

# BANK INTEREST RATES ON NEW LOANS TO NON-FINANCIAL CORPORATIONS– ONE FIRST LOOK AT A NEW SET OF MICRO DATA\*

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## ABSTRACT

This note aims at contributing to the assessment of the empirical relevance of a set of determining factors for bank interest rates in Portugal. For such purpose, an innovative dataset is used, considering micro-information on most new loan operations to non-financial corporations in the period June 2012 to February 2013. The results obtained point to the existence of a set of factors that induce discrimination in the setting of interest rates by the different customers. These factors include the risk attached to the customer, the size of the loan and the customer, their private or public nature, and the fact of having or not exporting activity.

## 1. INTRODUCTION

For most advanced economies, monetary policy is normally conducted through some form of interest rates targeting. However, the monetary policy transmission mechanism is rather complex, with several channels operating simultaneously, some upon the financial intermediaries, other depending on the structural and current characteristics of the non-financial agents. Thus, it is important for central banks to consider an extensive range of information, allowing for a thorough analysis in their decision making process. Taking into account the central role performed by banks in the financial intermediation process, it is crucial an understanding of how banks set their retail interest rates, both in deposit and lending operations.

In tandem, the assessment of banking interest rate levels is also of particular interest from a financial stability perspective. Taking into account the existence of a relationship between risk and compensation, embodied in the risk premium, it is important to assess if lending rate levels are adequate for the risks assumed. However, this assessment is clearly a multidimensional equation, which may not be feasible with a few aggregate parameters. This is clearly a field where micro-datasets may prove quite useful.

In this context, Banco de Portugal has established in June 2012 a new statistical requirement, aiming at obtaining a representative set of data concerning micro data on new euro denominated loan operations to euro area resident non-financial corporations. This note presents the initial results obtained from the data available so far, with the variable of interest being the level of interest rate set in each operation. The potential richness of this innovative dataset will obviously be further explored in future work.

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The remaining of the note is structured as follows: Section 2 describes the statistical data request. Section 3 provides initial insights on the data, highlighting some major composition effects assessed as affecting both the level and evolution of the aggregate loan rates on the non-financial corporations segment. Section 4 resorts to an econometric approach to the assessment of loan interest rate determinants for the considered period. Section 5 concludes.

## 2. THE DATASET

In accordance with its Organic Law, Banco de Portugal (BdP) shall ensure the collection and compilation of the monetary, financial, foreign exchange and balance of payments statistics, particularly within the scope of its co-operation with the ECB. This function is also included in the BdP's contribution to the national statistical framework, but is also justified on the grounds of the BdP's need to perform its own assessment of the Portuguese economy, in general, and of the financial system in particular. Under the scope of this last objective, BdP is entitled to adjust the definition of its statistical requirements in response to relevant developments observed in these fields. BdP may demand any entity, private or public, the necessary information to perform its duties.

In this context, BdP has issued Instruction No. 20/2012, through which it has set additional statistical requirements, amending Instruction No. 12/2010. The new requirements include individual information on the banks' interest rate on new loans to Non-Financial Corporations (NFC). Only euro denominated operations and loans to euro area resident entities are considered. The new requirement is not exhaustive, to the extent that it only applies to the institutions that grant in each month at least 50 million euro in new loan operations with non-financial corporations.<sup>1</sup>

The new statistical requirement allows for the characterization of each operation in a number of relevant dimensions. Directly, to the extent that the requirement includes the date of the operation, contractual maturity, initial rate fixation period, amount, annualized interest rate, the existence or not of collateral, the relationship nature of the loan (completely new, renegotiation of contract terms with active involvement of clients or renegotiation of contract terms without the active involvement of the client, *i.e.*, automatic renewal), and residence in Portugal or in other euro area country. Indirectly, through the possibility of obtaining additional customer information by means of the linkage to another databases through the tax identification number. In this note, this has allowed for the characterization of customers according to the following dimensions: private/public nature, exporting activity, size and NACE classification of the NFC.<sup>2</sup>

At this stage, it is important to be aware of some characteristics of the dataset which limit its analytical potential. First, it is available only for a short time period, from June 2012 to February 2013. This limits the longitudinal analysis of the data, to the extent that some variables have limited volatility in the period.

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<sup>1</sup> The concept of new operation is defined under the scope of ECB regulation ECB/2001/18 (with the changes introduced by Regulation ECB/2009/7), concerning statistics on interest rates applied by monetary financial institutions to deposits and to loans to households and non-financial corporations. This concept excludes the operations associated with credit restructuring and debt consolidation (grouping of several credits into a new contract) when there is non-performing situations. Therefore, it may occur that some banks which, on a monthly basis, engage in credit restructuring operations, may not be subject to the requirement set up by Instruction no. 20/2012, to the extent that those are operations are not taken into account in the above referred eligibility criteria. Nevertheless, the available information clearly signals that the data collected under the new requirement corresponds to almost all of the operations considered as new operations for the universe of all institutions, to which add some other operations not included in the new operation concept, such as the already mentioned credit restructuring operations.

<sup>2</sup> NFCs will be classified as micro, small, medium and large, according to the following criteria: Micro corporations: number of employees below 10 and turnover and/or annual balance-sheet total not above 2 million euros. Small corporations: number of employees below 50 and turnover and/or annual balance-sheet total does not exceed 10 million euros. Medium-sized corporations: number of employees below 250 and annual turnover not exceeding 50 million euros and/or annual balance-sheet total not exceeding 43 million euros. Large corporations: remaining cases.

Then, the initial assessment of the data has allowed for the identification of some variables which, in cooperation with BdP, reporting institutions must improve their answers. This is particularly clear for the relationship nature of the loan, concept that shall be redefined, in a more precise manner, so that consistency in the submissions of the different banks is assured. Finally, some initial submissions were conditioned by the difficulty in achieving the precision in the collection of some variables, due to the need to adjust the IT solutions. All these aspects point to the need of considering both the data and the corresponding analysis as having a preliminary nature.

### 3. DATA DESCRIPTION (JUNE 2012 – FEBRUARY 2013)

As mentioned, the new statistical requirement allows for the characterization of the new loans to NFCs. This characterization illustrates the importance of composition changes in the monthly flows of loans to the determination of the aggregate interest rate. This analysis is viable for operations with resident entities, for which the tax identification number allows for the inclusion of additional information in the analysis. The concept of new operation under analysis does not include overdrafts.

Charts 3.1 and 3.2 illustrate the monthly evolution of the number and amount of new loan operations with NFCs, separating public, private non-exporting and exporting corporations.<sup>3</sup>

It can be seen that the loans are mostly directed towards private non exporting corporations, both in terms of number of operations and, to a lesser extent, in terms of amount. It is also noteworthy that loans to state owned corporations, while clearly limited in terms of number, stand for a non-negligible share of the total amounts for some months. This is a relevant issue given that the aggregate figure for the whole NFCs sector is obtained as a weighted average (by amount) of each operation and it is expectable that the determinants for price setting in loans to state owned corporations may differ from those for private NFCs. In fact, this seems to be the case, as for most months under analysis, the interest rates charged on loans to state owned corporations were below those of private corporations (Chart 3.3). In turn, the rates charged on exporting private corporations are typically above those of the other segments (in average terms, not controlling for the characteristics of the customers and operations).

A closer look at the data suggests that other composition effects may be playing a relevant role in this result. In fact, for most periods, the minimum rates are charged on loans to large private non-exporting corporations and to medium and large state owned corporations (Chart 3.4). These subsets stand for a relatively small fraction of total operations, while being relevant in terms of amounts (Charts 3.5 and 3.6).

Other decompositions of the aggregate figures may be established on the basis of the size of the loan and the contractual maturity. In a consistent way, visual inspection points to lower interest rates on loans with higher amounts and on loans with contractual maturity exceeding 1 year (Charts 3.7 and 3.8).

This evidence should be taken into account as signaling the importance of composition effects for the determination of average aggregate figures for the interest rate on loans to NFCs. These features may potentially include characteristics (i) of the operation, such as the amount, the contractual maturity, the initial rate fixation period and the existence of collateral, (ii) of the lending institution, such as its capital position, liquidity and funding cost, and (iii) of the borrower, such as its size, branch of activity, overall risk profile (in this note by means of the z-score variable<sup>4</sup>), exporting/non-exporting activity and state owned/private nature. To some extent, all these features may contribute to justify the differences

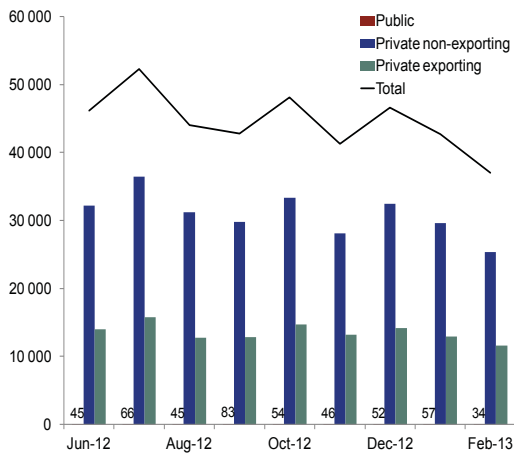
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<sup>3</sup> Private-owned exporting companies are defined as a) companies that export more than 50% of the turnover; or b) companies that export more than 10% of the turnover and the total amount exceeds 150 thousand euro. In turn, public NFCs include entities controlled by the public administrations which are not included in that institutional sector.

<sup>4</sup> This variable was calculated for 2011, according to the methods and specifications presented in "A scoring model for Portuguese non financial enterprises", Ricardo Martinho and António Antunes (2012).

Chart 3.1

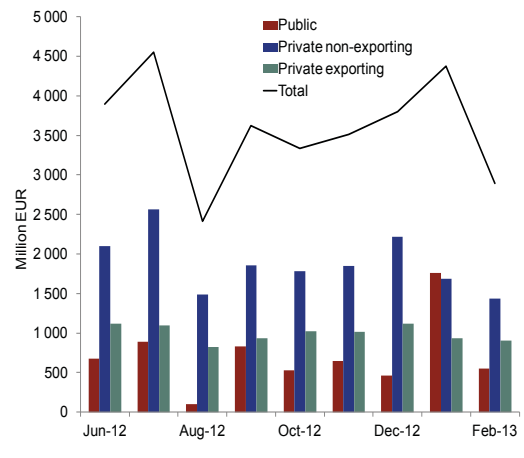
NUMBER OF OPERATIONS



Source: Banco de Portugal.

Chart 3.2

AMOUNT



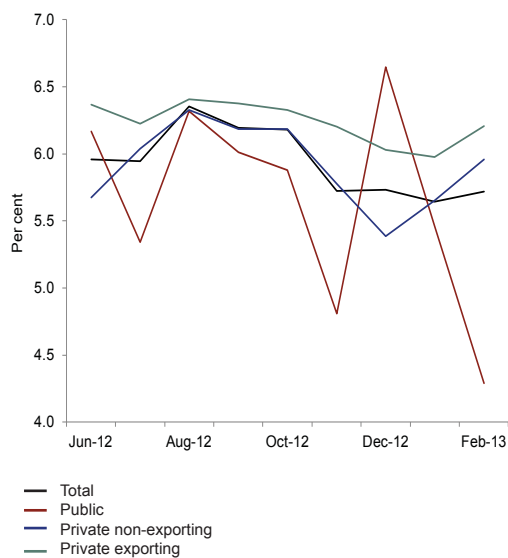
Source: Banco de Portugal.

between aggregate loan rates for different countries. However, due to comparable data unavailability for other countries, this exercise cannot be further developed for the time being.

However illustrative, the analysis presented above does not take into account the simultaneous relevance of the different factors in determining interest rates. This will be addressed in the next section, resorting to an econometric approach.

Chart 3.3

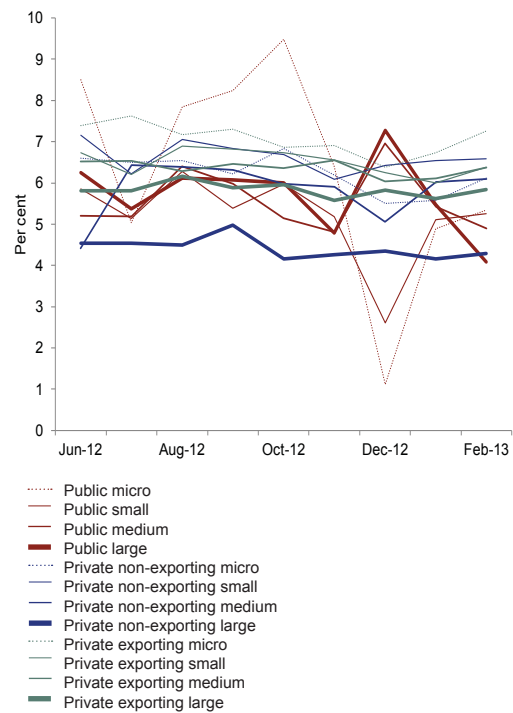
INTEREST RATE



Source: Banco de Portugal.

Chart 3.4

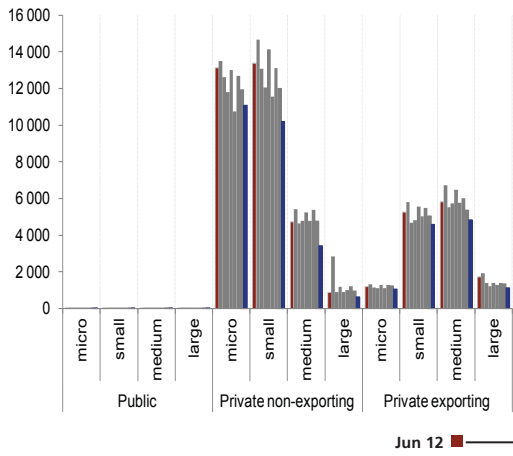
INTEREST RATE



Source: Banco de Portugal.

Chart 3.5

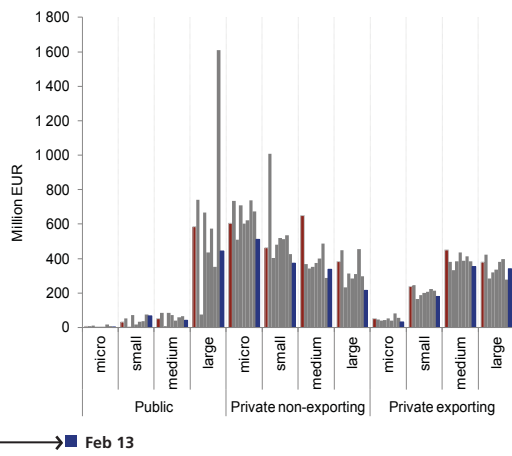
NUMBER OF OPERATIONS



Source: Banco de Portugal.

Chart 3.6

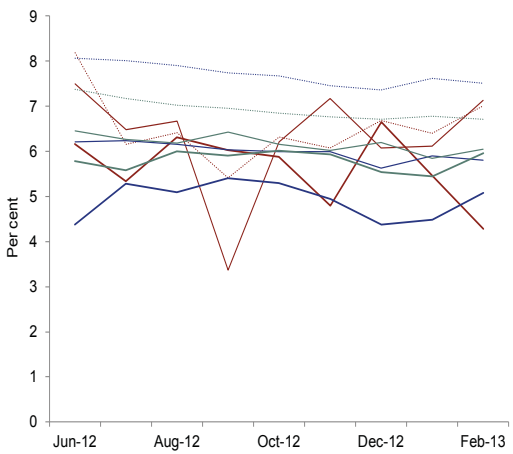
AMOUNT



Source: Banco de Portugal.

Chart 3.7

INTEREST RATE

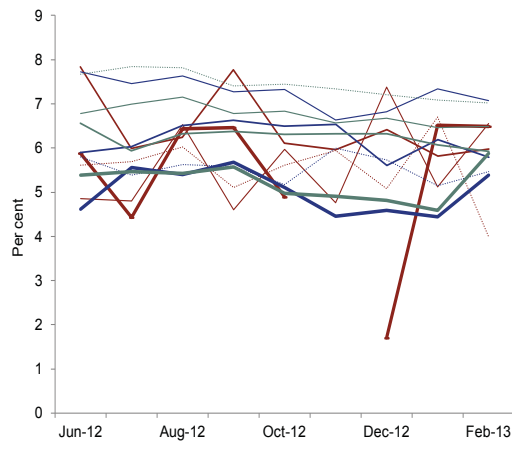


- ..... Public < EUR 0.25 M
- ..... Public < EUR 1 M
- ..... Public > EUR 1 M
- ..... Private non-exporting < EUR 0.25 M
- ..... Private non-exporting < EUR 1 M
- ..... Private non-exporting > EUR 1 M
- ..... Private exporting < EUR 0.25 M
- ..... Private exporting < EUR 1 M
- ..... Private exporting > EUR 1 M

Source: Banco de Portugal.

Chart 3.8

INTEREST RATE



- ..... Public ≤ 31 dias
- ..... Public ≤ 91 dias
- ..... Public ≤ 365 dias
- ..... Public > 365 dias
- ..... Private non-exporting ≤ 31 dias
- ..... Private non-exporting ≤ 91 dias
- ..... Private non-exporting ≤ 365 dias
- ..... Private non-exporting > 365 dias
- ..... Private exporting ≤ 31 dias
- ..... Private exporting ≤ 91 dias
- ..... Private exporting ≤ 365 dias
- ..... Private exporting > 365 dias

Source: Banco de Portugal.

## 4. ECONOMETRIC ASSESSMENT

The variable under study is the level of the interest rate set in each euro denominated new loan operation with a resident NFC. This variable will be assessed in terms of an array of theoretical determinants. This assessment will be based on the evidence obtained through a set of alternative econometric specifications, on the basis of the sets of variables presented in the preceding sections, which will allow for an indication of the robustness of the results.<sup>5</sup>

*A priori*, a number of factors can influence the determination of interest rates in NFCs loans: the cost of funds and its volatility, operating expenses (transaction costs, risk management costs, geographic dispersion), provisioning costs (the cost of risk and the regulatory framework), tax expenses, level of competition, credit rating of the customer (risk premium), inflation levels, management competency (product adequacy), financial literacy of customers.

At this stage, we will present results based on the full information obtained from Instruction no. 20/2012 and from a still limited set of data concerning customer and bank information.<sup>6</sup> Future work will benefit from the gradual inclusion of other potentially significant data, and from the progressive lengthening of the time dimension of the dataset. This lengthening will favor increased volatility for some variables, for which the sample now considered is rather limited – with the variables associated with the bank's characteristics being the main example at the moment.

The following table presents the results from a set of econometric specifications, applied to the data covering the period from June 2012 to February 2013. The results should be read as an econometric systematization of the behavior of banks in setting the interest rates during the short period under analysis, and not necessarily reflecting any structural pricing models.

The reading of the table suggests the following regularities:

- The interest rate level exhibited a negative relation with the maturity of the operations. This may reflect the fact that longer term operations are typically associated with investment operations. The purpose of the loan is not available in the information set. Further, banks shall be granting longer term loans to customers for whom the associated prospective risk is smaller, which shall benefit from lower interest rates;
- In the same vein, there is a negative relation between the amount of the loan and the level of the interest rate. This result calls for future additional analysis, as it is expectable that the relevant variable should be the total amount of loans granted to each customer and not necessarily the amount of each operation;
- NFC risk (as proxied by the zscore) is clearly significant, signaling the importance of NFCs' financial situation in the determination of the cost of funding. However, it should be noticed that this variable comes as lagged, as it is based on 2011 information, with banks having, typically, a more updated and forward looking approach to risk assessment;

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<sup>5</sup> The robustness of the results was also assessed by means of the estimation of the presented specifications for different samples, namely through the exclusion of the operations with public NFCs and of repeated operations, i.e., those for which all relevant variables are repeated, situation that takes place in the most visible manner when there is a sequence of successive renewals of short-term operations, so that the only change in the observations concerns the settlement date.

<sup>6</sup> The only variable excluded from the empirical analysis was the relationship nature of the loan, to the extent that the concept is not yet fully harmonized among the reporting institutions. Additional restrictions to the samples come as the result of the unavailability of information for some variables in some of the months of the sample.

Table 1

ECONOMETRIC SPECIFICATIONS									
Variable / Specification		I	II	III	IV	V	VI	VII	VIII
Characteristics of the operation	Log ( <b>maturity</b> , days)	-0.83	-0.81	-0.86	-0.84	-0.86	-0.98	-0.98	-0.98
	Log ( <b>amount</b> , EUR million)	-0.13	-0.15	-0.12	-0.15	-0.13	-0.19	-0.19	-0.19
	Dummy ( <b>collateral</b> )	0.25	0.20	0.27	0.22	0.27	0.61	0.61	0.61
	Dummy ( <b>relationship nature</b> of the loan)	-	-	-	-	-	-	-	-
Characteristics of the corporation	<b>Z-score</b> (%)	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.03
	Dummy ( <b>dimension</b> )	-	-	-	-	-	-	-	-
	Small	-1.03	-1.52	-1.05	-1.53	-1.05	-1.26	-1.27	-1.27
	Medium	-2.00	-2.60	-2.03	-2.61	-2.02	-2.42	-2.42	-2.45
	Large	-2.35	-2.51	-2.39	-2.52	-2.38	-2.91	-2.90	-2.91
	Dummy ( <b>public corporation</b> )	-0.51	-1.15	-0.42	-1.07	-0.42	-0.32	-0.34	-0.34
	Dummy ( <b>exporting</b> )	-0.45	-0.43	-0.46	-0.44	-0.46	-0.56	-0.55	-0.56
Characteristics of the bank	Dummy ( <b>bank</b> )	-	-	-	-	-	-	-	-
	<b>Core Tier 1</b> ratio	-	-	-	-	-	0.27	0.24	0.30
	<b>Credit at risk ratio</b> - NFC	-	-	-	-	-	0.29	0.30	0.28
	<b>Interest rate on deposits</b> - outstanding for NFPS	-	-	-	-	-0.35	-	-0.29	0.20
Cross-effects	Dummy ( <b>domestic banks</b> )	-	-	-	-	-	0.44	0.53	0.39
	Cross dummy ( <b>bank * z-score</b> )	-	-	-	-	-	-	-	-
Euribor	Cross dummy ( <b>bank * dimension of corporation</b> )	-	-	-	-	-	-	-	-
	Dummy ( <b>month</b> )	-	-	0.79	0.84	-	-	-	-
	<b>Constant</b>	10.8	11.1	10.4	10.7	11.9	5.7	6.7	4.6
No. observations		372 217	372 217	338 130	338 130	338 097	301 775	301 775	301 775
R-squared		43%	44%	43%	44%	43%	37%	37%	36%

Source: Banco de Portugal.

Notes: The gray areas correspond to the variable (in line) that was not included in the specification (in column). In turn, the dashes signal that the variable was included in the specification, even if, for sake of parsimony, the corresponding coefficients are not presented; NFC: Non-financial corporation; NFPS: Non-financial private sector; Credit at risk ratio: please refer to definition in "Section 4 Credit risk", of this Report.

- NFC size revealed a significant negative relation with the interest rate level;
- State owned NFCs benefited from a premium in the interest rates they pay, *i.e.*, they tend to pay lower interest rates;
- Likewise, exporting NFCs benefited from a premium in their loan interest rates, in the range of 40-50 basis points;
- The cost of funding, proxied either by money market rates (euribor) or interest rates on deposits, played a relevant role in determining the cost of loans;
- Operations for which collateral was reported to exist recorded higher interest rates. This is a standard result found in the research carried for Portugal, signaling that those borrowers could not access bank loans without collateral and that the collateral posted is not sufficient to compensate the higher risk of these borrowers. The coefficient shall be interpreted as reflecting a regularity and not a causal relation.

## 5. CONCLUSIONS

This note shows the first systematization of the information Banco de Portugal has started collecting under the scope of statistical requirement defined in Instruction no. 20/2012, concerning micro data on the banks' interest rate on new euro denominated loans to resident Non-Financial Corporations.

The focus of the analysis was on the level of the loans interest rates and on the empirical assessment of its determinants. For the reasons put forward throughout the note, this systematization shall be read as preliminary, reflecting ongoing work.

The evidence presented highlights the importance of composition effects in the determination of the aggregate interest rate on loans to NFCs. Composition effects may concern size, sector, state owned or private nature of the counterparty, term of the operation or associated credit risk. This suggests the need to use of caution in the short term analysis of the evolution of aggregate interest rates, and on the comparison of interest rates recorded in Portugal and in other euro area countries for this segment.

At another level, the econometric analysis confirms the importance of a set of factors considered as relevant in the determination of bank's interest rates, such as the cost of funding and credit risk. In fact, the coefficients associated with either money market or deposit interest rates and with the z-score variable, used as a proxy for credit risk, appear as significant and positive. In this context, it should be mentioned that the obtained results illustrate the importance of promoting a sounder financial structure for NFCs, as a means to promote a reduction in the cost of bank loans.

Public NFCs tended to benefit from lower interest rates. While corresponding to a small number of customers, the operations with public NFCs tended to assume relevant total amounts, therefore significantly affecting the aggregate level of interest rates.

The size of the loans and of the NFCs presents a negative relation with the cost of funding through bank loans. Longer term operations, higher amounts and larger customers tended to benefit, in the sample period, of lower interest rates. Finally, exporting firms benefited from a premium in their funding through bank loans (close to 50 basis points).

### References

Martinho, R. and Antunes, A., (2012), "A Scoring Model for Portuguese Non-Financial Enterprises", *Banco de Portugal, Financial Stability Report - November*.