

Allocating Lending of Last Resort and Supervision in the Euro Area *

Charles M. Kahn
Department of Finance
University of Illinois
1206 S. Sixth St.
Champaign, IL 61820
Email: c-kahn@uiuc.edu

João A. C. Santos
Federal Reserve Bank of New York
33 Liberty St.
New York, NY 10045
E-mail: joao.santos@ny.frb.org

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Abstract

The Maastricht Treaty created the European System of Central Banks and the ECB to head this system. The Treaty entrusted this institution with the responsibility for monetary policy, but it did not give the ECB supervisory powers or an explicit mandate for providing emergency liquidity support to individual banks. National authorities remained responsible for financial stability. As a result, in the euro area some bank regulatory functions are centralized, while others are allocated to not one, but multiple, competing national regulators. Previous researchers have discussed the potential implications of this institutional allocation of regulation on the financial stability of the region. In this chapter, we investigate instead the potential efficiency implications. We focus on the consequences of the allocation of the lender of last resort and supervisory functions for the degree of forbearance in closing distressed banks and for the level of diligence in bank supervision. We conclude that the integration of banking markets without the integration of regulatory functions increases forbearance and decreases supervision. Centralizing regulatory functions will tend to reverse this decline. If only one of the two functions is centralized, it will be more effective to centralize the supervisory function.

1. Introduction

Historically, the European Union (EU) has been building its bank regulatory framework through a process that fully harmonizes some components of this framework while leaving others at the national discretion. Over time, as more of these components are harmonized, questions of regulatory competition and of maintaining a level playing field with the remaining components have become more acute.

The move of monetary policy to the European Central Bank (ECB) and the decision to leave supervision and lending of last resort (LLR) with national authorities in turn has generated concern about financial stability in the EU area. We contribute to this debate by focusing instead on the efficiency implications of the institutional allocation of regulation and by studying the relative importance of centralizing supervision or LLR in the euro area (throughout the paper we use the term bank regulation in a broad sense, that is to include not only formal rules and standards but also LLR, supervision and deposit insurance).

The goal of creating a single financial market in Europe dates back to the 1957 Treaty of Rome that established the European Economic Community. The Treaty set out provisions to meet this goal, but the financial services industry remained a national business because obstacles to free entry continued in place. The 1977 First Banking Directive requirement that entry rules in a member state had to be those applicable to the host country's domestic institutions eased these obstacles. However, entry standards remained different across countries.

In time, it became evident that market forces alone were not capable of dismantling existing barriers to the single market in the short term. It also became

increasingly clear that it would be difficult to implement the single market through the harmonization of all national standards because these were very different, and where agreement was possible it was an extremely long process.

This motivated the adoption of a partial harmonization approach based on three principles: harmonization of minimum standards, home-country control and mutual recognition. Minimum standards would prevent regulatory standards from reaching an undesirably low level as a result of market forces. Home-country control in turn would guarantee that all financial institutions were supervised. Finally, mutual recognition of national authorities' supervision would avoid the duplication of supervision.

This new approach has facilitated the introduction of key legislation defining the regulatory framework that supports the single financial market. This framework, however, started to have standards that were harmonized or centralized at the European level while others, closely related to the former, were different across countries because they had been left under national control.

This dichotomy is evident in the 1988 Second Banking Directive. The directive introduced the single banking license, which allowed a bank to offer anywhere in the EU all of the services it was allowed to offer at home. It also harmonized the set of activities that a bank could offer, and other accompanying directives harmonized the solvency standards they had to meet. National authorities, however, were not required to allow their home banks to offer these activities. In addition, all of the other elements of the bank regulatory framework were left at national discretion.

It was only in 1994 that deposit insurance was harmonized, but once again following the same partial harmonization approach. The 1994 Deposit Insurance

Directive required all banks to enroll in a guarantee scheme that insures depositors up to a given minimum amount but it left at the country's discretion the choice of a level of coverage above this minimum and the design and administration of the scheme.

The Maastricht Treaty is the most recent example of the partial harmonization approach to build the single financial market. The treaty established the conditions for the introduction of the euro on January 1 1999, and harmonized monetary policy by transferring it from national central banks to the ECB.¹ However, the treaty left the responsibility for the stability of the financial system, including supervision and LLR, with national authorities.

This institutional allocation of bank regulation has generated an intense debate over its implications for financial stability and a level playing field in the euro area. In this paper, we focus instead on its efficiency implications. In particular, we investigate the consequences of the existing institutional allocation of LLR and supervision on the degree of forbearance in closing distressed firms and the level of diligence in bank supervision. We conclude that the integration of banking markets without the integration of regulatory functions increases forbearance and decreases supervision. Centralizing regulatory functions will tend to reverse this decline. If only one of the two functions is centralized, it will be more effective to centralize the supervisory function.

The remainder of the paper is organized as follows. The next section briefly characterizes the current institutional allocation of bank regulation in the euro area. Section 3 reviews the literature on the institutional allocation of this regulation. Section 4

¹ The eleven founding members were Austria, Belgium, Germany, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. Greece became the 12th member of the currency union in January 2001.

presents our model, and section 5 discusses the implications of centralizing supervision ahead of LLR or vice versa. Section 6 offers some final remarks.

2. The institutional allocation of bank regulation in the euro area

As noted above, the approach adopted by the EU to implement a single financial market has given rise to a bank regulatory arrangement where some components are fully harmonized and others left at countries' discretion within some limits. As we will document next, the restrictions imposed by these limits vary considerably across the three main components of a bank regulatory arrangement: deposit insurance, supervision and LLR.

2.1 Deposit insurance

The 1994 Directive on deposit guarantee schemes promoted only a partial harmonization of deposit insurance in the euro area. The Directive made deposit guarantee schemes mandatory in all member states and set a uniform minimum coverage of ECU 20,000 per depositor.² The Directive, however, left at the discretion of national authorities the design of national schemes, including funding and administration, and it allowed national authorities to offer higher levels of protection. As a result, nominal deposit insurance coverage varies considerably across the EU. The differences across countries are even more striking when we adjust their nominal coverage by the country's GDP per capita (Table 1).

Insert Table 1 here

² The Insurance Directive requires each scheme to cover the depositors of a state's credit institutions and the depositors of these institutions' branches in other member states.

As Table 1 illustrates, there are several other differences between national schemes. For example, while most schemes are funded ex ante through premiums paid by the banks, there are schemes funded ex post, that is, where banks commit to contribute to the scheme in case funds are needed to reimburse depositors of a failed bank. In addition, while many schemes are privately administered there are almost as many countries with public arrangements.³

3.2 Supervision

The Maastricht Treaty entrusted the European System of Central Banks (ESCB), which is headed by the ECB, with the full responsibility for formulating monetary policy and transferred to the ESCB the responsibility to promote the smooth functioning of the payment system.⁴ The Treaty, however, restricted the role of the ESCB with respect to safeguarding of financial stability “to the smooth conduct of policies pursued by competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system” (Art. 105 (5)), and to an advisory function in the regulatory process (Art. 105 (4)).⁵

This restricted and somewhat ambiguous role of the ECB in the maintenance of the stability of the financial system contrasts with the clear definition of its responsibilities with respect to monetary policy. This is similar to the Bundesbank

³ See Demirgüç and Sobaci (2000) for further details on the deposit insurance arrangements of the EU members.

⁴ Art 105(2) of the Treaty stipulates that one of the basic tasks of the ESCB “shall be to promote the smooth functioning of the payment system” and Article 22 stipulates that “the ECB and national central banks may provide facilities, and the ECB may issue regulations to ensure efficient and sound clearing and payment systems within the Community and with other countries.”

⁵ The ECB role in supervision can be increased without a revision of the Treaty. Art 105 (6) states: “The Council may, acting unanimously on a proposal from the Commission and after consulting the ECB and after receiving the assent of the European Parliament, confer upon the ECB specific tasks concerning policies relating to the prudential supervision of credit institutions and other financial institutions with the exception of insurance undertakings.”

Act, which does not include the preservation of the stability of the financial system as a task for the central banks, but is in contrast with the objectives of other central banks, including the Federal Reserve and the Bank of England.

A consequence of this allocation of responsibilities is that the home country control principle together with cross-border co-operation remains a cornerstone of the euro-area bank regulatory arrangement. This principle assigns the responsibility for consolidated supervision of a bank's business both inside and outside the EU to the "competent authority" of the member state where the bank has its head office.

Host country supervisors are expected to provide all necessary information to the home country authorities. Cross border co-operation is implemented at the bilateral level through memoranda of understanding and at the euro-area level through the Banking Supervisory Committee of the ECB, which brings together the authorities responsible for monetary policy and payments systems oversight in the ESCB with national banking supervisors. Co-operation between banking supervisors also occurs at the EU level through the European Commission's Banking Advisory Committee and its working group, the "Groupe de Contact".⁶

Given the different institutional allocation of bank supervision across Member States, including a substantial difference in central bank's involvement in this function (Table 2), the current regulatory arrangement in the euro area requires the cooperation of

⁶ The Banking Advisory Committee advises the European Commission with regard to the formulation and implementation of EC legislation for the banking sector. The "Groupe de Contact," which consists only of banking supervisors, deals with practical issues, including cooperation with respect to issues arising from individual institutions. See European Commission (2000) for further details on these committees.

agencies with quite different mandates. In addition, it promotes the supervision of similar organizations by authorities with different mandates and responsibilities.⁷

Insert Table 2 here

2.2 Lending of last resort

The Maastricht Treaty gave the ECB the responsibility for managing the monetary policy, but it did not give this institution an explicit mandate to act as a lender of last resort. By acting as a lender of last resort, we mean to provide discretionary liquidity support directly to individual financial institutions in response to a shock which causes an increase in their liquidity needs which they are unable to meet through other sources.

The ECB can manage overall liquidity in the euro area through monetary operations, but the arrangements put in place in the Eurosystem, namely the establishment of standing facilities available on demand and the pre-specification of what the ECB can accept as collateral, make it impossible for the ECB to meet the liquidity needs of an illiquid financial institution that runs out of assets qualifying as collateral according to the established list.

In contrast, by assigning the responsibility for financial stability to member states, the Treaty implicitly assigns the LLR task to national central banks. The reason is that this function in the euro area usually is performed by central banks, with the exception of Germany where it is managed by the Liquidity Consortium Bank (Liquiditäts-Konsortialbank GmbH), a private company jointly owned by banks

⁷ Besides the differences in both the central bank and the deposit insurance provider involvement in bank supervision, in some countries like the UK there is a single supervisor for all financial services while in others like Germany there are multiple supervisory authorities. See Goodhart and Shoenmaker (1998) for further details on the supervisory arrangements of EU members.

and the central bank.⁸ National central banks remained, therefore, responsible for the provision, and the cost, of liquidity assistance to the institutions operating in their jurisdiction.

The recognition that this allocation of responsibilities could require some coordination between the unrestrained LLR facility of the national central banks and the monetary policy of the ECB led to an agreement under which the ECB's Governing Council should be consulted on LLR operations that have EMU-wide implications.

3. The debate on the institutional allocation of bank regulation in the euro area

The continued reliance on the hybrid harmonization approach has increasingly raised concerns with the level of the playing field within the EU. The arrival of the euro by harmonizing additional elements of the regulatory framework in the euro area heightened these concerns. The reason is that, as more elements of that framework are harmonized, the competitive distortions that may arise from differences across countries in the complementary elements left at home country control grow in relative importance.

The move of monetary policy powers to the ECB accompanied by the decision to maintain the responsibility for financial stability with national authorities has also stimulated an intense debate on the institutional allocation of bank regulation in the euro area. Participants in this debate, including Aglieta (2000), Di Noia and Di Giorgio (1999), Prati and Schinasi (1999), Bruni and Boissieu (2000), Vives (2001) and Lannoo

⁸ National authorities that choose to deal with liquidity problems with public funds. However, in principle they become subject to the EU rules on state aid as set out in Article 92 of the EU Treaty. Thus, if state financial support is provided to banks, the Commission must establish whether that law is being respected. Exceptions can be made if a serious disturbance threatens the economy (Art. 92.3b).

(2000), note that giving national authorities the responsibility to maintain financial stability led to the separation of supervision and LLR functions from monetary policy, and to the fragmentation of the former functions.⁹

This institutional allocation, they argue, may be a source of potential problems to the financial stability in the euro area. A reason is that under the current diffused arrangement information may not be shared with all of the important parties in a timely fashion. Another reason is the absence of an authority at the EU level charged with the responsibility, and endowed with the necessary means, to maintain financial stability. It is now agreed that the ECB's Governing Council should be consulted on LLR operations at the local level that may have EMU-wide implications, implying that the ECB will coordinate LLR of truly European banks. However, the ECB is only allowed to lend against good collateral and, unlike the national central banks, it has limited financial means and is not backed by a Ministry of Finance for an eventual bank rescue. On the other hand, as banks expand across state lines, the potential for an inadequate internalization of the externalities resulting from a bank failure grows, reducing in turn the home country's willingness to incur the costs of an eventual bank rescue.

To preserve financial stability in the euro area, most of these researchers suggest the establishment of an European LLR. They do so after taking into account the potential synergies and conflicts of interest between monetary policy and bank supervision and several other reasons identified in the literature in favor of the separation of powers, including regulators' career concerns and reputation, monitoring of multitask

⁹ It is worth noting that the separation between monetary policy and banking supervision in the EMU is only partial because some central banks are the country's bank supervisors and participate in the definition of monetary policy.

organizations, and industry capture of regulators.¹⁰ They argue that this function is necessary to internalize the EMU area-wide externalities inherent to systemic risk and that it should be performed by the ESCB.

With respect to bank supervision, some of these researchers, including Aglietta (2000), propose that national supervisors work as part of a network headed by the Banking Supervision Commission of the ECB and in line with common criteria elaborated by the European LLR. Others, including Vives (2001), argue instead for separating supervision from the ECB and housing it in an independent institution perhaps like the Financial Services Authority in the UK.

As we can see from this brief summary of the debate over the current institutional allocation of bank regulatory powers in the euro area, there are important concerns with the arrangements currently in place and some agreement on certain changes needed to address these concerns. This debate, and the proposed changes, however, have been almost exclusively dominated by concerns with the implications of the institutional allocation of regulation for the preservation of financial stability. The potential implications of the current institutional allocation for the efficiency of banking appear to have been given at best only very minor consideration.

Participants in this debate have focused almost exclusively on the institutional allocation of supervision and LLR functions, implicitly assuming a passive role for the authority in charge of administering deposit insurance.¹¹ We will proceed along the same

¹⁰ See Vives (2001) for a review of these and other factors that may play a role in the optimal institutional allocation of bank regulation.

¹¹ Vives (2001) also discuss at length the institutional allocation of competition policy, that is, authority to approve mergers and acquisitions in the financial sector.

lines.¹² However, by concentrating on efficiency of the banking system, we will come to a different conclusion: leaving the regulatory systems at the national level reduces their effectiveness, but if only one set of regulators is to be integrated, it will be more effective to integrate the supervision function, and leave the LLR function at the national level. Since our earlier paper, Kahn and Santos (2001), provides other arguments in favor of allowing multiple competing lenders of last resort, the papers together argue for a different pattern of regulation than heretofore proposed.

4. A model of the institutional allocation of lending of last resort and supervision

Consider the following model. There are three periods, labeled 0, 1 and 2. There are three agents: the bank b , a bank supervisor s , and a lender of last resort l . In addition we will want to consider payoffs to the rest of the public p .

In period 0 the bank chooses a portfolio i . In period 1 a signal n in $\{0,1,\dots,N\}$ is generated. The signal provides information about the bank's profitability and its liquidity shock. The signal is stochastic, with distribution $\lambda(i,n)$. If the signal is *not* equal to 0, then the bank will suffer a liquidity shock requiring a loan from the lender of last resort in period 1. If the loan is needed but is not provided, then the bank is closed in period 1. If it receives the loan (or if it does not require the loan), then the portfolio matures in period 2. In this case, it has a probability $\pi(i,n)$ of not failing in period 2. Let $\pi(i)$ be the ex ante probability of not failing as of period zero and assume $\pi(i) < \pi(i,0)$ --- i.e., not needing to resort to a lender of last resort is good news for the bank.

¹² For studies of institutional allocation of bank regulation where the deposit insurance provider plays an active role, see for example, Repulo (2000) and Kahn and Santos (2001).

Let P_a denote the payoff to agent a from a successful bank, P_b the profit from a successful bank, and P_p the social value to the public of the successful bank. In general these payoffs are functions of i and n . However, for simplicity we assume that P_p is constant and positive. Let C_a be the cost to agent a of closing the bank in period 1, and F_a be the cost of a failed bank in period 2. Again for simplicity, F_a and C_a are taken to be independent of i and n (as noted before, the probability of a failure is dependent on these variables). Finally, we make the following assumptions regarding F_a, C_a , and P_a :

1. $F_b = C_b = 0 < P_b(i, n)$
2. $F_p > C_p \geq 0 \leq P_p$
3. $F_s = C_s > 0 = P_s$
4. $F_l > C_l > 0 = P_l$, with $(F_p + P_p) / (C_p + P_p) > F_l / C_l$

These assumptions are justified as follows: 1 is simply limited liability. 2 is the assumption that while both closures and bank failures are costly to the public, early closings are less disruptive than failures. The costs to the supervisor of closure or failure of a bank are bureaucratic costs and essentially identical. The costs to the lender of last resort of a failure are, in addition to bureaucratic costs, the costs of the funds lent and lost; nonetheless, a failure is still relatively speaking more costly for the non-bank public than it is for the lender of last resort---that is, we build into bureaucratic preferences a tendency towards forbearance.

By spending an amount k in period zero the supervisor is able to monitor the choice of i by the bank. The supervisor is then able to close the bank if desired, before the realization of the liquidity shock. If the supervisor leaves the bank open, and the liquidity

shock occurs, then the lender of last resort observes n and decides whether to provide the needed liquidity to keep the bank open.

4.1 Efficiency

The issue is the choice of efficient investment. We take the social benefits to be the sum of public and bank benefits (in other words, we put a weight of zero on bureaucratic preferences in the social calculus). The planner's problem is to choose a portfolio i and a closure policy to maximize social benefits. The optimal closure policy is to close the bank in any state n in which

$$-C_p > \pi(i, n) (P_b(i, n) + P_p) - (1 - \pi(i, n)) F_p$$

and the socially optimal portfolio i solves

$$\max_i E_{n|i} (\max \{-C_p, \pi(i, n) (P_b(i, n) + P_p) - (1 - \pi(i, n)) F_p\}).$$

4.2 Laissez faire profit maximization

A bank which worked in a world without regulators and without publicly provided LLR would choose i to solve

$$\max_i \lambda(i, 0) \pi(i, 0) P_b(i, 0).$$

A bank which worked in a world in which LLR was always provided would choose i , to solve

$$\max_i E_{n|i} (\pi(i, n) P_b(i, n)).$$

4.3 Regulation

A regulator's objective will be some convex combination of what is socially desirable and what would arise from an assumption of bureaucratic costs. We begin with an extreme assumption that both regulators only take into account bureaucratic costs. The proof is easy.

Theorem 1. *If both regulators only take into account bureaucratic costs, the supervisor does not monitor the bank's choice of investment and never shuts the bank. The lender of last resort shuts the bank if $\pi(i,n) < (F_l - C_l)/F_l$.*

Under these circumstances, the bank will choose an investment to maximize $\max_i E_n[\pi(i,n) \xi(i,n) P_b(i,n)]$, where ξ is an indicator function equal to 0 if $\pi(i,n) < (F_p - C_p)/F_p$ and 1 otherwise. Thus the bank's choice of investment opportunities will be biased against those opportunities which leave it dependent on a reluctant lender of last resort. This has two consequences: even socially beneficial outcomes will not be permitted if the risk of a failure is above the cutoff level, and outcomes with little social value will nonetheless be permitted if they have failure risks below the cutoff level.

We now consider the more realistic case that the regulators' objectives are instead a function (weighted average) of social objectives and bureaucratic costs. We will use μ_a in $[0,1]$ to denote the weight placed on social objectives by regulator a . $\mu_a = 0$ denotes a regulator with purely bureaucratic objectives, and $\mu_a = 1$ denotes a regulator with purely social objectives. The above theorem generalizes when regulators' objectives weight social objectives equally.

Theorem 2. *Suppose $\mu_s = \mu_l$ and suppose the supervisor would prefer a bank which is not in need of a lender of last resort to remain open. Then the supervisor does not monitor the bank and never shuts the bank.*

Of course, as the weight placed by the regulators on social objectives increases, the choices made by banks generally become more efficient. A lender of last resort

becomes less forbearing in states with low social values and more forbearing in states with high social payoffs.

Nonetheless, even an efficient regulator (that is, one who places full weight on social objectives and none on bureaucratic objectives), given limited regulatory powers, will not be able to force a bank into the globally efficient choice. The supervisor is limited in its ability to make timely interventions. The lender of last resort's interventions are more timely, but only permitted when the bank actually needs liquidity.

5. Centralizing lending of last resort or supervision first?

If the market is integrated but the regulator remains tied to its home country, then the primary effect of integration on a regulator's incentives is to reduce the weight of the social benefit on the regulator's decisions, since costs and benefits accrued outside the home country will be regarded as less important. Thus it would be expected that, in general, the decision to integrate banks without integrating regulation should lead to a lower weight on the efficiency of banking decisions and more excessive forbearance than previously (of course this ignores the increases in efficiency that might result within the banking system itself). In particular, there will be examples where regulators cease to monitor effectively as integration takes place (integration will also increase the costs of monitoring).

What is the effect on regulator incentives of changing from a home based to a community wide regulator? In general, the effects of international versus local regulation on the relative weight of bureaucratic versus public-welfare goals will be ambiguous: regulators will be more remote from the regulated public, but also more remote from the

political pressures encountered locally. In one respect, however, the effect is unambiguous: the constituency now again takes in the entirety of the public not just the public within the home country. Thus the baseline effect of moving to European-wide regulation would be to decrease the weight of bureaucratic preferences relative to social preferences in the behavior of regulators.

If it is feasible only to move one of the regulators to a European-wide integration, what are the merits of choosing one versus the other of the two? The model can be used to make a quick evaluation of the question; in general it supports the argument that integrating the supervisory role will be more effective than integrating the lender of last resort. To see the issues involved, consider the following extreme case. Start with the situation where both regulators have purely bureaucratic objectives and consider the differences arising from changing one or the other to purely social objectives. When both have only bureaucratic incentives, the supervisor does nothing. When the incentives of the lender of last resort change, the supervisor continues to do nothing. Thus, in this extreme case, if we want both regulators to contribute to the regulation of the banking system, we will put bank supervision on a European-wide basis.

In this model, changes in the objective of the supervisor do not change the behavior of the lender of last resort. However, changes in the objective of the lender of last resort can change the behavior of the supervisor. As the following example shows, it is not difficult to construct cases in which by improving the objectives of the lender of last resort, we eliminate the incentives of the supervisor to engage in monitoring. Such examples reinforce the intuition that it is more effective to centralize the supervisory function than the LLR function.

5.1 Example:

Assume the following values:

1. $F_p = 9, C_p = P_p = 0$

2. $F_s = C_s = 2$

3. $F_l = 3, C_l = 2$

The bank chooses between two investments, x and y . Investment x is completely safe: its profits are small: $P_b(x,0) = 1/4$ but there is zero probability of either the bank needing liquidity assistance or failing as a result of this investment. Investment y is a risky investment, with two states 0, 1. Most of the time it will require liquidity provision by the lender of last resort ($\lambda(y,1) = 0.9$). Only rarely ($\lambda(y,0) = 0.1$) will it not require such services. Whether or not it requires such services the probability of the bank's failure is 50% ($\pi(y,0) = \pi(y,1) = 0.5$). We also assume $P_b(y,0) = 1/4$ and $P_b(y,1) = 8$. In other words if the bank requires liquidity assistance, investment y is no more profitable than the safe investment. But if the bank avoids needing liquidity assistance, investment y is extremely profitable. Note that, given the high cost to the public of a bank failure, investment y is socially undesirable, even though it is preferred by the bank.

We assume the supervisor weights bureaucratic values and public values equally. We will consider the effect on the behavior of both regulators of a change of the lender of last resort from bureaucratic values to public values.

A bureaucratic lender of last resort will lend to the bank which has invested in the risky project: the additional cost of a failure is not too great, so it is worthwhile to gamble on the bank's survival rather than to shut it down and endure the certain cost of early closure. As the lender of last resort takes social values into account, however, the

potential cost of the failure increases, and the lender of last resort, when given the opportunity chooses to shut down a risky bank.

Since the bank receives little profit from the risky investment in the event of a liquidity shortfall, the lender of last resort's behavior has no effect on the bank's decision: The bank prefers the risky investment whether or not the lender of last resort will bail it out.

However the lender of last resort's policy will affect the behavior of the supervisor.¹³ The supervisor finds it costly to let a bank continue with a risky project. It therefore sees forbearance by the lender of last resort as a threat, and prefers to shut down the project preemptively, rather than allow the lender of last resort to keep the project going.

But if the supervisor knows that the lender of last resort will shut down risky projects, the supervisor has less incentive to close them down on its own. If there is a cost to investing in supervision, then the improvement in the behavior of the lender of last resort reduces the supervisor's incentive to invest.

To conclude, it is worth noting that as described, the model actually leaves no role for the lender of last resort: abolishing it would improve the situation. This can easily be modified: let there be a probability that the safe project is also in need of liquidity; since the safe project will not fail, it is socially desirable for a lender of last resort to exist to provide that liquidity. The rest of the model is unaffected.

¹³ Note that this incentive does not depend on assuming any financial responsibility of the supervisor for the behavior of lender of last resort. The issue is whether, given the knowledge of how the lender of last resort *will* behave, it becomes more or less worthwhile for the supervisor to do its own investing and monitoring.

6. Final remarks

In the recent past, academics and policymakers alike have shown a growing interest in the institutional allocation of bank regulation. Though initially most the attention was on issues related to the institutional allocation of bank supervision and in particular on whether this function should be housed in the central bank, more recently the interest has broaden to the other regulatory functions. The decision in the euro area to leave supervision and LLR functions with national authorities has raised a new set of important questions. Banks that are supervised by different authorities, have access to different lenders of last resort and are protected by different deposit insurance schemes are now competing in an increasingly integrated area with both a single currency and monetary policy.

In this paper, and in contrast with the existing literature which has focused on the level playing field and financial stability in the euro area, we show that the expected integration of the banking markets will have different implications for the degree of forbearance in closing distressed banks and for the diligence in supervision depending on whether supervision and LLR functions stay with member states or are centralized.

Following the historical practice in the EU of harmonizing certain functions while leaving related functions under national control, we investigate the implications of centralizing first one or the other of these functions and show that the order of centralization has important welfare implications. We show that centralizing supervision and LLR functions will tend to reverse the increase in forbearance and reduction in supervision diligence that comes with an integration of banking markets without the integration of these regulatory functions. If only one of the two functions is centralized, it

will be more efficient to centralize the supervisory function. Centralizing the LLR function reduces supervisors' incentives to invest in monitoring, allowing them to rely on the lenders of last resort to repair the damage when necessary. In contrast centralizing the supervisory function does not have such an effect. It does not take investments for a lender of last resort to learn that there is a problem: instead the problem tends to appear at their front door. Nor is there the opportunity to pass the problem along to other regulators: when the crisis arises the lender of last resort must deal with it immediately.

One of the many related issues, which we did not address and that appears to be a fruitful area for future research, is to extend this analysis of the institutional allocation of bank regulation in the euro area and include the deposit insurance provider.

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Table 1. Coverage of deposit protection schemes of euro area countries ¹				
	Coverage per depositor		Funding	Administration
	In euros	relative to GDP per capita, in %		
Germany	20,000 ²	85.4	Yes ²	Private ²
France	60,980	276.6	No	Private
Italy	103,291 ⁴	559.5	No ⁵	Private
Spain	15,000 ⁶	113.5	Yes	Joint
The Netherlands	20,000	90.1	No	Joint
Belgium	15,000 ⁶	68.4	Yes ⁷	Joint
Austria	18,895	80.6	No ⁸	Private
Portugal	15,000 ⁹	156.1	Yes ¹⁰	Government
Finland	25,228	113.4	Yes	Private
Ireland	15,000 ¹¹	73.3	Yes	Government
Luxembourg	15,000 ⁶	40.6	No	Private
Greece	20,000	193.8	Yes	Joint

¹As of end-1998. ²For almost all banks, 100% up to a limit of 30% of the bank's liable capital. Official coinsurance 90% up to €20,000. ³Additional assessments may be made if necessary to meet the fund's responsibilities. ⁴100% of first Lit 200 million (€103,291). ⁵Banks commit ex ante; but, contributions are ex post. ⁶Until December 1999; €20000 thereafter. ⁷In case of insufficient reserves, banks may be asked to make additional payments. ⁸System is organized as an incident-related guarantee facility. ⁹100% up to €15,000; 75% from €15,000 to €30,000; 50% from €30,000 to €40,000. ¹⁰The payment of the annual contributions may be partly replaced, with a legal maximum of 75%, by the commitment to deliver the amount due to the fund, at any moment it proves necessary. ¹¹90% up to €15,000. Sources: Barth, Nolle and Rice (1997) and IMF, as quoted in Prati and Schinasi (1999); and national data.

Table 2 Bank supervisory agencies of euro area countries	
Country	Supervisory agencies
Austria	Ministry of Finance
Belgium	Commission Bancaire et Financière
Finland	Financial Supervision Authority & Suomen Pankki
France	Commission Bancaire & Banque de France
Germany	Bundesaufsichtsamt für das Kreditwesen & Deutsche Bundesbank
Greece	Bank of Greece
Ireland	Bank Ceannais na hÉireann
Italy	Banca d'Italia
Luxembourg	Institut Monétaire Luxembourgeois
The Netherlands	De Nederlandsche Bank
Portugal	Banco de Portugal
Spain	Banco de España
Source: Goodhart and Schoemaker (1998) and National Central Banks.	