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Is Bank Risk Disclosure More Effective After Banking Union in Europe?

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Abstract

This paper aims at investigating the impact that the establishment of the Banking Union (BU) and the Single Supervisory Mechanism (SSM) has had on European bank risk disclosure practices.

Adopting a tailored disclosure dictionary, we analyse the risk disclosure of a sample of SSM supervised banks, and financial institutions supervised by National Supervisory Authorities (NSA), before and after the establishment of the European BU.

Our results show that the BU has had a positive effect on European bank disclosure. However, the banks supervised by the SSM have worsened their risk disclosure in comparison to NSA supervised financial institutions, even though the new supervisory mechanism has been established specifically for monitoring them. Moreover, we found that less important financial institutions used their financial statements to send a signal to their shareholders and stakeholders about the fact that, although they are considered less important financial institutions, they are still sound and important banks.

This paper contributes to the extant literature on bank disclosure, analysing the effects that the European BU has had on the way financial institutions provide information in their financial statements. The detection of a clear regulatory shock, and the analysis of the risk disclosure provided by a large number of European banks in their financial statements are important aspects to take into consideration for the contribution of this paper.

Our findings have important policy implications. In order to enhance bank risk disclosure, it is necessary to rethink the bank supervisory mechanism in Europe. From our disclosure perspective, it emerges that the current supervisory system for the SSM monitored financial institutions is even worse than that of the less important financial institutions. Possible suggestions to improve it involve the provision of a real direct monitoring mechanism, and the interruption of any national mediation between the SSM and the significant supervised entities.

Keywords: Risk disclosure, Risk Management, Banks, Banking Union, Single Supervisory Mechanism, Principal-Agent problem, Financial regulation

JEL classification: G21, G24, G28, G 32, G38.

1. Introduction

Investors in banks need information about the risks to which they are exposed in order to be able to assess and price those risks properly and ensure that banks do not take on too much risk. If banks are not properly disciplined, then bank managers will have access to an excessive amount of information in comparison to outsiders, which will raise the cost of issuing equity and give banks an incentive to become more leveraged and hence more fragile (Myers & Majluf, 1984). The 2008-09 global financial crisis has been attributed in part to inadequate public disclosure by banks that complicated assessments of their risk-taking (Avgouleas, 2009; Gorton, 2009; Sowerbutts et al., 2013) and various groups of stakeholders have since urged that regulators act to ensure that users of financial statements are protected from material levels of information asymmetry (Bamber & McMeeking, 2015; Bank of England, 2009; Enhanced Disclosure Task Force, 2012).[1] Post crisis regulatory reform in the European Union (EU) sought to address this problem in part through revisions to risk-reporting regulations for all banks (e.g., the Markets in Financial Instruments Directive II; the Markets in Financial Instruments Regulation; the European Market Infrastructure Regulation) to help to alleviate the problem of asymmetric information between banks and investors, and by the enhanced supervision of systemically important financial institutions. In the latter case, the effectiveness of banking supervision was seen as being undermined by the fragmented system of national supervision and bank resolution in which regulators pursued domestic objectives that exacerbated systemic risk (Draghi, 2018). In 2014, the European Council moved to establish a more coherent policy framework for cross-border banking and deeper integration in the banking sector by pooling national financial policies at the EU level and establishing a BU with a single supervisory mechanism (SSM).[2] At the same time, the European Central Bank (ECB) published a list of systemically important financial institutions (SIFIs) that would be subject to the SSM and a list of other financial institutions that would continue to be supervised by national regulators. However, the coherence of the 'two-tier' supervisory framework has been questioned on at least two fronts. First, the ECB would rely on information provided by national regulators to fulfil its role as principal supervisor of SIFIs and national regulators would be left with discretionary supervisory authority over these institutions depending on particular national circumstances.[3] This led some commentators to fear regulatory inconsistencies for the financial

[1] For example, Gorton (2008) argues that during the recent financial crisis investors found that they did not have enough information to assess bank risks, which led to a sharp increase in funding costs that intensified the crisis.

[2] The other two pillars of the BU are a single resolution mechanism (SRM) and a European deposit insurance scheme.

[3] The article 64 of the Directive 2013/36/EU of the European Parliament and of the Council states that "Competent authorities shall be given all supervisory powers to intervene in the activity of institutions that are necessary for the exercise of their function". On the same line, the "ECB Guide on options and discretions available in Union Law" sets out the approach of the ECB related to the exercise of discretion and options concerning the prudential supervision of

institutions supervised by the SSM (Carboni et al., 2017). Second, the new framework entailed a double principal agent problem—between the banks and the ECB on the one hand, and between the national supervisor and the ECB on the other (Carletti et al., 2015). The latter relationship is particularly problematic as the ECB and national supervisors may have different utility functions and final objectives that might be reflected in the way banks provide information on their financial statements[4]. In this paper, we shed light on the validity of these claims by examining the relationship between the SSM and bank disclosure. In particular, we are interested in whether enhanced supervision under the SSM resulted in systemically important banks providing more disclosure than banks that remained under the monitoring of national supervisors. Such a finding would suggest that the SSM had been successful in reducing information asymmetries between banks and investors. In contrast, a finding that there was a less comprehensive disclosure of SSM supervised banks in comparison to national supervisor monitored financial institutions would be consistent with: (a) the SSM having negative impact on reporting behaviour; (b) national regulator-supervised banks opting to adopt—perhaps for reputational reasons—the reporting practices of SSM-supervised banks; or (c) the ability of national regulators to undermine the effectiveness of the SSM regime by managing the information provided to the SSM regulator (i.e., the ECB). In particular, the last argument is supported by the theories that describe the effectiveness of the bank monitoring mechanism in a multi-supervisor setting (Agarwal et al., 2014; Carletti et al., 2015).

We study the impact of the supervisory regimes by constructing a tailored dictionary specifically designed to analyse bank financial statements and validated by experts in the field of banking supervision and disclosure. We employ a difference-in-difference methodology to study the effect that the 'two-tier' supervisory framework (SSM supervision) has had on bank disclosure, by comparing it with the traditional national supervision.

financial institutions (ECB, 2016). The guide is relevant only for the SIFI and sets out the general aspects to be taken into account in order to determine supervisory requirements, which depend on "indicators related to territories of the participating Member States". For more information on national options and discretions in terms of banking supervision see also the supervisory disclosure provided by the EBA, available at https://eba.europa.eu/supervisory-convergence/supervisory-disclosure.

[4] The ECB itself is concerned about the disclosure provided by the SIFI. For instance, in a recent speech, Andrea Enria, Chair of the Supervisory Board of the ECB, at the SSM & EBF Boardroom dialogue stated that the "practices on the disclosure of Pillar 2 requirements vary widely. In some cases, no information is disclosed, even though it is essential […] with direct consequences for all categories of investors and possibly even for uninsured depositors." (Enria, 2019a). In a recent interview, he also argued that "while there is some soft information [...] which should remain part of a private dialogue between the supervisors and the banks, other aspects are information which is relevant for investors to understand where the banks are with respect to where the supervisors want them to be. […] We need to create an environment in which investors have an adequate access to information about the banks they invest in." (Enria, 2019b).

Our findings support the idea that while the establishment of the SSM has had a positive impact on the disclosure of the overall banking sector, it has worsened the disclosure of the SIFI. These findings might be due to the drawbacks of the current supervisory system in Europe.

The contribution of this paper is manifold. Our research contributes to the existing literature analysing the effect of a double supervisory system on bank risk disclosure, looking at the effects that the SSM has had on the way European financial institutions provide information in their financial statements. The detection of a clear exogenous regulatory shock, which has not received enough attention by scholars, and the analysis of the disclosure provided by a large number of European banks in their financial statements are the main aspects to take into account for the contribution of our paper. Furthermore, this paper provides useful hints on how to redesign the structure of the banking supervisory system in Europe to improve bank disclosure. Overall, we have improved the understanding of the European banking system, adopting a disclosure perspective.

The important policy implication of our findings is that further efforts are still necessary by bank regulators and supervisors to improve the disclosure of the SSM supervised banks. In order to achieve this goal, the SSM itself should deal with the information collection process, and provide the information to national supervisors (when required), and not vice versa. The mediation role performed by national supervisory authority may result in inefficiencies, which are reflected in the way financial institutions provide information in their annual reports.

The remainder of the paper is organised as follows. Section 2 provides an analysis of the theoretical framework, reviews the most relevant literature for our research, and develops our research hypotheses. Section 3 describes the methodology and data we used to carry out our empirical analysis. Section 4 illustrates the results of our research, discusses them and provides some robustness tests. Section 5 describes the policy implications of our results. Section 6 concludes.

2. Theoretical framework, literature review and hypotheses development

Supervision and bank disclosure are closely linked. The existing literature has already provided evidence that bank supervision has a strong impact on bank disclosure (Mester, 2017; Costello et al., 2018). Bank supervisory authorities are essential to maintain the integrity and transparency of the whole banking sector. Over the last few years, NSA have been remarked the importance of their role in shaping the disclosure practices of the banks that are under their supervision. Furthermore, bank disclosure is extremely beneficial for supervisors. Nier and Baumann (2006) show that more

transparency decreases equity return volatility, and consequently improve supervisors' view of the risk and relative performance of the bank. Thus, bank supervisors and regulators are extremely interested in bank disclosure, as it enhances financial stability, which is one of their main final objectives. The importance of risk reporting is remarked also by Diamond and Verecchia (1991), who provide evidence that an enhanced disclosure and the consequent reduction of the information asymmetry can even reduce the cost of capital. Moreover, this kind of information can supplement conventional supervisory tools, as the increasing complexity of large financial institutions makes them difficult to control using traditional monitoring techniques (Flannery, 2001). The literature provides various theoretical frameworks to explain the role that supervisory authorities have on bank disclosure practices, and their analysis is crucial to understand the impact that the BU has had on bank risk reporting. In our research setting, we follow the perspectives proposed by the organization society theories (Burgstahler & Dichev, 1997; Cho et al., 2015; Cohen et al., 2017) to study the effect that a change in the supervisory system has on bank disclosure.

Another theoretical framework, which is crucial for our analysis, stems from the theories that shed light upon the effectiveness of the bank monitoring mechanism in a multi-supervisor setting (Agarwal et al., 2014; Carletti et al., 2015). These theories are extremely important to understand whether or not the supervisory function performed by the SSM is better than that of the NSAs.

Before describing the theoretical framework of our investigation, it is fundamental to describe the harmonisation process of the accounting language in Europe, and its impact on bank risk reporting practices. These preliminary considerations are particularly important to understand why the European banking sector is particularly suitable for analysing the effects of the new supervisory mechanism on bank disclosure practices.

2.1 Preliminary considerations on accounting harmonisation

The European banking sector has been characterised by a profound accounting harmonisation process, which has made European bank financial statements increasingly comparable. The beginning of the process of international harmonisation of financial reporting dates back to the 1980's. In this regard, Van der Tas (1988, p. 157) stated that "many national and international organisations, such as the Accounting Standards Committee, the Financial Accounting Standards Board (FASB), the International Accounting Standards Committee (IASC) and the European Community (EC) […] are currently engaged in the process of national and international harmonisation of financial reporting." In order to study this phenomenon, several studies have been

investigated into the issues related to accounting harmonisation and financial statement comparability for the subsequent three decades (Joos & Lang, 1994; Barth et al., 1999; Ali, 2005; Young & Zeng, 2015).

The process of harmonisation of bank risk disclosure has only more recently advanced. In 2012, the Financial Stability Board established an Enhanced Disclosure Task Force (EDTF) to promote and monitor bank risk disclosure at worldwide level. The EDTF provided recommendations to improve several aspects of bank annual reporting, such as the information on the key risks that arise from bank business model, risk measurement, risk weighted assets and other important risk related information[5]. Moreover, on a yearly basis, the EDTF issued a report to assess the level and quality of application of the recommendations of their first report. In 2015, they published the last survey on global systemically important banks and domestic systemically-important banks. They reached an important objective in terms of disclosure harmonisation, as "participating banks report disclosure of 82% of the information recommended by the EDTF. This represents […] a 48% increase from disclosures prior to the release the original EDTF report in October 2012."[6] After this accomplishment, the FSB has formally disbanded the EDTF, as it succeeded in enhancing disclosure harmonisation to a satisfactory level.

As for the European Union, the current regulation on bank financial statements is the result of a long process of harmonisation guided by the International Accounting Standard Board (IASB), and more recently by the International Financial Reporting Standard Board (IFRSB) (Tutino, 2015, 2019). Since 2005, all listed companies in EU have been required to prepare their consolidated financial statements according to IAS/IFRS[7]. Regulation No. 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards is a crucial step ahead towards the accounting harmonisation process (Agostino et. al., 2011). The first article of regulation 1606/2002/EC states that "… this Regulation has as its objective the adoption and use of international accounting standards in the Community with a view to harmonising the financial information […] in order to ensure a high degree of transparency and comparability of financial statements." IAS/IFRS has created a common European accounting language, which enhances financial statement comparability. NSAs themselves have been remarked that the hierarchical power of the international regulation is superior to that of national authorities. In this regard, Bank of Italy states that it "has the power to adopt regulations and impose sanctions relating

[5] For further information see Enhanced Disclosure Task Forse (2012).
[6] Enhanced Disclosure Task Forse (2015).
[7] For further information on the list of countries where IAS/IFRS regulatory requirements are mandatory see https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/#1

to the format of financial statements […] within the scope of these powers, the Bank issues specific measures relating to the financial statements of the banks and financial intermediaries it supervises, in accordance with international accounting standards (IAS/IFRS)."[8] Also Banco de España, amongst others, argues that its Circular No. 4/2017 aims at aligning the Spanish accounting framework with IAS/IFRS (Banco de España, 2017). Thus, national authorities do not have room to significantly impact bank disclosure.

The Pillar 3 of the Basel capital accord (Basel Committee on Banking Supervision, 2016) is another important regulatory source for bank disclosure, which is common to all European banks. It embraces the most important risk categories for financial institutions, namely credit, market, operational and liquidity risk, as well as other crucial information on capital adequacy, risk monitoring and risk management functions. The Pillar 3 disclosure requirements set out some minimum requirements in terms of risk disclosure, seeking to promote market discipline via compulsory disclosure requirements at worldwide level, enhancing the harmonisation process of bank financial and risk reporting.

Especially for bank financial statements, the accounting harmonisation process is so advanced that it can be considered a real standardisation process (Bischof & Daske, 2013). Although national accounting regulations may affect specific balance sheet figures, they should not affect the narrative disclosure of banks subject to homogeneous regulatory requirements, and with a common accounting language. Hence, we argue that the differences between national regulatory accounting frameworks are just minor discrepancies, which are not going to affect our analysis. In conclusion, the European banking sector is perfectly suitable to analyse the effects of the new supervisory mechanism on bank disclosure.

2.2 The organization society theories

The *organization-society theories* (which include stakeholder theory, resource dependence theory and legitimacy theory) (Burgstahler & Dichev, 1997; Cho et al., 2015; Cohen et al., 2017) constitute a fundamental theoretical framework[9] to explain the importance of supervisors for bank disclosure purposes (Barakat & Hussainey, 2013). According to these theories, banking supervisory authorities that are informed and able to promptly and precisely take corrective actions, are likely to be

[8] https://www.bancaditalia.it/compiti/vigilanza/normativa/index.html?com.dotmarketing.htmlpage.language=1. For further information see also Bank of Italy (2005).
[9] See Verecchia (2001) for a comprehensive description of other disclosure theories.

effective and influential to motivate bank management to provide a better disclosure. Hence, there are two main preconditions essential for supervisors to fulfil their role properly: the capability of taking corrective actions to promote changes, and the speed and precision of taking this kind of decisions. While there is no reason why both local and central supervisors should not be able of taking the right corrective action, when it comes to the speed and precision of deciding how to behave, there is a substantial difference between them. Since the current structure of the supervisory mechanism requires NSAs to act as information collector on behalf of the SSM, central supervisory authorities may not be able to promptly take the necessary corrective actions. This indirect and slow flow of information may also result in an information loss for the central supervisor. Furthermore, since NSA have been the sole supervisors until 2014, they could be more precise in taking the right corrective actions, as they have also a more complete set of soft information about the banks they supervise. Hence, the central supervisor would be in no position to fulfil its role properly. On closer inspection, the legitimacy theory (O'Donovan, 2002; Cho & Patten, 2007; Cho et al., 2015) explains how firms show their adherence to the system of values of the society, trying to meet social expectations. According to this theory, financial institutions may comply with disclosure requirements, in order to confirm and show their full adherence to the institutional values of the society (institutional legitimacy). The resource dependence theory (Boyd, 1990; Cohen et al., 2017) postulates that organization survival and growth depends on some important resources that are available in the external environment. Thus, firms compete with each other in order to control these resources. In this perspective, it is important to note that the supervisory authorities have the power to grant and withdraw banking licenses. The licence for the banking activity is a crucial resource for financial institutions, therefore banks can use disclosure as a tool to have control over it, and to convince the supervisor to let them run their activities. The stakeholder theory (Bowen et al., 1995; Burgstahler & Dichev, 1997) posits that stakeholders have different expectations and influence on the firm. Thus, banks may want to provide an effective disclosure to interact and communicate more effectively with the most influential stakeholders, and bank supervisor is amongst the most important between them. However, if the central supervisor is not capable of quickly and precisely taking corrective actions, its monitoring function may turn out to be ineffective. A slow, imprecise and not fully informed supranational supervisor may not be able to get the right level of institutional legitimacy, show that it controls a valuable resource for financial institutions, and that it is an influential and powerful stakeholder. In our research setting, since the SSM still has to rely on the information provided by the NSAs, it may be less informed, slower and less precise, resulting in an inefficient supervisory function. This inefficiency will be reflected also in bank disclosure, resulting

in a less comprehensive disclosure for SSM supervised banks in comparison to the financial institutions monitored by national supervisors, after the establishment of the BU.

2.3 Effective monitoring in a multi-supervisor setting

Since the current supervisory system in Europe requires the cooperation of national and supranational supervisors, the theories that deal with the efficacy of the monitoring activity in a multi-supervisor setting represent an important point of reference for our research setting.

Agarwal et al. (2014) analyse the supervisory decisions of US bank regulators, exploiting a legally determined rotation policy, which assigns state or federal supervisors to the same financial institution at predetermined time periods. They address the following research question: "Does regulatory effectiveness depend only on written rules, or do the institutions that are entrusted with implementing those rules also matter for regulatory outcomes?". The authors show that different supervisors implement the same rules inconsistently, because of differences in their utility functions. In particular, local supervisors might exert their role in a softer way during stressed economic conditions, as a tough supervision might increase the likelihood of a bank failure, which could in turn lead to a loss of local lending activity as well as banking jobs. In contrast, federal supervisors are more concerned about systemic stability at national level, rather than about the geographical distribution of banking credit supply and jobs. This is what they call the 'local interest hypothesis'. According to this theory, a central supervisor should perform better than local supervisors, as they do not have specific interests in favour of large institutions at local level. The central supervisory authority is concerned about stability and welfare at systemic-wide level, above any specific local interests. In contrast, local supervisors have specific interests on the geographic area under their supervision. Furthermore, local supervisors compete with each other. For instance, they may want to attract banks from closer geographical areas or avoid that their local banks move elsewhere. In order to do so, they could perform a less demanding supervisory function. This circumstance may give financial institutions the chance to exploit a regulatory arbitrage from different jurisdictions, undermining the stability of the whole national banking system. Hence, these local interests might be detrimental for the systemic-wide financial stability, as local supervisory authorities focus on specific objectives that may jeopardise the all banking sector. The findings of Agarwal et al. (2014) are crucial to understand properly the trade-offs related to the distribution of supervisory responsibility and powers across different authorities. The authors themselves argue that their findings should be taken into consideration for the debate concerning the redesign of European bank supervisory system. Although NSA might have an informational advantage, as they

have been the sole supervisors until November 2014, their utility functions are crucial in determining the efficacy of the supervisory mechanism. For instance, NSA may want to be softer with distressed banks, if they are too big to fail for their economy. Moreover, NSAs have a close link with the respective national governments. In this regard, the concept too big to fail should be interpreted in relative terms. More specifically, a financial institution might be too politically important to fail at national level, whilst it is not so important at systemic (European) level. However, according to this theoretical perspective, there are various reasons why the current European supervisory system may not work properly. NSA still have room to influence the supervisory process carried out by the SSM, since the latter still relies on the information provided by the former in order to perform its supervisory functions[10]. Consequently, these diverging interests between national and central supervisors may result in a lack of efficacy of the supervisory process of the banking system. The problems caused by the aforementioned local interests of the national supervisors may not be solved by the current supervisory system in Europe. The conflicting utility functions and objectives of the local supervisors may still result in a lack of efficiency of the SSM, as long as NSAs can interfere in the supervisory process. Hence, the SSM may be in no position to fulfil its role properly. In conclusion, even though the local interest theory would suggest that a central supervisor should perform better than several local ones, the current structure of the supervisory system in Europe may not be able to overcome the issues related to the conflicting interests between NSAs and ECB, resulting in a worsened disclosure provided by the banks under SSM supervision.

Carletti et al. (2015) study the behaviour of supervisors in the so called 'hub-and-spokes' regime: where a central supervisor has juridical power over all decisions concerning financial institutions, but it has to rely upon local supervisors in order to collect the information it needs to take the necessary corrective actions (see figure 1). This institutional structure entails a double principal agent problem, between the bank and its supervisor on the one hand, and between the local and the central supervisor on the other. The latter is a serious issue, since the two supervisors have different utility functions and final objectives. In this situation, the scale of information collection of local supervisors will not only be inferior to that of a central supervisor, which directly collects all information, but also to that of independent local supervisors, which remains inferior to the central supervisor model. The reason behind this suboptimal level of information collection lies on the fact that local supervisors prefer to remain ignorant, rather than learn information that could lead the

[10] Council Regulation EU No 1024/2013 states as follows "national competent authorities shall in particular provide the ECB with all information necessary for the purposes of carrying out the tasks conferred on the ECB by this Regulation."

central supervisory authority to actions that are against their interests. This, in turn, leads to an inefficient supervisory system and to a less sound banking sector. The final outcome of the "hub-and-spokes" model is more risk taking than the social optimum, causing instability at systemic level. The authors themselves state that their theoretical framework is inspired by the current supervisory design in Europe. This model suggests that unless the spokes (NSAs) and the hub (the ECB) act jointly with the same objectives, the effectiveness of the whole supervisory system will be compromised, suggesting that the current supervisory structure in Europe is far from being able to solve the problems of the fragmentation of bank monitoring activity. In conclusion, in our research setting, this model would predict a worsening in the supervisory function, and, as a consequence, a less comprehensive bank disclosure for SSM supervised financial institutions after the establishment of the BU.

[INSERT FIGURE 1 HERE]

2.4 Empirical literature on risk disclosure and the effects of the Banking Union

The aim of this paper is to study the effect that the BU has had on bank risk disclosure. Hence, our research is broadly related to two different strands of literature. Our first points of reference are the previous contributions that study the risk disclosure in the banking industry, whilst the second point of reference is the literature that analyses the effects of the BU.

An extensive stream of literature analyses several different aspects of risk disclosure in the banking sector, adopting various methodological perspectives. The main reason behind the research carried out by these scholars lies on the idea that a faithful and correct representation of bank risk exposure and management is a fundamental prerequisite for investors to take conscious and rational economic decisions (Bisoni et al., 2012; Rutigliano, 2012, 2016). In this perspective, an important aspect to take into consideration is related to the incentives banks have to underreport their risk exposure. Begley et al. (2017) show that financial institutions tend to underreport their risk exposure, when they have low capital ratios. More specifically, a contraction of bank equity is followed by more violations of its self-disclosed risk levels. Hence, these risk measures become less informative precisely when investors need them most, remarking the importance of this field of study from both a scientific and practical viewpoint. Other studies focus specifically on bank annual report in order to understand whether the information provided in these documents is really relevant

and useful to understand bank risk profile[11]. Linsley et al. (2006) adopt a content analysis approach to study the risk disclosures of a sample of UK and Canadian banks, in order to detect their areas of improvement. The main issues identified by the authors involve a scarce quantitative risk information and a strong bias towards backward-looking rather than forward looking disclosure. The authors themselves argue that it was just an exploratory study, whose aim was to establish a reference point for further risk disclosure research. Due to the aforementioned complexity of bank risk disclosure, other authors decided to deal with specific aspects of bank risk, adopting a research methodology close to that proposed by Linsley et al. (2006). In particular, some authors focus on the three main risks identified by the Basel II regulation (BCBS, 2006), namely, credit risk (Frolov, 2006), market risk (Woods et al. 2008; Al-Hadi et al. 2017), and operational risk (Helbok & Wagner, 2006; Barakat & Hussainey, 2013) to analyse bank disclosure in annual financial statements. These contributions extended our knowledge on several aspects related to bank risk disclosure practices. Most of them adopt a content analysis approach (Weber, 1990; Krippendorff, 2004). The small number of observations is probably one of the main limitations of these studies, as it makes difficult to generalize the results of the research to a larger population. Other studies adopt a different perspective. For instance, Goncharenko et al. (2018) studies the effect of bank risk disclosure looking at the stress test disclosure provided by the European Banking Authority. This study remarks the importance of the supervisors for bank disclosure purposes. An important and revolutionary study is that proposed by Burks et al. (2018). The authors address the question as to whether market competition affects bank voluntary disclosure choices. The innovativeness of Burks et al. (2018) is related to the fact that the authors analyse the impact that a regulatory shock has on bank disclosure, whilst previous research in this field did not identify any shock that may have an effect on risk reporting. More specifically, the authors exploit the relaxation of interstate branching restrictions under the Interstate Banking and Branching Efficiency Act to determine if an increase in competition affects disclosure choices. However, Burks et al. (2018) does not examine financial statements, they rather analyse the content, the tone and the frequency of press release. Although press release contains information concerning financial performance and bank risk, the information provided by the financial statement is more reliable and trustworthy, as it is prepared according to internationally recognised accounting standards, scrutinized by professional auditors and influenced by accounting regulatory requirements (Tutino, 2009, 2015, 2019).

Notwithstanding the relevance of the topic, the literature that analyses the effects of the BU is rather scarce. Carboni et al. (2017) analyse the effect that the announcements of the banks that were going

[11] Some studies analyse other regulatory disclosure report, such as the S-1 and 10-K filings (Loughran & McDonald, 2013; Dyer et al., 2017; Friberg & Seiler, 2017).

to be subject to the SSM supervision has had on their stock prices. Their analysis provides empirical evidence that investors penalised the financial institutions subject to the SSM supervision, due to the fear of some regulatory inconsistencies. In contrast, performing an analysis similar to that proposed by Carboni et al. (2017), Sahin and De Haan (2016) provide empirical evidence that European bank stock market prices and credit default swap showed no reaction to the BU. A more recent contribution proposed by Sáiz et al. (2019) addresses the question as to whether the BU influences the contagion mechanism between banks and sovereign risk, as it was one of the main aims of the ECB. The authors do not find robust empirical evidence that the BU decreased the contagion between bank stock returns and sovereign risk.

Although there are other studies that deals with various issues related to the BU (Kudrna, 2016; Benczur et al., 2017; Hüser et al., 2018), the literature on this topic is not well developed. However, it is extremely important to understand the effects that the launch of the SSM as a supranational supervisory authority has had on the banking system (Colliard, 2018). Hence, this topic still requires further investigation.

2.5 Hypotheses development

According to the aforementioned theories, the establishment of the BU may result in less comprehensive disclosure for SSM supervised banks, in comparison to NSA monitored financial institutions. Furthermore, the European Directive 2013/36 and the Regulation (EU) N. 575/2013 prescribe several national options and discretions that can be applied on the basis of certain national circumstances[12]. This aspect may lead to the fear of regulatory and supervisory inconsistencies for the financial institutions supervised by the SSM (Carboni et al., 2017), supporting the idea that flexible, well informed and quick local supervisors are better than a slow, less informed and inconsistent central supervisor. Hence, we develop our first research hypothesis as follows:

Hypothesis 1: The banks supervised by the SSM have worsened their risk disclosure in comparison to NSA monitored financial institutions after the establishment of the BU.

However, there should not be any fear of regulatory and supervisory inconsistency for the financial institutions that are still supervised by the NSAs. Furthermore, after the establishment of the BU, an important message has been sent to the entire banking system: the supervisory function has become a priority at national and international level. Hence, our expectation is that there may be an overall

[12] See Regulation (EU) N. 575/2013, Article 400(2)(c) for further information.

improvement in the supervisory system across Europe, after the establishment of the BU. Furthermore, after the establishment of the BU in 2014, the total amount of workload of the local supervisory authorities has decreased, as NSAs are not in charge anymore to supervise the largest financial institutions. Hence, they have more time and resources to monitor the other financial institutions. Based on these considerations and theories, our second research hypothesis is the following:

Hypothesis 2: The banking system has improved its risk disclosure after the BU.

As already mentioned, the supervisory system of the European banking sector has changed drastically. Since it became clear that the supervisory function has become a priority at national and international level, European banks may want to provide further information on this regulatory shock in order to reassure investors and stakeholders about the fact that they are supervised by a trustworthy national or international authority. A simple way to do it is to increase the references to the regulatory and supervisory framework in their financial statements. As already mentioned, the distinction between the SIFI and the banks that are less important has been formally clarified by the ECB itself, which issued the "The list of significant supervised entities and the list of less significant institutions" (ECB, 2014). The former are supervised by the SSM, whereas the latter are under the supervision of NSAs. This clear distinction may have triggered a reaction from the less important financial institutions, not only in terms of risk disclosure. These less important financial institutions might increase the references to the regulatory and supervisory framework in their financial statements for two main reasons, supported by the signalling theory (Spence, 1973; Morris, 1987). Firstly, to send a signal through their financial statements, to remind everyone that they are still under the trustworthy supervision of the NSA. Secondly, to provide a signal to the supervisory authorities that they are still important banks, even though they have been defined as less important financial institutions. Based on these considerations, we develop our third research hypothesis as follows:

Hypothesis 3: The banking system has increased the references to the regulatory and supervisory framework in their financial statements after the establishment of the BU.

However, the financial institutions supervised by the SSM should improve more on this aspect, as they are the main target of this change in the supervisory system. Specifically, they have to inform investors and stakeholders about this important change in the regulatory environment. Thus, we develop our fourth research hypothesis as follows:

Hypothesis 4: The banks supervised by the SSM have increased the references to the regulatory and supervisory framework in their financial statements more than NSA monitored financial institutions after the establishment of the BU.

For the same aforementioned reasons, and following the signalling theory, financial institutions should reassure their shareholders and stakeholders about the fact that, although the ECB has distinguished between important and less important financial institutions, all of them are still sound banks and there is nothing to worry about them. In order to provide this signal to the market and to supervisors, they can increase the use of reassuring words in their financial statements. More reassuring disclosure should help these banks to show that they are safe, sound and important. Thus, our fifth research hypothesis is the following:

Hypothesis 5: The banking system has increased its reassuring disclosure after the establishment of the BU.

In contrast, the SIFI should not have any particular pressure to enhance their reassuring disclosure, as they have been defined systemically important by the ECB itself. Hence, we develop our sixth research hypothesis as follows:

Hypothesis 6: The significant supervised entities (SSM supervised) have decreased their reassuring disclosure more than less significant institutions (NSA supervised) after the establishment of the BU.

3. Methodology

Previous literature has already provided evidence that textual analysis techniques are trustworthy tools to extract valuable information from financial reports (Li, 2010; Brown & Tucker, 2011; Bushman et al., 2016). Hence, in order to investigate into bank disclosure practices, we adopted a tailored dictionary specifically designed to analyse bank financial statements, as applying standardised dictionaries outside the context for which they were created might invalidate the analysis (Loughran & McDonald, 2011; Beattie, 2014; Kearney & Liu, 2014). We created this dictionary selecting the most relevant words to test our research hypotheses from a selection of specialised banking and finance dictionaries (Fitch et al., 2000; Rutherford, 2013; Shim & Constas, 2016; Law, 2018). Afterwards, we submitted our tailored dictionary to a panel of experts from the SSM and the academia, in order to validate it and to be sure that it was suitable to answer our

research questions[13]. The final results of this procedure is a dictionary of 125 words, aggregated in 4 different categories (Table 1). The category "risk management disclosure" consists of terms that financial institutions are supposed to use to describe the risk management, monitoring, and measurement procedures and functions they adopt for the wide range of risks they are exposed to. The category "risk exposure disclosure" comprises the words that provide information related to the vulnerability of the bank to these risks. The category "references to the regulatory framework" is a list of terms that identify the most important regulatory and supervisory authorities that influence European bank activities at international level. The category "reassuring disclosure" consists of terms that financial institutions may want to use to reassure investors and stakeholders about their financial position, performance and risk exposure. Table 1 shows the words belonging to each category .

[INSERT TABLE 1 HERE]

For each of these categories, we created a disclosure index computed as the standardised mean of the occurrences of each word belonging to the category, divided by the total number of words of the entire document, as suggested by previous disclosure studies (Tetlock et al., 2008; Bushman et al., 2016). Formally:

$$Disclosure\ Index_{Category\ 1} = \frac{\text{mow}_{Category\ 1} - \mu_{Category\ 1}}{\sigma_{Category\ 1}} \quad (1)$$

Where $\text{mow}_{Category\ 1}$ is the mean of the relative occurrences of the words belonging to category 1, and μ and σ are respectively its mean and standard deviation. The standardisation may be necessary if our disclosure index is non-stationary, which might happen in case there are regime changes in the word distribution (Tetlock et al., 2008). These disclosure indexes represent the dependent variables of our econometric models. We study the effects that the BU has had on bank risk disclosure using a differences-in-differences design. This approach has been widely adopted in banking and accounting studies (Barth & Israeli, 2013; Berger et al., 2014; Fiordelisi et al., 2017). Formally, for each disclosure index, our econometric model is as follows:

$$Disclosure\ Index_{Category\ 1_{ijt}} = \beta_0 + \beta_1 * Banking\ Union + \beta_2 * SSM\ supervised$$

[13] The panel of experts was also allowed to eliminate or add words to the dictionary.

$$+ \beta_3 * (Banking\ Union * SSM\ supervised)$$

$$+ Controls + Country\ Fixed\ Effects + \varepsilon_{ijt} \quad (2)$$

Where:

- $Disclosure\ Index_{Category\ 1_{ijt}}$ = disclosure index of the category number 1 for bank i in country j at time t.
- $Banking\ Union$ = indicator variable equal to 1 if a bank-year observation falls after 2014, and 0 otherwise;
- $SSM\ supervised$ = indicator variable equal to 1 if a bank is supervised by the SSM, and 0 otherwise;
- $Banking\ Union * SSM\ supervised$ = the interaction term of the two indicator variables above;
- $Controls$ = a set of bank specific control variables;
- $Country\ Fixed\ Effects$ = fixed effects at country level.

We introduce a set of control variables to detect cross-bank heterogeneity, which could affect bank disclosure independently by the establishment of the BU (the descriptive statistics of all variables are provided in table 2). Our control variables are the following:

- Equity divided by total assets (E/TA), as a measure of bank capitalisation;
- Return on Assets (ROA), as a measure of bank profitability;
- Loans on total assets ratio (LOANS), introduced in order to capture the effects of the credit structure;
- Offbalance sheet on total assets ratio (OBS), as a measure of offbalance sheet exposure;
- Total customer deposits on total assets ratio (CUST), introduced to capture the effects of the funding structure.
- The country level business extent of disclosure index computed by the World Bank (WB_DISCL_INDEX), in order to capture potential effects of different regulatory frameworks concerning financial disclosure.

These control variables are widely used in the disclosure literature (Richardson & Welker 2001; Linsley et al., 2006; Chen & Vashishtha, 2017).

Moreover, we introduce the following indicator variables as additional controls:

- The BIG4_DUMMY, to capture potential effects of BIG4 audit firms on bank disclosure. This variable is equal to unity for the banks whose financial statement is audited by a BIG4 firm, and zero otherwise;
- NCA_DUMMY, to take into account whether there is more than one NSA in certain countries. This variable is equal to unity for the countries that have more than one national supervisor, and zero otherwise. This variable allows us to take into consideration potential diverging interests between different supervisors also at country level.

[INSERT TABLE 2 HERE]

We tested the control variables for multicollinearity problems through the Variance Inflation Factor (VIF). An average VIF of 1.04 suggests that our control variables are not highly correlated (the correlation matrix is provided in Table 3).

[INSERT TABLE 3 HERE]

Our regressions are estimated with bank-level clusters, allowing for correlation in the error term (Petersen, 2009). Furthermore, we use country fixed effects to control for country heterogeneity, and robust standard errors to control for dependence and heteroscedasticity (White, 1980).

3.1 Data

The word category variables have been obtained counting the number of occurrences of the words of our tailored dictionary in bank financial statements. The financial statements have been collected manually from each bank's official website. Banks' websites have been identified using the Orbis Bank Focus (Bureau van Dijk) database. Also bank balance sheet and performance data have been taken from the Orbis Bank Focus database. The World Bank business extent of disclosure indexes have been collected from the World Bank "Doing Business" database. Bank balance sheet variables have been winsorized at the 1% and 99% level, in order to avoid the influence of outliers.

The sample consists of 75 SIFI (out of a total of 117)[14] and 150 large European less important financial institutions. We downloaded the consolidated financial statements of the SIFI that provide this published official report for the period 2011-2017. We excluded the banks that do not provide the documents for all years, and that do not provide audited and English versions of their

[14] Source: European Central Bank (2019). List of significant entities supervised by the ECB and less significant institutions.

consolidated financial statements. As for the less important institutions, we selected a random sample of 150 banks (the double of our treatment group)[15], selected from a larger sample obtained adopting analogous (but less restrictive) criteria to those proposed by the ECB in the SSM framework regulation. As before, we excluded the banks that do not provide audited English versions of their consolidated financial statements for the time period 2011-2017. We adopt this sampling method in order to select the banks that share more similarities with our treatment group. More specifically, both groups are composed by large banks important at national level, stakeholders and supervisors are particularly interested on them, and potentially, all of them might be subject to the supervision of the SSM if they increase their size or merge with other financial institutions. The only noticeable difference between the treatment and the control group is that the former is composed by banks that are supervised by the SSM, whilst the banks belonging to the latter are monitored by the SSM. Hence, we argue that this is a correct way to identify a control group for our difference-in-differences identification strategy. Table 4 provides the geographical distribution of the banks of the sample.

[INSERT TABLE 4 HERE]

Our sample period runs from 2012 to 2017. This time horizon includes 3 years before the introduction of the BU and 3 years after. It is intentionally short as the change in the treatment group should be concentrated around the onset of the treatment (Bertrand et al., 2004). As we are specifically interested in assessing the impact that the establishment of the BU in 2014 has had on bank disclosure, the choice of this time period enhances the validity of our analysis.

4. Results

Table 5 shows the results of the empirical analysis from estimating the econometric equation (2). Specifically, we regress our four risk disclosure categories (risk management disclosure, risk exposure disclosure, references to the regulatory framework and reassuring disclosure) on our difference-in-difference indicator variables and control variables. Concerning the regression where our dependent variable is the category risk management disclosure (column 1), the coefficient of the indicator variable which identifies the period from which the BU has been established (banking_union) is positive and statistically significant, indicating that the BU has had a positive effect on the risk management disclosure of European banks. The coefficient of the interaction term

[15] For further information on the selection of the optimal sample size see De Santis et al. (2004).

of the two indicator variables (interaction_dummy) is negative and statistically significant. It suggests that, even though the BU has had a positive effect on this disclosure category, the SSM supervised banks have provided a less comprehensive disclosure in comparison to NSA supervised financial institutions. These findings support our research hypotheses 1 and 2. Exactly the same results hold also for our second specification, where the category risk exposure is the dependent variable (column 2). Since both these categories represent two different aspects of a broader risk disclosure concept, both our previous specifications are suitable to support our first and second research hypothesis. As for the third regression in table 5 (column 3), it emerges that the banking_union has had a positive and statistically significant impact on the category references to the regulatory framework of the whole sample, supporting our third research hypothesis. Furthermore, also the coefficient associated to the interaction_dummy is positive and statistically significant at conventional levels, suggesting that the financial institutions supervised by the SSM have increased the references to the regulatory and supervisory framework more than NSA monitored financial institutions after the establishment of the BU. This finding supports our research hypothesis 4. Concerning the last regression in table 5 (column 4), the banking_union has had a positive and statistically significant impact on the category reassuring disclosure of the European banking system, whereas the interaction_dummy is negative and statistically significant. Thus, it emerges that while the control group has increased its reassuring disclosure after the establishment of the BU, the SSM supervised banks have decreased their reassuring disclosure in comparison to less significant institutions, supporting our research hypothesis 5 and 6.

[INSERT TABLE 5 HERE]

The signs of the control variables are in line with the academic literature on bank risk disclosure[16] (Richardson & Welker 2001; Linsley et al., 2006; Chen & Vashishtha, 2017).

The coefficient associated to E/TA is positive and statistically significant in both of our risk disclosure regressions, suggesting that less capitalised banks have a higher pressure to provide information about their risk exposure and management. This result is related to the fact that less capitalised banks are more vulnerable to a wide range of negative events, and consequently, they feel impelled to provide more information to explain in depth their risk exposure and management.

[16] To our best knowledge the extant literature has not analysed the impact of these control variables neither on the references to the regulatory framework, nor on the reassuring disclosure. Thus, we describe the effects of our set of covariates on the risk disclosure categories, leaving to future research the study of the effects on other disclosure categories.

ROA is negatively and significantly related to our risk disclosure categories, indicating that less profitable financial institutions provide more information about their risks. This finding is due to the circumstance that less profitable banks feel the pressure to provide explanations for their low profitability, and one of the most important explanation is related to their past risk exposure.

The coefficient associated to LOANS is positive and statistically significant in one of the two risk disclosure categories. This result is related to the circumstance that loans are an important source of credit risk, and as a consequence banks are supposed to provide more information about this risk exposure and management.

CUST_DEP is negatively and significantly related to our risk disclosure categories. This finding is related to the fact the higher the amount of customer deposits in bank balance sheet, the less the financial institution depends on the debt, and consequently the less likely it is that creditors' concerns are addressed through risk disclosure.

The coefficient associated to BIG4_DUMMY is positive and statistically significant in one of the two risk disclosure categories. This finding indicates that BIG4 audit firms positively influence the level of details of bank risk disclosure.

WB_DISCL_INDEX is positively and significantly related to our risk disclosure categories, suggesting that banks belonging to countries that better protect investors through disclosure of financial information are characterised by a more comprehensive risk disclosure.

4.1 Discussion

From our empirical investigation, it emerges that the BU, and more specifically the establishment of the SSM as a supranational supervisor, has had a positive influence on bank disclosure under different aspects. However, although the SSM is meant to supervise only a group of systemically important financial institutions, we find evidence that the risk disclosure provided by these banks has worsened in comparison to that of other large European banks. The reasons behind these findings are related to several different issues of the current supervisory system in Europe. The most severe problem is related to the fact that the supervision of the SSM is not direct, as NSAs collect the information on behalf of the central supervisor. This unnecessary and redundant mediation has a negative impact on the speed of the information flow between the SIFI and their ultimate supervisory authority. Furthermore, the NSAs and the ECB have different interests and utility functions. This is precisely the reason why the SSM has been established. However, the NSAs still

play an important role in the supervisory system. Because of these aspects, there may be an information loss between the supervised entities and the central supervisor, as well as a suboptimal level of information collection, resulting in an ineffective monitoring function performed by the SSM. This is one of the reasons why, although the local interest theory (Agarwal et al., 2014) suggests that a central supervisor should perform better than several local supervisors, still we observed a less comprehensive disclosure for SSM supervised financial institutions. As already explained by the "hub-and-spokes" model (Carletti et al., 2015), the current supervisory system for the SIFI is characterised by several drawbacks. Other possible explanations of the relative ineffectiveness of the SSM in terms of bank disclosure are related to the organization society theories. As a central supervisor that rely on the information collection of local supervisors, the SSM is slower, less informed and, as a consequence, less precise in taking corrective actions. Hence, the SSM cannot be able to reach a satisfactory level of institutional legitimacy to show banks that it is in the position of performing its supervisory function properly (legitimacy theory). The lack of institutional legitimacy and the fear of regulatory inconsistencies are likely to lead bank managers to perceive that the SSM does not control any resource which is valuable to them (resource based theory). All these aspects undermine the trustworthiness of the central supervisor, which may not be considered an influential and powerful stakeholder (stakeholder theory), resulting in the ineffectiveness of the monitoring function performed by the SSM. Thus, the aforementioned theories on bank disclosure and on the optimal structure of the supervisory system identify the reasons why the SSM has had a negative effect specifically on the systemically important institutions in terms of disclosure.

Our analysis also provides empirical evidence that both SIFI and less important institutions make more extensive use of words related to the regulatory framework. While the former should do it to explain the change of their supervisory system to the users of their financial statements, the latter may have sent a signal through their financial reporting to remind everyone (especially supervisors) that they are still important banks, supervised by trustworthy authorities, even though they have been defined as less important financial institutions. These banks are willing to show they are important, stable and sound financial institutions, notwithstanding what the ECB says. This argument is strengthened by our results on the reassuring disclosure regressions. Less important financial institutions are trying to use this kind of disclosure to reassure investors, stakeholders and supervisors about the fact that they are safe and sound, and there is nothing to worry about them, whilst SIFI provide less disclosure on this aspect.

Since we analyse bank disclosure looking at their financial statements, our results may be affected by the influence of accounting regulation on bank financial reporting. We recognize it as a limitation of our study. However, we argue that national accounting regulations should not significantly affect our analysis, because of the aforementioned harmonisation process. Consequently, the observed changes of bank disclosure are to a large extent explained by the new supervisory regime in Europe, introduced by the BU.

4.2 Robustness tests

A possible concern related to our econometric model is that bank disclosure may have been affected by other events occurred before 2014, invalidating our results. Specifically, it might be the case that financial institutions have changed their risk disclosure in response to the announcement of the BU in 2012, instead of the change of the supervisory mechanism. In order to rule out this hypothesis we carry out a placebo test, widely used in previous studies that adopted the difference-in-differences identification strategy (Hertzberg et al., 2011; Balakrishnan et al., 2014; Schepens, 2016). We assume that the treatment took place in 2012 instead of 2014, and estimate the effect of this fictitious BU. In order to centre the time horizon of the analysis around the onset of the false treatment, we analyse the time period running from 2011 to 2014 for this robustness test. The results reported in table 6 show that the fictitious BU has had no statistically significant effect on our variables of interest, supporting our finding that the change of banking supervision has triggered a reaction on bank disclosure.

[INSERT TABLE 6 HERE]

Our study is affected by the limitation that, although our word categorisation has been validated by a panel of experts, it might not be the correct way to create our disclosure categories. In order to rule out this hypothesis, we use an alternative purely objective statistical approach to create our disclosure categories. Specifically, we use the k-means clustering algorithm proposed by Hartigan and Wong (1979) to aggregate the words according to the variability of their occurrences in bank annual reports.[17] The results of this new categorization is a four category clustering, which shares some common characteristics with our original categorisation, supporting its reliability and accuracy. Table 7 shows the relative proportion of words in common between each k-means cluster and our original categorisation. According to this table, the majority of the words of the cluster one

[17] An interesting banking study which provides useful insights on the k-means cluster methodology is Krink et al. (2007).

belong to our risk management disclosure category (28% after normalizing by the number of words belonging to the risk management disclosure category). The same finding holds also for cluster 2 and the risk exposure category (100%), cluster 3 and the reassuring disclosure category (30%), cluster 4 and the references to the regulatory framework category (73%). Hence, it emerges that each cluster uniquely identifies one and only one category, supporting the reliability of our original categorisation.

[INSERT TABLE 7 HERE]

However, it is important to check whether the clusters identified by the k-means approach behave similarly to our original categories. In order to do so, we run the regressions substituting our original categories with the k-means clusters. Table 8 show the results of this analysis. Specifically, it emerges that for each cluster, the results of the regressions are qualitatively unchanged from those of our baseline models. Hence, we can conclude that our original categorisation is reliable and accurate, as it is validated not only by a panel of experts, but also by a purely objective statistical methodology.

[INSERT TABLE 8 HERE]

The results of our analysis might be affected by the choice of the weights assigned to each word of the four aforementioned categories. As already explained, the term $\mathrm{mow}_{Category\ 1}$ in equation (1) is the mean of the relative occurrences of the words belonging to the first category. It is implicit that all words have the same weight equal to unity. We test the robustness of our results to the assignment of different weights to the words of each category. More specifically, we use principal component analysis to aggregate the occurrences of the words of each category into a single variable. Principal component analysis is a statistical technique that converts a set of variables into a smaller set of linearly uncorrelated variables, named principal components, which preserve the information and structure of the original variables (Cumming & Wooff, 2007). This methodology has been widely used in banking and accounting studies (Larcker et al., 2007; Ludvigson & Ng, 2007; Carlson & Wheelock, 2018). For each category of our dictionary, we use the first principal component as the dependent variable of our regressions. The results reported in Table 9 are consistent with the risk disclosure regressions proposed in our baseline models.

[INSERT TABLE 9 HERE]

One of the most severe assumption of the difference-in-differences model requires that the control group must be a valid counterfactual of the treatment. Even though our sample selection approach

should guarantee that our control group (NSA supervised banks) is similar to the treatment one (SSM supervised financial institutions), we further test the robustness of our model to this assumption by selecting a restricted control group using propensity score matching (Rosenbaum & Rubin, 1983). More specifically, the predicted probability (propensity score) of being selected as a SSM supervised banks is computed by estimating a simple probit model. We use capitalisation (E/TA) and profitability (ROA) to match SSM supervised financial institutions with NSA supervised financial institutions, by using the Kernel matching approach (Heckman et al., 1998). The results of the propensity score matching difference-in-differences estimation (Table 10) are consistent to those of our baseline models, supporting the robustness of our results.

[INSERT TABLE 10 HERE]

We analyse a sample of banks from all 28 European Union countries. Table 4 provides some details about the geographical distribution of the banks analysed. However, the SSM supervised banks are from Eurozone countries only. Hence, the results of our analysis might be affected by the fact that the banks of non-eurozone countries are different from those that are from the Eurozone. In order to address this concern, we run a robustness test excluding non-eurozone banks from our regressions. The results reported in table 11 are qualitative unchanged, supporting the robustness of our results.

[INSERT TABLE 11 HERE]

Tetlock et al. (2008) argue that the words 'risk' and 'uncertain' are extremely important, when it comes to create a quantitative measure of language, as they can be used to predict stock returns and annual earnings. In order to test the robustness of our results for the risk disclosure categories, we run our regressions using only these two words (including stemmed words) to construct our dependent variables. The results reported in Table 12 are consistent with the two risk disclosure regressions proposed in our baseline model.

[INSERT TABLE 12 HERE]

Bertrand et al. (2004) argue that the difference-in-differences identification strategy might suffer from serial correlation issues. In order to address this concern in our research setting, we follow the procedure proposed by Bertrand et al. (2004) themselves. We collapse the time series information into a the pre- and post- 2014 period. More specifically, we take the means of the data of these two time periods separately, and then we repeat the difference-in-differences regression at the averaged level. The results in Table 13 are qualitatively unchanged. Hence, our results are still robust after controlling for serial correlation issues, supporting the reliability of our analysis.

[INSERT TABLE 13 HERE]

5. Policy implications

The important policy implication of our findings is that further efforts are still necessary by bank regulators and supervisors to improve SSM bank disclosure and the current European bank supervisory system. In order to achieve this goal, the SSM itself should deal with the information collection process, and provide the information to NSAs (when required), and not vice versa. Since the information collection process is a crucial component of the whole supervisory process, the SSM itself should be mandated to perform this role. The mediation role performed by NSAs may result in inefficiencies, which are reflected in the way financial institutions provide information in their financial statements. Although improving accounting regulation would be a straightforward choice to tackle the bank disclosure problem, we argue that a change in the current mediated supervisory mechanism for large European banks may enhance bank disclosure. In this perspective, a real direct supervision performed by the SSM may be more effective, as the scale of information collection performed by NSAs is suboptimal. However, there may be political resistances towards a really direct SSM supervision. The BU and the European Union itself are the result of a compromise of national authorities that do not want to give up their political power in favour of a centralised authority (Gros & Schoenmaker, 2014). The willing of national authorities to keep their power over the respective national banking system is probably one of the main causes of the creation of the current indirect supervisory mechanism and incomplete BU. Hence, it is crucial to overcome these political resistances. Although national authorities could make an effort to try to enhance the institutional legitimacy of the supranational supervisor and help the SSM to show that it is a powerful stakeholder, they would still have different objectives and utility functions that would undermine the effectiveness of the whole monitoring activity. The trade-off between local and systemic interests needs to be rebalanced, acknowledging that any compromise which gives supervisory power to the national authorities would cause inefficiencies and regulatory inconsistencies.

6. Conclusions

This paper examines the effects of the new European supervisory regime on bank disclosure. Adopting a tailored disclosure dictionary, specifically designed to investigate into bank

consolidated financial statements, we analyse the risk disclosure provided by a sample of 75 SSM supervised banks, and 150 financial institutions supervised by NSAs, before and after the establishment of the BU, over a time period running from 2012 to 2017. We use four different disclosure categories (risk management, risk exposure, references to the regulatory framework and reassuring disclosure), in order to study how this revolutionary change in the supervisory mechanism has prompted banks to modify their disclosure.

Our findings support the idea that the BU, and more specifically the establishment of the SSM, has had a positive impact on bank disclosure. However, we find evidence that the risk disclosure provided by SSM supervised banks has worsened in comparison that of the other NSA supervised financial institutions. These findings are related to the limitations of the current supervisory system in Europe. The most important limitation is the indirect collection of the information, which is performed by the NSAs. The inefficiency of the regulatory system has a negative impact on the speed of the information flow between the SIFI and the SSM, as well as on the scale of information collection, which is suboptimal.

From our results, it emerges that further efforts are still necessary by bank regulators and supervisors to improve the disclosure of the SIFI. A change in the current mediated supervisory mechanism for large European financial institutions may enhance bank disclosure. A direct information collection performed by the SSM may be more effective, as the mediation role performed by NSAs may result in inefficiencies, which are reflected in the way financial institutions provide information in their financial statements. However, national authorities are not willing to give up their supervisory power in favour of a European central authority. It is important to overcome any political resistance towards a real direct monitoring mechanism performed by the SSM and a complete BU. The trade-off between local and systemic interests needs to be rebalanced, acknowledging that any compromise which gives supervisory power to the national authorities would cause inefficiencies and regulatory inconsistencies.

Tables and figures

Table 1 - Disclosure categories.

Category: Risk Management Disclosure	Category: Risk Exposure	Category: References to the Regulatory Framework	Category: Reassuring Disclosure
Advanced measurement approach	Ambiguity	Bank for International Settlement	Bail out
Asset Quality Review (AQR)	Bank run	Basel committee	Boom
Backtest	Bankrupt	Central bank	Contingency Funding and Recovery Plan (CFRP)
Credit rating	Basis risk	European Banking Authority (EBA)	Compliance
External Credit Assessment Institutions (ECAI)	Business risk	European Central Bank (ECB)	Economic growth
Evaluation	Commodity risk	European Stability Mechanism (ESM)	Institutional Protect Scheme (IPS)
Expected Loss (EL)	Compliance risk	European Systemic Risk Board (ESRB)	Lender of last resort
Expected Shortfall (ES)	Concentration risk	Financial Stability Board (FSB)	Recovery plan
Exposure At Default (EAD)	Contagion	International Accounting Standard (IAS)	Reputation
Internal Capital Adequacy Assessment Process (ICAAP)	Counterparty risk	International Financial Reporting Standard (IFRS)	Rescue
Internal assessment	Country risk	Basel Pillar	Safe
Internal control	Credit risk	Prudential regulation	Sound
Internal Model Approach (IMA)	Crisis	Regulation	Stability
Internal Rating Based (IRB)	Currency risk	Single Resolution Mechanism (SRM)	Too big to fail
Incremental Risk Charge (IRC)	Danger	Single Supervisory Mechanism (SSM)	Trust
Liquidity Coverage Ratio (LCR)	Default	Supervision	
Loss Given Default (LGD)	Default risk		
Measurement	Emergency		
Net Stable Funding Ratio (NSFR)	Emerging risk		
Probability of Default (PD)	Enterprise risk		
Quantitative Impact Study (QIS)	Failure		
Rating	Foreign exchange risk		
Reverse stress test	Fraud		
Standardised method	Idiosyncratic risk		
Stressed Value at Risk (SVaR)	Illiquid		
Test	Incremental		

	risk charge		
Unexpected Loss (UL)	Insolvency risk		
Valuation risk	Instability		
Value at Risk (VaR)	Interest rate risk		
Conditional Value at Risk (CVaR)	Liquidity risk		
Exposure At Default (EAD)	Market risk		
Enterprise risk management	Operational risk		
Evaluation risk	Other risk		
Model risk	Panic		
Probability of Default (PD)	Peril		
Risk Appetite Framework (RAF)	Political risk		
Risk avoidance	Regulatory risk		
Risk coverage	Reputational risk		
Risk culture	Residual risk		
Risk management	Risk		
Risk measurement	Risk concentration		
Risk mitigation	Risk exposure		
Risk monitoring	Risk factor		
Risk provisioning	Settlement risk		
Risk tolerance	Sovereign risk		
Risk transfer	Strategic risk		
Stress test	Stress		

Table 2 - Descriptive statistics.

	N	Mean	St.Dev.	min	max
DEPENDENT VARIABLES					
Category: Risk Management Disclosure	1582	0	1	-1.91	9.314
Category: Risk Exposure	1582	0	1	-1.994	9.072
Category: References to the Regulatory Framework	1582	0	1	-1.725	8.133
Category: Reassuring Disclosure	1582	0	1	-1.57	8.934
DIFF-IN-DIFF VARIABLES					
banking_union	1582	.429	.495	0	1
ssm_supervised	1582	.332	.471	0	1
interaction_dummy	1582	.142	.349	0	1
CONTROL VARIABLES					
E/TA	1524	.119	.136	.008	1
ROA	1524	.051	.483	-2.205	2.923
LOANS	1431	.115	.135	.003	.697
OBS	1471	.18	.324	0	2.52
CUST_DEP	1418	.524	.248	0	.967
BIG4_DUMMY	1582	.942	.233	0	1
WB_DISCL_INDEX	1582	6.525	2.287	1	10
NCA_DUMMY	1582	.544	.498	0	1

Table 3 - Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) banking_union	1.000										
(2) ssm_supervised	-0.000	1.000									
(3) interaction_dummy	0.470	0.578	1.000								
(4) E/TA	0.050	-0.179	-0.088	1.000							
(5) ROA	-0.073	-0.048	-0.043	0.126	1.000						
(6) LOANS	-0.083	-0.056	-0.068	-0.013	-0.017	1.000					
(7) OBS	-0.015	0.005	-0.026	0.014	-0.015	0.047	1.000				
(8) CUST_DEP	0.117	-0.134	-0.018	-0.103	-0.007	-0.209	-0.002	1.000			
(9) BIG4_DUMMY	-0.000	0.053	0.031	0.019	0.017	-0.019	0.010	-0.133	1.000		
(10) WB_DISCL_INDEX	0.023	-0.089	-0.039	0.170	0.023	-0.057	-0.114	0.004	-0.042	1.000	
(11) NCA_DUMMY	0.000	-0.148	-0.085	0.003	0.078	0.077	0.009	-0.023	0.003	0.174	1.000

Table 4 - Number of banks in the sample by country of origin.

Country	Number of banks	Percent
Austria	10	4.44
Belgium	6	2.67
Bulgaria	5	2.22
Croatia	4	1.78
Cyprus	3	1.33
Czech Republic	5	2.22
Denmark	6	2.67
Estonia	4	1.78
Finland	4	1.78
France	18	8.00
Germany	22	9.78
Greece	5	2.22
Hungary	6	2.67
Ireland	8	3.56
Italy	23	10.22
Latvia	3	1.33
Lithuania	3	1.33
Luxembourg	7	3.11
Malta	6	2.67
Netherlands	16	7.11
Poland	8	3.56
Portugal	4	1.78
Romania	3	1.33
Slovakia	4	1.78
Slovenia	3	1.33
Spain	9	4.00
Sweden	5	2.22
United Kingdom	25	11.11
Total	**225**	**100.00**

Table 5 - Effects of Banking Union on Bank Disclosure.

VARIABLES	(1) Category: Risk Management Disclosure	(2) Category: Risk Exposure	(3) Category: References to the Regulatory Framework	(4) Category: Reassuring Disclosure
banking_union	0.2617***	0.2397***	0.1885***	0.1764***
	(0.0453)	(0.0526)	(0.0704)	(0.0415)
ssm_supervised	0.2069***	0.2979**	0.0702	0.1940**
	(0.0286)	(0.1454)	(0.1204)	(0.0881)
interaction_dummy	-0.1733***	-0.1543***	0.1316**	-0.1811***
	(0.0388)	(0.0448)	(0.0632)	(0.0317)
E/TA	-0.7145***	-0.7777**	0.1576	-0.0107
	(0.2363)	(0.3466)	(0.1575)	(0.3768)
ROA	-0.1348**	-0.1219***	-0.0324	-0.1213***
	(0.0602)	(0.0334)	(0.0537)	(0.0195)
LOANS	0.2534**	0.1178	0.4009***	0.5973**
	(0.1109)	(0.1599)	(0.1303)	(0.2602)
OBS	0.0248	0.0109	-0.1988***	-0.1276
	(0.0415)	(0.0527)	(0.0456)	(0.0967)
CUST_DEP	-0.3699**	-0.3056***	-0.0788	0.1419
	(0.1539)	(0.0765)	(0.2174)	(0.1104)
BIG4_DUMMY	0.1461	0.2976**	0.4204**	0.0624
	(0.1154)	(0.1181)	(0.1997)	(0.1906)
WB_DISCL_INDEX	0.1897***	0.1083*	0.1287***	0.0855*
	(0.0735)	(0.0616)	(0.0286)	(0.0507)
NCA_DUMMY	-0.6204	-0.0620	-0.7346***	-0.0934
	(0.4213)	(0.1732)	(0.2666)	(0.2532)
Observations	1,209	1,209	1,209	1,209
R-squared	0.302	0.365	0.373	0.287
Number of id	225	225	225	225
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: banking_union is an indicator variable that assumes value 1 for the years after the establishment of the banking union (2015, 2016, 2017) and 0 otherwise (2012, 2013, 2014). ssm_supervised is an indicator variable that assumes value 1 for SSM supervised financial institutions, 0 otherwise. interaction_dummy is the interaction of the two previous variables. E/TA is the equity to total assets ratio. ROA is the net income to total assets ratio. LOANS is the loans on total assets ratio. OBS is the offbalance sheet on total assets ratio. CUST_DEP is the total customer deposits on total assets ratio. BIG4_DUMMY is an indicator variable equal to 1 if the bank financial statement is audited by a big4 audit firm, 0 otherwise. WB_DISCL_INDEX is the world bank country level business extent of disclosure index. NCA_DUMMY is an indicator variable equal to 1 if the country has a NSA different from the national central bank, 0 otherwise.

Table 6 - Robustness test: Placebo test.

VARIABLES	(1) Category: Risk Management Disclosure	(2) Category: Risk Exposure	(3) Category: References to the Regulatory Framework	(4) Category: Reassuring Disclosure
banking_union_fake	0.0397	-0.0405	0.0753*	-0.0201
	(0.0536)	(0.0391)	(0.0417)	(0.0419)
ssm_supervised	0.3117*	0.3826	0.0659	0.3181**
	(0.1764)	(0.2874)	(0.2021)	(0.1461)
interaction_dummy_fake	-0.0320	-0.0081	-0.0056	-0.0589
	(0.0515)	(0.0727)	(0.0504)	(0.0364)
Observations	586	586	586	586
R-squared	0.346	0.409	0.358	0.287
Number of id	205	205	205	205
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7 - Relative percentages of the words in common between each category and cluster.

	Category: Risk Management Disclosure	Category: Risk Exposure	Category: References to the Regulatory Framework	Category: Reassuring Disclosure
Cluster #1	28%	26%	20%	26%
Cluster #2	0%	100%	0%	0%
Cluster #3	17%	25%	28%	30%
Cluster #4	21%	6%	73%	0%

Note: The cells marked in blue show the percentage of words in common between each cluster and the category represented by it (i.e. the maximum value by row).

Table 8 - Robustness test: Cluster analysis.

VARIABLES	(1) Cluster #1 ~ Category: Risk Management Disclosure	(2) Cluster #2 ~ Category: Risk Exposure	(3) Cluster #3 ~ Category: Reassuring Disclosure	(4) Cluster #4 ~ Category: References to the Regulatory Framework
banking_union	0.3102***	0.2339***	0.2397***	0.1864***
	(0.0608)	(0.0449)	(0.0532)	(0.0552)
ssm_supervised	0.3286***	0.3137***	0.1685***	0.1871***
	(0.0341)	(0.1197)	(0.0554)	(0.0720)
interaction_dummy	-0.0934***	-0.1435***	-0.1497***	0.1095**
	(0.0355)	(0.0415)	(0.0278)	(0.0556)
Observations	1,209	1,209	1,209	1,209
R-squared	0.292	0.399	0.349	0.361
Number of id	225	225	225	225
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9 - Robustness test: Principal component analysis.

VARIABLES	(1) Category: Risk Management Disclosure	(2) Category: Risk Exposure	(3) Category: References to the Regulatory Framework	(4) Category: Reassuring Disclosure
banking_union	0.3102***	0.2339***	0.1859***	0.2397***
	(0.0608)	(0.0449)	(0.0552)	(0.0532)
ssm_supervised	0.3286***	0.3137***	0.1868***	0.1685***
	(0.0341)	(0.1197)	(0.0720)	(0.0554)
interaction_dummy	-0.0934***	-0.1435***	0.1120**	-0.1497***
	(0.0355)	(0.0415)	(0.0556)	(0.0278)
Observations	1,209	1,209	1,209	1,209
R-squared	0.292	0.399	0.361	0.349
Number of id	225	225	225	225
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10 - Robustness test: propensity score matching.

VARIABLES	(1) Category: Risk Management Disclosure	(2) Category: Risk Exposure	(3) Category: References to the Regulatory Framework	(4) Category: Reassuring Disclosure
banking_union	0.2465***	0.2151***	0.1734**	0.1610***
	(0.0452)	(0.0510)	(0.0702)	(0.0401)
ssm_supervised	0.2233***	0.3446**	0.0428	0.2303**
	(0.0509)	(0.1630)	(0.1368)	(0.1063)
interaction_dummy	-0.1704***	-0.1492***	0.1458**	-0.1752***
	(0.0401)	(0.0514)	(0.0655)	(0.0348)
Observations	1,070	1,070	1,070	1,070
R-squared	0.292	0.367	0.391	0.292
Number of id	200	200	200	200
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11 - Robustness test: excluding non euro-zone countries.

VARIABLES	(1) Category: Risk Management Disclosure	(2) Category: Risk Exposure	(3) Category: References to the Regulatory Framework	(4) Category: Reassuring Disclosure
banking_union	0.2340***	0.2454***	0.1538***	0.1818***
	(0.0387)	(0.0466)	(0.0566)	(0.0548)
ssm_supervised	0.2323***	0.3332**	0.0788	0.2141***
	(0.0353)	(0.1630)	(0.1127)	(0.0750)
interaction_dummy	-0.1506***	-0.1529***	0.1550**	-0.1969***
	(0.0256)	(0.0442)	(0.0680)	(0.0389)
Observations	874	874	874	874
R-squared	0.307	0.433	0.326	0.209
Number of id	152	152	152	152
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12 - Robustness test: regressions with the words 'risk' and 'uncertain'.

VARIABLES	(1) Word 'risk'	(2) Word 'Uncertainty'
banking_union	0.2339***	0.2312*
	(0.0449)	(0.1203)
ssm_supervised	0.3137***	-0.0037
	(0.1197)	(0.2044)
interaction_dummy	-0.1434***	-0.1474***
	(0.0415)	(0.0312)
Observations	1,209	1,209
R-squared	0.399	0.443
Number of id	225	225
Clusters	YES	YES
Country Fixed Effects	YES	YES
Controls	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

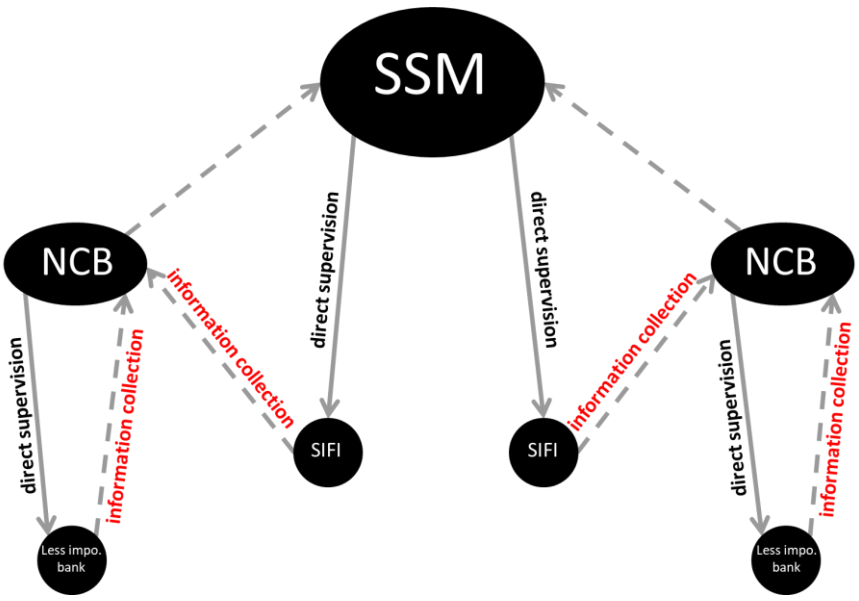
Table 13 - Robustness test: addressing serial correlation concerns.

VARIABLES	(1) Category: Risk Management Disclosure	(2) Category: Risk Exposure	(3) Category: References to the Regulatory Framework	(4) Category: Reassuring Disclosure
banking_union	0.3140***	0.2171***	0.2553***	0.2076***
	(0.0041)	(0.0011)	(0.0041)	(0.0051)
ssm_supervised	0.1525***	0.2654***	0.0210	0.1421
	(0.0493)	(0.0277)	(0.0397)	(0.1444)
interaction_dummy	-0.0985***	-0.0304**	0.0569***	-0.0404***
	(0.0239)	(0.0129)	(0.0192)	(0.0123)
Observations	1,335	1,335	1,335	1,335
R-squared	0.301	0.417	0.382	0.293
Number of id	225	225	225	225
Clusters	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 1 - 'Hub-and-spokes' supervision.



Source: own elaboration

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