CREDIT DERIVATIVES DISCLOSURE IN BANKS' RISK REPORTING: EMPIRICAL EVIDENCE FROM FOUR LARGE EUROPEAN BANKS

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Abstract

This paper aims to analyze the derivatives disclosure in banks' annual risk reports. In this paper, the author uses content analysis to examine the qualitative and quantitative profiles of the derivatives disclosure at a cross-country level, with particular reference to credit derivatives. The empirical research is conducted on a sample of large European banks. The paper also shows that there is room to improve various aspects of derivatives disclosure, and provides some useful insights for further research. The derivatives disclosure in banks' annual risk reports has deep managerial, financial, regulatory and accounting implications at a firm and industry levels, and the comprehension of the rational underlying it is critical to maintaining competitive advantages in the banking industry and informational and allocative efficiency in the financial markets. Although the existence of substantial research on credit derivatives and financial statements in the literature, none have directly focused on credit derivatives disclosure at a cross-country level applying the content analysis based on an objective evaluation approach. It leaves a gap that the paper aims to overcome.

Keywords: Risk Reporting, Risk Disclosure, Credit Derivative, Banking, Financial Regulation, Risk Management, Banking Risk

1. INTRODUCTION

Risk disclosure, and credit derivatives disclosure particularly, is a pivotal topic in banking. The attention on banking risks and risk reporting has improved enormously in the last times due to the turmoil in the financial systems, the growing regulatory and accounting requirements in the banking industry, and the growing complexity of banking activity, especially large and multi-business banks.

In this paper we make an empirical analysis of credit derivatives disclosure with reference to four largest European banks, using the content analysis as a research method. The paper shows that different aspects of derivative disclosure can be improved, discusses some policy and theoretical implications, and provides some useful suggestions for further research.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 analyses the methodology that has been used to conduct empirical research on risk disclosure. Section 4 introduces credit derivatives and bank risk management. It aims to highlight the nature and functions of credit derivatives and provide a risk management perspective. Section 5 provides an accounting perspective on credit derivatives in banking. Section 6 analyses the research design of the empirical study. Section 7 analyses and compares the results of the empirical research. Section 8 discusses the research findings. Section 9 provides some proposals for a better credit derivative disclosure in banking and for future research. Section 10 concludes.

2. LITERATURE REVIEW

The derivative disclosure is essential for banks' stakeholders to assess the bank's risk exposures and to make decisions. It is necessary that an adequate disclosure on banks' credit derivative exposures does not stay within the boundaries of a bank, but it

should be provided to all stakeholders. Risk disclosure contributes to reducing asymmetric information (Akerlof, 1970; Leland & Pyle, 1977). Disclosing information about banking risks and their derivative portfolios will result in a reduction of the information asymmetry and agency problems (Fama & Jensen, 1983; Jensen & Meckling, 1976) among stakeholders in banking. Bank managers have more information about risks that might affect future results than other stakeholders. From this view, risk disclosure can be intended as an incentive device (Armstrong et al., 2010; Dobler, 2008) to make a level with different stakeholders' interests and to better perform the functions of screening, selection, and monitoring (Diamond, 1984). Risk disclosure acts also as a signal of the soundness and stability of a bank; it performs a signaling mechanism for the market (Leland & Pyle, 1977; Ross, 1977). By disclosing more information about risks, shareholders and other stakeholders are able to correctly appreciate the bank's performances and market value (Belcredi, 1993; Linsley & Shrives, 2005; Linsley et al., 2006). Risk transparency allows users to make more informed decisions on banks' performances and strategies. Disclosing information about banking risks will give the opportunity to maximize shareholders' value (Carey & Stulz, 2007). Consequently, a risk disclosure threshold has to be established by accounting standard setters and banking regulators, otherwise, the efficacy of risk disclosure would be affected by a "firm-specific" principal-agent problem.

In the last decades, many studies have examined bank disclosure from different points of view, mainly accounting and financial markets efficiency perspectives. Recent studies have analyzed specifically risk reporting in bank's annual reports (Ahmed et al., 2006; Ammon, 1996; Chalmers & Godfrey, 2000; Gaetano, 1996; Malinconico, 2007) by using content analysis (Abraham and Cox, 2007; Beattie et al., 2004; Beretta and Bozzolan, 2004; Bernini et al., 2011; Bryan 1997; Linsley & Shrives, 2005; Linsley et al., 2006; Neri, 2011; Scannella, 2018; Scannella and Polizzi, 2018; Woods & Marginson, 2004). In this perspective, risk disclosures and banking risks have to be analyzed using a holistic approach (Tutino, 2013; Tutino et al., 2011).

Although the existence of a large quantity of research on credit derivatives and financial statements in the banking literature, none have directly focused on credit derivative disclosure at a cross-country level, with homogeneous banking regulations, applying the content analysis based on an objective evaluation approach. This paper provides insights to overcome the gap in the literature.

3. RESEARCH METHODOLOGY

In this paper, the content analysis is used to measure the quality and quantity of credit derivative disclosure in banking.

The content analysis, as a "research technique for making replicable and valid inferences from texts to the contexts of their use" (Krippendorff, 2004), and as "a research technique for the objective, systematic and quantitative description of the manifest content of communication" (Berelson, 1952), is the methodology that has been mostly used by many researchers to examine and evaluate risk reporting in annual reports. Over the years, content analysis has been widely used in many research areas (Holsti, 1969; Weber, 1990). The content analysis enables researchers to investigate, evaluate, systematize, and categorize a large amount of textual information, such as the information that is published in banks' risk reporting. The aim of the content analysis is to organize and elicit meaning from collected data. Consequently, we argue the appropriateness of the use of content analysis for conducting empirical research on risk disclosure.

By using a scoring model based on key disclosure parameters, this paper shows evidence that banks provide different credit derivative risk reporting, even though they are compliant to a harmonized regulatory and accounting framework.

Although the topic of risk disclosure has increased in the last years, there are not so many empirical researches that examine cross-country and industry-specific factors. In this empirical research, we employ a content analysis methodology than aims to evaluate the quality and quantity of credit derivative disclosure in banking.

4. CREDIT DERIVATIVES AND RISK MANAGEMENT IN BANKING

Credit derivatives are credit risk transferring instruments. They are used by banks and other financial institutions (mainly insurance companies) for credit risk management purposes, as they provide an effective means to hedge and trade credit risk. Credit derivatives separate the credit risk trading from asset trading.

Credit derivatives are over-the-counter financial instruments, exchanged on a bilateral transaction scheme where two parties (protection buyer and protection seller) decide to trade credit risk arising from a specific asset, usually called "reference obligation" (Chance & Brooks, 2012; Chaplin, 2010; Choudhry, 2013; Das, 2005; Tavakoli, 1998).

Credit derivatives offer a flexible approach to conduct credit risk management in banking since they can be tailored to reflect the specific characteristics of credit risk exposures, and credit risk management purposes (Dunbar, 2011; Mengle, 2007; Murphy, 2013; Steinherr, 2000). Hedging continues to be the predominant reason for the use of derivatives. Speculation is the second reason behind the widespread of credit derivatives in financial markets. Speculators use derivatives not to reduce financial risk but to potentially profit from it. They gain exposures to credit risk without the need to purchase the underlining asset. At the same time, they provide liquidity that makes risk hedging achievable (Drago, 1998). Another important reason for the use of derivatives is the arbitrage (McDonald, 2013).

A critical aspect that makes the credit derivatives instruments very attractive to banks is that credit risk might have a huge impact on bank performance (Bomfim, 2005; Culp, 2004; Nelken, 1999; Onado, 2004, 2018). Banks are exposed to credit risk since their core business is lending, mainly in the commercial banking business, and investing in bonds issued by firms, mainly in the investment banking business. Credit risk is a serious threat for banks and even more for the stability of the financial industry since the interconnections

among financial institutions provide a contagion mechanism by which financial crises spread, as reflected by the systemic risk (Acharya & Richardson, 2009; Hull, 2018).

Credit risk transfer provides many advantages to banks. It reduces the regulatory capital requirements on credit exposures. Consequently, it will free bank capital that could be used to make more loans. At the same time, the bank keeps maintaining the relationships with borrowers. Another important aspect that makes the credit derivatives attractive is that they allow banks to diversify their credit portfolios, especially for small and medium banks, without negotiating the asset itself (Drago, 2014; Scannella, 2013).

The credit risk transfer has microeconomic and macroeconomic implications. Since credit derivatives instruments allow the credit risk transfer and the overall reduction of credit risk exposure, banks may attenuate the lending standards and the monitoring of credit exposures subject to risk transfer. In this perspective, a bank has fewer incentives to control and monitor borrowers.

Therefore, bank lending can increasingly be characterized by a decreasing level of accuracy towards the creditworthiness of the borrower, determining a potential increase in the overall level of credit risk in the financial industry. The high degree of interdependences among financial institutions may increase the systemic risk that follows the growth of credit derivatives (Basel Committee on Banking Supervision, 2005, 2008; Duffee & Zhou, 2001; Instefjord, 2003; International Monetary Fund, 2006).

At the microeconomic level, we can observe that the expansion of the credit risk transfer market has contributed to the transformation of the traditional banking business model called "originate-to-hold" into the new one called "originate-to-distribute". According to the first business model, a bank originates loans and holds them in their balance sheet until their maturity. Instead, in the originate-to-distribute business model, a bank does not provide all the functions of the previous model, but it specializes mainly in the origination and servicing activities. Consequently, the previous "relationship banking" approach is replaced by a "transactional banking" approach, in which banks do not have strong incentives to establish a long-term financial tie with borrowers (Baravelli, 2011; Mottura, 2011, 2016; Ruozi, 2015; Scannella, 2011).

Credit derivatives were first introduced in 1993, but they have experienced very rapid growth since then Basel Committee started in December 2004 publishing data on credit derivatives market. At the end of 2016, the Bank for International Settlement (2016) estimated that the total notional principal underlying outstanding credit derivatives were close to $6 trillion. It was $57,894 trillion in 2007. As a share of all OTC derivatives, credit derivatives fell from 10% to 2% (in terms of notional amounts) between end-June 2007 and end-June 2016, and from 8% to 2% (in terms of gross market value).

Briefly, credit derivatives are effective tools for credit risk management in banking. With credit derivatives, it is possible to isolate the credit risk from the risk/return profile of a financial asset. As an insurance instrument, credit derivatives allow banks to protect their credit exposures against borrowers' defaults or other credit events.

5. CREDIT DERIVATIVES IN BANKING: AN ACCOUNTING PERSPECTIVE

Accounting for credit derivatives is based on the accounting standards for derivatives and are covered by IAS 39 that establishes principles for recognizing and measuring financial assets, financial liabilities. IAS 39 has been removed by IFRS 9 in January 2018.

At the time of initial recognition, all derivatives are measured at fair value. After the initial recognition, the fair value changes of derivatives are recognized in profit or loss of the bank's balance sheet. Special hedge accounting requirements are provided for hedging instruments (Chalmers & Godfrey, 2000; Ramirez, 2015; Rutigliano, 2011, 2016). Initially, the "fair value" was defined in IAS 39 as the price for which an asset can be negotiated, or a liability settled, between knowledgeable parties in an arm's length transaction. After that, IFRS 13 has revisited this definition. It describes the fair value on the basis of an "exit price" notion and uses a "fair value hierarchy". IFRS 13 defines fair value as the price that can be obtained to sell an asset or to transfer a liability ("exit price") in an orderly transaction between market participants. IFRS 13 provides a three-level hierarchy of fair value measurements. IFRS 13 requires to use valuation methods that are appropriate with reference to available data.

Derivatives are often measured by using market prices in an active market (fair value hierarchy: level 1). When there are not any available market prices, its fair value is calculated using appropriate evaluation methods: if inputs are observable we have the level 2 fair value hierarchy. On the contrary, if inputs are unobservable we have the level 3 fair value hierarchy. Over-the-counter derivatives are usually evaluated by using measurement methodologies because there are not any discernable market prices.

As we have seen above, the use of derivative instruments is widespread among financial institutions. This increases the importance of an accurate credit derivative disclosure in banking, particularly with respect to the ongoing turmoil in world financial systems. An appropriate evaluation of a bank's risk exposures is possible if a bank discloses information not only on its accounting policies and practices where financial risks arise (i.e. investments, proprietary trading, lending, funding) but also on credit derivatives in banks' portfolios (Bessis, 2015; Sironi & Resti, 2008).

In 2002, the European Union started a process of accounting harmonization with the aim to adopt a common accounting language. This process began with the adoption by the European Parliament and the Council of the Regulation n. 1606/2002 of 19 July 2002 on the application of IAS standards in order to harmonize and compare the financial information provided by European banks in their financial statements, both across time and space (Bisoni et al., 2012; Tutino, 2009, 2015). Since January 2006, European financial institutions have been disclosing information on risk exposures and derivatives accordingly to International Accounting Standards.

With the directive 2001/65 the European Parliament and of the Council have recommended a fair value accounting scheme for the evaluation of most financial instruments, including derivatives, for the annual and consolidated statements of banks and other financial institutions.

More risk reporting requirements are proposed by Basel II. This bank capital adequacy framework consists of three pillars. For the purpose of this research, Pillar 3 is the most important one, because it aims to promote an effective market discipline mechanism of the financial markets that is mainly based on disclosure frameworks. Pillar 3 requires quantitative and qualitative information to be disclosed for each type of banking risk.

It is essential to notice that both Basel II and International Accounting standards require risks to be disclosed "through the eyes of management" and to be "consistent with the approaches and methodologies that the directors use to assess and manage the bank's risk" (Linsley & Shrives, 2005).

In this section, we briefly analyzed the most important regulation and accounting standards that represent the regulatory and accounting framework of derivatives disclosure in banking. This will help discern between obligatory and voluntary disclosure in banking, and it sets the background behind the bank's disclosure strategies and practices. Next section depicts the research design of the empirical investigation.

6. AN EMPIRICAL STUDY ON CREDIT DERIVATIVES DISCLOSURE IN BANKING: RESEARCH DESIGN

The main purpose of this study is to examine the differences among banks with reference to credit derivative disclosure in annual reporting. In order to do this research, we have analyzed the information on credit derivatives in the 2015's Annual statements and Pillar 3 reports of four large European banks. This is a cross-country research established on one-year risk reporting. It is not historical analysis. We decided to investigate 2015 because it is a sort of "timeline" in derivative disclosure in banking.

The banks considered in this empirical research are the largest ones in Europe, one for each country, ranked by market capitalization: BNP Paribas, Banco Santander, Intesa Sanpaolo, and Deutsche Bank (Table 1). These banks have some characteristics in common that enhance the accuracy of the content analysis: they have a market capitalization greater than 20 billion euro; all of them are global and multi-business banks; each one is the most significant bank in its own country; their size calls for a "too big to fail" policy; with the exception of Intesa Sanpaolo, they are "global systemically important banks" (Financial Stability Board, 2015).

Table 1.Sample

Bank	***Country***	***Market capitalization (2016)*** *(data in billions of euro)*
BNP Paribas	France	75,5
Banco Santander	Spain	73,6
Intesa Sanpaolo	Italy	40,5
Deutsche Bank	Germany	23,8

In this paper, we propose a scoring model to evaluate credit derivative disclosure in banking. This model provides two disclosure ratios for each bank based on key disclosure parameters, that will be used to compare the quality of banks' derivative disclosure:

- the derivative transparency ratio (DTR): it gives an overview of the derivative disclosure in banking;
- the credit derivative transparency ratio (CDTR): it focuses only on credit derivative information.

In order to provide the first ratio (*derivative transparency ratio*) we have chosen 10 meaningful risk disclosure parameters as follows: reasons to hold derivative instruments; fair value hierarchy; valuation techniques, notional amount of derivatives disaggregated by use; fair value of derivatives disaggregated by use; notional amount of derivatives disaggregated by hedge accounting category; fair value of derivatives disaggregated by hedge accounting category; notional amount of derivatives by instrument type; fair value of derivatives by instrument type; maturity of derivative instruments. For each parameter, we have assigned "1" or "0" score: score "1" means that a bank discloses the piece of information; score "0" means that a bank does not disclose the piece of information, and the bank fails to provide any information required. The transparency of derivative information is calculated by dividing the total score for each bank by the maximum score. The derivative transparency ratio (DTR) is equal to "bank's score/bank's total maximum score".

In order to provide the second ratio (*credit derivative transparency ratio*) we have chosen 4 meaningful risk disclosure parameters as follows: credit derivatives by protection and portfolio type; credit risk mitigation techniques; fair value of credit derivatives; notional amount of credit derivatives. For each parameter, we have assigned "1" or "0" score: score "1" means that a bank discloses the piece of information; score "0" means that a bank does not disclose the piece of information, and the bank fails to provide any information required. The transparency of credit derivative information is calculated by dividing the total score for each bank by the maximum score. The credit derivative transparency ratio (CDTR) is equal to "bank's score/bank's total maximum score".

By reading the 2015 annual reports, qualitative and quantitative data on derivative disclosure are collected and analyzed through the application of content analysis on the published disclosure statements (Annual statements and Pillar 3 reports). This analysis is not based on software. In the disclosure indices, each of the 14 key parameters is treated equally. The most important characteristic of this content analysis is the absence of any subjective evaluation. The final result of the scoring model includes qualitative and quantitative key information that is analyzed using an objective evaluation approach. So, it means that the disclosure indices do not involve any subjective judgment. The disclosure indices detect differences in transparency across banks.

The content analysis we propose in this paper provides a scoring model based on a binary evaluation scheme ("0" or "1" score) to evaluate the risk reporting. This is the most important aspect of

the methodology. Furthermore, it is not based on users perspectives. Consequently, it cannot evaluate the usefulness of risk disclosure and the level of satisfaction of users of the bank's risk disclosure. Specifically, it leaves unanswered the question of whether risk disclosure in banking adds "pages" to annual reports rather than increases transparency. More disclosure does not necessarily imply an increase of transparency. It is crucial to differentiate between disclosure and transparency (Beretta and Bozzolan, 2008; Freixas and Laux, 2012). The next section will discuss the empirical research results more in depth.

7. RESULTS

In this section, we discuss the results of the empirical research we have conducted on the following banks: BNP Paribas, Banco Santander, Intesa Sanpaolo, and Deutsche Bank.

7.1. BNP Paribas: derivative transparency ratio

BNP Paribas provides information about: fair value hierarchy; valuation technique, notional amount of derivatives disaggregated by use; fair value of derivatives disaggregated by use; fair value of derivatives disaggregated by hedge accounting category; fair value of derivatives by instrument type; date of maturity of derivative instruments.

BNP Paribas provides details about the fair value hierarchy in the section "Instrument classes and classification within the fair value hierarchy for assets and liabilities measured at fair value" of the Notes for the year 2015. Assets and liabilities are categorized into the fair value hierarchy:

- level 1: fair values are determined using market prices in active markets. Level 1 positions include all derivatives that are listed on exchanges markets or other active markets;
- level 2: crucial inputs of evaluation methods are observable market data, either directly or indirectly. Level 2 positions include instruments such as credit default swaps, equity/foreign exchange (FX)/commodities forwards and options, interest rate swaps, caps, floors and swaptions, structured derivatives such as exotic options, mono- and multi-underlying equity/funds derivatives;
- level 3: the evaluation of the fair value is based on crucial inputs that are unobservable in the secondary market of financial instruments. Complex derivatives in level 3 class include hybrid instruments, credit correlation instruments, stock basket optional instruments.

With reference to the valuation techniques, the main ones used by BNP Paribas to calculate the fair value of the derivative instruments are the following:

a) interest rate derivatives: prepayment modelling, discounted cash flows, hybrid forex interest rate option pricing model, inflation pricing model, interest rates option pricing model;
b) credit derivatives: recovery modelling and base correlation projection methods, credit default model, stripping, extrapolation and interpolation;
c) equity derivatives: several volatility option models.

A score 0 is assigned to the parameter "reasons to hold derivative instruments" because BNP Paribas does not disclose any information.

BNP Paribas provides a disaggregation of derivatives by use and their fair value: derivatives held for hedging and derivatives held for trading purposes. Interest rate derivatives are mainly used for hedging purposes. It also discloses information on the fair value of derivatives disaggregated by hedge accounting category in the note 5.b of the 2015 Annual Report, and the fair value of derivatives by instrument type. BNP Paribas failed to provide the notional amount of derivatives disaggregated by hedge accounting category and the notional amount of derivatives by instrument type, thus a score of 0 is assigned to these items. BNP Paribas discloses information as regards the fair value of derivative contracts by maturity in section "Contractual maturities of the balance sheet". Derivative financial instruments are included in the "not determined" maturity section. Briefly, the BNP Paribas' derivative transparency ratio (DTR) is equal to 0,7 (total score/bank's total maximum score = 7/10).

Table 2. BNP Paribas: Derivative transparency ratio

Risk disclosure parameters	*Score*
Reasons to hold derivative instruments	0
Fair value hierarchy	1
Valuation techniques	1
Notional amount of derivatives disaggregated by use	1
Fair value of derivatives disaggregated by use	1
Notional amount of derivatives disaggregated by hedge accounting category	0
Fair value of derivatives disaggregated by hedge accounting category	1
Notional amount of derivatives by instrument type	0
Fair value of derivatives by instrument type	1
Maturity of derivative instruments	1
Total score	*7*

Sources: BNP Paribas, Annual statement and Pillar III report, 2015.

7.2. BNP Paribas: Credit derivative transparency ratio

BNP Paribas does not provide any information about the protection and portfolio type of credit derivatives, thus a score 0 is assigned to this item. BNP Paribas uses netting agreements in order to reduce credit risk that is related to derivative trading. The Fédération Bancaire Française (FBF) and the International Swaps and Derivatives Association (ISDA) provide the most used agreement frameworks. It also discloses information about the notional amount and the fair value of credit derivatives. Briefly, the BNP Paribas' credit derivative transparency ratio (CDTR) is equal to 0,75 (total score/bank's total maximum score = 3/4).

Table 3. BNP Paribas:
Credit derivative transparency ratio

Risk disclosure parameters	*Score*
Credit derivatives by protection and portfolio type	0
Credit risk mitigation techniques	1
Fair value of credit derivatives	1
Notional amount of credit derivatives	1
Total score	*3*

Sources: BNP Paribas, Annual statement and Pillar III report, 2015.

7.3. Banco Santander: Derivative transparency ratio

Banco Santander provides complete information about the reasons to hold derivative instruments; fair value hierarchy; valuation techniques; notional amount of derivatives disaggregated by use; fair value of derivatives disaggregated by use; aggregate notional amount of derivatives disaggregated by hedge accounting category; fair value of derivatives disaggregated by hedge accounting category; notional amount of derivatives by instrument type; fair value of derivatives by instrument type.

Banco Santander negotiates derivatives for the following reasons: management of customers' exposures to market and credit risks; management of own risk exposures (hedging derivatives); trading derivatives.

Banco Santander provides details about the fair value hierarchy in the section "Valuation technique" of the Notes for the year 2015. The hierarchy establishes three categories for valuing financial instruments:

- level 1: quoted prices in active financial markets. Level 1 positions include, exchange-traded derivatives, government debt securities, equity securities and short positions in securities;
- level 2: observable market data are available for internal models. Level 2 positions include loans and advances to banks, loans and advances to customers, equity and credit derivatives, debt securities, equity securities, exchange rate derivatives, interest rate derivatives, deposits by banks;
- level 3: observable market data are not available for internal models. Level 3 positions include exchange rate derivatives, loans and advances to customers, equity and credit derivatives, equity securities and debt securities in issue debt securities.

Banco Santander uses several types of derivatives, including both exchange-traded and over-the-counter (OTC) instruments. Most of the derivatives are traded in the OTC market and are classified within level 2 in the fair value hierarchy. These consist of swaps, index and securities options, exchange rate options, interest rate futures, interest rate options. The value of level 3 derivatives is based on unobservable inputs or are traded less actively or traded in less-developed markets, such as some cross-currency swaps, credit default swaps and options.

The main techniques used by Banco Santander to calculate the fair value of derivatives are the following:

- swaps and interest rate futures: present value method;
- exchange rate options, index and securities options: Black-Scholes Model;
- interest rate options: Black-Scholes Model and Heath-Jarrow-Morton Model;
- other derivatives: Monte Carlo valuation model.

Banco Santander provides a disaggregation of derivatives by use: derivatives held for hedging and derivatives held for trading purposes. Banco Santander discloses, also, the notional amount and the fair value of derivatives disaggregated by hedge accounting category and instrument type in the 2015's Annual Report. Interest rate swaps are mainly used for hedging purposes. The maturity of derivative instruments is not specified by Banco Santander Group, thus a score 0 is assigned to this item. Briefly, Banco Santander's derivative transparency ratio (DTR) is equal to 0,9 (total score/bank's total maximum score = 9/10).

Table 4. Banco Santander: Derivative transparency ratio

Risk disclosure parameters	*Score*
Reasons to hold derivative instruments	1
Fair value hierarchy	1
Valuation techniques	1
Notional amount of derivatives disaggregated by use	1
Fair value of derivatives disaggregated by use	1
Notional amount of derivatives disaggregated by hedge accounting category	1
Fair value of derivatives disaggregated by hedge accounting category	1
Notional amount of derivatives by instrument type	1
Fair value of derivatives by instrument type	1
Maturity of derivative instruments	0
Total score	***9***

Sources: Banco Santander, Annual statement and Pillar III report, 2015.

7.4. Banco Santander: Credit derivative transparency ratio

Banco Santander's Pillar 3 report (at page 151) provides statistics about the amount (in thousands of euros) of credit derivatives, divided between bought and sold protection and by portfolio type (regulatory banking book and regulatory trading book).

Banco Santander employs many methods to mitigate and reduce credit risk exposures in derivative trading by entering into framework agreements for the netting-off of asset positions (such as ISDA Master Agreements) and the provision of collateral for non-payment. Banco Santander also discloses information as regards the notional amount and the fair value of credit derivatives. Briefly, Banco Santander's credit derivative transparency ratio (CDTR) is equal to 1 (total score/bank's total maximum score = 4/4).

Table 5. Banco Santander: credit derivative transparency ratio

Risk disclosure parameters	*Score*
Credit derivatives by protection and portfolio type	1
Credit risk mitigation techniques	1
Fair value of credit derivatives	1
Notional amount of credit derivatives	1
Total score	*4*

Sources: Banco Santander, Annual statement and Pillar III report, 2015.

7.5. Intesa Sanpaolo: Derivative transparency ratio

Intesa Sanpaolo provides complete information about fair value hierarchy; valuation techniques, the notional amount of derivatives disaggregated by use; fair value of derivatives disaggregated by use; the aggregate notional amount of derivatives disaggregated by hedge accounting category; fair value of derivatives disaggregated by hedge accounting category.

Intesa Sanpaolo provides details about the "fair value hierarchy" in Part A.2 "Information on Fair Value" of the Notes for the year 2015. There are three different levels:

- level 1: contributed equities and bonds, spot exchange rates, and derivatives for which quotations are available on an active market;
- level 2: bonds that do not have an official price in an active market, derivatives measured through specific models, whose parameters are a quote in the market;
- level 3: internal models based on unobservable market data.

The main techniques used by Intesa Sanpaolo to calculate the fair value of derivatives are the following:

- interest rate derivatives: net present value, Libor Market Model, Bivariate lognormal, etc.
- foreign exchange rate derivatives: net present value FX, Garman-Kohlhagen, Lognormal with Uncertain Volatility, Stochastic Local Volatility;
- equity derivatives: Net present Value, Generalised Black-Scholes, Heston, Jump Diffusion;
- commodity derivatives: net present value, Generalised Black-Scholes, Independent Forward.

Intesa Sanpaolo provides a disaggregation of derivatives by use: derivatives held for hedging and derivatives held for trading purposes. It also discloses the notional amount and the fair value of derivatives disaggregated by hedge accounting category in section 8 of the 2015's Annual Report.

Intesa Sanpaolo does not show any information on the notional amount and fair value of derivatives by instrument type, and the date of maturity of derivative instruments. Consequently, score 0 is assigned to these items. Briefly, Intesa Sanpaolo's derivative transparency ratio (DTR) is equal to 0,6 (total score/bank's total maximum score = 6/10).

Table 6. Intesa Sanpaolo: derivative transparency ratio

Risk disclosure parameters	*Score*
Reasons to hold derivative instruments	0
Fair value hierarchy	1
Valuation techniques	1
Notional amount of derivatives disaggregated by use	1
Fair value of derivatives disaggregated by use	1
Notional amount of derivatives disaggregated by hedge accounting category	1
Fair value of derivatives disaggregated by hedge accounting category	1
Notional amount of derivatives by instrument type	0
Fair value of derivatives by instrument type	0
Maturity of derivative instruments	0
Total score	*6*

Sources: Intesa Sanpaolo, Annual statement and Pillar III report, 2015.

7.6. Intesa Sanpaolo: Credit derivative transparency ratio

Intesa Sanpaolo's Pillar 3 provides statistics about the notional amount (in millions of euros) of credit derivatives, divided between bought and sold protection and by portfolio type (regulatory banking book and regulatory trading book).

Intesa Sanpaolo mitigates the exposure with reference to OTC derivatives, by using two techniques: bilateral netting agreements (by entering into ISDA agreements); collateral agreements to cover OTC derivatives transactions.

Intesa Sanpaolo discloses information as regards the notional amount and the fair value of credit derivatives. Briefly, Intesa Sanpaolo's credit derivative transparency ratio (CDTR) is equal to 1 (total score/bank's total maximum score = 4/4).

Table 7. Intesa Sanpaolo: Credit derivative transparency ratio

Risk disclosure parameters	*Score*
Credit derivatives by protection and portfolio type	1
Credit risk mitigation techniques	1
Fair value of credit derivatives	1
Notional amount of credit derivatives	1
Total score	*4*

Sources: Intesa Sanpaolo, Annual statement and Pillar III report, 2015.

7.7. Deutsche Bank: Derivative transparency ratio

Deutsche Bank provides information about the reasons to use derivative instruments; fair value hierarchy; fair value of derivatives disaggregated by use; fair value of derivatives disaggregated by hedge accounting category; maturity of derivative instruments.

Deutsche Bank holds derivatives for different reasons: to attenuate its market risks with reference to asset and liability management (hedging derivatives); to gain profits in derivatives markets (trading derivatives); to meet customers' risk management needs. Deutsche Bank uses different types of derivatives.

Deutsche Bank provides details about the fair value hierarchy in note 14 "Financial instruments carried at Fair value" to the consolidated financial statements for the year 2015. The financial instruments are classified into three levels of the fair value hierarchy:

- level 1: it includes exchange-traded derivatives and equity securities traded on active markets, government bonds;
- level 2: observable market data to evaluate financial instruments. In Level 2 there are many OTC derivatives and CDOs;
- level 3: not directly observable market data to evaluate financial instruments. Level 3 positions include complex OTC derivatives, highly-structured bonds, illiquid asset-backed securities, distressed debt, illiquid CDO's, some private equity placements, illiquid loans and some municipal bonds, many commercial real estate loans.

Most of Deutsche Bank's derivative positions are classified within Level 2 in the fair value hierarchy. As regards the valuation techniques, Deutsche Bank does not disclose the main techniques used for the product type, thus a score 0 is assigned to this item.

Deutsche Bank provides a disaggregation of derivatives by use: derivatives held for hedging and derivatives held for trading purposes. Deutsche Bank also discloses the fair value of derivatives disaggregated by hedge accounting category in note 37 of the 2015's Annual Report.

Deutsche Bank does not provide any information about the notional amount of derivatives disaggregated by use and hedge accounting category, the notional amount and the fair value of derivatives by instrument type, thus a score 0 is assigned to these items. On the contrary, Deutsche Bank discloses information as regards the fair value of derivative contracts by maturity in section "Maturity Analysis of Assets and Financial Liabilities". Briefly, Deutsche Bank's derivative transparency ratio (DTR) is equal to 0,5 (total score/bank's total maximum score = 5/10).

Table 8. Deutsche Bank: derivative transparency ratio

Risk disclosure parameters	*Score*
Reasons to hold derivative instruments	1
Fair value hierarchy	1
Valuation techniques	0
Notional amount of derivatives disaggregated by use	0
Fair value of derivatives disaggregated by use	1
Notional amount of derivatives disaggregated by hedge accounting category	0
Fair value of derivatives disaggregated by hedge accounting category	1
Notional amount of derivatives by instrument type	0
Fair value of derivatives by instrument type	0
Maturity of derivative instruments	1
Total score	*5*

Source: Deutsche Bank, Annual statement and Pillar III report, 2015.

7.8. Deutsche Bank: Credit derivative transparency ratio

Deutsche Bank's Pillar 3 Report (page 130) discloses the exposures of credit derivative transactions, used for hedging, divided between bought and sold protection and split into regulatory banking book ("used for own credit portfolio") and regulatory trading book ("acting as intermediary").

Deutsche Bank employs mainly two credit risk mitigation techniques in order to reduce credit risk on derivative exposures: netting agreements (for exchange traded and OTC derivatives), and collateral arrangements.

Deutsche Bank discloses information as regards the notional amount and the fair value of credit derivatives. Briefly, Deutsche Bank's credit derivative transparency ratio (CDTR) is equal to 1 (total score/bank's total maximum score = 4/4).

Table 9. Deutsche Bank: credit derivative transparency ratio

Risk disclosure parameters	*Score*
Credit derivatives by protection and portfolio type	1
Credit risk mitigation techniques	1
Fair value of credit derivatives	1
Notional amount of credit derivatives	1
Total score	*4*

Source: Deutsche Bank, Annual statement and Pillar III report, 2015.

7.9. Research findings: Summary

This subsection briefly summarizes the research findings. Half of the banks in the sample disclose the reasons for the use of derivatives in their 2015's Annual Reports. All banks provide information about the fair value hierarchy. Most banks (3 out of 4) disclose information about the valuation techniques.

All banks disclose the fair value of derivatives disaggregated by use and hedge accounting. Half of the sample provides information about the notional amount of derivatives disaggregated by use and hedge accounting, and the maturity of derivatives. Table 10 summarizes the total scores and the derivative transparency ratios of the four banks.

Table 10. Derivative transparency ratios: a summary

Risk disclosure parameters	*BNP Paribas*	*Banco Santander*	*Intesa Sanpaolo*	*Deutsche Bank*
Reasons to hold derivative instruments	0	1	0	1
Fair value hierarchy	1	1	1	1
Valuation techniques	1	1	1	0
Notional amount of derivatives disaggregated by use	1	1	1	0
Fair value of derivatives disaggregated by use	1	1	1	1
Notional amount of derivatives disaggregated by hedge accounting category	0	1	1	0
Fair value of derivatives disaggregated by hedge accounting category	1	1	1	1
Notional amount of derivatives by instrument type	0	1	0	0
Fair value of derivatives by instrument type	1	1	0	0
Maturity of derivative instruments	1	0	0	1
Total score	*7*	*9*	*6*	*5*
Derivative transparency ratio	0,7	0,9	0,6	0,5

Banco Santander shows the highest "derivative transparency ratio". This score means that disclosed derivative information is wide and easily accessible for all users. The bank should disclose information as regards the maturity date of derivatives to improve the level of transparency.

BNP Paribas is the second bank ranked by "derivative transparency ratio". The score of 0,7 shows that BNP Paribas has room for the improvement of the derivative transparency. The disclosure could be improved by providing the notional amount of derivatives disaggregated by hedge accounting category and instrument type. Moreover, there is also room for the improvement of the explanations of the use of derivatives.

Intesa Sanpaolo shows a "derivative transparency ratio" equal to 0,6. It means that there is room to increase its level of derivative transparency. The disclosure could be improved by providing more information about the notional amount and fair value of derivatives by instrument type, and their date of maturity. As for BNP Paribas, there is also room to improve the explanations of the use of derivatives.

Deutsche Bank shows the lowest "derivative transparency ratio". This score shows that Deutsche

Bank can improve significantly the level of derivative disclosure. The disclosure could be improved by providing more information about the notional amount and fair value of derivatives, as well as the valuation techniques for derivatives.

Table 11 summarizes the total scores and the credit derivative transparency ratios of the four banks.

Table 11. Credit derivative transparency ratios: a summary

Risk disclosure parameters	BNP Paribas	Banco Santander	Intesa Sanpaolo	Deutsche Bank
Credit derivatives by protection and portfolio type	0	1	1	1
Credit risk mitigation techniques	1	1	1	1
Fair value of credit derivatives	1	1	1	1
Notional amount of credit derivatives	1	1	1	1
Total score	*3*	*4*	*4*	*4*
Credit derivative transparency ratio	0,75	1	1	1

Table 11 suggests that the level of transparency as regards credit derivatives is very high. Most of the banks in the sample (3 out of 4) disclose information about credit derivatives by protection and portfolio type, while all banks provide information about credit risk mitigation techniques, notional amount and fair value of credit derivatives. Banco Santander, Intesa Sanpaolo, and Deutsche Bank have a "credit derivative transparency ratio" equals to 1. This means that the credit derivatives disclosure is very high. BNP Paribas shows a lower ratio. It could improve its disclosure by providing information about the number of credit derivatives with reference to protection and portfolio type.

Taking into account the fair value of derivatives and the total assets of the four banks in the sample (as stated in their annual reports), Deutsche Bank has the highest percentage of derivatives on total assets (more than 30%), while Intesa Sanpaolo has the lowest percentage of derivatives on total assets (5,6%). Banco Santander holds derivatives for 84,451 million of euros (it is equal to 6,30% of the total assets), and BNP Paribas holds derivatives for 354,687 million of euros, that represents the 17,78% of its total assets.

8. DISCUSSION

This empirical research has evaluated the quality of derivative disclosure in 2015's annual statements and Pillar 3 reports of four European banks: BNP Paribas, Banco Santander, Intesa Sanpaolo, and Deutsche Bank. By reading the annual reports and using a scoring model based on key disclosure parameters, the paper finds that qualitative and quantitative risk information was disclosed by banks in different ways. Nevertheless, banks face a level playing field in terms of regulation and accounting standards.

The research findings suggest that derivative disclosure can be improved. Given the large diffusion of derivatives in banking, it is evident the unavoidable need to improve disclosure practices by providing qualitative and quantitative information about their derivative activities, portfolios, policies, and strategies. Meaningful and accurate information provides an important basis for the decision making processes of banks' stakeholders, investors' understanding of risk exposure in banking, and the well-functioning of financial markets. To be able to correctly understand and appreciate the bank performance, investors need information to respect two critical dimensions of credit derivative disclosure: derivative use and hedging strategies. In this sense, the Notes to the account in the Annual Reports play a crucial role.

Inadequate and incorrect derivative disclosure has many negative effects on investors, such as limited knowledge of derivative counterparties, and credit and liquidity risk, limited ability to evaluate the effectiveness of hedging, and underestimated risk exposure not reported on balance sheets. Consequently, derivative disclosure promotes a contraction of information asymmetry and agency problems. From this perspective outside stakeholders will have more information to take into account in their decision-making processes. Increased risk disclosure would help stakeholders in their investment decisions, although it is arduous to use the disclosure to verify a bank's risk exposure or risk appetite (Woods & Marginson, 2004). In addition, the risk disclosure is also a way to reduce agency problems that arise from a divergence of interests between principals and agents (Fama, 1980; Fama & Jensen, 1983; Jensen & Meckling, 1976; Ross, 1973), and to increase externalities in financial reporting (Foster, 1980).

Risk disclosure, and derivative disclosure particularly, is also connected to the cost of capital of the bank. There is a connection between risk disclosure and the cost of capital. Risk disclosure might result in reduced costs of capital (Botosan, 1997; Botosan & Plumlee, 2002; Healy & Palepu, 2001; Leuz & Verrecchia, 2000).

Credit derivative disclosure plays a decisive role in order to promote trust in stakeholder relationships and market discipline, to attenuate the increase of the financial leverage and mitigate the adverse consequences for the financial system stability (Acharya & Richardson, 2009; Acharya & Ryan, 2016; Crockett, 2002; Nier & Baumann, 2006). A better knowledge of derivatives in banking could enhance both transparency and stability in the financial markets.

This empirical investigation outlines some key characteristics of derivative reporting in banking. Risk disclosure is largely limited to compliance with legal requirements. Banks show remarkable differences in their reporting even though they adopt common accounting and regulatory standards. In this perspective, the adoption of standardized measures and reports can create the right conditions to achieve the objective. The harmonization has proved that the discretion left to the European member states in the creation of country-specific regulations allowed the presence of many

discrepancies between financial statements across European banks.

Such differences in risk reporting can also be analyzed within the "signaling" approach (Leland & Pyle, 1977; Ross, 1977) which proposes that banks might prefer to differentiate themselves from each other and that particularly those with good performances.

Even if disclosure rules are homogeneous across European countries, there are important differences in the disclosure indices among banks in the sample. This evidence suggests that there is typically a voluntary element to risk disclosures. It might be the results of different information disclosure strategies. Banks develop and implement disclosure strategies that drive to a firm-specific combination of mandatory and voluntary disclosure. However, according to Lev (1992), not mandatory disclosure may change stakeholders' expectations on bank market value. These findings are consistent with the view that firms provide voluntary disclosures for three main reasons: to reduce firm's risk perception; to promote the reputation for transparency, and to address the shortages of mandatory reporting (Graham et al., 2005).

Furthermore, the comprehensive maturity disclosure of derivative contracts (contractual and expected maturity), both assets and liabilities side, is important for stakeholders due to the poor reporting of the cash flow effects of derivatives, and the fact that a derivative asset can be transformed into a liability during the holding period.

Despite the improved disclosure over the years, there still are important differences across large banks in Europe regarding the type, the features and usefulness of the information disclosed about their derivative strategies.

9. PROPOSALS FOR A BETTER CREDIT DERIVATIVE DISCLOSURE IN BANKING

This empirical research provides evidence that there is significant room for disclosure improvements in banking. The disclosure of the effects of hedging strategies on the bank's performance, the effectiveness of hedging strategies and objectives, the costs of hedging, the risk management policies, should be enhanced. In particular, derivative and hedging disclosure could be better integrated with other risk disclosures in banking. Derivative disclosure and, in a wider perspective, risk disclosure in banking lacks a holistic view. The adoption of a holistic perspective will likely enhance the derivative disclosure on the interconnection of different risk factors. It also may help to better appreciate the effectiveness of risk management policies and strategies.

The derivative disclosure lacks also of an adequate forward-looking perspective (e.g. scenario analyses and simulations, risk sensitivity analysis, expected and unexpected potential losses of derivatives exposures) that might stimulate the adoption of a longer-term instead of a short-term investment perspective.

In order to appreciate the purpose of derivatives and hedging strategies in banking, the derivative disclosure should include details on the following aspects: underlying risk factors of derivative instruments; nature and purpose of embedded derivatives; distinction between hedging and trading derivatives; hedging strategies and techniques; profits and losses of derivative exposures; impacts of derivative exposures on bank's cash flows and income; explanation of the methodologies that have been used by the bank to determine the fair value of derivatives. In particular, value at risk (VAR) can be an informative measure to predict the variability of trading revenues and compare the risk exposures of banks' trading portfolios (Jorion, 2002).

An element denoted in the course of the analysis regards the disclosure of the notional amount of derivatives. Each bank in the sample uses to disclose this kind of information. It is important to notice that the "notional amounts of derivatives" is not an appropriate piece of information to understand the bank's risk exposure and derivative portfolios. In order to increase the usefulness of such information it should be disaggregated as follows: risk category (foreign currency, interest rate, commodity, and so on), nature (hedging or trading), accounting method (cash flow, fair value, net investment), long versus short exposures, type of instrument, and expected losses and gains.

Finally, it is possible to state that the derivative disclosure in banking can be improved in the next future to better satisfy the growing demand of transparency that comes from investors and the growing accounting and regulatory constraints that come from national and international banking authorities and accounting standard setters. In brief, despite the progress observed in recent years, there is still an information gap between disclosure that users require for analytical purposes and the disclosure provided by banks.

It is important to notice that the current International Accounting standards for derivatives (IAS 39) has been replaced in 2018 by the new IFRS 9. It will stimulate future research in this field. Furthermore, the Pillar 3 disclosure requirements have been recently modified by the Basel Committee on Banking Supervision (2015, 2017). These will imply relevant qualitative and quantitative changes in banks' annual derivative reports.

10. CONCLUSION

The use of derivatives is widespread across large banks, and they can be a significant source of systemic risk in the financial industry (Acharya & Richardson, 2009; Masera, 2009). The credit derivatives market has grown extraordinarily since 1993, and the most important derivative instrument is the credit default swap. In addition, the use of derivatives in the banking industry has continued to raise after the burst of the financial crisis (Bank for International Settlements, 2016).

Recent developments in the financial markets and regulatory frameworks at the European level put more emphasis on risk reporting in banking. The ongoing financial crisis and the adoption of a new bank resolution regulation have significantly increased the demand for a better risk disclosure in banking.

The aim of this research is to compare derivative disclosure among four large European banks, ranked by market capitalization. The derivative transparency ratio and the credit

derivative transparency ratio of the four banks provide empirical evidence that derivative disclosure could be improved in the Annual statements and Pillar 3 Reports. There is still room for improvement in the explanations of the use of derivatives and hedging strategies. The conclusion to be drawn from the research is that the examined banks provide derivative disclosure variously. We expect that the risk disclosure in banking will increase after the introduction of the recent new version of the Pillar 3 disclosure requirements and the new IFRS 9.

It is important to mention some crucial aspects of this empirical research. The paper is based only on the 2015 annual reports of four large European banks. Further investigations could extend the period of analysis and the sample of larger banks in Europe. The content analysis we propose in this paper is based on an objective evaluation of risk disclosure by reading the annual bank reports. The scoring model uses a binary scheme to evaluate each key disclosure parameter. This is the main restriction of the methodology. On the contrary, this purely objective method attenuates the subjectivity that affects the content analysis. More risk disclosure parameters could be taken into account within a more granular scoring model to improve the quality of the methodology. Further research could overcome these limitations.

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