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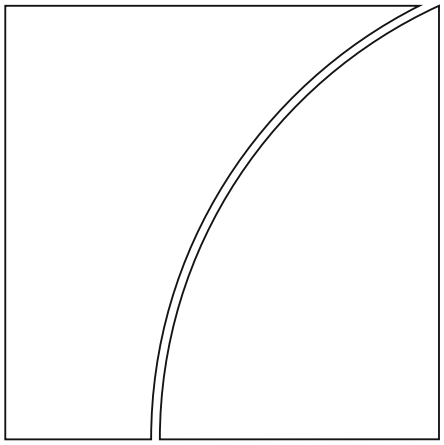

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Keywords: bad banks, resolutions, lending, non-performing loans, rescue packages, recapitalisations

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Bad bank resolutions and bank lending

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Abstract

The paper investigates whether impaired asset segregation tools, otherwise known as bad banks, and recapitalisation lead to a recovery in the originating banks' lending and a reduction in non-performing loans (NPLs). Results are based on a novel data set covering 135 banks from 15 European banking systems over the period 2000–16. The main finding is that bad bank segregations are effective in cleaning up balance sheets and promoting bank lending only if they combine recapitalisation with asset segregation. Used in isolation, neither tool will suffice to spur lending and reduce future NPLs. Exploiting the heterogeneity in asset segregation events, we find that asset segregation is more effective when: (i) asset purchases are funded privately; (ii) smaller shares of the originating bank's assets are segregated; and (iii) asset segregation occurs in countries with more efficient legal systems. Our results continue to hold when we address the potential endogeneity problem associated with the creation of a bad bank.

JEL classification: E44; G01; G21.

Keywords: bad banks, resolutions, lending, non-performing loans, rescue packages, recapitalisations.

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Introduction

Impaired asset segregation in asset management companies has become a ubiquitous method used by supervisors and private investors to clean up the balance sheets of troubled banks. Yet, a comprehensive study assessing which specific design is most efficient in promoting bank lending and reducing non-performing loans (NPLs) is absent from the literature. The present paper fills this gap by assembling and analysing a new data set on impaired asset management companies, which we will refer to as bad banks (BBs). BBs acquire non-performing assets – typically NPLs – at a discount price and they manage them over a limited time with the aim of maximising the recovery value. However, as we will show later on, BBs differ along several dimensions, among which, the most salient are the amount of private funding, the degree of risk transfer, and whether their ultimate goal is to restructure assets or to dispose of them.

The great financial crisis and its aftermath have left many banks with large burdens of non-performing assets. In response, a large number of BBs have emerged in Europe in the form of asset management companies.[1] The ultimate objective is to clean up and de-risk the balance sheet of the originating bank, which we define as the "good bank" after the removal of the NPLs from the balance sheet.

For the good bank, which is the focus of our study, the segregation of impaired assets should reduce uncertainty about its asset values and the associated obstacles to funding. It should improve credit ratings and enhance the confidence of markets, investors, shareholders and depositors (Morrison and Foerster, 2009). The disposal and sale of impaired assets is also expected to relieve the pressure on a troubled bank's capital constraints, restoring its earnings together with its capacity and willingness to lend. By separating viable and profitable businesses from distressed and non-performing assets, the good bank will be able to focus on its core businesses and generate new lending.

Impaired asset segregation is often combined with state-funded resolution tools, such as recapitalisations, liquidity injections and debt or asset guarantee schemes (McKinsey, 2009a; HM Treasury, 2013). Recapitalization may simply be needed to restore the viability of the bank as asset transfer is likely to occur at a price below the book value.

[1] Asset management companies were first used in the late 1980s and early 1990s in the United States (RTC) and Sweden (Securum) to resolve problems at banks with persistently high stocks of impaired assets. BBs were also used during the Asian crisis in the late 1990s (Korea, Malaysia, Indonesia), and more recently in Turkey and Nigeria. For details, see Cerruti and Neyens (2016).

Thus asset segregation on its own might not suffice to raise the good bank's capital position to levels that would allow the bank to engage in profitable but risky new lending, eg in the form of loans to small and medium enterprises (HM Treasury, 2013).

Our study focuses on a sample of 135 major banks, of which 38 segregated parts of their impaired assets. They operated in 15 countries from the European Union and in Switzerland over the period 2000–16. Our aim is to assess whether the banks in our treatment group, namely those that received recapitalisations and/or segregated impaired assets, have been able to increase lending and lower future NPLs relative to the control group of banks that neither received recapitalisations nor segregated impaired assets. We do so by testing for structural shifts in bank lending and NPLs in response to recapitalisations and asset segregations.

Anticipating our main results, we find that asset segregation without recapitalisation has a statistically insignificant impact on the loan growth and future NPLs of originating banks. Similarly, when banks receive capital injections but do not segregate their impaired assets, they tend to use the injected funds to clean up their balance sheets. While NPLs decline, there is no recovery in lending. The two interventions, recapitalisations and impaired asset segregations, are only effective in the clean-up and recovery process when they are undertaken together. In fact, mere recapitalisation proved to be ineffective, as shown by Hoshi and Kashyap (2010) for Japan.

Asset segregation events may differ along several dimensions: the mix of private and public funds involved; the perimeter of the interventions (system-wide versus bank-specific asset management companies); the fraction of the originating bank's assets transferred to the BB; the ultimate mandate of the BB (assets disposition versus restructuring vehicles); and the efficiency of a country's legal system. We exploit this heterogeneity to assess an event's differential impact on our two response variables. We find that, when the funding to purchase impaired assets is in majority private, the originating bank's increase in lending and the reduction in its NPLs are more pronounced than they are in the case of mostly publicly funded BBs. Moreover, those banks that transfer a smaller fraction of their assets exhibit stronger credit growth and lower future NPLs. We also find that those banks that set up a BB aimed primarily to dispose of impaired assets, increase loans and reduce future NPLs by more than do BBs that act primarily as restructuring vehicles. Finally, the more efficient is the country's legal system, the stronger is the credit recovery after a bank segregates its impaired assets.

The rest of the paper is organised as follows. In Section 1, we discuss the mechanisms and different dimensions of asset segregation. In Section 2, we lay out our testable hypotheses. In Section 3, we describe the data and conduct the empirical analysis. Section 4 concludes.

1. Background

Historically, segregating impaired assets from the healthy part of the bank has been conducted in many ways, corresponding to different levels of risk transfer and organisational complexity (McKinsey, 2009a,b; Morrison and Foerster, 2009; Gandrud and Hallerberg, 2014; Cerruti and Neyens, 2016; KPMG, 2016; HM Treasury, 2013). It represents an exceptional tool for providing relief on the asset side by swapping and selling impaired and illiquid assets for liquid funds.

In this paper, we will focus only on the bad bank structures that achieve risk transfer. We will therefore ignore internal BBs where the bank segregates some of its impaired assets from the rest of the bank's portfolio, but without achieving effective risk transfer.[2] We will also neglect risk transfer via the direct sale of impaired assets to specialised operators.

Risk transfer takes place when the bank creates an external BB to offload its unwanted assets.[3] Maximum risk transfer and a correct market evaluation, at the cost of some added organisational complexity is achieved when the off-balance sheet vehicle is also a legally separate

[2] Examples of internal BBs include Dresdner Bank and RBS. As McKinsey (2009b) and HM Treasury (2013) argue, internal BB may be suited when impaired assets are complex and/or account for a large share of the balance sheet. The HM Treasury (2013) argues that an external BB (such as UKAR for Northern Rock and Bradford & Bingley) would be more difficult to manage due to the complex and more diverse asset structure of RBS with large corporate loans, structured products and derivatives. While such an on-balance sheet solution lacks effective risk transfer, it provides a signal to the market and increases transparency of the good bank's core performance.

[3] Asset segregation is most often done using external BBs, see Cerruti and Neyens (2016). External BBs tend to be established as special purpose vehicles (SPVs), statutory bodies or limited liability companies. The choice of legal entity depends on the country's legal system; for instance, common law jurisdictions tend to use SPVs and statutory bodies established under the law. For example, the large Irish BB (NAMA) was implemented by setting up a majority (51%) privately funded SPV (Cerruti and Neyens, 2016). An example for a BB that is a publicly funded SPV is UBS with an external BB funded by the Swiss National Bank to acquire up to $60 billion of impaired and illiquid assets.

entity removed from the regulatory and financial perimeter. We refer to either case as asset segregation in a BB.

Although, historically, the creation of most BBs involved injections of public funds,[4] the phasing in of the Bank Recovery and Resolution Directive (BRRD) has changed both the framework for impaired asset segregation in the European Union and the mix of public and private funds (Philippon and Salord, 2017). From the start of the crisis until mid-2009, the prevailing ownership model of BBs in Europe was mixed. Later on, member states created BBs first with minimal private majority ownership and then with large private majority ownership, encouraged by public opinion less favourable to public intervention (Gandrud and Hallerberg, 2014).[5]

The ownership mix matters since it is linked to the price at which impaired assets are transferred by the originating bank to the BB (European Commission, 2018). Determining the transfer price involves several dimensions. The first one is the difficulty of establishing the real economic value of those assets (typically the expected discounted cash flow); that is, their theoretical value absent asymmetrical information and when the secondary market functions normally. In reality, banks have an information advantage and the secondary market for those assets is likely to be stressed and thin precisely because there is a problem of impaired assets to start with, so that the estimated market value could be below the real economic value.

Second, despite the various attempts to harmonise accounting criteria, banks retain considerable leeway to determine the value at which they record assets, particularly in the banking book (where assets are expected to be held to maturity). Therefore, even if it is possible to determine the real economic value of loans, this may be lower than their book value after provisioning (the net book value). A large bid-ask spread may thus follow between the net book value and the estimated market value. Banks are therefore often reluctant to transfer assets at a price that implies a large haircut from their net book value and which may generate a substantial capital shortfall.

The third factor affecting the transfer price is the role of state funding. When state funding was involved, this has often entailed

[4] The first privately funded BB, which remained an exception for many years, was the 1988 resolution of Mellon Bank. Mellon Bank was split into two units with the bad assets moved to a separately chartered and capitalised BB, financed partially by junk bonds that did not take deposits and merely existed to liquidate bad loans (see, New York Times, 1988, and Thomson, 2011).

[5] Besides the aforementioned Irish NAMA, another recent example of a mainly privately funded BB is the Spanish SAREB (55% owned by the largest banks in Spain).

transferring assets to the BB at a price higher than the estimated market value. This can lead to losses when the BB eventually disposes of these assets. As Baudino and Yun (2017) argue, authorities have faced the alternative of either setting up a purely private BB, with a transfer price close to the market value (ie high haircuts), and provision of capital to the good bank, or alternatively, setting up a public BB, with higher transfer prices but accepting the risk of potential losses in the BB.

However, the European legislation requires that when public funding is involved, the state should act as an economic agent; that is, any transactions conducted to buy impaired assets from the originating bank must take place at the estimated market value (European Commission, 2018).

Asset segregation may involve removing impaired assets from one or many distressed banks at once. The resulting BBs may thus have a different scope and size with, at one extreme, system-wide centralised BBs, and bank-specific BBs at the other extreme (Baudino and Yun, 2017 and European Commission, 2018). System-wide BBs are often created when a large portion of the banking system exhibits significant NPL problems. In the past, as Baudino and Yun (2017) argue, it was more likely that system-wide BBs would be set up with public funds, given the scale of the resources involved and the coordination capacity needed to run them. However, with the phasing-in of the BRRD, even system-wide BBs tend to be privately funded.[6]

The quality of the impaired assets to segregate varies, so that the BBs may have different objectives: some are mostly restructuring vehicles while others are mostly asset disposition vehicles, with the latter type generally performing better (Klingebiel, 2001).

2. Testable hypotheses

Before developing testable hypotheses, it is useful to discuss how we should classify banks in our treatment group. We identify three groups of banks according to the following types of intervention: (1) banks that received only a public recapitalisation ($Type^R$), (2) banks that segregated some of their impaired assets in a BB ($Type^B$), and (3) banks that both segregated some impaired assets in a BB and received a public recapitalisation, previously or at the same time ($Type^{RB}$). Out of

[6] Examples of recent system-wide BBs are Ireland's NAMA, Spain's SAREB, Italy's National Resolution Fund, and Hungary's MARK Zrt. Bank-specific BBs have been used, among others, in Austria, Belgium and Switzerland.

135 banks in our sample, 81 (or 60%) benefited from public recapitalisations and/or asset segregation in a BB. Of these 81 episodes, 36% are $Type^R$, 11% are $Type^B$, and 53% are $Type^{RB}$.

Our first step is to investigate whether there is a differential impact on our response variables in the treated banks group relative to banks that were not subject to any of these rescue measures (our baseline).

Recapitalisation and asset segregation in isolation

First, we investigate the impact on the response variables of subjecting banks to recapitalisation without asset segregation ($Type^R$). Following Brei et al. (2013) we argue that while bank capitalisation plays a very important role in supporting bank lending, banks can turn additional capital into greater lending only once their capitalisation exceeds a critical threshold. That is distressed banks use the recapitalisation funds first to clean up their balance sheet by lowering their NPLs, and not to increase lending.

From this observation, we derive our first testable hypothesis.

HP 1. Banks subject to recapitalisation without asset segregation reduce future NPLs but do not increase loan growth, relative to banks which were not subject to rescue measures.

Banks may also be reluctant to increase loan growth and lower the future stock of NPLs if they create a BB without being recapitalised ($Type^B$). Two channels are at work. First, banks may be reluctant to get rid of their NPLs as it often requires writing down the value of impaired assets, which in turn generates a capital shortfall. Thus, without recapitalisation, banks may face constraints in their lending and have little incentives to segregate assets. Second, as a result, impaired assets tie up bank capital that otherwise could be devoted to increase lending (see eg IMF, 2015). This provides us with a second testable hypothesis.

HP 2. Banks subject to impaired asset segregation without recapitalisation do not reduce future NPLs and do not increase loan growth relative to banks that were not subject to rescue measures.

As we argued, asset segregation events differ along many dimensions. Our next step is thus to explore the impact of this heterogeneity on our two response variables, lending and NPLs, among banks that were both recapitalised and subject to asset segregation ($Type^{RB}$). Among the many sources of heterogeneity, we focus on four measurable factors identified by the literature as potential sources of differential responses. Three factors are bank-specific: (i) the source of funding for impaired asset purchases (private or public), (ii) the amount of assets transferred to the BB, and (iii) whether the BB's objective is primarily to

dispose of impaired assets or to restructure them. One factor, the efficiency of the country's legal system where the originating bank is located, is common to all banks in that jurisdiction.

Private versus public bad banks

BB resolutions with majority private ownership might be more effective than publicly owned ones (Haldane and Kruger, 2002; Goodhart and Avgouleas, 2016). This could depend upon different factors. First, as long as banks suffer from moral hazard problems linked to managerial incentives, privately funded asset segregation may work better because private funding imposes more market discipline on the management and future behaviour of the originating bank. For example, Gandrud and Hallerberg (2014) argue that majority-privately owned BBs acquire assets at higher haircuts, which forces the originating bank to realise losses sooner, thus avoiding the problem of "zombie lending", that is rolling over bad loans. This frees up resources for new and more profitable loans.

Second, BB resolutions may be set up with majority private ownership precisely when the impaired assets problem is less severe, which would require a smaller capital injection and allow the good bank's performance bounce back faster. Indeed, if asset segregation is effective only when the originating bank has been recapitalised (HP 1 and HP 2), the smaller is the capital shortfall, the smaller is the required recapitalisation, and the more likely that asset segregation is effective. From this, we derive the following hypothesis.

HP 3. When the funding to segregate the impaired assets is private, bank lending grows more and future NPLs decline more than when funding comes from public sources.

Size of bad banks

The amount of impaired assets transferred to the BB could impact the future loan supply and NPLs of the originating bank. However, these effects are ambiguous a priori. For example, the European Commission (2018) argues that BB resolutions work better if they involve a large fraction of the banking system, if loans are secured by commercial real estate, and if there are large corporate exposures. Conversely, they do not work well when assets are heterogeneous and portfolios are not concentrated. For instance, smaller consumer and retail loans seem to be better managed by the originating bank as they require soft and private information that is difficult to assess by potential investors. Moreover, BB resolutions may not work well when residential real estate is involved because of political constraints in selling these assets.

By contrast, a low amount of assets transferred to the BB may work better because, as we argued above, it could reflect a less severe impaired asset problem and generally less acute asymmetric information problems. An example is provided by the BB set up by the British Treasury to deal with RBS's impaired assets. The HM Treasury (2013) argues that the bulk of the losses from RBS assets were concentrated in a small pool of high-risk assets. Hence the benefit of a creating a BB containing all its impaired assets, including its low-risk impaired assets would have been minimal with respect to its impact on capital and valuation. From this, we derive the following hypothesis.

HP 4. The effects of the size of the assets transferred to the BB on loan supply and future NPLs are ambiguous.

Asset disposition vehicles

Even if the objective of every BB is to maximise the recovery value of assets, some BBs aim primarily to dispose of non-performing assets, while others aim primarily to restructure these assets before selling them. The impact on our two response variables may be stronger when the BB is primarily an asset disposition vehicle than when it is primarily an asset restructuring vehicle. One could argue that asset disposition vehicles tend to house loans of the worst quality: in this case the contribution of the BB is patient capital, to buy time to liquidate them and avoid fire sales. This relieves the originating bank of high-risk assets, with a stronger impact on risk-weighted assets and earnings potential. Instead, asset restructuring vehicles tend to house assets with potentially higher quality that may be worth more after restructuring than they would be if liquidated. Consequently, it could be that the difference between the two types of BB is in the ex ante quality of the assets transferred to the BB. If this is the case (ie worst assets in disposition vehicles, not-so-bad assets in restructuring vehicles) the impact on our two response variables should be stronger when the originating bank gets rid of the worst assets. From this, we derive the following hypothesis.

HP 5. When a bank segregates its impaired assets in a disposition vehicle, the bank increases loans and lowers future NPLs by more than when it segregates them into a restructuring vehicle.

Efficiency of the insolvency regime

Our last source of heterogeneity stems from the efficiency of a country's insolvency regime. The efficiency of the insolvency regime matters since it affects the ability of banks to realise their claims in a predictable, quick, transparent manner, thus providing incentives to sell and segregate NPLs, hence freeing resources for more lending (IMF,

2015, and European Commission, 2018). As a result, bid-ask spreads between the book value of loans and their estimated market value appear to be larger in environments with legal uncertainty about enforcement regimes and lengthy foreclosure times (KPMG, 2016). Taking the number of years to foreclose on impaired assets as an indicator for the inefficiency of insolvency regimes, a cross-country study by the IMF (2015) shows that the time to foreclose on distressed assets correlates positively with the NPL ratio and negatively with the return on the investment in distressed assets. From this, we derive our last hypothesis.

HP 6. Loan growth increases by more, and future NPLs decline by more, when the banks subject to asset segregation and recapitalisation operate in countries where it takes less time to enforce contracts.

3. Empirical analysis

3.1 Data

One important contribution of this study is the construction of a comprehensive and novel cross-country data set on BB resolution schemes in Europe. We make use of annual bank-level data obtained from Fitch Connect on the main European banking systems. Where possible, we refer to the consolidated financial statements of banks based on the fact that these institutions manage their entire set of banking activities on a consolidated level. We have gathered this information from individual banks' balance sheets, financial newspapers, press releases, and central bank websites. Our focus is thus on banks that are headquartered in each of the countries and we exclude majority-owned subsidiaries to avoid double-counting.[7] We also control for mergers and acquisitions by constructing pro-forma entities at the bank holding level to remove variations in lending that are associated with takeovers. To ensure consistently broad coverage, we select banks by country in descending order of size, ensuring that we cover at least 75% of the assets in each domestic banking system.

Our sample has an annual frequency and covers the 17 years from 2000 to end-2016, a period spanning different economic business cycles, the great financial crisis and its recovery. The final sample includes 135 banks operating in 15 countries: Austria, Belgium, Denmark, France, Germany, Hungary, Ireland, Italy, Netherlands,

[7] In the case of Hungary only, we included three foreign-owned banks that were subject to BB resolutions in Hungary.

Portugal, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. Table 1 reports summary information for the sampled banks by country, along with information on the type of intervention ($Type^{RB}$, $Type^{R}$, $Type^{B}$). At the end of 2016, banks' assets amounted to EUR 29.9 trillion, or 77% of the total assets of banks from the European Union and Switzerland (EBF, 2016). These banks transferred EUR 444.2 billion of impaired assets to bad banks, a sizeable amount, even compared with that of recapitalisations, EUR 297.2 billion.

Table A1 in the Appendix lists the 38 BB resolutions that occurred in the 15 countries of our study over the period 2000–16. It contains information on the name of the originating banks in distress, the surviving banks after the assets transfer (the good bank), and the year of asset segregation. We have also classified BB resolutions according to their objective (asset disposition versus restructuring), the source of funding for impaired asset purchases (private or public), and whether among segregating banks of $Type^{RB}$ recapitalisation also occurred. In some knife-edge cases, in which it was not straightforward to classify banks into one or the other category, we have relied on multiple sources.[8] BB resolution schemes have been implemented in 13 out of the 15 countries covered in our sample.

Table 2 provides summary information of the BB resolution schemes and splits them into different dimensions: public/private majority ownership, recapitalisation, size of asset transfer, and objective of the asset segregation vehicle.

Out of 38 asset segregation events, most (29) involved a public recapitalisation ($Type^{RB}$) and the use of asset disposition vehicles (27). The remaining nine asset segregation events occurred without recapitalisation involving four small banks from Italy, four from Hungary and one from Portugal. Public resolutions have been more common than private ones (21 versus 17). On average, 26% of the total assets of the originating bank have been transferred to the segregation vehicle. When resolutions were private, the BBs were all asset disposition vehicles and tended to involve a smaller percentage of assets transferred.

Figure 1 shows the BB resolutions over time across two dimensions: (i) asset disposition vehicles and (ii) publicly resolved bad banks. Of the 21 publicly resolved BBs, 13 occurred prior to 2012 and there seems to

[8] More difficult to classify is the Hungarian Asset Management Company (MARK Zrt.) which purchased distressed commercial real estate portfolios from banks, particularly, about the resolutions of the foreign subsidiaries CIB and Raiffeisen. We have classified MARK Zrt as an asset restructuring vehicle.

be a declining trend. The use of asset disposition vehicles is more evenly distributed, with hikes in 2012 (mainly Spain's SAREB) and 2015 (Italy's National Resolution Fund).

The left-hand panel of Figure 2 shows the dynamics of bank lending for the case of BB resolutions with recapitalisations ($Type^{RB}$) and the case of recapitalisation only ($Type^{R}$). In the first case, after an initial significant drop at time 0 (the year of the creation of the BB) the growth rate of lending recovers progressively. In the second case, the injected capital is associated with a progressive drop in bank lending. The adjustment in non-performing loans in response to the interventions also differs remarkably (see right-hand panel of Figure 2).[9] Only when recapitalisations are accompanied by BB resolutions, we observe a significant and permanent drop in the growth rate of non-performing loans. It means that banks not only benefit from the BB creation in the year of intervention but they also make efforts to re-evaluate, recognise and resolve problem loans.

3.2 Econometric framework

The empirical specification is designed to test whether the rescue measures adopted during the great financial crisis and its aftermath helped to (i) sustain the supply of bank lending and (ii) reduce future NPLs ratios on banks' balance sheets. Our baseline model takes the following form:

$$Y_{ijt} = \alpha + \beta Y_{ijt-1} + \sum_{k=R,B,RB} (\gamma_k \cdot Type_{ijt}^{k} + \gamma_k^{*} \cdot Type_{ijt-1}^{k}) + \delta X_{ijt-1} + \varphi Z_{jt-1} + \vartheta_i + \varepsilon_{ijt} \quad (1)$$

where Y_{ijt} denotes either (i) the growth rate of lending or (ii) the NPLs of bank i in year t operating in country j. When considering bank lending, we express the dependent variable in local currency[10], while we use the logistic transformation of the NPL stock as a percentage of

[9] Although the application of the NPL concept is currently not fully harmonised across countries and banks, a widely accepted definition is any exposure for which repayments are more than 90 days past due, or unlikely to be repaid without recourse to collateral (ESRB, 2017).

[10] For the majority of our sample countries the local currency is the euro, except for banks operating in Denmark (Danish krone), Hungary (Hungarian forint), Slovenia (Slovenian tolar prior to 2007), Sweden (Swedish krona), Switzerland (Swiss franc) and the United Kingdom (British pound).

total loans in the second case, and we call it NPLs for short when this does not generate ambiguity.[11]

The main coefficients of interest are γ_k and γ_k^* associated with the different types of rescue: $Type^R$, $Type^B$, and $Type^{RB}$. The coefficients measure the impact of the different interventions on our response variables Y_{ijt} in the same year ($Type_{ijt}^k$) and one year later ($Type_{ijt-1}^k$), respectively, relative to banks that were not subject to rescue measures. The different $Type$ variables are specified as indicator variables that are equal to one once the intervention took place and zero otherwise. To deal with situations in which a bank first received a recapitalisation and then a BB segregation, we allow banks to be first of $Type^R$ and then to switch to $Type^{RB}$. In our sample, of the 72 banks that received a public recapitalisation, 29 have switched and segregated impaired assets into a BB, see Table 1.

The coefficients, γ_k, allow us to identify the direct impact of the interventions. For instance, if we find that γ_k is significantly positive in the lending equation, this means that bank lending has increased in response to the intervention, relative to banks that were not subject to rescue measures. The coefficients γ_k^* measure the impact of the intervention on our response variables Y_{ijt} after one year, that is, $Type_{ijt-1}^k$. For instance, if we find that γ_k and γ_k^* are significantly positive then bank lending increased both in the year of intervention (γ_k) and the year following the intervention (γ_k+γ_k^*).

A number of bank-specific and macroeconomic determinants of bank lending are included. Bank-specific characteristics included in vector X_{ijt-1} are: bank size, liquidity, capitalisation and market funding, as defined in Table 3. Bank fixed effects, ϑ_i, control for time-invariant differences across banks and countries, while country-level time series in vector Z_{jt-1} account for macroeconomic conditions and thereby for shifts in credit demand (Ehrmann and Worms 2004; Gambacorta, 2005). We include real GDP growth, the change in the monetary policy rate and the growth rate in central bank assets (broad measure on unconventional monetary policy). The control variables are lagged by one year (t-1) to mitigate possible endogeneity problems.

[11] Given that the dependent variable is bounded between zero and one, the logit-transformed value of the non-performing loan ratio, $\ln(\frac{NPL}{1-NPL})$, is used to create an unrestricted variable in the regressions. As a consequence, we have to transform them, when inferring the economic impact on the NPL ratio according to $\frac{\partial y}{\partial x} = \beta / (\frac{1}{y} + \frac{1}{1-y})$, where y is the NPL ratio, x an independent variable, and β the estimated coefficient. Evaluated at the mean of the NPL ratio (0.067), this implies that the coefficients have to be multiplied by a factor of 0.063.

To test the various hypotheses on the non-linear impacts, the econometric specification is augmented with interaction terms between the BB resolution with recapitalisation identifier, $Type^{RB}$, and the following resolution schemes, D_{ijt}: (1) the asset segregation was publicly funded, (2) the asset segregation involved smaller transfers of assets relative to a bank's total assets, and (3) the resolutions occurred in countries with weaker insolvency regimes. Publicly funded asset segregations are those with majority public ownership. Resolutions with smaller asset transfers are those for which the ratio of transferred assets to total assets of the originating bank was below the 25th percentile of the distribution. Weaker insolvency regimes are those for which the average number of days to enforce contracts is in the upper quartile of the distribution. The interactions with the different schemes are included one at the time, in separate regressions.

The augmented models thus take the following form:

$$Y_{ijt} = \alpha + \beta Y_{ijt-1} + \sum_{k=R,B,RB}(\gamma_k \cdot Type_{ijt}^{k} + \gamma_k^{*} \cdot Type_{ijt-1}^{k})$$
$$+\left(\tilde{\gamma}_{RB} \cdot Type_{ijt}^{RB} + \tilde{\gamma}_{RB}^{*} \cdot Type_{ijt-1}^{RB}\right)D_{ijt} + \delta X_{ijt-1} + \varphi Z_{jt-1} + \vartheta_i + \varepsilon_{ijt}\,, \quad (2)$$

where D_{ijt} is the interaction variable. Table 3 provides the variable definitions and Table 4 the summary statistics of the regression variables.

The marginal contemporaneous effect of the BB resolution with recapitalisation, $Type^{RB}$, is now given by $\gamma_{RB} + \tilde{\gamma}_{RB} \cdot D_{ijt}$. For example, if we find that the two coefficients $\gamma_{RB} + \tilde{\gamma}_{RB}$ are significant and positive, then bank lending has increased by γ_{RB} for BB resolutions of type $D_{ijt} = 0$ and by $\gamma_{RB} + \tilde{\gamma}_{RB}$ for BB resolutions of type $D_{ijt} = 1$. Similar reasoning applies to the effect one year after the resolution.

Due to the dynamic set up, the regressions are estimated with the dynamic System Generalised Method of Moments (S-GMM) panel methodology, which is a consistent estimator in our setting (small time, large cross-sectional dimension). For the estimator to be valid, it has to pass the misspecification tests on the validity of instruments and the absence of second-order autocorrelation in the residuals. We use the two-step system GMM estimator to improve estimation efficiency by adding a second equation to the differenced version of the GMM estimator. Finally, we use the Windmeijer (2005) finite-sample correction to reduce the possibility of spurious precision (Roodman, 2009).

While this type of estimator is designed for our setting, it can lead to biased results in small samples, especially when the number of instruments is large (Roodman, 2009). To address such a concern, we

use a parsimonious set of instruments across all specifications and verify the robustness of our results using OLS with bank fixed effects, which does not rely on instruments but which is biased in our setting (Nickell, 1981).

As one might argue our BB segregation identifier might be endogenous in the regressions. For instance, while our identification strategy assumes that banks adjust NPLs in response to asset segregation, it could also be that a bank has undergone the treatment simply because its NPL ratio was high. We thus cross-check our results by instrumenting the BB identifier in our baseline regression with the probability of a BB segregation predicted by a first-stage regression that includes a number of bank-specific, macroeconomic and legal determinants that are correlated with BB resolutions but not with bank lending and the NPLs of individual banks.

3.3 Results for the baseline regressions

Table 5 reports the baseline regression results for bank lending and NPLs.[12] First we report the baseline specification and subsequently the augmented regressions. The misspecification tests on the absence of second order autocorrelation and the validity of instruments, reported at the bottom of the table, support our regressions. There is also evidence of significant persistence in the dependent variables supporting the choice of a dynamic framework.

Recapitalised banks of $Type^R$ appear to reduce lending one year after the capital injection, while NPLs increase initially and start to fall one year after the intervention, which confirms HP 1. It appears that banks use the injected funds to clean up their balance sheets (Mitchell, 2001; Brei et al., 2013). With more capital in hand, they have sufficient funds to recognise and absorb losses associated with asset writedowns. They do not, however, increase lending. Similar responses were observed in Japan during the late 1990s where recapitalisations were followed by lower bank risk but not higher lending (Nakashima, 2016).

The results are also economically significant. In the baseline specification (column I, Table 5), the growth rate of lending among recapitalised banks decreases on average by 6.16 percentage points (p.p.), which, relative to an average growth rate of 6.72% (see Table 4) represents a remarkable slowdown. The NPLs of recapitalised banks

[12] In the Appendix to this paper, we show in Tables A3 and A4 the full set of results, i.e. including the coefficients of the control variables (bank-specific and macroeconomic).

initially increase by 2.92[13] p.p. (column IV, Table 5), relative to an average ratio of 6.70%. The initial increase is then followed by a decline in NPLs of 1.90 p.p. (= –0.302*0.063) one year after the intervention.

BB resolutions without a public recapitalisation ($Type^B$) do not have a significant impact on either bank lending or the future NPLs.[14] This result may be an indication of a less powerful rescue package combination, which would support HP 2. However, we cannot put too much weight on this result, which could be driven by the small sample size of this category.

There are significant adjustments in the loans of $Type^{RB}$ banks, ie when the BB segregation was preceded by or associated with a public recapitalisation. We observe an initial rise of 3.99 p.p. (= 0.634*0.063) in NPLs accompanied by a cut in lending of 12.83 p.p.. One year after the intervention, the impact on lending is insignificant while the initial rise in NPLs is followed by reduction of 3.41 p.p. (= –0.541*0.063). The balance sheet adjustment is similar to the one observed for recapitalised banks, since a credit crunch is accompanied by an increase in NPLs in the initial period with lower exposure to credit risks one year later.

The initial rise in impaired loans could indicate that the resolutions were implemented precisely when there was a surge in NPLs, which, without the intervention, would have become unsustainable (Mesnard et al., 2016). It could also be that recognised NPLs increase initially due to more stringent loan evaluations or because the authorities require that the originating banks go through an asset quality review, but once the asset segregation takes place NPLs start to decline because asset disposition vehicles acquire and dispose of them (Gandrud and Hallerberg, 2017).

Next, we present the results of the baseline specification using OLS with bank fixed effects, see columns (II) and (V) of Table 5. We exclude the lagged dependent variable to avoid the Nickell bias. On the other hand, this introduces potentially an omitted variable bias, which we try to minimise by including country-year fixed effects. We find quantitatively similar results in most cases. For banks that received only a recapitalisation, bank lending decreases one year after the intervention but the coefficient is not significant. BB resolutions without

[13] Using the methodology discussed in footnote 11 the coefficients have to be multiplied by a factor of 0.063. In the present case, this means that the impact is given by: 0.463*0.063=0.0292.

[14] Because these interventions occurred only very recently and at the end of our sample period, we were not able to include the $Type^B$ identifier in t-1.

recapitalisation appear now to be significant in the loan regressions and the reduction in NPLs one year after the intervention appears not to be significant for both recapitalised banks and banks that received asset segregation and recapitalisation.

The columns III and VI of Table 5 present the results when we instrument the BB resolution identifier with its predicted probability. In a first stage, we estimate an auxiliary regression on the probability of receiving a BB segregation. The model takes the form:

$$P\left(Bad\ bank_{ijt}\right) = \alpha + \beta Bank_{ijt} + \gamma Macro_{jt} + \delta Legal_{jt} + \varepsilon_{ijt}.$$

The dependent variable is an indicator variable equal to one in the year a BB was created (with/without recapitalisation) and zero otherwise. As explanatory variables, we use bank-specific characteristics (bank size, return on equity, capital ratio, loan-to-assets, deposits in total funding, GSIB identifier), macroeconomic determinants (domestic credit, central bank assets, government debt (all over GDP), policy rate, real GDP growth, crisis dummies for 2008–09 and 2010–12), and indicators for the legal environment (country rank in resolving insolvency, enforcing contracts, protecting minority interests, starting a business).

We derive an instrument for BB resolutions as follows. First, the model is estimated by the Logit methodology (results are shown in Table A2 in the Appendix), then the predicted probabilities are calculated and included as instruments for the BB resolution identifier in the system GMM estimations. We cross-check whether instruments are correlated with the dependent variables and we find that the correlation is negligible (correlation coefficient 0.15 for bank lending and –0.14 for NPLs ratios) and high with the asset segregation identifier (0.48) which confirms the chosen approach. The results are very similar to those of the baseline specification supporting our econometric strategy.

3.4 Conditioning on different types of BB resolution

Have these adjustments been similar across all types of BB resolution with recapitalisation? To answer this question, we now discuss the results obtained exploiting the heterogeneity of the asset segregation events, which conditions our estimates on differences in the ownership of the asset segregation vehicle, the size of the bad asset transfer, and the strength of insolvency regimes.

As argued above, privately funded asset segregations may work better because they impose a greater degree of market discipline on the originating bank and may also provide stronger incentives for the

bank to realise losses sooner and avoid zombie lending. However, it could also be an indication that the asset deterioration was less severe to start with. Indeed, our descriptive statistics (see Table 2) show that when resolutions are private, the percentage of assets of the originating bank transferred to the BB tends to be smaller, suggesting that the impaired asset problem has probably not reached a systemic dimension. The results of this test are consistent with HP 3 and are shown in columns I and V of Table 6.

The first column suggests that privately funded BB resolutions have been more effective in counteracting the credit crunch at the originating bank (column I, Table 6). Initially, there are no significant differences in the adjustment: banks cut lending by 16.01 p.p. in the year of intervention, whether or not asset segregation was privately or publicly funded. However, after one year, banks recover and increase lending by 10.90 p.p. when asset segregation was privately funded, whereas, when asset segregation was publicly funded, lending still contracts by 1.98 p.p. (10.90 – 12.88). This result is further supported by Figure 3, which shows bank lending across private/public interventions over time, where t=0 represents the year of the BB creation. Lending by banks subject to privately funded asset segregation recovers over time, while there is no recovery at banks subject to publicly funded asset segregation.

The fifth column of Table 6 suggests that private interventions are associated with important adjustments in NPLs, whereas there is little adjustment in the case of public asset segregation. When the originating bank is subject to privately funded asset segregation, there is an initial surge in NPLs (+5.21 p.p. = 0.827*0.063) and a subsequent reduction in the year after (–4.72 p.p. = –0.749*0.063). When the originating bank is subject to publicly funded asset segregation, the impact is close to zero (+0.37 p.p. in t=0, (0.827–0.768)*0.063, and –0.14 p.p. in t=1, (–0.749+0.726)*0.063). This may indicate that private resolutions impose more stringent loan evaluations, forcing banks to re-evaluate, recognise and resolve problem loans. Public interventions may also be more oriented towards the elimination of toxic assets from the market but not of problem loans (Gandrud and Hallerberg, 2017, Berti, Engelen and Vasicek, 2017).

Next, we investigate whether the adjustment depends on the size of the assets transferred to the BB, relative to the total assets of the transferring bank. As we argued in HP 4, the expected signs of our two response variables are *a priori* ambiguous. All else equal, a larger transfer of impaired assets leads to an improvement in bank risks and possibly to a recovery in lending. However, a smaller transfer may itself

be an indication that the impaired asset problem is less severe and bank performance may bounce back faster and more strongly.

The results reported in the second column of Table 6 suggest that the initial credit crunch is more pronounced at banks with small asset transfers (–22.37 p.p. (= –10.87–11.50) compared with –10.87 p.p.). But after one year, their lending recovers and expands (17.90 p.p.), which is not the case for banks with a large resolution.

The results in the sixth column of Table 6 show that the recovery in NPLs is stronger at banks with smaller resolutions. In the initial period, we observe an increase in problem loans (no longer significant at the 10% level) across all banks. However, after one year, only the NPLs of banks with small transfers decrease (–5.28 p.p. = –0.838*0.063). This result tends to confirm our second explanation above.

In the next test, we examine whether BBs which are mainly asset disposition vehicles have a stronger impact on our two response variables than those that are mainly asset restructuring vehicles (HP 5). Our results suggest that there are no significant differences in the responses of banks across the two types of segregation (see column III and VII in Table 6).

Finally, we examine whether more efficient insolvency regimes are associated with faster credit recoveries and future NPLs decline (HP 6). Recall that less efficient insolvency regimes are those for which the average number of days to enforce contracts is in the upper quartile of the distribution. In more efficient environments, banks should be able to realise the value of their impaired assets more quickly and predictably. This would reduce uncertainty and free resources for more lending. The results of this test are shown in column IV and VIII of Table 6.

First, we find that the recovery in bank credit of the originating bank is stronger in countries where the insolvency regime is more efficient (column IV, Table 6). Even though the initial drop in bank lending is stronger (–17.02 vs. –9.33 p.p. (= –17.02+7.687)), the pattern reverses after one year and banks increase lending in countries with more efficient insolvency regimes (+13.08 p.p.). In the other countries, bank lending still has not recovered (–5.34 p.p. =13.08–18.42).

Second, we find that NPLs decline faster in countries with more efficient insolvency regimes (column VIII, Table 6). Initially, there is a 3.91 p.p. (=0.620*0.063) increase in the NPLs – independently of the strength of the regime. However, after one year, in more efficient legal systems, we observe a significant reduction in NPLs (–4.80 p.p. = –

0.762*0.063), as opposed to less efficient environments where the decrease is modest (–0.45 p.p. = (–0.762+0.691)*0.063).

The legal environment thus plays an important role. The inevitable balance sheet restructuring of problem banks requires full recognition and writedown of the value of NPLs. The incentives for this are stronger in environments where the involved parties identify and resolve problems, force action and do not "extend and pretend" loans (Gandrud and Hallerberg, 2017). Banks can also realise their claims and dispose of toxic assets in a more predictable, transparent and timely way (IMF, 2015; European Commission, 2018). Thus, more efficient legal systems help reducing the uncertainty and risk of bank balance sheets with a positive effect on banks' willingness and capacity to lend.

Concerning the bank-specific control variables, we find that lending is consistently lower at large banks and higher at well-capitalised banks (see Tables A3 and A4 in the Appendix). The negative bank size effect can be explained by the strong lending relationship existent between small banks and small firms in many countries (Ehrmann and Worms, 2004; Gambacorta, 2005). Consistent with the literature, well-capitalised banks are more able to lend and to absorb adverse shocks. As a result, they can maintain a higher loan growth rate than other banks (Kashyap and Stein, 1995, 2000; Kishan and Opiela, 2000; Gambacorta and Shin, 2018). The same bank characteristics are significant determinants of NPLs. Both larger and better capitalised banks operate with a lower volume of problem loans. The first result could be related to differences in the business model of large banks, which are more involved in lending to large borrowers and in other financial activities.

Our results on the macroeconomic determinants, shown in Tables A3 and A4 of the Appendix, reveal that bank lending and non-performing loans are strongly dependent on the stance of the economy. As expected, higher GDP growth is associated with significantly higher loan growth and a lower volume of problem loans. This finding reflects that better economic conditions increase the number of profitable investment projects and hence increase the demand for credit and improve borrowers' repayment capacity (Kashyap et al., 1993). We also find that a higher monetary policy rate is associated with less bank lending and higher credit risks. This is expected since monetary tightening is associated with a decline in loan demand and an increase in the debt service costs of variable-rate borrowers.

4. Conclusions

Using a novel data set, this paper finds that bad bank resolutions are only effective if they combine recapitalisation with asset segregation. Indeed, impaired asset segregation often occurs together with other types of intervention, mainly public, aimed at stabilising distressed banks. This is also what we observe in practice: more than half of the banks in our sample benefited from public recapitalisations and/or asset segregation. The sheer frequency of these interventions, and the vast amount of funds involved, raise the question whether these interventions are effective in promoting bank lending and reducing future NPLs, our two response variables. Using disaggregated bank data, this is the first paper to shed light on the effectiveness of these resolution tools.

Our first main finding is that only when the two tools are used together do they have the desired effect and a sizeable impact on our two response variables: neither tool is effective separately.

Exploiting the heterogeneity in the asset segregation events, we are able to show which features of resolution schemes have a stronger impact on our response variables. We find that, when the funding to purchase impaired assets from the originating bank is private, bank lending grows more and future NPLs decline more than when funding comes from public sources. Furthermore, originating banks that transfer a smaller fraction of their assets to the BB exhibit stronger loan growth and lower future NPLs than do banks that transferred larger fractions of their impaired assets. Finally, in countries where the legal system is more efficient, credit recovery and NPLs reductions are stronger in response to impaired asset segregations.

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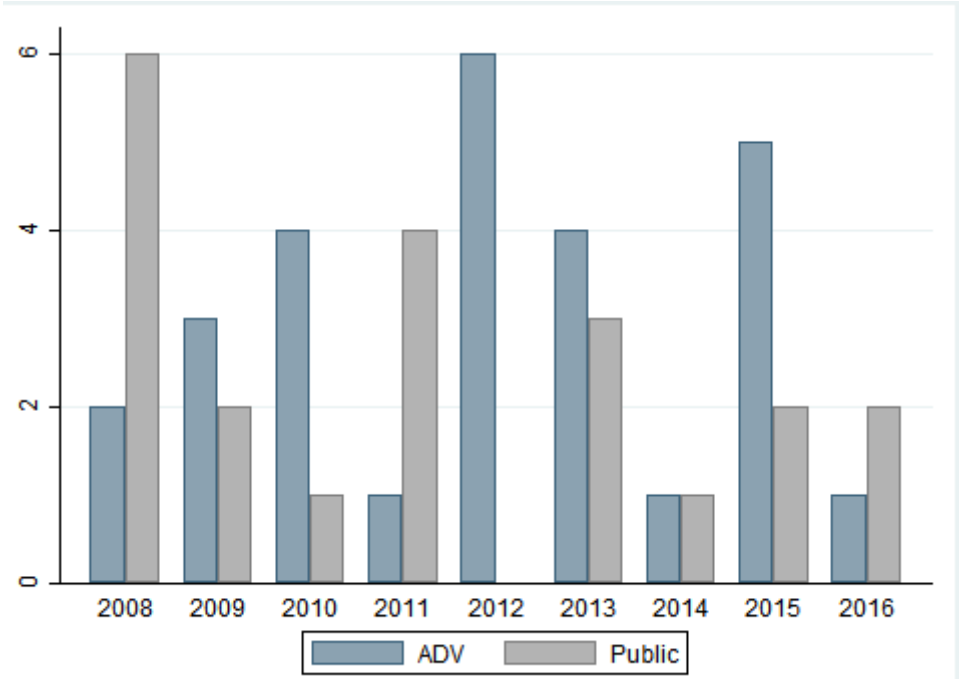
Figures and tables

Figure 1: Bad bank resolutions over time

Number of resolutions



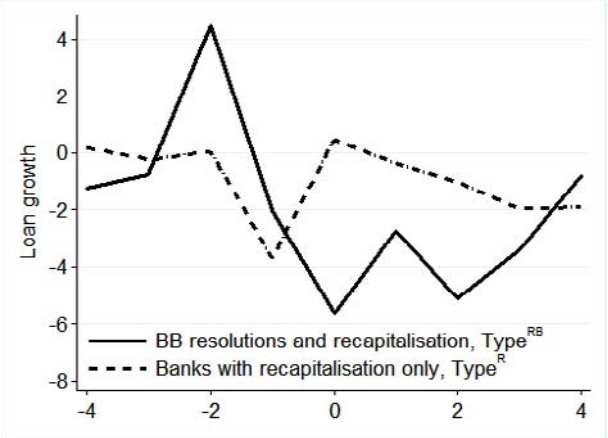
Note: The histogram shows the number of BB resolutions that involved (i) asset disposition vehicles (ADV) and (ii) publicly funded bad banks (Public). For details, see Table A1.

Sources: Press Releases. Authors' calculations.

Figure 2: Bank lending and non-performing loans

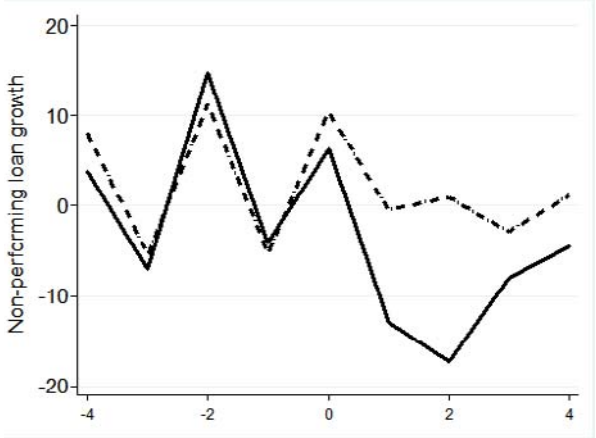
(I) Bank lending

Percent



(II) Non-performing loans

Percent



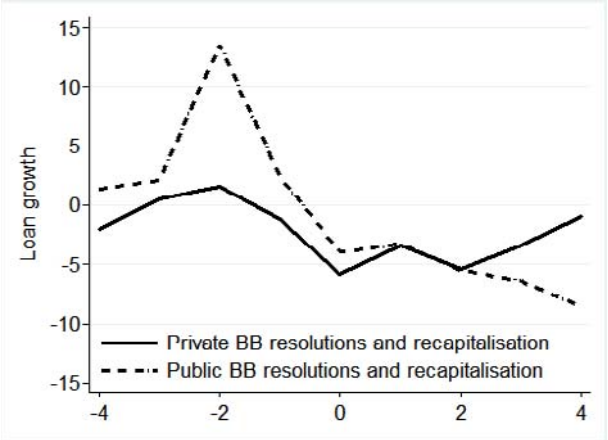
Note: The vertical axes show the average growth rate of lending and NPLs in domestic currency and demeaned by year and country. Two types of interventions are considered: (i) banks subject to $Type^{RB}$ interventions (BB resolutions and recapitalisations) and (ii) $Type^{R}$ interventions (recapitalisation only). The horizontal axis shows eight-year windows where t=0 represents the year in which (i) a bank was subject to a BB resolution ($Type^{RB}$ banks) and (ii) a bank was recapitalised ($Type^{R}$ banks).

Sources: Fitch Connect; Brei et al. (2013); Press Releases. Authors' calculations.

Figure 3: Bank lending and non-performing loans, privately and publicly funded bad banks

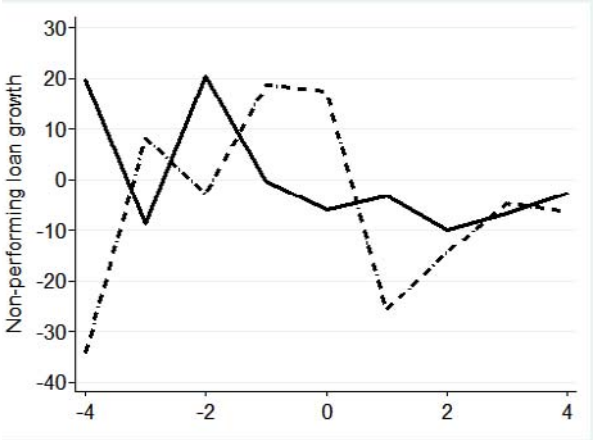
(I) Bank lending

Percent



(II) Non-performing loans

Percent



Note: The vertical axes show the average growth rate of lending and NPLs in domestic currency and demeaned by year and country. Two types of $Type^{RB}$ interventions (BB resolutions and recapitalisations) are considered: (i) privately funded interventions and (ii) publicly funded interventions. The horizontal axis shows eight-year windows where t=0 represents the year in which (i) a bank was subject to private resolution and (ii) a bank was subject to public resolution.

Sources: Fitch Connect; Brei et al. (2013); Press Releases. Authors' calculations.

Table 1: Characteristics of the database (2000–16)

	Total assets	Banks	Banks with recap.	Bad banks with recap.	Bad banks without recap.	Year of first intervention		Total recap. amount	Total assets in bad bank	Number of public bad banks	Loans	NPLs	Enforcing contracts
	Billion EUR, 2016	*No. of entities*				*Recap.*	*Bad bank*	*Billion EUR*	*Billion EUR*		*% of assets*	*% of loans*	*No. of days*
Austria	490	8	5	2	0	2008	2009	8.2	45.0	2	54.1	6.6	397
Belgium	750	5	2	2	0	2008	2008	20.3	154.2	1	43.7	3.2	505
Denmark	900	16	0	7	0	2008	2008	1.8	6.5	7	62.4	3.6	423
France	6411	6	5	0	0	2008		16.5		0	35.1	3.8	392
Germany	3724	16	4	1	0	2008	2009	39.4	77.5	1	47.4	4.5	419
Hungary	91	14	1	0	4	2009	2016	0.1	2.0	4	57.8	12.5	581
Ireland	268	5	2	4	0	2009	2010	50.8	45.0	0	67.0	8.0	578
Italy	2265	18	6	0	4	2009	2015	12.3	1.2	0	64.1	6.8	1223
Netherlands	2071	5	3	1	0	2008	2013	17.9	4.8	1	63.0	2.2	514
Portugal	207	5	3	0	1	2012	2011	3.2	3.9	1	68.4	4.0	573
Slovenia	22	4	3	2	0	2011	2013	3.9	3.3	2	53.6	16.7	1297
Spain	3343	17	6	8	0	2009	2012	47.6	45.8	0	63.3	5.8	513
Sweden	1323	4	1	0	0	2009		0.7		0	64.7	2.2	509
Switzerland	1914	5	0	1	0	2008	2008	7.4	54.2	1	56.1	1.9	464
United Kingdom	6145	7	2	1	0	2008	2010	67.1	0.8	1	57.1	3.4	416
Average/sum*	29922*	135*	43*	29*	9*	2009	2011	297.2*	444.2*	21*	57.2	5.7	587

Note: The information is based on 135 banks over the period 2000–16. Of these, 43 received a public recapitalisation ($Type^{R}$), 29 banks received both a public recapitalisation and BB resolution ($Type^{RB}$), and 9 banks received a BB resolution without recapitalisation ($Type^{B}$). "Total assets in bad bank" indicates the amount of assets that have been transferred to the BB. "Public bad banks" refer to banks that were resolved using majority-publicly owned bad banks. "Enforcing contracts" is the average number of days it takes to enforce a contract. "Average/sum*" indicates unweighted averages or sums (*) over countries.

Sources: Fitch Connect; Brei et al. (2013); Press Releases; Doing Business. Authors' calculations.

Table 2: Bad bank resolution schemes

Bad bank ownership:	Public recapitalisation		Size of transfer (% of total assets)		Asset disposition vehicle		Total
	Yes ($Type^{RB}$)	No ($Type^{B}$)	Mean	Median	Yes	No	
Public resolutions	AT(2), BE(1), CH(1), DE(1), DK(7), NL(1), SI(2), UK(1)	HU(4), PT(1)	31.0	22.2	AT(2), CH(1), DE(1), HU(1), NL(1), PT(1), SI(2), UK(1)	BE(1), DK(7), HU(3)	21
Private resolutions	BE(1), ES(8), IE(4)	IT(4)	21.1	5.3	BE(1), ES(8), IE(4), IT(4)		17
Total/average*	29	9	26.0*	13.7*	27	11	38

Note: The table shows summary statistics across different types of BB resolutions. Iso2 country codes are shown in the cells with the number of banks involved in brackets. For example, AT(2) reads as two banks from Austria. 'Public/private resolutions' indicate BB resolutions with majority public/private ownership, 'Public recapitalisation' indicates BB resolutions that involved recapitalisation with public funds, 'Size of transfer' indicates the amount of assets transferred to the BB in percent of total assets of the originating bank, and 'Asset disposition vehicle' indicates whether the BB is primarily an asset disposition vehicle vs. asset restructuring.

Table 3: Variable definitions

Variable	***Definition***
Dependent variables	
Loan growth	Annual growth rate of total loans
Non-performing loans	Logarithmic transformation of the ratio of non-performing loans over total loans; NPL: ln(NPL/(1-NPL))
Independent variables	
Recapitalised bank	=1, once a bank was recapitalised with public funds ($Type^R$)
Bad bank without recap.	=1, once a not recapitalised bank transferred assets to a bad bank ($Type^B$)
Bad bank	=1, once a recapitalised bank transferred assets to a bad bank ($Type^{RB}$)
Bank size	Logarithm of total assets
Liquidity	Liquid assets as a percentage of total assets
Capital	Total equity as a percentage of total assets
Short-term funding	Short-term funds as a percentage of total assets
Policy rate	Annual change in policy rate (daily average)
Real GDP	Annual growth rate of GDP
Central bank (CB) assets	Annual growth rate of central bank assets

Sources: Fitch Connect; Individual reports; European Commission Press Releases; BIS database.

Table 4: Summary statistics of the regression variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent variables					
Loan growth	1769	6.72	15.79	-27.83	96.96
Non-performing loans: ln(NPL/(1-NPL))	1392	-3.27	1.33	-7.59	6.91
Independent variables					
Recapitalised bank	1769	0.15	0.36	0.00	1.00
Bad bank without recap.	1769	0.00	0.05	0.00	1.00
Bad bank	1769	0.06	0.24	0.00	1.00
Bank size	1769	4.19	2.06	-1.86	8.24
Liquidity	1769	16.66	10.77	0.02	95.23
Capital	1769	6.11	3.65	-45.82	26.32
Short-term funding	1769	23.78	14.54	0.00	92.17
Policy rate	1769	-0.29	1.10	-4.25	2.95
Real GDP	1769	1.47	2.79	-7.90	25.50
Central bank (CB) assets	1769	12.74	31.97	-53.88	230.45

Note: The variable definitions are provided in Table 3.

Table 5: Baseline regression results

	Baseline, S-GMM	Baseline, OLS-FE	Baseline, S-GMM+IV	Baseline, S-GMM	Baseline, OLS-FE	Baseline, S-GMM+IV
	Y (t): Loan growth			**Y (t): NPL, log transformed**		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Y (t-1)	0.189***		0.165***	0.807***		0.736***
	(0.033)		(0.035)	(0.121)		(0.155)
Recapitalised bank (t)	1.150	1.392	-0.800	**0.463*** **	0.127	**0.761*** **
	(3.254)	(1.939)	(3.549)	**(0.111)**	(0.119)	**(0.220)**
Recapitalised bank (t-1)	**-6.157** **	-3.072	**-5.614* **	**-0.302*** **	-0.071	**-0.490*** **
	(2.837)	(2.111)	**(3.296)**	**(0.103)**	(0.095)	**(0.179)**
Bad bank without recap. (t)	-1.132	**-6.369*** **	-1.041	0.114	-0.162	0.219
	(7.112)	**(1.891)**	(6.838)	(0.223)	(0.130)	(0.245)
Bad bank (t)	**-12.83*** **	**-11.72** **	**-16.44** **	**0.634** **	**0.457** **	**2.038** **
	(3.017)	**(5.440)**	**(8.142)**	**(0.284)**	**(0.214)**	**(0.925)**
Bad bank (t-1)	5.621	4.412	-11.33	**-0.541** **	-0.257	**-1.118** **
	(3.688)	(3.473)	(9.867)	**(0.223)**	(0.206)	**(0.498)**
Bank-specific characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
No. observations/banks	1769/135	1769/135	1769/135	1769/135	1769/135	1769/135
Serial correlation test (1)	0.579		0.729	0.552		0.586
Hansen test (2)	0.115		0.216	0.152		0.126
No. instruments (3)	107		107	109		109

Note: The sample goes from 2000 to 2016. All estimations are based on the System GMM estimator, except for specifications (II) and (V) which are estimated by OLS with bank fixed effects and country-time fixed effects. In columns (III) and (VI) the bad bank resolution identifiers are instrumented by the predicted probability obtained from an auxiliary Logit regression (see Table A2 in the Appendix). Robust standard errors are reported in brackets. (***, **, *) indicate significance at the 1%, 5%, 10% level. (1) Reports p-values for the test of the null hypothesis that the errors in the first difference regression exhibit no second-order serial correlation. (2) Reports p-values for the test of the null hypothesis that the instruments used are valid. (3) Reports the number of instruments.

Table 6: Results for different BB resolutions

	Public bad banks	Small transfer	Assets disposition	Weak insolvency	Public bad banks	Small transfer	Assets disposition	Weak insolvency
	Y (t): Loan growth				**Y (t): NPL, log transformed**			
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Y (t-1)	0.187***	0.192***	0.185***	0.189***	0.805***	0.801***	0.809***	0.793***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.119)	(0.125)	(0.117)	(0.120)
Recapitalised bank (t)	0.970	1.081	1.256	0.635	**0.412*** **	**0.457*** **	**0.464*** **	**0.453*** **
	(3.238)	(3.149)	(3.154)	(2.925)	**(0.095)**	**(0.110)**	**(0.109)**	**(0.101)**
Recapitalised bank (t-1)	**-6.034** **	**-6.016** **	**-6.292****	**-5.853** **	**-0.240*** **	**-0.291*** **	**-0.307*** **	**-0.283*** **
	(2.941)	**(2.794)**	**(2.726)**	**(2.530)**	**(0.086)**	**(0.102)**	**(0.095)**	**(0.095)**
Bad bank without recap. (t)	-1.106	-1.408	-0.754	-1.914	0.114	0.114	0.109	0.134
	(7.066)	(6.811)	(7.187)	(6.938)	(0.217)	(0.226)	(0.223)	(0.219)
Bad bank (t)	**-16.01*** **	**-10.87*** **	**-12.42***	**-17.02*** **	**0.827*** **	0.506	0.713	**0.620** **
	(3.505)	**(3.314)**	**(7.377)**	**(3.412)**	**(0.282)**	(0.341)	(0.766)	**(0.279)**
Bad bank (t-1)	**10.90** **	2.090	12.24	**13.08*** **	**-0.749*** **	-0.253	-0.724	**-0.762*** **
	(5.207)	(3.329)	(10.37)	**(3.926)**	**(0.243)**	(0.220)	(0.774)	**(0.275)**
Bad bank (t) * Type	5.916	**-11.50***	-0.783	**7.687***	**-0.768** **	0.365	-0.103	-0.030
	(6.521)	**(6.082)**	(7.693)	**(4.513)**	**(0.361)**	(0.471)	(0.785)	(0.422)
Bad bank (t-1) * Type	**-12.88***	**17.90** **	-8.284	**-18.42*** **	**0.726***	**-0.838***	0.218	**0.691***
	(7.404)	**(8.218)**	(10.991)	**(4.941)**	**(0.422)**	**(0.472)**	(0.820)	**(0.424)**
Bank-specific characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations/banks	1769/135	1769/135	1769/135	1769/135	1392/122	1392/122	1392/122	1392/122
Serial correlation test (1)	0.552	0.497	0.586	0.543	0.222	0.225	0.227	0.227
Hansen test (2)	0.152	0.151	0.126	0.172	0.364	0.309	0.307	0.325
No. instruments (3)	109	109	109	109	123	123	123	123

Note: The sample goes from 2000 to 2016. The following BB resolutions are considered: (I) with a majority public ownership, (II) with modest transfers of assets, (III) with asset disposition vehicles, and (IV) in countries with weak insolvency regimes. All estimations are based on the System GMM estimator. Robust standard errors are reported in brackets. (***, **, *) indicate significance at the 1%, 5%, 10% level. (1) Reports p-values for the test of the null hypothesis that the errors in the first difference regression exhibit no second-order serial correlation. (2) Reports p-values for the test of the null hypothesis that the instruments used are valid. (3) Reports the number of instruments.

Table A1: Individual bad bank resolutions

Name of distressed bank	Name of surviving bank (good bank)	Name of bad bank	Iso2	Year of asset transfer	Public recaps.	Asset disp. vehicle	Private resolutions	Main sources
Hype Alpe Adria International	Hype Alpe Adria International	Heta Asset Resolution	AT	2014	YES	YES	NO	https://en.wikipedia.org/wiki/Hypo_Alpe_Adria_Bank
Kommunalkredit	Kommunalkredit	KA Finanz	AT	2009	YES	YES	NO	https://www.kafinanz.at/en/
Dexia	Belfius	Dexia	BE	2011	YES	NO	NO	http://www.dexia.com/EN/journalist/dexiaAZ/Documents/Dexia_AZ_EN.pdf
Fortis Bank SA/ NV	BNP Fortis	Royal Park Investments	BE	2008	YES	YES	YES	https://en.wikipedia.org/wiki/Fortis_(finance); https://www.bloomberg.com/profile/company/3294774Z:BB
UBS	UBS	StabFund	CH	2008	YES	YES	NO	Various documents of the Swiss National Bank
West LB - Erste Abwicklungsanstalt	Portigon Financial Services	EAA	DE	2009	YES	YES	NO	https://en.wikipedia.org/wiki/Portigon_Financial_Services
EBH Bank a/s	Finansiel Stabilitet A/S.	Finansiel Stabilitet A/S.	DK	2008	YES	NO	NO	Gandrud and Hallerberg (2014)
Eik Bank Danmark A/S	Finansiel Stabilitet A/S.	Finansiel Stabilitet A/S.	DK	2010	YES	NO	NO	Gandrud and Hallerberg (2014)
Fionia Bank A/S	Finansiel Stabilitet A/S.	Finansiel Stabilitet A/S.	DK	2008	YES	NO	NO	Gandrud and Hallerberg (2014)
Fjordbank Mors A/S	Stopped existing	Finansiel Stabilitet A/S.	DK	2011	YES	NO	NO	Gandrud and Hallerberg (2014)
Max Bank A/S	Stopped existing	Finansiel Stabilitet A/S.	DK	2011	YES	NO	NO	Gandrud and Hallerberg (2014)
Roskilde Bank	DK National Bank	NA	DK	2008	YES	NO	NO	Gandrud and Hallerberg (2014)
Sparekassen Ostjylland	Stopped existing	Finansiel Stabilitet A/S.	DK	2008	YES	NO	NO	Gandrud and Hallerberg (2014)
NCG Banco	ABANCA Corp. Bancaria	SAREB	ES	2012	YES	YES	YES	Bagus et al. (2014)
Banco Ceiss	Banco Ceiss	SAREB	ES	2012	YES	YES	YES	Bagus et al. (2014)
Banco de Valencia	Banco de Valencia	SAREB	ES	2012	YES	YES	YES	Bagus et al. (2014)
Banco Gallego	Stopped existing	SAREB	ES	2013	YES	YES	YES	Bagus et al. (2014)
Banco Mare Nostrum S.A.	Banco Mare Nostrum	SAREB	ES	2009	YES	YES	YES	Bagus et al. (2014)
Bankia S.A.	Bankia S.A.	SAREB	ES	2012	YES	YES	YES	Bagus et al. (2014)
Catalunya Banc S.A.	Catalunya Banc S.A.	SAREB	ES	2012	YES	YES	YES	Bagus et al. (2014)
Liberbank	Liberbank	SAREB	ES	2012	YES	YES	YES	Bagus et al. (2014)
CIB Bank Zrt	CIB Bank Zrt	MARK Zrt	HU	2016	NO	NO	NO	Fenemore et al. (2017), https://www.esrb.europa.eu/pub/pdf/other/20160323_notification_template_central_bank_hungary.pdf
Erste Bank Hungary Zrt.	Erste Bank Hungary Zrt.	MARK Zrt	HU	2016	NO	NO	NO	Fenemore et al. (2017), https://www.esrb.europa.eu/pub/pdf/other/20160323_notification_template_central_bank_hungary.pdf
MKB Bank Zrt.	MKB Bank Zrt.	MKK	HU	2015	NO	YES	NO	https://europa.eu/rapid/press-release_IP-15-6347_en.htm
Raiffeisen Bank Zrt.	Raiffeisen Bank Zrt.	MARK Zrt	HU	2015	NO	NO	NO	Fenemore et al. (2017), https://www.esrb.europa.eu/pub/pdf/other/20160323_notification_template_central_bank_hungary.pdf
Allied Irish Banks, plc	Allied Irish Banks, plc	NAMA	IE	2010	YES	YES	YES	www.nama.ie
Bank of Ireland	Bank of Ireland	NAMA	IE	2010	YES	YES	YES	www.nama.ie
EBS d.a.c.	EBS d.a.c.	NAMA	IE	2010	YES	YES	YES	www.nama.ie
Irish Nationwide Building	Stopped existing	NAMA	IE	2010	YES	YES	YES	www.nama.ie
Banca Marche	Nova Banca Marche	National resolution fund	IT	2015	NO	YES	YES	https://it.wikipedia.org/wiki/Fondo_nazionale_di_risoluzione
Banca Polorare dell'Etruria e del Lazio	Nuova Banca Polorare dell'Etruria e del Lazio	National resolution fund	IT	2015	NO	YES	YES	https://it.wikipedia.org/wiki/Fondo_nazionale_di_risoluzione
Cassa di Risparmio di Chieti	Nuova Cassa di Risparmio di Chieti	National resolution fund	IT	2015	NO	YES	YES	https://it.wikipedia.org/wiki/Fondo_nazionale_di_risoluzione
Cassa di Risparmio di Ferrara SpA	Nuova Cassa di Risparmio di Ferrara SpA	National resolution fund	IT	2015	NO	YES	YES	https://it.wikipedia.org/wiki/Fondo_nazionale_di_risoluzione

SNS Reaal NV	SNS Bank	Propertize	NL	2013	YES	YES	NO	https://en.wikipedia.org/wiki/SNS_Reaal
BPN-Banco Portugues de Negocios, S.A.	BPN-Banco Portugues de Negocios, S.A.	Parvalorem	PT	2011	NO	YES	NO	https://en.wikipedia.org/wiki/Banco_Portugu%C3%AAs_de_Neg%C3%B3cios
Nova Kreditna Banka Maribor	Nova Kreditna Banka Maribor	BAMC/DUTB	SI	2013	YES	YES	NO	OECD (2013), OECD Economic Surveys, Slovenia 2013, OECD Publishing
Nova Ljubljanska banka d.d.	Nova Ljubljanska banka d.d.	BAMC/DUTB	SI	2013	YES	YES	NO	OECD (2013), OECD Economic Surveys, Slovenia 2013, OECD Publishing
Bradford & Bingley International Ltd	Santander	UKAR	UK	2008	YES	NO	NO	https://www.ukar.co.uk/

Note: Iso2 country codes are used. 'Public recaps.' indicates BB resolutions that involved a public recapitalisation. 'Asset disp. vehicle' indicates whether the BB is primarily a vehicle for asset disposition vs. asset restructuring. 'Private resolutions' indicate BB resolutions with majority private ownership,

Table A2: Probability of bad bank resolutions

Y (t): Bad bank intervention	Baseline, bank-specific	Baseline, bank & macro	Baseline, full
Bank size	**-0.341****	**-0.512*****	**-0.424*****
	(0.141)	**(0.155)**	**(0.143)**
ROE	**-0.035*****	**-0.028*****	**-0.028*****
	(0.005)	**(0.007)**	**(0.008)**
Capital ratio	**-0.107*****	**-0.108*****	**-0.101****
	(0.037)	**(0.037)**	**(0.042)**
Non-interest income	**-0.837***	-0.522	-0.575
	(0.475)	(0.452)	(0.513)
Loan/assets	**-0.043*****	**-0.047*****	**-0.041****
	(0.013)	**(0.016)**	**(0.019)**
Deposits/funding	**0.027*****	**0.023****	0.014
	(0.009)	**(0.010)**	(0.009)
G-SIB, 2016	-0.755	-0.566	-0.925
	(0.970)	(1.044)	(0.975)
Domestic credit/GDP		-0.012	-0.019
		(0.013)	(0.015)
Central bank assets/GDP		**0.033*****	**0.049****
		(0.010)	**(0.022)**
Policy rate		**-0.510****	**-0.594*****
		(0.220)	**(0.217)**
GDP growth		-0.180	-0.199
		(0.155)	(0.183)
Government debt/GDP		**-0.023****	**-0.028****
		(0.010)	**(0.012)**
Crisis, 2008-09		1.077	1.222
		(1.142)	(1.421)
Crisis, 2010-12		**1.325*****	**1.266***
		(0.499)	**(0.685)**
Rank, resolving insolvency			0.020
			(0.024)
Rank, enforcing contract			-0.039
			(0.026)
Rank, protecting minority			-0.016
			(0.013)
Rank, starting business			**-0.019****
			(0.009)
Constant	-0.762	2.300	**5.692***
	(1.248)	(2.531)	**(3.000)**
Observations	1765	1736	1736
R2 (1)	0.289	0.377	0.401
AUROC (2)	0.872	0.940	0.948

Note: The sample goes from 2000 to 2016. All estimations are based on the Logit estimator. Robust standard errors are reported in brackets. (***, **, *) indicate significance at the 1%, 5%, 10% level. (1) Reports the pseudo-R-squared and (2) the Area Under ROC (Receiver Operating Characteristics) curve. The AUROC is a widely used metric for judging the predictive power of a probability model.The AUROC ranges from 0.5 (purely random prediction) to 1 (perfect prediction).The following explanatory variables are included: bank size (logarithm of total assets), return on equity (ROE), capital ratio (total equity divided by total assets), loan-to-assets (total loans divided by total assets), deposits in total funding (total deposits divided by total funding), G-SIB identifier (dummy equal to 1 if a bank is a global systemically important bank according to FSB in 2016, domestic credit (domestic credit provided by banks to private sector divided by GDP), central bank assets (divided by GDP), central government debt (divided by GDP), policy rate, GDP growth (real), crisis dummies (for 2008-09 and for 2010-12, and the country rank in resolving insolvency, enforcing contracts, protecting minority interests, and starting a business.

ources: Fitch Connect; Press Releases; BIS database; World Development Indicators; Doing Business.

Table A3: Results for bank lending

Y (t): Loan growth	Baseline, S-GMM	Baseline, OLS-FE	Baseline, S-GMM +IV	Public bad banks	Small transfer	Assets dis-position	Weak in-solvency
Y (t-1)	0.189***		0.165***	0.187***	0.192***	0.185***	0.189***
	(0.033)		(0.0354)	(0.032)	(0.032)	(0.032)	(0.032)
Recapitalised bank (t)	1.150	1.392	-0.800	0.970	1.081	1.256	0.635
	(3.254)	(1.939)	(3.549)	(3.238)	(3.149)	(3.154)	(2.925)
Recapitalised bank (t-1)	**-6.157****	-3.072	**-5.614***	**-6.034****	**-6.016****	**-6.292****	**-5.853****
	(2.837)	(2.111)	**(3.296)**	**(2.941)**	**(2.794)**	**(2.726)**	**(2.530)**
Bad bank without recap. (t)	-1.132	**-6.369*****	-1.041	-1.106	-1.408	-0.754	-1.914
	(7.112)	**(1.891)**	(6.838)	(7.066)	(6.811)	(7.187)	(6.938)
Bad bank (t)	**-12.83*****	**-11.72****	**-16.44****	**-16.01*****	**-10.87*****	**-12.42***	**-17.02*****
	(3.017)	**(5.440)**	**(8.142)**	**(3.505)**	**(3.314)**	**(7.377)**	**(3.412)**
Bad bank (t-1)	5.621	4.412	-11.33	**10.90****	2.090	12.24	**13.08*****
	(3.688)	(3.473)	(9.867)	**(5.207)**	(3.329)	(10.37)	**(3.926)**
Bad bank (t) * Type				5.916	**-11.50***	-0.783	**7.687***
				(6.521)	**(6.082)**	(7.693)	**(4.513)**
Bad bank (t-1) * Type				**-12.88***	**17.90****	-8.284	**-18.42*****
				(7.404)	**(8.218)**	(10.99)	**(4.941)**
Bank size (t-1)	**-0.798****	**-13.44*****	**-0.873****	**-0.760****	**-0.735****	**-0.768****	**-0.667***
	(0.366)	**(2.718)**	**(0.388)**	**(0.372)**	**(0.366)**	**(0.362)**	**(0.369)**
Liquidity (t-1)	0.061	**0.165****	0.085	0.062	0.057	0.063	0.057
	(0.080)	**(0.067)**	(0.072)	(0.079)	(0.079)	(0.080)	(0.076)
Capital (t-1)	**0.958*****	**0.873****	**0.976*****	**0.963*****	**0.988*****	**0.929****	**1.009*****
	(0.358)	**(0.341)**	**(0.373)**	**(0.363)**	**(0.355)**	**(0.365)**	**(0.355)**
ST-funds (t-1)	0.070	**0.222****	0.050	0.072	0.073	0.074	0.070
	(0.066)	**(0.090)**	(0.070)	(0.066)	(0.067)	(0.067)	(0.067)
Policy rate (t-1)	**-1.305*****	**3.349*****	**-1.371*****	**-1.289*****	**-1.303*****	**-1.331*****	**-1.276*****
	(0.389)	**(0.407)**	**(0.378)**	**(0.386)**	**(0.389)**	**(0.386)**	**(0.395)**
GDP growth (t-1)	**0.566*****	**-0.916*****	**0.595*****	**0.564*****	**0.578*****	**0.590*****	**0.594*****
	(0.162)	**(0.109)**	**(0.148)**	**(0.162)**	**(0.161)**	**(0.161)**	**(0.155)**
CB assets growth (t-1)	**-0.034*****	**0.042****	**-0.036*****	**-0.034*****	**-0.034*****	**-0.035*****	**-0.034*****
	(0.012)	**(0.015)**	**(0.013)**	**(0.012)**	**(0.012)**	**(0.012)**	**(0.012)**
Constant	0.141	**48.621*****	1.561	-0.138	-0.419	0.065	-0.732
	(4.106)	**(10.51)**	(4.282)	(4.190)	(4.119)	(4.163)	(4.147)
Observations	1769	1769	1769	1769	1769	1769	1769
Banks	135	135	135	135	135	135	135
AR2	0.579		0.730	0.552	0.497	0.586	0.543
Hansen	0.115		0.236	0.152	0.151	0.126	0.172
No. instruments	107		107	109	109	109	109

Note: The table presents the complete results of Tables 5 and 6.

Table A4: Results for non-performing loans

Y (t): NPL, log transformed	Baseline	Baseline, OLS-FE	Baseline, IV	Public bad banks	Small transfer	Assets dis-position	Weak in-solvency
Y (t-1)	0.807***		0.736***	0.805***	0.801***	0.809***	0.793***
	(0.121)		(0.155)	(0.119)	(0.125)	(0.117)	(0.120)
Recapitalised bank (t)	**0.463*** **	0.127	**0.761*** **	**0.412*** **	**0.457*** **	**0.464*** **	**0.453*** **
	(0.111)	(0.119)	**(0.220)**	**(0.095)**	**(0.110)**	**(0.109)**	**(0.101)**
Recapitalised bank (t-1)	**-0.302*** **	-0.071	**-0.490*** **	**-0.240*** **	**-0.291*** **	**-0.307*** **	**-0.283*** **
	(0.103)	(0.095)	**(0.179)**	**(0.086)**	**(0.102)**	**(0.095)**	**(0.095)**
Bad bank without recap. (t)	0.114	-0.162	0.219	0.114	0.114	0.109	0.134
	(0.223)	(0.130)	(0.245)	(0.217)	(0.226)	(0.223)	(0.219)
Bad bank (t)	**0.634** **	**0.457** **	**2.038** **	**0.827*** **	0.506	0.713	**0.620** **
	(0.284)	**(0.214)**	**(0.925)**	**(0.282)**	(0.341)	(0.766)	**(0.279)**
Bad bank (t-1)	**-0.541** **	-0.257	**-1.118** **	**-0.749*** **	-0.253	-0.724	**-0.762*** **
	(0.223)	(0.206)	**(0.498)**	**(0.243)**	(0.220)	(0.774)	**(0.275)**
Bad bank (t) * Type				**-0.768** **	0.365	-0.103	-0.0300
				(0.361)	(0.471)	(0.785)	(0.422)
Bad bank (t-1) * Type				**0.726***	**-0.838***	0.218	**0.691***
				(0.422)	**(0.472)**	(0.820)	**(0.424)**
Bank size (t-1)	**-0.062*** **	-0.0344	**-0.070***	**-0.063*** **	**-0.064*** **	**-0.062*** **	**-0.061*** **
	(0.022)	(0.149)	**(0.036)**	**(0.022)**	**(0.022)**	**(0.022)**	**(0.022)**
Liquidity (t-1)	0.001	0.004	0.002	0.001	0.001	0.001	0.001
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)
Capital (t-1)	**-0.041** **	**-0.069*** **	-0.034	**-0.041** **	**-0.042** **	**-0.041** **	**-0.042** **
	(0.021)	**(0.008)**	(0.023)	**(0.021)**	**(0.020)**	**(0.020)**	**(0.021)**
ST-funds (t-1)	-0.006	**-0.006***	-0.005	-0.006	-0.006	-0.006	-0.006
	(0.005)	**(0.003)**	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Policy rate (t-1)	**0.056*** **	0.070	**0.052** **	**0.057*** **	**0.055*** **	**0.056*** **	**0.058*** **
	(0.018)	(0.047)	**(0.021)**	**(0.018)**	**(0.019)**	**(0.019)**	**(0.020)**
GDP growth (t-1)	**-0.041*** **	0.026	**-0.042*** **	**-0.041*** **	**-0.042*** **	**-0.040*** **	**-0.046*** **
	(0.009)	(0.018)	**(0.012)**	**(0.010)**	**(0.010)**	**(0.010)**	**(0.011)**
CB assets growth (t-1)	**0.001***	0.004	0.001	0.001	**0.001***	**0.001***	**0.001***
	(0.001)	(0.002)	(0.001)	(0.001)	**(0.001)**	**(0.001)**	**(0.001)**
Constant	0.073	**-2.423*** **	-0.286	0.071	0.076	0.080	0.039
	(0.206)	**(0.674)**	(0.311)	(0.205)	(0.220)	(0.194)	(0.201)
Observations	1392	1392	1392	1392	1392	1392	1392
Banks	122	122	122	122	122	122	122
AR2	0.226		0.204	0.222	0.225	0.227	0.227
Hansen	0.300		0.336	0.364	0.309	0.307	0.325
No. instruments	121		121	123	123	123	123

Note: The table presents the complete results of Tables 5 and 6.

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