



The dark side of stress tests: Negative effects of information disclosure[☆]

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ABSTRACT

This paper studies the effect of information disclosure on banks' portfolio risk. We cast a simple banking system into a general equilibrium model with trading frictions. We find that the information disclosure lowers the expected risk-adjusted profits for a non-negligible fraction of banks. The magnitude of this effect depends on the structure of the banking system and, alarmingly, it is more pronounced for systemically important institutions. We connect these theoretical findings to the stress test procedure, where bank information is disclosed by the regulator. The 2011 and 2014 stress tests are used in an empirical study to further support our theoretical results.

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1. Introduction

In the aftermath of the 2008 financial crisis, policymakers were faced with a task of restoring the soundness and safety of financial systems. An extra effort has been made to ensure the stability of financial institutions and to make their balance sheets as transparent as possible.¹ The stress test procedure has been developed as a part of this endeavor, aiming at “*assessing the resilience of financial institutions to adverse market developments, as well as to contribute to the overall assessment of systemic risk in the EU financial system*”.² Alternatively, one could view the stress test as a stability analysis of financial institutions in various adverse scenarios.

As a part of the procedure, banks are required to disclose otherwise unavailable information.³ There is an ongoing debate on whether such information should be disclosed and if so, how detailed it should be. A growing strand of literature, both theoretical and empirical (see Prescott (2008) and Goldstein and Leitner (2017) for theories and Schuermann (2014) for empirical evidence), provides mixed results on the issue. The advantages appear to be clear: information disclosure helps to discipline banks, reduces adverse selection, and leads to more informative prices. One could easily agree that market transparency seems like a desirable feature. However, Goldstein and Leitner (2017) find that during normal times, no disclosure is optimal. They show that during bad times some disclosure is necessary, but too much may destroy risk-

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¹ Further details can be found in the Dodd-Frank Act and Basel Accords for the US and Europe, respectively.

² European Banking Authority (EBA) definition of the stress test's purpose.

³ From 2011 the stress test procedure is coordinated by the EBA. The scope is to analyze the evolution of banks' capital under both a baseline as well as an adverse scenario over a two-year period. The setup of the two scenarios is provided by the European Commission (baseline) and the European Systemic Risk Board (adverse). The European Central Bank is responsible for interacting with banks during the exercise and for the validation of banks' data and results. Although stress test methodology can differ from one year to another, the basic timeline of the procedure stays the same. In the first step, the EBA announces the new round of stress tests. In the second step, it publishes the methodology and the scenarios that will be used. In the third step, it publishes the final template for the test such that banks can simulate the scenarios themselves. Finally, the EBA reports both results and the micro-data used during the procedure. This last step is what we mean by information disclosure. For details on current methodology see <http://www.eba.europa.eu/-/eba-issues-2018-eu-wide-stress-test-methodology-for-discussion>.

sharing. Moreover, Goldstein and Yang (2017) show that disclosing public information has a potential negative indirect effect of changing price informativeness.

Our main finding indicates that the information disclosure may result in a reduction of risk-adjusted expected profits for a non-negligible fraction of banks in the system. We refer to this change of risk-adjusted expected profits as the *disclosure effect*. Interestingly, in our model, systemically important banks⁴ gain the least from the disclosure and bear the highest cost in terms of its volatility. Moreover, their likelihood of experiencing a negative disclosure effect (as a result of new information) is higher.

These results follow from a simple one-period general equilibrium model in which agents (hereafter banks) face trading frictions. Being the main ingredient of our framework, trading frictions can be seen as a network of connections. Bank A is said to be *connected* to bank B if and only if A is not constrained in investing into B's asset. Therefore, the network is simply a way of writing down the portfolio constraints in a systematic way, which allows us to assess the structure of these restrictions.

The simulation exercise suggests that disclosure is beneficial in a sense that an average bank is expected to attain a positive profit. However, there are multiple factors that could possibly tip the scales towards non-disclosure. Firstly, we show that systemically important banks are more likely to be negatively affected by the disclosure. Alarming, these are the players that could potentially destabilize the whole system.⁵ Secondly, one needs to take into account the network density (the level of banks' interconnectedness) when drawing policy implications. We find that a negative disclosure effect is more likely to be observed in low-density networks.

We further show that these results are robust across different connection structures. The effect is present in simulated homogeneous networks as well as in network structures more similar to the actual financial systems. Moreover, we include an empirical section where we test our model predictions using the actual 2011 and 2014 stress tests. Results support our theoretical findings – i.e., banks subjected to a stress test procedure exhibit lower future expected risk-adjusted profits.

1.1. Related literature

Our work contributes to a few strands of literature. Broadly, our paper fits within the scope of the literature on public information disclosure. In frictionless markets, more information is always ex-ante better for a decision maker, a result known as Blackwell's Theorem (Blackwell, 1951). However, when operating in an environment with asymmetric information, more information does not necessarily imply an improvement.

The proponents of public information disclosure argue that it disciplines markets, reduces adverse selection, and improves price informativeness (Tarullo, 2010; Bernanke, 2013). Diamond (1985) shows that optimal disclosure reduces information asymmetries and enhances trade. Moreover, Korn and Schiller (2003) show that firms lose the ability to misreport under mandatory disclosure. Additionally, Admati and Pfleiderer (2000) demonstrate how correlated firms' values can increase the welfare under mandatory disclosure.

However, there are also arguments why public information disclosure can be harmful. Hirshleifer (1971) shows that releasing

information about the future state of the economy destroys ex-ante risk-sharing incentives. Goldstein and Leitner (2017) apply this idea to study the optimal disclosure policy in banking systems. They find that disclosing too much destroys the risk-sharing, but disclosing too little might result in a market breakdown in the time of a crisis. Andolfatto et al. (2014) show that it is only optimal to disclose information to prevent agents from its costly acquisition. Alvarez and Barlevy (2015) show in a model of information spillover that the decision to disclose depends on the presence of contagion. Furthermore, Gigler et al. (2014) show that frequent disclosure requirements may lead to managers' short-termism.

Morris and Shin (2002) provide an argument which is based on the dichotomy between public and private information. If there is no private information, public disclosure is always welfare enhancing. However, in the presence of private information, an increase in public information precision can be detrimental. If access to the private information is costly, agents have less incentive to obtain it and rely on the – possibly imprecise – public information. In comparison, disclosure in our model is unanticipated. This ensures that the only friction in the agents' decision making is their portfolio constraints.

Prescott (2008) provides an additional argument against information disclosure, namely possible detrimental welfare effects caused by disclosure during bad times. As a result, by disclosing banks' private information, the regulators' ability to obtain such information in the first place is threatened. In comparison, there is no business cycle in our model. Bond and Goldstein (2015) show that disclosure can also simply reduce investors' incentives to acquire and trade on private information. Earlier literature also argues that mandatory information disclosure may simply be unnecessary because firms have plenty incentives to disclose information by themselves (see Grossman and Hart, 1980; Grossman, 1981; Milgrom, 2007).

This paper adds to the existing literature by showing that the information disclosure may have negative effects even in a simple general equilibrium framework with portfolio constraints. We show the implications of the banking system network structure on the effect of information disclosure. More importantly, our paper shows that systemically important banks are more likely to suffer from disclosure.

Our work is closely linked to many of the papers we have already mentioned. Similarly to Admati and Pfleiderer (2000), our framework is also built around different effects of correlated assets, only we do not focus on a welfare analysis. Unlike Tarullo (2010), Bernanke (2013) or Diamond (1985) who focus on agency problems, our model uses a general equilibrium market mechanism with trading frictions instead. Similarly to Goldstein and Leitner (2017) and Andolfatto et al. (2014), we question the purpose of disclosure. The same goes for Prescott (2008), except instead of incorporating a business cycle into our model, we focus on a market-implied riskiness resulting from a general equilibrium.

Our work also contributes to the literature on financial networks (see e.g. Upper, 2011; Poledna et al., 2015, or alternatively Roukny et al., 2016). We offer a novel modeling approach based on a simple general equilibrium framework. It has a closed form solution which makes it computationally attractive while being easily implemented by a regulator at the same time. Translating the portfolio constraints into network connections constitutes a new perspective on systemic risk. Empirical works on the subject include Acharya et al. (2017) and Adrian and Brunnermeier (2016).

As suggested by the title, a practical example of information disclosure is the stress testing procedure. We strive to contribute to the debate on its proper design (see Goldstein and Sapra, 2014). Our paper provides a potential channel (trading frictions) to complement the literature on negative effects of information disclosure.

⁴ We focus on the network component of systemic risk where the institutions' positions play a vital role. Throughout the paper, we use the terms *systemic risk* and *network systemic risk* interchangeably.

⁵ The literature provides several examples in which systemically important banks can endanger the integrity of the network via contagious defaults (see Allen and Gale, 2000 or Elsinger et al., 2006).

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