

# The use of security-by-security databases to monitor the interest rate of private debt securities and to measure credit risk premium – the Portuguese case<sup>1</sup>

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## 1. Introduction

The recent turmoil in financial markets brought new challenges and demands to the compilers of statistics. The current set of statistics on financial markets seemed insufficient for an appropriate and prompt intervention of policy-makers. With the present knowledge about the holdings of mortgage-backed securities or asset-backed securities, it proved very difficult to find who ultimately bears the risk of default of underperformance loans. Only more recently, after the presentation of companies' losses, is becoming possible to measure the extent of the damage caused by the subprime loans crisis. To appropriately answer the new demands that statisticians face in this new context, the introduction of risk categories in the current set of statistics compiled by central banks should be taken into account, as well as the compilation of new statistics, able to monitor risk. In this article, the author explores the use of the Portuguese security-by-security database on issuances to monitor the interest rate of private debt securities and their corresponding spreads. Spreads are obtained from the comparison of the underlying rates of debt securities and market risk-free interest rates of similar maturity, giving a measure of the credit risk premium.

The proposal presented in this document is based on a security-by-security database on issuances, a tool increasingly used within the scope of the European System of Central Banks (ESCB). These databases were developed to comply with the obligations that were defined by European Central Bank (ECB) guidelines on several statistics. With developments in financial markets worldwide, securities statistics have increasingly gained importance. In this context, security-by-security databases enable a more efficient and harmonised production of statistical data. The security-by-security system managed by Banco de Portugal, an integrated system that includes data on issues and portfolios and covers all the economy's institutional sectors, makes it possible to cope efficiently with most information requirements in the field of securities statistics and thus of financial markets.

The coupon rates associated with debt securities, along with the dates of coupon payments, are included in these databases mostly because they are needed to calculate accrued interest and interest payments in the framework of the financial accounts and the balance of payments/international investment position. They can also be used to examine the coupon rates of private debt securities and their corresponding spreads. The regular use of security-by-security databases for this purpose is encouraged by the author as an extension of the analysis based on Monetary Financial Institutions Interest Rate (MIR) statistics, since micro data on securities and issuers are available on those databases, and also as an alternative to the use of commercial databases, the typical source for this type of analysis.

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The article is organised as follows. After the presentation of the motivation in the Introduction, in the second section the characteristics of the Portuguese database are described. The third section contains an exploratory analysis of the results. Finally, suggestions are made for the further use of security-by-security databases in this domain.

## **2. Database and methodology**

Statistical data on securities are compiled through the security-by-security system managed by Banco de Portugal (SIET, the Portuguese acronym for Securities Statistics Integrated System). This system was developed by the Statistics Department of Banco de Portugal with the purpose of gathering in a single repository all the information deemed necessary to comply with reporting statistical requirements on securities. SIET was designed to meet the user needs, at both national and international level.

In the segment of issuances, information is collected on securities issued by resident entities in Portugal, either issuance in the Portuguese market or in external markets. Data on issues are collected from several sources, namely, from the institutions that register and act as a depository for commercial paper, the listings in the Lisboa Euronext Bulletin, the Government Gazette, the Portuguese Government Debt Agency, the Monetary Financial Institutions (including the Banco de Portugal) and the entities that issue the securities, mainly when they are made in external markets. In accordance with Article 13 of the Organic Law of Banco de Portugal and the Guideline of the ECB on monetary, financial institutions and markets statistics (ECB/2007/9) of 1 August 2007, Banco de Portugal shall ensure the production of securities statistics covering issues by Portuguese residents and it may require from any public or private body the direct supply of information deemed necessary for the compilation of these statistics.

SIET stores information on the type of instrument, the institutional sector, prices (quotations), transactions and positions associated with securities issues (issues, redemptions and outstanding amounts), interest rate coupons, interest payments and maturity dates. Classification of securities and entities follows the European System of National and Regional Accounts (ESA/95), which is complemented by the ECB Guideline mentioned above. Securities are preferably identified through the ISIN code (International Securities Identification Number) and resident issuers through the NPC (Portuguese acronym for Legal Person Identification Number).

Securities issues statistics are reported to international organisations, namely the ECB and the Bank for International Settlements (BIS). In the case of the ECB, the Portuguese database also contributes to the Centralised Securities Database (CSDB). The purpose of the CSDB is the set up of a database with complete, consistent, validated and updated information on all securities relevant to the ECB's statistics. This database uses information from commercial databases and other sources, among which are the National Central Banks (NCBs) that maintain security-by-security databases.

In order to develop the analysis of this article, the following data were extracted from the database: issuer identification number, institutional sector, amount of issuance, interest rate coupons, market interest rates, issue dates and maturity dates. In the study 19,975 observations (securities) were used, 18,301 from non financial corporations and 1,674 from financial corporations.

The coupon rates are obtained from each debt security at the time of issuance and the weighted average of the coupon rates was determined by the amount issued according to the following expression:

$$\frac{\sum_{i=1}^n C_i \cdot w_i}{\sum_{i=1}^n w_i}$$

In which  $C_i$  is the coupon interest rate of security  $i$ , weighted by the amount issued each period, which is represented by  $w$ .

Spreads were obtained as the difference between the coupon rates of each security issued and the market interest rates. For every security, the same original maturity was used to compare both, coupon and risk-free market interest rates, in order to obtain the credit spread. The reference rates adopted were the Euribor (Euro Interbank Offered Rate) for short term maturities and the yields on Portuguese Treasury bonds for long term maturities. As so, spreads are represented by the expression:

$$\frac{\sum_{i=1}^n (C_i - R_i) \cdot w_i}{\sum_{i=1}^n w_i}$$

In which  $R_i$  represents the risk-free market interest rate for the same original maturity of security  $i$ .

### 3. Exploratory findings

This chapter contains an exploratory analysis of the results. The coupon rates for the financial institutions are described in chart 1.

The coupon rates are very much in line with the market risk-free interest rates for the period under observation. Note that under these coupon rates there is a mixture of several maturities, different amounts issued and distinct financial institutions, including banks, financial intermediaries and financial auxiliaries, whose characteristics are rather different between them. After examining the coupon rates, it is also feasible to obtain the spreads associated with each issue. Credit spreads reflect the particular characteristics of an obligation. For example, private debt generally has lower credit quality than sovereign debt. They also reflect the financial condition of the issuer, the issuer's industry and the issuer's home country (the country risk). If an obligation has both credit and liquidity spreads, it may be difficult to separate these into two distinct spreads. The same maturity must be used when comparing both rates, coupon and market rates. Chart 2 illustrates the results obtained for the financial sector. It can be seen that the spread is not constant over time. A negative spread means that the financial institutions were able to finance their activity by selling bonds directly to their costumers, most likely as substitutes to time-deposits. On the opposite,

Chart 1  
Financial Institutions  
coupon rates

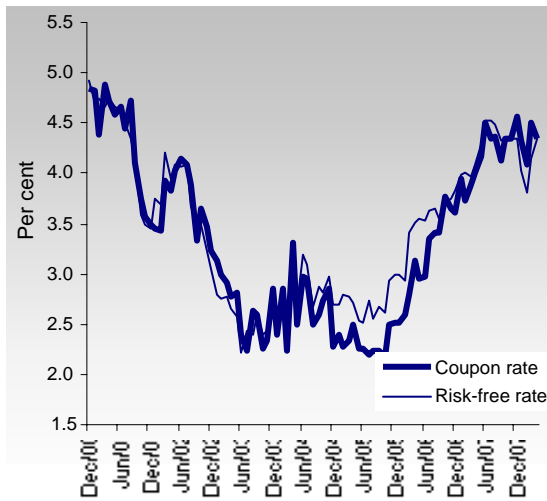
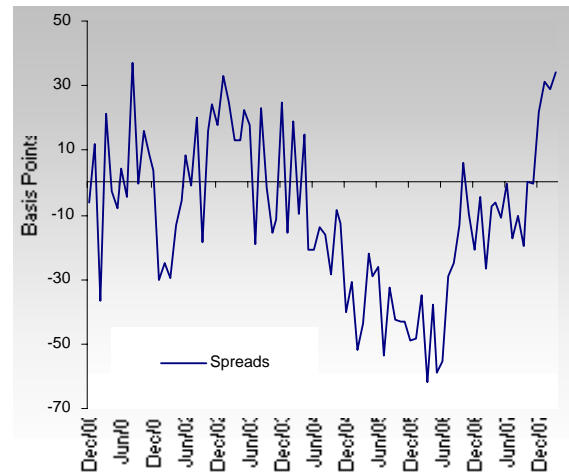


Chart 2  
Financial Institutions  
Spreads



spreads are positive when the financial institutions are out of available alternatives to finance their activity in the interbank market. Of course, high spreads may also reflect the poor conditions of one financial institution. If it really captures the financial conditions of the issuer, it was relatively high during 2001–2003, a bearish moment in the financial market, decreased until mid-2006, alongside the expansion of the world economy, and rose steadily since then, accompanying the upturn of interest rates, augmented by the recent liquidity constraints in the interbank money market. To conclude further, this analysis should be complemented with more indicators, such as the scoring attributed by rating agencies and the turnover of the money market. For the seven years under examination, the average spread was around –10 basis points, indicating that the financing through debt securities was an advantageous alternative to interbank loans.

A more detailed analysis by type of financial institution is also possible. As an example, the coupon rate associated with one particular institution (bank A) can be isolated from the dataset. Chart 3 and 4 allows the comparison between the financial sector and a single institution.

Chart 3  
Financial vs Bank A  
coupon rate

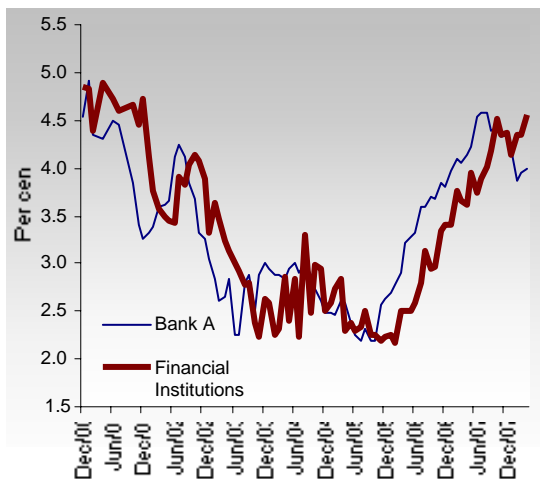
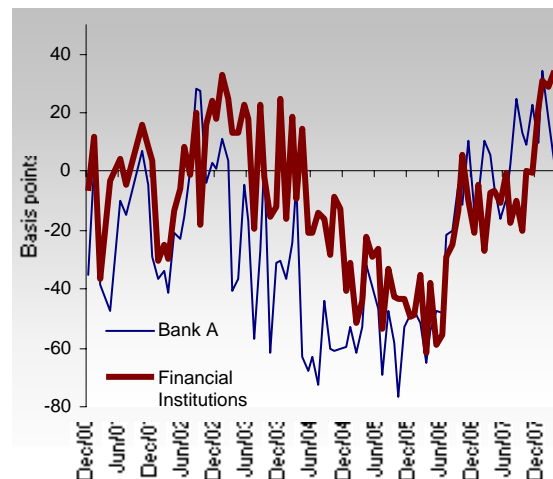
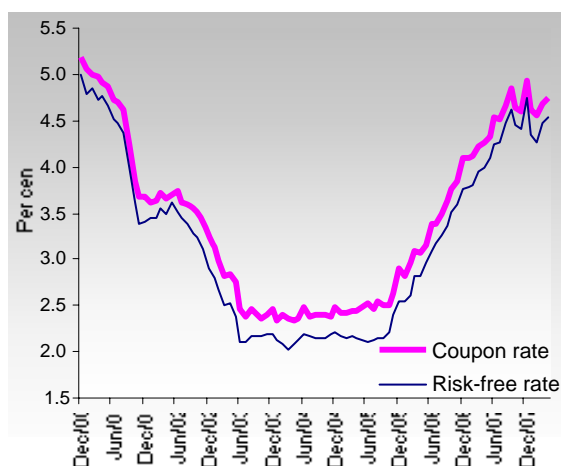


Chart 4  
Financial vs Bank A  
spreads

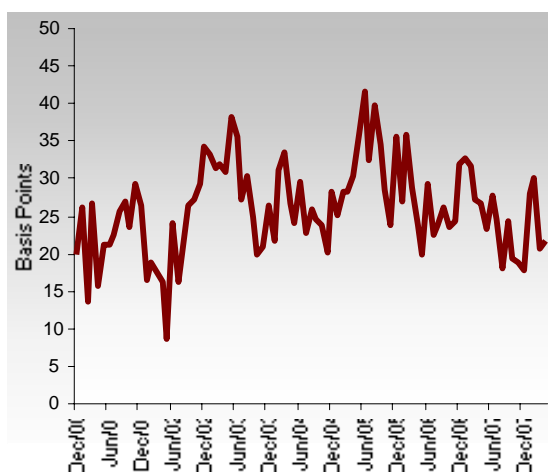


In the case of the non financial corporations, the return paid on debt securities is generally higher than the return on government bonds. The high probability of default of the debt issued forces non financial corporations to pay a premium for the higher risk – the risk premium. Chart 5 illustrates the difference between the coupon rates of the underlying securities and the corresponding risk-free rates. The coupon rates closely follow the market rates.

**Chart 5**  
**Non financial corporations**  
 Coupon vs risk free rates



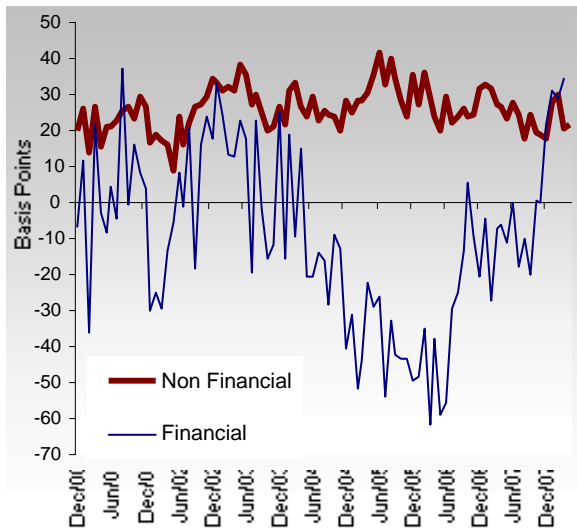
**Chart 6**  
**Non financial corporations**  
 spreads



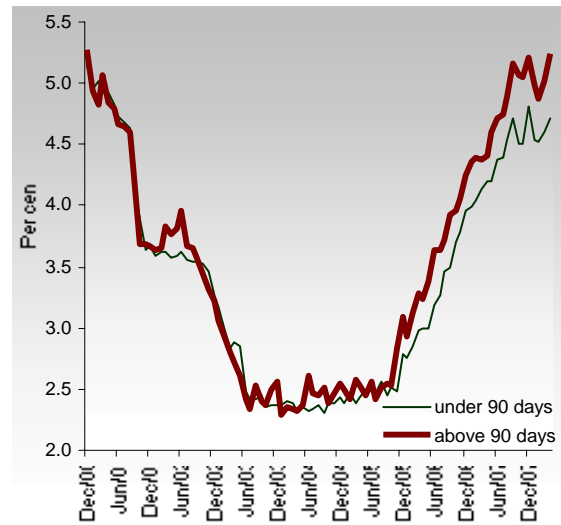
When examining spreads (chart 6), one can conclude that they were always positive, reflecting the underlying risk premium. Spreads vary between 9 and 42 basis points and the average spread during the period under analysis was 26 basis points. As expected, this spread was high above the average spread obtained in the case of the financial institutions (–10 basis points). The rather irregular pattern observed may be explained by the asymmetric characteristics of the Portuguese market, with a large number of small and medium business enterprises and few big companies.

Another interesting analysis is the comparison of the spreads between financial and non financial corporations. Chart 7 shows that the spreads of the latter are usually higher, as expected, but they were similar at some stages between 2001 and 2003 and more recently since end-2007. This may be explained by the difficulties that financial institutions are facing in order to finance their activity in the interbank market. A more detailed analysis of non financial corporations by size and by sector of economic activity would be interesting, since it would highlight the differences between them. That kind of analysis is not made in this document, but it would be relatively easy to gather that information from SIET. It is also possible to analyse the coupon rates by original maturity. Chart 8 illustrates this purpose.

**Chart 7**  
**Financial vs non financial**  
**spreads**



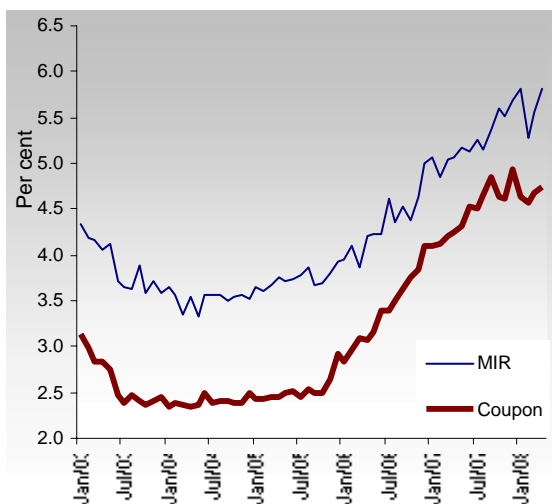
**Chart 8**  
**Non financial corporations**  
**Original maturity**



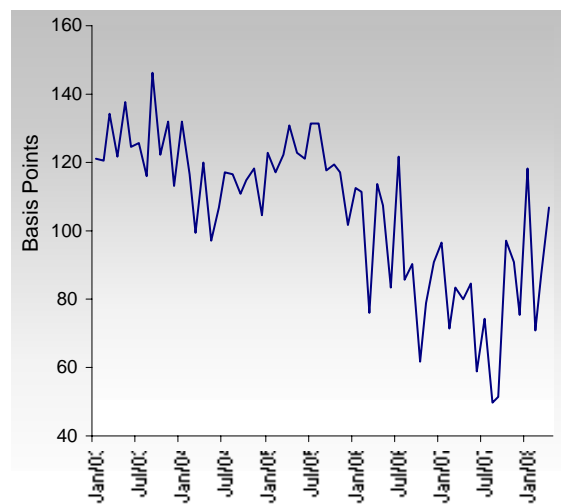
It can be concluded that, markedly since 2005, the coupon rates were higher for issues with more than 90 days of original maturity, accompanying the general increase of the interest rates and reflecting the positive slope of the yield curve since then. The reason behind this is that long term securities are less liquid compared to short term securities and investors expect a liquidity premium for investing in longer maturity securities.

A comparison can also be made between the coupon rates and the MFI<sup>3</sup> Interest Rates statistics (MIR) of new loans to non financial corporations (above 1 million euros), which are regularly compiled by the National Central Banks of the ESCB. The following charts illustrate this comparison.

**Chart 9**  
**Non financial corporations**  
**Coupon vs MIR statistics**



**Chart 10**  
**Non financial corporations**  
**Coupon – MIR statistics**



<sup>3</sup> Monetary and Financial Institutions.

Both rates are very much in line for the period under observation and the coupon rates are always below the MFI interest rates indicating that the direct financing through the issuance of securities proved to be an advantageous alternative to the traditional financing borrowing next to financial intermediaries. Possible explanations for the difference found are i) the higher costs associated with the institutional arrangements of securities issues, which are not reflected in the coupon rate, and the fact that these are usually supported by large companies, financially well structured, whose issues involve large amounts ii) since securities are available to numerous investors, there is more competition in the market. It seems to be a matter of supply (investors) and demand for funds (issuers), which brings a spread advantage over traditional borrowing from financial intermediaries. One can also observe that the difference between both indirect and direct financing of non financial corporations decreased until mid 2007, the latter becoming less attractive. Since mid 2007, the issuance of securities appeared to be a good alternative to overcome the credit restrictions imposed by financial intermediaries.

Chart 11

**Non financial corporations**  
Securities / Loans (financial accounts  
outstanding amounts)

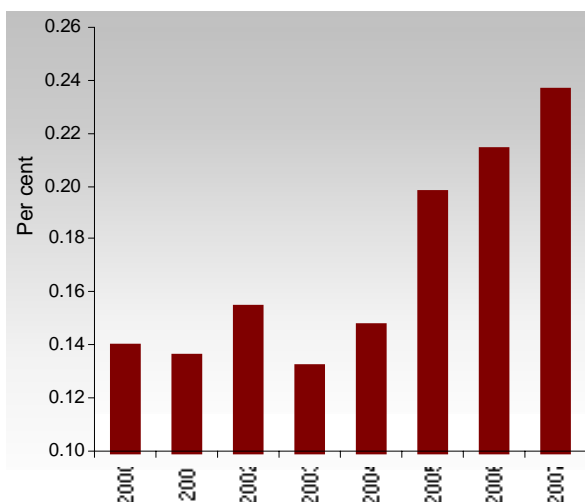
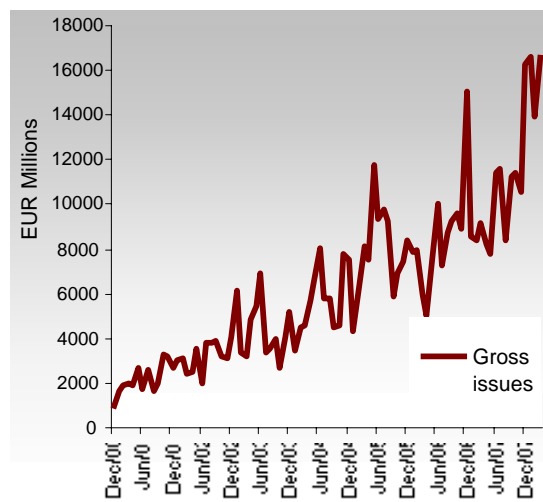


Chart 12

**Non financial corporations**  
Gross Securities Issues



Finally, charts 11 and 12 illustrate the growing importance of the direct financing through securities. It can be concluded that the direct financing via securities gained importance, markedly since 2005, and that the gross issues rose steadily since 2000.

#### 4. Steps forward

In the previous chapter, some exploratory findings were presented in order to illustrate the vast capability of the analysis of the coupon rates associated with securities issues. In this chapter, various steps forward are proposed. In the case of the financial institutions, since underneath the coupon rates estimated there is a mixture of several maturities, different amounts issued and distinct financial institutions, including banks, other financial intermediaries and financial auxiliaries, whose characteristics are rather different between them, a more detailed analysis by type of financial institution is also possible and desirable. When comparing the coupon rates with the interbank interest rates, positive spreads were found possibly indicating that the financial institutions were out of available alternatives to finance their activity. To conclude further, this analysis should be complemented with data on the investors of the securities issued and with more indicators, such as the scoring attributed by rating agencies and the turnover of the money market.

Concerning the non financial corporations, a more detailed analysis by size and by sector of economic activity would be interesting, since it would highlight the differences between them. That kind of analysis is not made here, but it would be relatively easy to gather that information from the SIET database. Another possible extension would be the introduction of solvency and financial debt ratios by company, with the aim of measuring the degree of differentiated spreads. These ratios by company can be straightforwardly obtained from the Central Balance-Sheet Database, which is also maintained by the Banco de Portugal. The analysis of interest rates based on security-by-security databases could also be used as an extension of the MFI Interest Rate statistics (MIR), which are defined under a Regulation (ECB/2001/18). It would allow the examination of the different characteristics of non financial corporations, since micro data by company and issuance would be available. Then, the reasons for the positive difference between MIR and coupon rates could be analysed.

Additionally, security-by-security databases could also be used to calculate spreads as a replacement for commercial databases, which are the most common source for this type of output.

## **5. Summary**

More than a deep analysis of the coupon rates or the risk premium of Portuguese private institutions, this article presents an idea: the use of security-by-security databases to explore the interest rate of private debt securities and their corresponding spreads. The proposal presented in this document was based on one of the databases used within the scope of the European System of Central Banks. The coupon rates associated with the debt security, along with the dates of coupon payments, are included in these databases mostly because they are needed to calculate the accrued interest and the interest payment in the framework of the financial accounts and the balance of payments/international investment position. This paper explores the use of the Portuguese security-by-security database on issuances to monitor the interest rate of private debt securities and also to measure credit risk premia through spreads. Spreads were obtained from the comparison of the underlying rates of debt securities and market risk-free interest rates of similar maturity, giving a measure of the credit risk premium. Some exploratory findings were presented and various steps forward were proposed. Among other findings, the coupon rates and spreads were examined for financial and non financial corporations and some extensions were tested, such as the split by original maturity.

The analysis of interest rates based on security-by-security databases could also be used as an extension of the MFI Interest Rate statistics (MIR), which are defined under a Regulation. It would allow the examination of the different characteristics of non financial corporations, like dimension and sector of economic activity, since micro data by company and issue would be available. Like MIR, these coupon interest rates would enable an additional assessment of the impact of monetary policy on the economy and facilitate an analysis of the transmission mechanism of monetary policy, in particular of the extent and the speed of the pass-through of official rates to the borrowing of non financial corporations. Additionally, security-by-security databases could also be used to calculate spreads as a replacement for commercial databases, which are nowadays the most common source for this type of output. Since the security-by-security databases are widely used within the ESCB, it would be a less expensive alternative and it could be extended to the CSDB. Finally, as security-by-security databases also cover portfolios, the compilation of assets by risk category and by institutional sector might also be feasible in the future.



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