent, seeing the mother enterprise owns few assets accounting-wise, when compared to the remaining Firms.

Regarding the bigger Firms – D and E – and to analyze the evolution of the risk of both the retail and, more specifically, the tobacco industries, we present on Tables 1 and 2 some information about the aforementioned industries.

Table 1 - Retail and Tobacco industries – Global

	Retail		Tobacco		
	βU	βL	βU	βL	CoD (%)
2011	0,60	0,77	0,44	0,50	ND
2012	0,73	0,91	0,48	0,54	ND
2013	0,69	0,93	0,59	0,67	5,94
2014	0,69	0,93	0,67	0,77	4,13
2015	0,82	1,14	0,79	0,90	5,94
2016	0,77	1,11	0,62	0,71	4,62
2017	0,88	1,18	0,61	0,68	4,61

Source: Damodaran Industry Averages

Table 2 - Retail and Tobacco industries - Europe

	Retail		Tobacco		
	βU	βL	βU	βL	CoD (%)
2011	ND	0,87	ND	0,39	ND
2012	ND	1,11	ND	0,38	ND
2013	0,57	1,01	0,40	0,46	4,90
2014	0,68	1,19	0,70	0,82	3,92
2015	0,74	1,32	0,66	0,79	4,38
2016	0,62	1,23	0,51	0,61	3,96
2017	0,48	0,90	0,49	0,56	3,93

Source: Damodaran Industry Averages

"βU" represents the unlevered beta; "βL" represents the levered beta; "CoD" represents the cost of debt, according to the WACC methodology; "ND" means there was no available data for these years.

We observe an increasing trend in the betas of Global markets, and a different behavior for the European markets alone, with the latter registering very low increase, or even a decrease – because in the Global table we consider the available information for all countries, we necessarily include emerging markets, as well as underdeveloped economies, facts which reflect a higher risk, which in turn increases the observed betas.

When considering the European markets alone, the disparity between more and less advanced economies is much smaller, providing overall smaller betas. Regarding the cost of debt, it represents the average required rate of return of debtholders, and we see a drop in values, and a smaller value for the European markets average. The drop is linked with the drop in interest rates, which in turn also drops the expectations and required rates of return of debtholders and equityholders, the difference between Global and European markets can also be related to the inclusion of less developed economies in the Global average.

Looking at the Debt-to-Equity ratios for Firms D and E (Annex A3), they might seem excessively high, however, since they are the only ones who contract loans, and these loans support all firms, it is not a totally unexpected result.

Focusing on Firm D, almost all its debt results from only two items of the balance sheet – Government and Other Public Authorities[12] (5,66 Million €), which is where the special tobacco tax lies; and Loans (5,87 Million €) – making up approximately 93% of the total Debt of Firm D.

The picture is similar for Firm E, with a different balance sheet item – Suppliers, this item accounts for, by far, most of the Debt (16,41 Million €) and, naturally, Loans (4,14 Million €) – adding up to a slightly over 97% of the whole Debt of Firm E.

Adding as a comparison note, according to the Damodaran industry averages, the average Debt-to-Equity ratio, for US firms is 0,2523; and for the European firms the average is 0,7363. We included these numbers as a mere comparison note, knowing entirely that these numbers are probably not very representative of the industry, since they concern publicly traded firms only, and due to their small sample – 17 US companies and 6 European ones.

Contracted rate behavior analysis

As stated previously, the behavior of the contracted rate is heavily influenced by the behavior of the EURIBOR. Looking at Figure 5, we obtain a broader look at the EURIBOR climate, a sharp drop following the 2008 financial crisis, followed by a slight recover in late 2011, caused by an increased liquidity of the ECB's new reserve maintenance program[13], which rose the expectations of the markets. Followed by a period of stabilization, until a new dropping trend set in, in mid-2014.

Our contracted rate, by being indissociable from the EURIBOR 6 months, naturally changes and is affected by this interest rate climate. This is the case until our base rate goes into negative values, in December 2015, from which point on, the Firms payed the pre-established reserve rate, seeing that a negative base rate would shrink the

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[12] Equivalent to the Portuguese EOEP – Estado e Outros Entes Públicos.
[13] ECB press release from 8th December 2011.

interest rate spread, and the banks hedged their position, assuring the payment of the reserve rate, at the very least.

Regarding Firm D, we observe that the contracted rate, after mimicking the EURIBOR, stabilizes around the interest rate spread, which is 3,70%, according to the latest contract renewal. The spread charged to this Firm is annually revised, and slightly increased, following the inflation expectations. The reason why the spread is only revised due to market conditions, is because Firm D renews its loans in approximately the same amounts, with also very similar payment schemes, and with the bank yearly renewing and monitoring Firm D's credit demand, there seems to be no apparent reason for a significant rate increase (or decrease).

Firm E present us with a different scenario: a seemingly stabilized interest rate around the credit spreads, but with frequent increases. This Firm also keeps approximate repayment schemes across yearly renewals, however, it varied its loan amounts. Group X's expansion plans and frequent reinvestment schemes increase the cash demanded through financing. Knowing that Firm D already borrows much larger amounts than Firm E, and benefits from very competitive interest rates, not wanting to aggravate these rates, while also not wanting to maintain three different loan contracts (by taking on a third loan through another firm), Group X decided to increase the borrowing through Firm E. The bank's revision of the loan contracts resulted in spread increases, most notably the increase for the 2017 contract – where spread was increased from 6,4% to 8%.

When comparing the contracted rates before and after the introduction of the negative DFR, we observe the contracted rates post cut are more stabilized, once again because these rates are no longer under the influence of the EURIBOR; for Firm E we do observe a rise in rates, however, these rate increases are consistent with the yearly contract renewals with the bank, and also linked with the changes in loan requirements by Firm E – an increase in demand for the loan amount puts the bank in a riskier position, and it, in turn, increases the contracted interest rate (through the credit spread), readjusting its remuneration, making it reflect the risk increase.

Overall rate behavior analysis

As stated, for this analysis we considered an average rate of the two combined firms, opposed to the previous section where we analyzed the firms separately. Since we want to analyze the true financing costs for the whole group, and not necessarily for each of the firms, we can consider these are the total financing costs for the whole group.

The contracted rates serve as a comparison, and were, naturally, influenced by the management, namely through the decisions of "where" to borrow from (which firm or combination of firms), and as such, could be considered more subjective, in the sense that different loaning schemes throughout the firms could originate different results.

By considering the group as a whole, we gain the objectivity of knowing that the group needs a certain amount of money to finance its activity, and it achieved the obtained overall interest rates, regardless of the chosen financing scheme. One could also argue that we should take the chosen financing scheme and consider it is the most beneficial for the group in terms of minimizing costs, which makes sense, seeing that, certainly, the group wishes to finance itself at the lowest possible cost; however we have been considering the possibility that a lower contracted cost might not equate into a lower overall cost, and the focus of our work is finding out if the group achieved cheaper financing, and not if the financing scheme is optimal cost-wise.

Looking at the obtained values for the overall rates, it is with no surprise we observe different values, and the overall rates higher than the contracted ones. We say this because, knowing how we calculated the different rates, we also know that the contracted rates would never be the same as the overall ones, unless banks charged no amount other than direct interest rates over their lent funds, which is an unrealistic idea. Even if a bank wanted to "freely" lend money, charging only a pure interest rate that compensated its risk, it would still have to charge at least the stamp duty, mandated by law, which does not come incorporated in the contracted rate.

The two firms exhibited different behaviors in the period analyzed: Firm D maintained a relatively stable borrowing amount, and due to the bulkiness of the loans, together with timely payments and reimbursements, means the interest rate charged does not fluctuate very much; from the banks perspective, when faced with this type of

behavior – and provided the risk profile of the firm does not change – there seems to be no reason for a rate increase.

Firm E, however, registered a more volatile behavior: in 2011 it cut into its financial costs, through the cessation of a car lease contract, opting to acquire a new fleet for distribution, this way reducing interest rate charges directly attributable to the car leasing scheme; and in 2017, as mentioned, it increased the loan requirements significantly, with the extra cash being channeled to increase the warehouse capacity as well as add automated warehouse machinery. This investment benefited the whole group, but was financed solely through Firm E. Due to this loan increase, the bank agreed to a twelve-month waiting period on both capital and interest, meaning Firm E would only start paying back the loan one year after the contract was signed.

The previous two paragraphs describe some important events regarding the financing costs of the group, and why they could influence the overall rate, seeing we considered the average between the two firms.

Looking at Figures 7 and 8, we notice that the EURIBOR contribution and proportion diminishes each year, disappearing completely from 2015 onwards. This was expected, due to the EURIBOR drops in this period, and this base rate has no influence in the overall rate after it goes negative, and it does not carry a negative proportion into it (although the EURIBOR is negative), because the contract with the bank contemplates a floor, to prevent such a situation.

Regarding the behavior of the Credit Spread component, we see more or less stable contribution and proportion, with the exception of 2017, where we see a significant rise. This rise is, without a doubt, caused by the loan increase of Firm E, which, in the perspective of the bank, constituted an increased credit risk, to which the bank responded with a credit spread increase, which ultimately reflected itself in the overall rate, representing almost 80% of the overall rate in 2017.

Looking at the influence of the Taxes, Commissions and Fees, they start by representing about 45% of the overall rate in 2011, achieving over 60% proportion in 2014, the same year as the rate cut, possibly due to generalized market uncertainty after the cut, which prompted banks to increase these costs, reaching for new means of

income over new loans and loan renewals. This element appears to have its proportion stabilized between 50% and 60% of the overall rate, except for 2017, where, for the aforementioned reasons, the Credit Spread plays a very big role, the EURIBOR has no influence, and the Taxes, Commissions and Fees represent slightly over 20% of the overall rate.

Regarding the comparison pre and after rate cut, we see the disappearance of the EURIBOR component, and a generalized increase in the proportion and contribution of both the credit spread, and the commissions and fees. About the total value of the overall rate, we see know the introduction of the waiting period will influence the results, diminishing the interest rate costs for Firm E. From Figure 7, it is not very clear if the overall rate actually increased or decreased, and we will analyze that issue in the next subsection.

Comparing between rates and periods

Since we computed the contracted rates for both firms separately, and the overall rates for the whole group, in this subsection, and to be able to compare both rates directly, we took the average of the contracted rates. This way we will be confronting what the group expects to pay over the loans (contracted rates) with what the firm ends up paying (overall).

Beginning by addressing the observed differences between the two types of rates, we see on Table 3, for the whole group, the yearly comparison between their contracted rate and their overall rate, as well as the absolute difference between them.

Table 3 - Yearly differences between rates for the Group

	2011	2012	2013	2014	2015	2016	2017	2017a
O.R.	10,459%	8,540%	9,582%	11,247%	10,025%	9,552%	7,456%	10,225%
C.R.	5,824%	5,032%	4,409%	4,394%	4,165%	4,425%	5,850%	4,450%
DIF	4,635%	3,509%	5,173%	6,853%	5,859%	5,127%	1,606%	5,775%

Source: Own computations

"O.R." represents the overall rate; "C.R." represents the contracted rate; "DIF" represents the absolute difference between the two aforementioned rates. The year 2017a represents what would be the expected rates if Firm E did not contract the big loan renewal, giving us a better idea of the financial costs for the Group in "normal conditions" – loan renewals according to the usual cash demands and excluding the machinery investment – making this rate immune to the influence of the waiting period, which, as we observe, impacted the overall rate and consequently the rate difference.

We see a difference that registers considerable fluctuation across the years, since these results were obtained through averages, the significant events the firms went through will have influence over the values, and consequently over the differences. We see the overall rate for the year 2012 closer to the contracted rate than in any other year analyzed (except 2017), probably due to the cut in interest expenditure took by Firm E, by terminating the car leasing contract. Then we have a period where the difference increases, that is, the indirect costs of financing were growing faster than the contracted rate components – EURIBOR plus credit spread, and then the reserve rate. This period coincides with the highest overall rates and lowest contracted rates, while also coinciding with the maximum proportion of the Taxes, Commissions and Fees on the overall rate, the same year the ECB cut the rate into negative.

The year 2017 constitutes an extreme result – the overall and contracted rates are "only" about 160 bp apart – this year, as mentioned, Firm E increased the loan demanded in a large amount, and the bank agreed to conceed a twelve-month waiting period over this new loan renewal, which, as observable, caused a drop in the overall rate, and an increase in the contracted rate, through an increased credit spread for Firm E.

The year 2017a is what we would have expected in the absence of the loan increase by Firm E. Because we are considering the continuation of the loan renewals without any abnormal situation, we considered the maintenance of the credit spread for Firm E – becoming the same value as the previous year instead of its increase – which affects the contracted rate of Firm E, and naturally the average for the Group as well. For the overall rate, we assumed Firm E would achieve an average of the previous years. These adjustments were only made to Firm E, while keeping the same values for Firm D as the "true" year 2017; so, the differences between the years 2017 and 2017a result solely from Firm E. This way, we increase our comparing power in the last year, because we know the true results, but we also know the expected results under normal conditions

– and not by excluding the last year as an outlier, but by adjusting that year into simulating reality under the chosen conditions.

Although borrowing money to invest is a common practice for firms, we decided to analyze the year 2017 separately – including and excluding the loan increase. The Group also invested in previous years within our analysis, however, the money demanded to invest in 2017 was so great it was only made possible by a big loan increase, and consequently a serious interest rate aggravation. This was not the case for the previous investments – for example the distribution fleet acquisition – where there was no interest rate aggravation directly caused by a loan increase. For this reason, we present the results for the years 2017 and 2017a. This way, it is easier to observe how this investment decision impacted the financial costs, not only of Firm E, but also of the Group as a whole.

Regarding the differences between analyzed periods, we have on Table 4 the depiction of the average interest rates obtained, split by time period, once again using the average of the contracted rates obtained for the firms.

Table 4 - Average rates for the Group by period

Contracted		Overall	
Before June 2014	After June 2014	Before 2014	After 2014
5,014%	4,735%	9,527%	9,570%

Source: Own computations

The split in period coincides with the rate cut into negative from the ECB in June 2014; for the contracted rates, where we have monthly data, that is where we split. For the overall rates, since we have yearly data, we considered 2014 as the first "After" year, because we believe that this event created market conditions and stresses that, naturally, should be considered post-cut, risking biasing the data if we included it in the "Before" period.

Comparing before and after the cut into negative, we see that the average contracted rate decreased, which is in line with our expectations, because the announcement and application of the ECB's rate cut influenced the market, reducing the market rates. Despite this rate dropping environment, banks still try to be competitive

and offer lower rates to its borrowing customers, this way, firms obtaining cheaper contracted loans comes as no surprise – naturally, without taking into consideration the indirect costs with this measure.

Looking at the values for the overall rate averages, we see that the rate increased slightly. Once again, the value for the average overall rate after the rate cut is biased by Firm E's loan increase and waiting period; if we did not have this particular situation, the overall rate for Firm E would be higher in 2017, which would cause the average overall rate after rate cut to be higher, which would ultimately end in a more pronounced increase in the overall rate, than the one we can observe. Likewise, for the contracted rates, taking into consideration this abnormal situation would produce a lower average value – we would exclude the large credit spread increase for Firm E in 2017 – and give us a more pronounced contracted rate decrease after June 2014.

Like in the case of the average contracted rates comparison, these results are not surprising – when the credit institutions were forced to offer reduced contracted rates, but wanting to remain competitive, they looked at other means of collecting income from their clients, and the way they chose to do that was through indirect borrowing costs – such as new or increased commissions and fees, or the imposition of borrowing conditions, such as mandatory credit cards, or insurances. Following this path, the credit institutions were able to seemingly reduce their charged interest - by presenting clients with low contracted rates - while actually increasing their overall earnings, and achieving higher interest rate charges – through the indirect financing costs.

When it comes to relating the results obtained to the established backdrop, the behavior of the EURIBOR is fundamental, seeing that these rates dictate – when positive – the behavior of the contracted rates, and their registered decline below zero since December 2015 has influenced our contracted rates, in keeping them equal to the reserve rate; whereas they previously represented an additional interest to be paid over the spread. Regarding the average interest rate charged in new credit operations, its behavior is similar to the EURIBOR. Seeing this data is obtained from the new credits given by the banks, and the banks charge an interest rate spread on top of the base rate, and the base rate is usually the EURIBOR, this finding was to be expected.

Section 6 – Conclusions

We began this work with very clear intentions – find out if the successive interest rate cuts made by the ECB, which reached into negative values, had any impact in the financing costs of a non-financial firm. To try to find an answer, we computed two different interest rates paid by the firm, one based on the contract signed with the bank, and the other based on the balance sheet information, creating a theoretical against practical interest rate comparison scenario.

We found that the contracted interest rate registered a drop. This drop was due to this rate being composed of an interest rate spread added unto a base rate; the interest rate spread is calculated by the bank before the loan is contracted, and it reflects the risk profile of the borrower in percentage points, the base rate used was the EURIBOR 6 months, and the behavior of this rate is dependent on the DFR. When the ECB repeatedly cut the DFR, the EURIBOR rates also suffered continuous drops, also delving into negative values, thus reducing the contracted rate, shrinking it into the preestablished reserve rate – which was, in our case, equal to the interest rate spread. This result is unsurprising, since, according to market expectations and predictable behavior, rate cut policies translate themselves into market rate cuts also.

Regarding the overall rate, we noted that this rate was always higher than the previous rate, which is not a surprising outcome, since this rate will be capturing the indirect costs of borrowing money, unlike the contracted rate. We also found this rate behaved in the opposite manner than the previous – it actually rose post rate cuts – considering normal situations, that is, this rate did not grow for Firm E, but we explained the particularities of this firm's financing scheme for the year 2017, also theorizing the expected result changes if there was no extraordinary event to consider.

Analyzing the source of the financing cost increases, through the disaggregation of the interest rate, we found that in the post cut period, the Taxes, Commissions and Fees segment holds a higher influence over the overall rate than pre rate cut, and the credit spread remains somewhat stable in its proportion, with the exception of 2017, where

clearly there was an increased risk exposure with the loan renewal, which translated itself in a very significant credit spread increase

These results are in line with our *ex-ante* thought – the actual rates a firm will pay (overall) could be strongly higher than the theoretical rates (contracted), due to the indirect costs, which became more prevalent since the rate cuts, because the banks want to remain competitive, by offering loans at low (contracted) rates; but also looking for alternative sources of income, often through offering to reduce the interest rate spread through cross--selling their products, such as insurances, credit cards, payment services, among others. The subscription and maintenance of these additional products grants the bank with additional income, while giving the impression the bank reduced its offered interest rate on loans, and while that might be true in theory, in practice the banks maintain or increase their earnings, even in a dropping interest rate environment.

These findings are relevant in the sense that they not only contradict the general idea that a drop in the interest rates also means a drop in financing costs, shared by many - and the logical though process for non-finance educated people; but also in the sense that the negative interest rates increase the overall financing costs might change the behavior of the CFO, seeing that when the reference rates are positive we can borrow cheaper than when we have negative ones. The relevance of these findings is also tied with the future behavior of interest rates - if they return to positive, then we will know what to expect if they were to be cut below zero again. Long-term behavior is unpredictable, and short to medium-term behavior does not look much different from the present – negative EURIBORs are expected at least until 2021[14].

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[14] ECBs macroeconomic projections report (June 2019)

References

Agarwal, R., & Kimball, M. 2015. ***Breaking through the zero lower bound***. IMF Working Paper 15/224. https://doi.org/10.5089/9781513567327.001

Altavilla, C., & Boucinha, M., & Peydró, J. L. 2017. ***Monetary policy and bank profitability in a low interest rate environment***. No 2105, Working Paper Series, European Central Bank. https://doi.org/10.1093/epolic/eiy013

Bech, M., & Malkhozov, A. 2016. How have central banks implemented negative Policy Rates?. ***BIS Quarterly Review***, March 2016: 31-44.

Brunnermeier, M., & Koby, Y. 2018. ***The reversal interest rate***. Working Paper. https://doi.org/10.3386/w25406

Caruana, J. 2016. ***Persistent ultra-low interest rates: the challenges ahead***. In: Speech at the Bank of France-BIS Farewell Symposium for Christian Noyer, on 12 January 2016.

Coeuré, B. 2014. ***Life below zero: Learning about negative policy rates***. In: Speech at the Annual Dinner of the ECB'S Market Contact Group, on 09 September 2014.

Coeuré, B. 2016. ***Assessing the implications of negative interest rates***. In: Speech at the Yale Financial Crisis Forum, on 28 July 2016.

Constâncio, V. 2018. ***Past and future of the ECB monetary policy***. In: Speech at the Central Bank of Malta, Valletta, on 04 May 2018.

Danthine, J. P. 2016. The Interest Rate Unbound?. ***Comparative Economic Studies***, 59(2): 129-148. https://doi.org/10.1057/s41294-017-0019-3

Dombret, A. 2017. ***The ECB's low-interest-rate policy - a blessing or a curse for the economy, consumers and banks?*** In: Speech at the Sparkassen-Gesprchsforum, Witten, on 01 February 2017.

ECB annual report 2008.

https://www.ecb.europa.eu/pub/pdf/annrep/ar2008en.pdf?0da1f91236ee b11eed9f832a4a874095

ECB annual report 2012.

https://www.ecb.europa.eu/pub/pdf/annrep/ar2012en.pdf

ECB macroeconomic projections report, from June 2019.

https://www.ecb.europa.eu/pub/projections/html/index.en.html

ECB press release from 6th October 2011.
https://www.ecb.europa.eu/press/pr/date/2011/html/pr111006_4.en.html

ECB press release from 8th December 2011.
https://www.ecb.europa.eu/press/pr/date/2011/html/pr111208_1.en.html

ECB press release from 22nd January 2015.
https://www.ecb.europa.eu/press/pr/date/2015/html/pr150122_1.en.html

Eggertsson, G., & Juelsrud, R., & Wold, E. 2017. *Are negative nominal interest rates expansionary?.* NBER Working Paper No 24039.
https://doi.org/10.3386/w24039

Frank, M. Z., & Goyal, V. K. 2007. *Trade-off and pecking order theories of debt.*
http://dx.doi.org/10.2139/ssrn.670543

Grasselli, M. R., & Lipton, A. 2018. *On the normality of negative interest rates.*

Hall, R. 2017. Low Interest Rates: Causes and Consequences. *International Journal of Central Banking*, 13(3): 103-117.

Hannoun, H. 2015. *Ultra-low or negative interest rates: what they mean for financial stability and growth*. In: Speech Given at the BIS Eurofi High-Level Seminar in Riga, on 22 April 2015.

Heider, F., & Saidi, F., & Schepens, G. 2017. *Life below zero: bank lending under negative policy rates*. Working Paper.
https://doi.org/10.2139/ssrn.2788204

Hollo, D., & Kremer, M., & Lo Duca, M. 2012. *CISS- A composite indicator of systemic stress in the financial system.* European Central Bank Working Paper Series No 1426.
https://doi.org/10.2139/ssrn.1611717

Hong, G.H., & Kandrac, J. 2018. *Pushed past the limit? How Japanese banks reacted to negative interest rates*. IMF Working Paper 18/131.
https://doi.org/10.5089/9781484361610.001

Jobst, A., & Lin, H. 2016. *Negative interest rate policy (NIRP): Implications for monetary transmission and bank profitability in the euro area.* IMF Working Paper 16/172.
https://doi.org/10.5089/9781475524475.001

Kurowski, Ł. K., & Rogowicz, K. 2017. Negative interest rates as systemic risk event. *Finance Research Letters*, 22(C): 153-157.
https://doi.org/10.1016/j.frl.2017.04.001

Leary, M., T., & Roberts, M. R. 2014. Do Peer Firms Affect Corporate Financial Policy?. *The Journal of Finance*, 69: 139-178.

Lemmon, M., & Roberts, M. 2010. The Response of Corporate Financing and Investment to Changes in the Supply of Credit. ***The Journal of Financial and Quantitative Analysis***, *45*(3): 555-587.

Mira, F. S., 2001. ***On capital structure in the small and medium enterprises: The Spanish case***.
http://dx.doi.org/10.2139/ssrn.277090

Nucera, F., & Lucas, A., & Schaumburg, J., & Schwaab, B. 2017. Do negative interest rates make banks less safe?. ***Economics Letters***, 159(C): 112-115.
https://doi.org/10.2139/ssrn.2958763

Rajan, R. 2013. ***A step in the dark: unconventional monetary policy after the crisis***. In: BIS Andrew Crockett Memorial Lecture, on 23 June 2013.

Robinson, T., & Stone, A., 2005. ***Monetary policy, asset-price bubbles and the zero lower bound***. NBER Working Paper no. 11105.
https://doi.org/10.3386/w11105

Rognlie, M. 2015. ***What lower bound? Monetary policy with negative interest rates***. Working paper, MIT Department of Economics.

Data Sources

[All online links last consulted and available on May 22nd 2019]

Amount of money in circulation:

> http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=117.BSI.M.U2.N.C.L10.X.1.Z5.0000.Z01.E

Average interest rate:

> https://www.pordata.pt/Portugal/Taxas+de+juro+sobre+novas+opera%C3%A7%C3%B5es+de+empr%C3%A9stimos+(m%C3%A9dia+anual)+a+empresas+total+e+por+escal%C3%A3o+de+cr%C3%A9dito-2847

ECB interest rates:

> https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html

EURIBOR:

> https://www.emmi-bench03ks.eu/euribor-org/euribor-rates.html

> https://www.euribor-rates.eu/euribor-rates-by-year.asp

Inflation rates:

https://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=122.ICP.M.U2.N.000000.4.ANR

Averages by Industry (Damodaran database):

http://pages.stern.nyu.edu/~adamodar/

Annex

Annex A1 – Condensed balance sheet and income statement of Firm D – Thousands of Euros

FIRM D	2011	2012	2013	2014	2015	2016	2017
BALANCE SHEET							
ASSETS	19 365,43 €	18 477,91 €	19 204,03 €	21 092,47 €	22 034,79 €	19 804,41 €	18 297,06 €
Fixed Assets	2 894,19 €	2 971,00 €	3 183,59 €	3 002,87 €	3 090,30 €	3 045,34 €	2 962,92 €
Accounts Receivable	89,72 €	86,90 €	92,74 €	89,18 €	88,41 €	47,69 €	47,67 €
Trade Receivables	16 288,64 €	15 028,14 €	15 894,38 €	17 937,88 €	17 745,78 €	16 675,08 €	15 242,18 €
LIABILITIES	14 813,85 €	13 338,47 €	14 819,15 €	15 996,48 €	17 694,99 €	14 352,90 €	12 402,65 €
Trade Payables	902,28 €	956,17 €	899,31 €	814,56 €	777,72 €	877,26 €	628,25 €
Loans (Short and Long Term)	2 613,40 €	2 701,12 €	3 139,18 €	3 259,64 €	3 672,90 €	3 922,42 €	5 865,71 €
Government and Other Public Authorities	10 826,44 €	7 479,62 €	10 576,22 €	8 910,58 €	12 616,94 €	9 105,09 €	5 661,45 €
EQUITY	4 551,58 €	5 139,44 €	4 384,88 €	5 095,99 €	4 339,79 €	5 451,51 €	5 894,41 €
Issued Capital	70,00 €	70,00 €	70,00 €	70,00 €	70,00 €	70,00 €	70,00 €
Net Income	334,28 €	329,60 €	294,72 €	371,27 €	336,42 €	416,79 €	442,90 €
INCOME STATEMENT							
EBITDA	590,27 €	572,49 €	587,96 €	611,26 €	605,55 €	669,40 €	715,39 €
EBIT	482,20 €	494,77 €	502,24 €	516,87 €	507,83 €	561,18 €	620,27 €
Interest Expenses	139,72 €	171,25 €	180,68 €	179,85 €	128,35 €	216,01 €	345,89 €
Net Income	334,28 €	329,60 €	294,72 €	371,27 €	336,42 €	416,79 €	442,90 €

Source: Firm D

Annex A2 – Condensed balance sheet and income statement of Firm E – thousands of Euros

FIRM E	2011	2012	2013	2014	2015	2016	2017
BALANCE SHEET							
ASSETS	18 897,67 €	20 183,27 €	22 167,60 €	21 074,98 €	21 693,20 €	20 599,85 €	25 528,97 €
Fixed Assets	1 083,65 €	976,65 €	1 006,82 €	1 226,60 €	1 115,35 €	1 067,87 €	1 031,69 €
Inventory	13 434,21 €	13 880,40 €	14 557,21 €	16 294,83 €	14 327,77 €	13 162,68 €	12 927,52 €
Trade Receivables	1 493,22 €	1 399,10 €	1 963,25 €	2 097,33 €	1 828,17 €	1 356,48 €	1 242,16 €
LIABILITIES	16 249,91 €	17 112,40 €	19 305,11 €	18 900,94 €	19 253,39 €	17 810,53 €	21 177,08 €
Trade Payables	15 016,82 €	15 937,22 €	18 579,48 €	16 770,50 €	18 376,38 €	17 457,57 €	16 407,16 €
Loans (Short and Long Term)	259,74 €	206,97 €	187,36 €	194,82 €	211,27 €	194,96 €	4 137,70 €
Accounts Payable	231,47 €	186,94 €	74,35 €	514,74 €	311,14 €	48,80 €	175,80 €
EQUITY	2 647,76 €	3 070,88 €	2 862,49 €	2 174,05 €	2 439,80 €	2 789,32 €	4 351,90 €
Issued Capital	200,00 €	200,00 €	200,00 €	200,00 €	200,00 €	200,00 €	200,00 €
Net Income	297,47 €	422,48 €	452,18 €	397,83 €	33,13 €	326,74 €	1 581,44 €
INCOME STATEMENT							
EBITDA	496,17 €	613,07 €	652,18 €	581,20 €	241,92 €	520,09 €	2 175,19 €
EBIT	468,92 €	572,99 €	593,18 €	549,65 €	188,22 €	473,45 €	2 139,01 €
Interest Expenses	40,45 €	24,06 €	26,69 €	33,07 €	32,32 €	26,51 €	372,99 €
Net Income	297,47 €	422,48 €	452,18 €	397,83 €	33,13 €	326,74 €	1 581,44 €

Source: Firm E

Annex A3 – Major balance sheet items and net income for all Firms and Group from 2017 – Thousands of Euros

2017	ASSETS	DEBT	EQUITY	NET INCOME	D/E
X	735,27 €	235,09 €	500,18 €	78,03 €	0,47
A	1 666,69 €	975,94 €	690,75 €	44,19 €	1,41
B	1 284,73 €	679,66 €	605,06 €	39,73 €	1,12
C	670,30 €	403,50 €	266,80 €	18,39 €	1,51
D	18 297,06 €	12 402,65 €	5 894,41 €	442,90 €	2,10
E	25 528,97 €	21 177,08 €	4 351,90 €	1 581,44 €	4,87

Source: Group X and Firms A through E