Lifting the Banking Veil:

Credit Standards' Harmonization through Lending Transparency

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ABSTRACT

We explore whether banks' transparent reporting enhances the harmonization of credit terms that a bank offers to its borrowers in different geographic regions. We take advantage of a novel loan-level reporting initiative by the European Central Bank, which requires repo borrowing banks that pledge their asset-backed securities as collateral to disclose granular information on loan characteristics and performance. We find that loans originated under the transparency regime share more similar interest rate, loan-to-collateral-value ratio and maturity compared to same-purpose loans issued by the same bank in different regions. Learning and regulatory scrutiny are instrumental to the relation between transparent reporting and the convergence of credit practices. We further find that convergence leads to more favorable lending terms for borrowers and better loan quality for banks. Overall, we show that banks' transparent reporting can alleviate credit term dispersion, which has been documented to have significant adverse economic consequences for borrowers, including higher cost of debt and weaker access to credit.

Keywords: transparency, credit term convergence, harmonization, credit market integration, learning, regulatory scrutiny
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1. Introduction

A large body of literature on credit markets shows that banks specialize in producing and utilizing private information about their borrowers (e.g., Diamond 1984, 1991; Fama 1985; Rajan 1992). Over the past few decades, however, banks have alleviated information asymmetry about borrowers by disclosing granular loan information through credit bureaus and other reporting platforms (e.g., Pagano and Jappelli 1993). Transparency has been documented to influence credit availability and quality (e.g., Jappelli and Pagano 2006; Djankov et al. 2007; Ertan et al. 2017; Liberti et al. 2018; Sutherland 2018). However, less attention has been given to the effect of transparency on how banks internally process and assimilate information in their lending decisions.

We provide initial evidence on this topic by examining whether transparency in banks' loan decisions can foster the harmonization of credit standards that a bank employs across its geographic regions. Our research question is motivated by recent literature that documents a significant dispersion in the pricing of household credit, with much of this dispersion occurring within the same lender (e.g., Stango and Zinman 2016; Alexandrov and Koulayev 2018; Bhutta et al. 2018). Importantly, credit standard dispersion is associated with significant adverse economic consequences for borrowers, including higher cost of debt, increased probability of default and lower consumption and income (e.g., Allen et al. 2014; Argyle et al 2017; Alexandrov and Koulayev 2018).[1] Also, fragmentation of banks' credit standards across geographic areas has been linked to lower regional economic growth and excessive discrepancies in access to credit, which impede the transmission of fiscal policies across regions (e.g., Draghi 2014; Coeuré 2018). While prior studies argue that enhancing borrowers' financial literacy and reducing search costs can be

[1] Bhutta et al. (2018) show that some mortgage borrowers overpay more than 50 basis points in interest rate relative to what identical borrowers are charged in the same market on the same day, while Alexandrov and Koulayev (2018) assess excess interest payments of U.S. borrowers to be $13 billion per year.

potential solutions for credit term dispersion (e.g., Lacko and Pappalardo 2010; Allen et al. 2014; Stango and Zinman 2016; Argyle et al 2017; Alexandrov and Koulayev 2018; Bhutta et al. 2018), we add to this literature by examining whether banks' transparent reporting may be another viable mechanism through which credit term dispersion can be alleviated.

To address this question, following several studies, we exploit the new loan-level reporting requirements introduced by the ECB in January 2013 for banks that use their asset-backed securities (ABS) as repo collateral. Under the new reporting rules, banks that accessed the ECB's repo financing adopted in a staggered manner quarterly loan-level disclosures of their ABS portfolio structure and performance. Specifically, banks that had repo credit lines outstanding from the ECB by the end of 2012 were required to report loan-level data as of January 2013, while others had to comply with the new reporting rules only when they started repo borrowing in later quarters. A central information repository, the European DataWarehouse (ED), administers data collection and compliance. Importantly, the new requirements did not directly aim to alleviate banks' divergence in regional lending practices; rather, the ECB's primary objective was to facilitate better risk assessment of banks' securitization activities.

We predict that transparent reporting will foster the harmonization of the credit standards that a bank employs across its geographic regions for two primary reasons. First, the granular information collection and disclosure will allow loan officers to learn what branches in other regions offer to similar borrowers. Importantly, transparency is likely to facilitate the transmission of the more efficient credit practices across a bank's regional branches, leading to lower within-bank divergence in credit standards. Second, alleviating excessive credit standard discrepancies is an important objective of the policy makers at the ECB (ECB 2018). In this respect, transparency can facilitate greater external monitoring by exposing excessive deviations in the lending terms

that a bank offers across regions. We thus expect that greater regulatory scrutiny under the transparency regime will further contribute to the harmonization of the lending standards.

However, greater transparency may not result in higher credit term convergence. Transparency cannot alleviate persistent differences in lending standards driven by local credit market characteristics. Further, since the loan-level data is not available to borrowers, they cannot compare lending terms across a bank's branches. Thus, the transparency initiative does not diminish borrowers' search costs to which credit term dispersion has been largely attributed (e.g., Lacko and Pappalardo 2010; Allen et al. 2014; Argyle et al 2017).

We use residential mortgage data reported to the ED over the 2013-2017 period. Our sample covers 2,607,042 mortgages issued by 49 banks over the 2009-2017 period in Belgium, France, Ireland, Italy, Spain and the Netherlands. We focus on three primary mortgage terms reported by banks—interest rate, loan-to-value (LTV) ratio and maturity. For each sample mortgage, we construct a benchmark loan group by selecting mortgages issued by the same bank for the same purpose (house purchase or home equity) in different geographic regions of the same country over the previous quarter (benchmark mortgages, hereafter). We measure mortgage term divergence using the distance between a mortgage's terms and the average terms of its benchmark mortgages.

We find that residential mortgages originated under the transparency regime share more similar terms with benchmark mortgages, controlling for loan and borrower characteristics, and year of loan origination, region and bank fixed effects. Relative to pre-transparency mortgages, mortgages originated post-transparency have about 41.9% lower interest rate divergence than their benchmark mortgages. LTV ratio and maturity divergence drops by about 10.5% and 10.2%, respectively, for mortgages issued post-transparency.

We acknowledge that our results may be driven by banks strategically selecting which

mortgages to securitize and which ABS to pledge as collateral to the ECB. These selection concerns should be alleviated for banks with high securitized mortgage volume reported to the ECB as a percentage of total mortgages outstanding, since these banks have less discretion in their securitization and reporting choices. When we restrict our research sample to banks with a high proportion of reported securitized mortgage volume, we continue to find that transparency reduces credit term dispersion. Another concern is that banks may strategically choose when to adopt the new reporting standards based on the characteristics of their securitized loan portfolios. We limit our sample to banks that started ECB repo borrowing prior to the first quarter of 2013, since these banks must adhere to the reporting standards as of January 2013. We continue to find that transparency attenuates the dispersion of banks' credit practices.

Next, we recognize that our results may be affected by regulatory changes that may lead to a greater standardization of securitized loans, such as the Mortgage Credit Directive in 2016 and the EU Securitization Regulation 2017/2402. We restrict our sample to mortgages issued in the 2011-2014 period that precedes these rules and our results continue to hold. We further take advantage of banks' staggered adoption of the reporting standards. We focus on mortgages issued by banks that adopted the reporting standards in the first two quarters of 2013 and compare them to mortgages issued over this period by banks that have yet to adopt the new reporting standards. We continue to find that transparency reduces credit term dispersion.

Further, we examine whether our results may be influenced by the higher quality of loans that banks issue post-transparency (e.g., Ertan et al. 2017), which may decrease loan term divergence. Our findings are overall robust to (1) redefining benchmark groups to account for borrower characteristics; (2) controlling for borrower fixed effects; and (3) matching transparency with pre-transparency mortgages on their terms. In univariate tests, we also show that borrowers' average

credit risk profiles do not significantly differ between the pre- and post-transparency period.

In the next set of our analyses, we delineate the channels through which transparency affects credit standard harmonization. We first investigate whether the granular reporting mandated by the ECB facilitates banks' learning. We predict the learning channel to be stronger for banks with low internal reporting quality and those that are more incentivized to enhance their internal reporting in response to the new reporting requirements. First, we examine whether learning is stronger by banks with more heterogeneous internal reporting across their branches, which is likely to hinder the effective information sharing. Second, we expect transparent reporting to be more effective in facilitating learning for banks with weaker internal reporting systems prior to the ECB's disclosure mandate, as measured by banks' greater operational risk, internal control deficiencies and banks' recent merger and acquisition activities. Third, building on Khan et al. (2019), we predict that banks with the medium level of capital resources are more incentivized to improve their internal reporting systems due to ECB's reporting requirements. We find greater credit term convergence for mortgages issued by banks with more heterogeneous reporting, weaker internal reporting systems and a medium level of capital resources across most specifications, strongly supporting the learning channel. We also provide some evidence that, for banks with weak internal reporting quality, regional branches with a higher volume of mortgage defaults converge to the lending practices of their peers with stronger credit performance. Thus, transparency likely facilitates the transmission of better credit practices within banks.

Further, to examine the regulatory scrutiny channel, we rely on prior studies that demonstrate a positive association between a high intensity of consumer complaints and regulatory pressure (e.g., Engel and McCoy 2011; Demyanyk and Loutskina 2016; Buchak et al. 2018). We assess that a high consumer complaint volume about banks' practices may pressure them to harmonize the

credit terms they offer in different regions. In addition, banks that potentially pursue predatory lending practices likely face greater regulatory scrutiny. Building on prior literature (e.g., Carr and Kolluri 2001; Allen et al. 2014; Argyle et al. 2017; Bhutta et al. 2018), we proxy for predatory lending by excessive interest rates banks charge their low-income borrowers. We find that a high volume of consumer complaints and predatory lending further reinforce the effect of transparency on interest rate and maturity convergence. Last, the dispersion in the credit terms offered by a bank to similar households across a country's economically strong and weak regions is likely to attract greater scrutiny by regulators given their objective to alleviate such disparities (ECB 2018). We indeed find that post-transparency banks are more likely to converge the credit standards in their less-developed regions towards those in well-developed ones. Overall, these findings suggest that regulatory scrutiny is instrumental to the relation between transparent reporting and the convergence of credit practices.

In supplemental analyses, we provide preliminary evidence on the potential benefits of credit standard harmonization for both borrowers and lenders. We find that borrowers experience lower interest rate and longer maturity for mortgages issued by high-convergence banks, consistent with studies showing that credit term dispersion is associated with certain households overpaying for their debt (e.g., Allen et al. 2014; Alexandrov and Koulayev 2018; Bhutta et al. 2018). We also show that in the post-transparency period high-convergence banks have a lower ratio of non-performing loans but that their profitability does not differ from that of other banks. These findings suggest that transparent reporting allows high-convergence banks to improve their loan quality and that efficiency gains obtained from better credit practices compensate, at least partially, for the lower interest rate they charge.[2] Importantly, although our findings suggest that greater

[2] Given the benefits of credit term convergence, one may question why banks did not voluntarily develop more transparent internal reporting systems. While developing such internal reporting systems is costly for banks, the ED's

transparency is beneficial to bank and borrowers, we caution against a normative interpretation of these results. More homogenous lending practices may entail costs unexplored in this study, such as banks' greater exposure to macroeconomic shocks.

The paper makes several contributions to the literature. We extend the growing literature on credit term dispersion and its consequences on borrowers' cost of capital, access to credit and consumption (e.g., Allen et al. 2014; Argyle et al 2017; Bhutta et al. 2018). We show that reporting transparency is an important mechanism for mitigating credit term dispersion in household debt markets. We also highlight that both bank learning and regulatory scrutiny are instrumental for achieving this goal. In this respect, we respond to the call in Ryan (2017 and 2018) to extend our understanding of how transparent reporting enhances banks' internal and external discipline.

Further, our research extends the literature that examines the influence of information sharing across banks on credit availability and lending efficiency (e.g., Djankov et al. 2007; Doblas-Madrid and Minetti 2013; Liberti et al. 2018; Sutherland 2018). We add to these studies by documenting the role of transparency in enhancing banks' *internal* information processing and reporting. Our work is also related to Darmouni and Sutherland (2019), who find that information sharing among lenders in a U.S. commercial credit bureau motivates them to issue small business loans with more similar maturity to what other lenders offer. They show that these findings are driven by lenders' incentives to preserve market share by matching their competitors' credit terms. Our contribution lies in documenting the effect of transparency on harmonizing credit standards *within banks*. Importantly, we show that learning and regulatory scrutiny, rather than competitive pressures, are the primary channels that link transparency with credit term harmonization.

reporting infrastructure and close monitoring and quality assessment of loan-level data helped banks to significantly reduce such costs. Thus, the transparency initiative was instrumental in facilitating better accuracy and quality of banks' information collection and internal reporting.

Last, our research is relevant to studies that examine how external reporting incentives and compliance with reporting rules influence firms' internal information collection and processing, and consequently, their investment decisions (e.g., McNichols and Stubben 2008; Kanodia and Sapra 2016; Shroff 2017; Roychowdhury et al. 2019). We add to these studies by showing that transparency facilitates banks' learning about efficient credit practices and influences their lending decisions. Relatedly, we extend studies on the role of bank regulators in promoting transparent reporting (e.g., Granja 2018; Granja and Leuz 2018; Costello et al. 2019) by providing evidence of credit term convergence as an unintended consequence of the ECB's regulatory agenda.

2. Institutional background and predictions

2.1. Transparency initiatives in the banking sector

Over the past two decades, the banking sector has experienced many transparency initiatives that aim to make detailed information about lenders' decisions available to other lenders, investors and regulators. Prior literature documents mixed evidence on the benefits and costs of these initiatives. On one hand, prior research suggests that banks' information sharing through credit registries can enhance borrowers' access to credit (e.g., Jappelli and Pagano 2006; Djankov et al. 2007; Love et al. 2016; Calomiris et al. 2017). With respect to benefits to lenders, greater transparency has been shown to decrease banks' risk taking, increase the timeliness of their loan loss provisioning, and allow lenders to learn more about and enter into new credit market segments (e.g., Doblas-Madrid and Minetti 2013; Ertan et al. 2017; Liberti et al. 2018; Ertan and Balakrishnan 2018). On the other hand, Hertzberg et al. (2011) show that information sharing among lenders exacerbates lender coordination and increases the incidence of borrowers' financial distress. This is because when lenders share a negative private assessment about a borrower, they restrict credit access in anticipation of other lenders' reaction to this negative news. Sutherland

(2018) also finds that loan-level disclosures deter banks from establishing strong lending relationships with borrowers.

However, little is known about how transparent reporting affects lenders' internal information processing and loan decisions. We address this question by examining how transparency affects the dispersion in lending standards that a bank employs across its geographic regions. Credit term divergence can be driven by region-specific risk factors (e.g., PwC 2015; Belke et al. 2016) or influenced by loan officers' use of soft information about their borrowers (e.g., Petersen and Rajan 1994; Agarwal and Hauswald 2010). However, this divergence can also indicate inconsistent credit standards. Prior studies document a significant mortgage price dispersion across borrowers with very similar credit risk profiles and, importantly, this price dispersion is prevalent even within the same lender (Allen et al. 2014; Gurun et al. 2016; Stango and Zinman 2016; Alexandrov and Koulayev 2018; Bhutta et al. 2018). There is also evidence that the dispersion in credit pricing adversely affects households' cost of debt, access to credit and consumption and impedes the transmission of fiscal policies (e.g., Allen et al. 2014; Argyle et al 2017; Alexandrov and Koulayev 2018; Bhutta et al. 2018). These adverse economic effects are particularly important for policy makers in the Euro area, where financial fragmentation remains strong and creates welfare discrepancies across geographic regions (e.g., Draghi 2014; Coeuré 2018). Motivated by these important consequences of price dispersion, we investigate whether transparent reporting of lending decisions can foster the harmonization of credit standards within a bank.

2.2. The ECB loan-level reporting initiative

Perhaps the most important transparency initiative in the EU credit markets so far has been the introduction of the new loan-level reporting requirements for the ECB's repo borrowers. The ECB's goal in implementing these requirements was to improve the risk assessments of ABS that

in the past "have been hampered by the lack of standardized, timely and accurate information on single loan exposure." The ECB thus posits that "greater transparency will help to restore confidence in the securitization market."

Starting in January 2013, the ECB mandated that banks disclose quarterly granular data on the portfolio structure (i.e., loan terms and borrower characteristics) and performance (e.g., loan defaults and delinquencies) of the asset-backed securities (ABS) that they originated and pledge as repo collateral.[3] Thus, banks that traditionally used the ECB's ABS-backed repo credit line started loan-level reporting as of January 2013, while others that subsequently accessed this repo financing adopted the new disclosure standards in later quarters. These ABS are primarily backed by residential mortgages, auto loans, SME loans and credit card receivables. Loan-level reporting is facilitated by the European DataWarehouse (ED), which monitors data consistency and accuracy.[4] The ED data is accessible to the ECB, banks, regulators, non-bank institutional investors and credit rating agencies.

The new standards mandated by the ECB forced banks to materially improve their loan-level collection volume and quality. Ertan et al. (2017) document a significant volume of missing variable values at the beginning of the transparency regime, with banks enhancing their information collection by about 12.5% over the first three quarters of 2013. Moreover, based on our discussions with ECB researchers and credit managers at two large European banks who are directly involved with reporting loan-level data to the ED, loan data was often not shared across branches within the bank prior to the transparency regime. Specifically, many information items

[3] A bank that fails to comply with these new disclosure requirements cannot borrow from the ECB's repo financing, which can be costly given the very low interest rates the ECB offers (ECB Euro Money Survey 2012).
[4] ED checks for inappropriate or excessive missing variable values and for material deviations in key data compared to previous submissions. A significant component of ED analysts' tasks is the development of new data verification and accuracy checks as well as the improvement of existing ones.

had been kept in decentralized local branch reporting systems or in hardcopy and therefore were not shared across branches or effectively used by loan officers and credit risk managers. The ECB's new reporting mandate thus forced banks to improve their data collection process and internal information sharing.

2.3. Predictions

We predict that loans originated under the transparency regime will have credit terms that are more similar to those of loans issued by the same bank in different regions for two primary reasons. First, the granular reporting of loan terms, borrower characteristics and credit outcomes can facilitate greater learning across a bank's regional branches, allowing loan officers to gain insight into what their colleagues offer for similar loans and borrowers in other branches. Transparent reporting is likely to enhance the learning of better or more efficient credit practices across regional branches, leading to smaller differences in the credit terms a bank offers to borrowers across regions. This prediction is also consistent with prior evidence in the corporate setting that external reporting incentives and compliance with reporting rules affect internal information quality and decision making (McNichols and Stubben 2008; Shroff 2017; Roychowdhury et al. 2019).

Second, greater regulatory scrutiny under the new reporting requirements is also likely to contribute to the harmonization of lending terms. Recent studies suggest that credit term dispersion is more prevalent across borrowers with low credit scores, income and net worth, which adversely affects these borrowers' cost of debt and access to credit (e.g., Allen et al. 2014; Argyle et al 2017; Bhutta et al. 2018). An important objective in the ECB's agenda is to attenuate material divergence in borrowing costs and credit availability (ECB 2018). Although the ECB's new reporting requirements were not imposed for this purpose, transparent reporting can reveal material discrepancies in regional credit standards. We therefore expect transparency to increase regulatory

scrutiny related to banks' credit decisions, incentivizing them to alleviate excessive heterogeneity in the loan terms offered to borrowers in different regions.

Although we expect that greater transparency will harmonize banks' lending practices, we recognize several factors that may confound this prediction. First, while transparency can facilitate learning and regulatory oversight, it is unlikely to alleviate strong and persistent differences in lending standards driven by regional characteristics and risk factors. Second, the loan-level data is not available to households; thus, the transparency initiative does not decrease borrowers' search costs, which has been argued to drive credit term dispersion (e.g., Lacko and Pappalardo 2010; Allen et al. 2014). Therefore, whether transparency can lead to greater harmonization of a bank's lending terms remains an open question.

3. Data methodology

We obtain data on securitized residential mortgages (RMBS) from the European DataWarehouse (ED). We focus on this credit market segment because housing finance is the largest liability of households and a significant proportion of bank lending, accounting for 47% of the EU's GDP (European Mortgage Federation 2017). Further, with respect to mortgage securitizations, the ED covers detailed information on borrowers' profiles and loan terms, thus allowing us to control for a variety of characteristics that can affect loan term dispersion. Given that repo borrowing from ECB can be facilitated by ABS that banks have issued and are currently outstanding, the ED database covers granular information on ABS' loans issued before and after the initiation of the new reporting standards.

We start with 3,523,512 residential mortgages with complete data on credit terms issued over the 2009-2017 period to 2,279,917 unique borrowers. We focus on mortgages issued after 2009 to alleviate the concern that our results are affected by the greater standardization of securitized loan

contracts during the credit expansion (e.g., Ayotte and Bolton 2011; Bozanic et al. 2018). We exclude banks that only report mortgages issued in the pre-transparency period (255,559 mortgages). We eliminate mortgages in the restructured RMBS of Bass Master N.V.S.A Series-2008 to mitigate the concern that RMBS renegotiations can affect securitized mortgage pool characteristics (221,724 mortgages). Last, we exclude regions where sample banks report a very low mortgage issuance volume (regions with mortgage reporting intensity at the bottom decile of sample banks' reporting intensity, i.e., regions where a bank reports fewer than 400 new mortgages per quarter; 439,187 mortgages are excluded). Our final sample includes 2,607,042 mortgages issued to 1,620,386 borrowers by 49 commercial banks over the 2009-2017 period in Belgium, France, Ireland, Italy, Spain and the Netherlands.[5] Our sample banks cover small regional banks to national and international banks. Consistent with credit market reports on RMBS issuance volume across Eurozone countries (e.g., AFME 2017), our sample residential mortgages are primarily originated in the Netherlands (50%), France (25.1%) and Belgium (19.2%). The sample process criteria are summarized in Panel A of Table 1.

4. Research design and empirical results

4.1. Transparency and mortgage term convergence

We measure the divergence in mortgage terms (interest rate, loan-to-value ratio and maturity) as the distance between the terms of a mortgage and the average terms of similar mortgages issued by the same bank over the prior quarter. For each sample mortgage, we construct a benchmark group of mortgages originated by the *same bank* for the *same purpose* (house purchase or home

[5] The RMBS outstanding in the sample countries explains about 91.5% of the Eurozone RMBS outstanding (AFME 2017). As of 2017 Q3, about 18% of residential mortgages outstanding were securitized in our sample countries (AFME 2017; European Mortgage Federation 2017).

equity) in *different regions* (NUTS3) of the *same country* over the *previous quarter*.[6] Specifically, we measure *Interest rate divergence* by taking the absolute value of the difference between a mortgage's interest rate (in percentage points) and the mean interest rate of the benchmark mortgages. Similarly, we measure *LTV ratio divergence* (*Maturity divergence*) by using the natural logarithm of the absolute value of the difference between a mortgage's loan-to-collateral-value ratio (maturity in months) and the mean loan-to-value ratio (maturity) of the benchmark mortgages. We test the association between transparent reporting and mortgage term divergence using an ordinary least squares (OLS) model, where the dependent variables are *Interest rate divergence*, *LTV ratio divergence* and *Maturity divergence*.

$$\begin{aligned} \textit{Mortgage term divergence} = \alpha &+\beta_1 \textit{Transparency} +\beta_2 \textit{Interest rate divergence} \\ &+\beta_3 \textit{LTV ratio divergence} +\beta_4 \textit{Maturity divergence} \\ &+\beta_5 \textit{Mortgage amount divergence} +\beta_6 \textit{Mortgage guarantee divergence} \\ &+\beta_7 \textit{Borrower income divergence} +\beta_8 \textit{Borrower employment divergence} \\ &+\beta_9 \textit{Borrower age} \text{ divergence} +\textit{Fixed effects} \end{aligned} \quad \text{(Model 1)}$$

The primary independent variable of interest in Model 1 is an indicator variable for whether a mortgage is originated after the bank initiated transparent reporting (*Transparency*); we expect β_1 to be negative. We control for divergence in borrower and credit features between a mortgage and its benchmark loans that are likely associated with the dependent variables, including: i) *Mortgage amount divergence* (*Borrower income divergence)* defined as the natural logarithm of the distance between mortgage amount (borrower income); ii) *Mortgage guarantee divergence* (*Borrower*

[6] Benchmark groups exclude mortgages issued in the same NUTS3 region to the mortgage under consideration. Nomenclature of Territorial Units for Statistics, or NUTS, is a geocode standard of European countries' regions. NUTS can be defined in three levels (NUTS1, NUTS2 and NUTS3), with the third level referring to smaller regional subdivisions. Our choice to measure mortgage term convergence at the more granular NUTS3 level allows us to select a greater number of benchmark mortgages. We compare mortgage terms across regions of the same country to rule out that our results are influenced by cross-country economic heterogeneity (Higgins et al. 2006). Across our analyses, we also include region (NUTS1) fixed effects, which further alleviates heterogeneity concerns. Since our sample includes banks with a very different number of benchmark mortgage groups, we note that our results continue to hold when we exclude mortgages with few benchmark groups (i.e., bottom decile or quintile of the number of benchmark mortgage groups of our sample banks) (untabulated).

employment divergence), defined as the distance between the probability that a mortgage is guaranteed (a borrower is unemployed or a student); iii) *Borrower age divergence*, defined as the distance between borrower age. Variables are defined in detail in Appendix A, and we report summary statistics in Table 2. Moreover, we include in our tests year of mortgage origination, property region (NUTS1) and bank fixed effects to control for changes in credit standards over time, region-specific risk factors and bank characteristics that may influence credit term divergence.[7] Last, we include mortgage purpose (house purchase or home equity) and borrower type (individual or other) fixed effects to capture differences in lending terms across borrower and mortgage types. Standard errors are clustered at the bank level.

As we report in Panel A of Table 3, across all specifications, transparent reporting significantly decreases mortgage term divergence. Economically, relative to pre-transparency mortgages, mortgages originated post-transparency have about 41.9% lower interest rate divergence from their benchmark mortgages. Also, *LTV ratio divergence* and *Maturity divergence* drop by about 10.5% and 10.2%, respectively, for mortgages issued post-transparency. These findings also suggest that transparent reporting has a greater effect on the convergence of loan interest rate than on loan-to-value or maturity, consistent with prior evidence that credit availability divergence narrows at a slower pace than price-based divergence (ECB 2018).[8]

Although the results in Panel A of Table 3 are consistent with our predictions, an important concern is that our findings may be affected by banks strategically selecting which mortgages to securitize and which ABS to pledge as collateral to the ECB under the transparency regime. We

[7] Our results are robust to controlling for NUTS2, NUTS3 or country fixed effects and when we use year-quarter fixed effects (untabulated).

[8] Our findings continue to hold when we eliminate from our sample mortgages issued by banks that received bailout funding during the European sovereign debt crisis in 2010-2013, suggesting that the ECB's close monitoring of the lending practices of these banks is unlikely to drive our results (untabulated tests).

expect that these selection concerns are attenuated for banks with a higher ratio of securitized mortgage value reported to ECB to total value of mortgages outstanding, as these banks should have substantially less discretion in their securitization and reporting choices.[9]

For 35 banks with available data, we obtain mortgages outstanding from the transparency test disclosures by the European Banking Authority and estimate the ratio of the value of mortgages reported to ECB by a bank over a year to its annual total mortgages outstanding, averaged across all years following the bank's adoption of the ECB loan-level reporting. In Panel B of Table 3, we re-estimate Model 1 by restricting our sample to loans issued by high securitization volume banks (defined as banks for which this ratio falls in the top tercile of the sample distribution).[10] We find a negative and significant coefficient on *Transparency* in the interest rate and LTV ratio analyses, which alleviates the concern that banks' securitization and reporting choices drive our results.

Another strategic selection choice that banks may engage in is that they may choose when to adopt the new reporting standards based on the characteristics of their securitized portfolio mortgages. To address this concern, we rely on banks' annual reports, business press articles and the ED's reports to identify sample banks that started using ECB's ABS-backed repo financing prior to January 2013.[11] These banks are thus required to adopt the new standards in the first quarter of 2013 and cannot choose the adoption date strategically. We re-estimate Model 1

[9] With respect to the selection issue of which loans to securitize versus retain, banks with a higher ratio of securitized mortgages to mortgages outstanding should have less flexibility in this choice. With respect to the selection issue of which ABS to pledge as collateral to ECB, banks with a higher proportion of reported securitized mortgages to their securitized mortgages should have lower discretion in their reporting choices. Overall, combining these two issues (i.e., $\frac{\text{securitized mortgages}}{\text{mortgages outstanding}}$ X $\frac{\text{securitized mortgages reported}}{\text{securitized mortgages}} = \frac{\text{securitized mortgages reported}}{\text{mortgages outstanding}}$), banks with the higher ratio of securitized mortgages reported to ECB to their mortgages outstanding have less discretion in their selection choices.

[10] Importantly, the mean of the ratio of securitized mortgages reported to mortgages outstanding for this subsample is 42%, which is about twice as high as the average value of mortgage securitization intensity across banks in our sample countries (AFME 2017; European Mortgage Federation 2017). This evidence suggests that we have indeed identified banks with a substantial proportion of their securitized mortgages reported to ECB.

[11] We rely on various external reports—instead of merely using the ED's loan-level reporting data in January 2013—to verify that these sample banks borrowed repo prior to 2013.

restricting our sample to these banks and present the results in Panel C of Table 3. We continue to find significant and negative coefficients on *Transparency* across all specifications.

Next, an important concern is that our findings may be driven by the introduction of other regulatory initiatives that can affect banks' reporting or securitization activities. For example, the Mortgage Credit Directive adopted in 2016 mandates that banks provide borrowers with information about mortgage terms in a standardized and comparable format. This information likely improves borrowers' understanding of mortgage terms and facilitates the comparison of mortgage terms offered by a bank's branches, potentially incentivizing banks to offer more standardized mortgage terms. In addition, under the new EU Securitization Regulation 2017/2402, the design of securitized loans should be more standardized with respect to the interest rate, early amortization terms and provisions of creditors' control rights. While this regulation did not become effective until 2019, banks may proactively increase their reliance on a more standardized set of borrower hard characteristics.

To address this concern, we perform two sets of analyses. First, we restrict our sample to mortgages issued within a two-year period around the initiation of transparent reporting standards (i.e., during the 2011-2014 period). This sample period precedes the two regulatory changes discussed above. Panel D of Table 3 reports the results of these tests. We show that our findings on mortgage interest rate and maturity convergence continue to hold within this significantly shorter sample period. Second, we take advantage of banks' staggered adoption of the reporting standards. We limit our sample to mortgages originated in the first two quarters of 2013 and compare the credit term convergence of mortgages issued by transparent banks and banks that have yet to adopt the new reporting standards (i.e., banks that started using repo financing in later

quarters).[12] As we report in Panel E, despite a drastic reduction in the sample size, we find that *Transparency* has a significant negative effect on mortgage price and maturity divergence.

Lastly, we acknowledge the possibility that banks may strategically select to securitize and report loans originated based on a standardized set of hard information under the transparency regime. We note that such behavior is unlikely because banks have been extensively criticized for securitizing hard-information-based loans, which typically poorly reflect borrowers' underlying performance and thus led to massive ABS impairments during the financial crisis (e.g., Keys et al. 2010; Keys et al. 2012). To the extent that loan portfolios pledged as collateral to ECB face high regulatory scrutiny, banks should be reluctant to securitize and report to ECB more standardized, hard-information-based loans.

Nevertheless, to address this concern empirically, in untabulated tests, we attempt to identify soft-information- versus hard-information-based loans. If banks strategically securitize and report to ECB more hard-information-based loans, we expect the proportion of soft-information-based loans to significantly decrease post transparency. Following Agarwal and Hauswald (2010) and Campbell et al. (2019), we regress loan interest rate on borrower and loan characteristics, property region, loan purpose and borrower type fixed effects and measure loan-specific soft information as the absolute value of the residual from this model. Univariate analyses suggest that there is no decrease in the volume of soft-information-based loans under the transparency regime, as the mean value of our measure is similar across the pre- and post-transparency period. In addition, the findings of our multivariate analyses hold when we exclude loans issued primarily on hard information (i.e., loans for which the soft information measure falls in the bottom quintile of this

[12] Note that banks that adopted the new disclosure standards in 2013Q1 reported loan-level data in early January 2013, i.e., they reported granular information on previously issued ABS loans. Thus, we can identify mortgages issued by these banks in the last quarter of 2012 and construct benchmark loan groups for mortgages issued in the first quarter of 2013.

measure's distribution).[13]

Collectively, the analyses discussed above suggest that our results are unlikely to be explained by banks' strategic selection choices, their tendency to securitize hard- versus soft-information-based loans and other regulatory initiatives.

4.2. Sensitivity analyses

We perform a battery of additional sensitivity tests to support the credibility of our findings. Ertan et al. (2017) show that banks issue better-quality loans following the adoption of the ECB's transparent reporting standards. This "flight to quality" can decrease heterogeneity in borrower and loan characteristics, influencing our findings on the higher credit term convergence post-transparency. To alleviate this concern, we first explore whether borrowers' credit risk profiles change post-transparency. We report the results of these univariate tests in Table B1 of Appendix B. We focus on borrower characteristics commonly employed to assess loan repayment ability, including *Borrower income*, *Borrower employment*, and *Borrower age*. We find no evidence that these characteristics are significantly different across the pre- and post-transparency periods.

Second, we estimate mortgage term divergence by redefining benchmark mortgage groups to include borrower characteristics. Specifically, we use as benchmark mortgages those issued to borrowers with *similar income* and *age* (i.e., within the same tercile rank) for the *same purpose* by the *same bank* in *different geographic regions* (NUTS3) within the *same country* over the *previous quarter*. We re-estimate Model 1 and report the results in Panel A of Table 4. Our findings continue to hold for the interest rate and maturity divergence measures.

[13] Banks may also choose to securitize their better quality loans and omit reporting low quality loans, which can further increase securitized loan convergence under the transparency regime. Such strategic reporting behavior is unlikely. If banks choose to retain bad quality loans as non-securitized and to securitize better quality ones, banks' credit riskiness should increase in the post-adoption period. However, Ertan et al. (2017) find that banks experience a significant decrease in their credit riskiness, as reflected by lower credit default swap (CDS) spreads and bonds' yield to maturity. Ertan et al. (2017) also explain that such strategic behavior is unlikely because securitization is fundamentally used to alleviate retaining on the balance sheet standalone low-quality loans.

Third, we compare credit standard convergence of mortgages issued in the pre- and post-transparency period to the same borrowers. We restrict our sample to borrowers that take on at least three mortgages over our sample period (and at least one mortgage before and after the transparency regime) to allow for enough within-borrower variation in lending decisions. We augment Model 1 with borrower fixed effects and report our findings in Panel B. Although the sample size in these analyses declines drastically, our findings continue to hold for two out of the three loan terms we explore.

Last, we match mortgages issued in the pre- and post-transparency period based on their terms (interest rate, LTV ratio and maturity). The one-to-one propensity score matching of treated (transparency) mortgages with control (pre-transparency) mortgages is done in random order and without replacement.[14] We replicate our primary analyses within the sample of matched loans: as we report in Panel C of Table 4, our findings continue to hold across all divergence measures. Collectively, our findings on the association between transparency and lending term harmonization remain mostly robust to addressing changes in mortgage terms and borrower features over time.

4.3. Transparency, learning and mortgage term convergence

We next examine the channels through which transparency can lead to greater credit term convergence. We first investigate whether the comprehensive data collection and reporting mandated by the ECB can facilitate greater learning across a bank's different regional branches. In this respect, we focus on the characteristics of banks' internal reporting, as higher internal reporting quality should be pivotal in facilitating information sharing and learning within banks. Thus, we expect banks with low internal reporting quality and those that are more incentivized to

[14] Matched mortgages are within a distance ("caliper") of 0.01 of the propensity score of the mortgages in the treatment group. In unreported analyses, we check whether there are any significant differences in the weighted means of the matching variables between the control and treatment groups and find no such differences.

enhance their internal reporting systems in response to the new reporting requirements to primarily learn from the granular reporting mandated by the ECB. Because it is difficult to assess the quality of banks' information and control systems as they are not directly observable (Ryan 2019), we employ a number of measures to capture this construct: i) *Heterogeneous internal reporting*; ii) *Weak internal reporting*; and iii) *Medium capital resources*.

4.3.1 Heterogeneous internal reporting

We expect banks with more heterogeneous internal reporting to learn more from loan-level disclosures under the transparency regime. As we discuss in Section 2, prior to the transparency regime, many information items used in the decision-making were not uploaded into the central reporting systems or shared across branches. Instead, these information items had been kept in decentralized local branch reporting systems or in hardcopy. We thus posit that more heterogeneous internal reporting may have hindered the effective information sharing within a bank. Building on Ertan et al. (2017), we measure the heterogeneity of internal reporting using the variation in variables that are not reported under the ECB requirements. Specifically, banks use the "ND2," "ND3" and "ND4" categorization for missing variable values to indicate data that are used and collected for loan underwriting decisions, but not reported in the bank's central reporting systems. *Heterogeneous internal reporting* is the absolute value of the difference between the number of data items collected for a mortgage but not reported in the bank's central reporting systems (i.e., kept in local reporting systems) and the mean value of this number for its benchmark group loans. Greater values of *Heterogeneous internal reporting* indicate a greater divergence with respect to branches' loan-level data captured by a bank's central reporting system.

We augment Model 1 with *Heterogeneous internal reporting* and its interaction term with *Transparency*. As we report in Panel A of Table 5, the coefficient on the interaction term is

negative and significant across all specifications. Economically, relative to mortgages originated by banks with more homogenous reporting, mortgages originated by banks with heterogeneous reporting exhibit greater interest rate, LTV ratio and maturity convergence by about 7.0%, 2.8% and 17.2%, respectively. This evidence suggests that mortgage term convergence post-transparency is greater for banks with more heterogeneous local reporting systems.

4.3.2 Weak internal reporting systems

We expect transparent reporting to be more effective in facilitating within-bank learning for banks with weaker internal reporting systems prior to the ECB's disclosure mandate. We create four measures to capture the strength of banks' internal reporting. Our first measure focuses on a bank's operational risk, i.e., "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events" (BIS 2004). Banks with high operational risk are likely to be characterized by weaker internal reporting systems. For 12 sample banks that employ Advanced Measurement Approach (AMA) to measure operational risk, we retrieve information from EBA transparency reports and banks' financial statements on the bank's risk weighted assets (RWA) for operational risk and total RWA. [15] For each bank, we estimate the ratio of RWA for operational risk to total RWA, measured at the year preceding the year of a bank's adoption of transparent reporting. *High operational risk* is an indicator variable equal to one if this ratio falls in the top quintile of this ratio's sample distribution, and zero otherwise.

Our second measure reflects deficiencies in a bank's internal controls. For 20 banks with publicly available annual reports, we define *Internal control deficiencies* as an indicator variable

[15] Under the AMA, regulatory capital requirements for operational risk are estimated based on the bank's internal operational risk measurement system relying on both quantitative and qualitative criteria. Banks are encouraged to use AMA and this approach requires supervisory approval. Because of the substantially more sophisticated measurement of the operational risk under AMA, we rely on this approach when estimating operational risk for our sample banks. We thus exclude from these analyses banks that follow the Basic Indicator and the Standardized Approach, where operational risk assessment is largely based on fixed percentages of a bank's gross income.

for whether a bank discloses an operational system disruption, deficiency in internal control system, or breaching of internal control procedures and related regulatory penalties within the three-year period prior to the year when the bank adopted the ECB reporting. These incidences are likely to be indicative of weak internal reporting systems.

The third measure of internal reporting quality captures banks' merger and acquisition activities. We posit that banks that have recently experienced mergers and acquisitions are likely to be characterized by weaker internal reporting systems due to technical difficulties arising from physical integration of two previously independent information systems, lack of data compatibility and the adverse effect of integration on employees' work routines (e.g., Giacomazzi et al. 1997; Chang et al. 2014). Using bank-level M&A data from Capital IQ, we define *M&A activity* as an indicator variable for whether a bank engaged in M&A transactions within the three-year period prior to the year when the bank adopted the ECB loan-level reporting.

To capture the overall strength of the internal reporting systems, we construct a combined estimate that reflects the three measures of the strength of internal reporting systems. *Weak internal reporting* is an indicator variable equal to one if at least two of the *High operational risk, Internal control deficiencies, or M&A activity* measures take the value of one, and zero otherwise.[16]

In Panel B of Table 5, in the interest rate and maturity divergence specifications, the coefficient on the interaction term between *Transparency* and *Internal reporting measure* is negative and significant across all four measures of the strength of internal reporting systems. Economically, based on the specification in column 4 (12), relative to mortgages originated by banks with stronger

[16] Another proxy for the strength of a bank's internal reporting systems is the quality of its credit risk management, as banks with weak credit-risk modeling will have low-quality internal reporting. Following Bhat et al. (2019), we perform textual analysis of banks' financial statements to identify disclosures related to credit risk modeling and stress testing in the year prior to the year when they adopted the new reporting requirements. However, we find that most banks over our sample period employ statistical credit risk modeling and stress testing, which prevented us from estimating cross-sectional analysis based on this measure.

internal reporting systems, mortgages originated by banks with weaker reporting systems exhibit interest rate convergence (maturity convergence) that is greater by about 21.1% (43.1%). These findings are consistent with transparent reporting fostering stronger learning in banks with weaker internal reporting systems.

4.3.3 Capital resources

Khan et al. (2019) provide evidence supporting the importance of financial institutions' capital resources in developing and supporting internal information and control systems. Specifically, they demonstrate that insurers with a medium level of statutory surplus have financial capabilities and incentives to enhance their internal reporting systems in response to more stringent fair value measurement requirements. In contrast, insurers with low statutory surplus are reluctant to invest in these systems due to low resources, while insurers with high statutory surplus have sufficiently plentiful resources not to require additional incentives to invest in these systems. Building on these arguments, we expect banks with a medium level of capital resources to be more incentivized to improve their internal reporting systems due to ECB's reporting requirements.

We measure a bank's capital resources by its ratio of total equity to total assets in the year prior to the year when the bank adopted the ECB loan-level reporting requirements. We define *Medium capital resources* as an indicator variable equal to one if the bank's capital ratio falls in the middle tercile of this ratio's sample distribution, and zero otherwise. In line with our expectations, in Panel C of Table 5, we find negative and significant coefficients on the *Transparency* × *Medium capital resources* interaction term when we use interest rate and maturity divergence as our dependent variables. Economically, relative to mortgages originated by banks with low or high capital resources, mortgages originated by banks with a medium level of these resources exhibit greater interest rate and maturity convergence by about 22.7% and 54.1%, respectively. Overall, our

findings of the greater credit term convergence for mortgages issued by banks with more heterogeneous reporting, weaker internal reporting systems and a medium level of capital resources strongly support the learning channel.[17]

4.3.4 Learning, weak internal reporting systems and transmission of better credit practices

In the last set of learning-channel-related analyses, we try to shed some light on whether transparency can facilitate learning and transmission of better credit practices for banks with weak internal reporting quality. Under the transparency regime, regional branches with poor credit performance are likely to learn from the credit practices of their peers with stronger credit performance, especially when these banks had weaker internal reporting systems.

We measure credit performance by an indicator variable for whether the percentage difference between the mortgage default rate in a loan's region (NUTS3) and mean default rate in the regions of benchmark mortgages falls in the upper quartile of this ratio's sample distribution (*Region loan defaults*). Mortgage default rates at the regional level are measured using data from the bank's first reporting quarter; thus, our variable captures the bank's regional credit performance at the beginning of the transparency regime. We report these analyses in Table 6, where our main variable of interest is the triple interaction term between *Transparency*, measures of *Internal reporting system* (*Heterogeneous internal reporting*, *Weak internal reporting* or *Medium capital resources)* and *Region loan defaults*.[18] We find negative and significant coefficients on this

[17] In untabulated analyses, we also address the possibility that our findings are primarily driven by loan officers' learning from the more extensive information collection rather than from greater information sharing within banks under the transparency regime. We restrict our post-transparency sample to mortgages originated over the January 2013 to September 2013 period, i.e., during the "grace period" that the ECB granted to banks to fully comply with the new reporting requirements. During this period, credit information had been shared across branches, but data collection was only slowly improving (e.g., Ertan et al. 2017). Our results continue to hold in this specification (untabulated), significantly mitigating information collection concern.

[18] The indicator variable *Internal reporting system* and double interaction terms between *Internal reporting system* and *Transparency* and *Internal reporting system* and *Region loan defaults* are included in the estimation but not tabulated.

interaction term in five out of nine specifications. These findings provide some evidence of directional learning: loan-level reporting enhances the transmission of better credit practices across regional branches of banks that are more likely to learn from the new reporting requirements.

4.4. Transparency, regulatory scrutiny and mortgage term convergence

Next, we investigate whether regulatory scrutiny is instrumental to the association between transparent reporting and the convergence of credit practices across a bank's regional branches. We capture regulatory scrutiny by: i) the volume of consumer complaints; ii) predatory lending; and iii) divergence of credit standards in low economic growth regions.

4.4.1 Consumer complaints

Prior research and institutional evidence suggest that borrowers' complaints are an important driver of regulatory oversight of financial institutions. Engel and McCoy (2011) and Demyanyk and Loutskina (2016) demonstrate that borrowers' complaints are associated with a greater regulatory pressure on financial institutions. Similarly, Buchak et al. (2018) use mortgage-related lawsuits against banks as a proxy for regulatory oversight. Deloitte identifies consumer complaints as an early warning signal that a financial institution is at risk of regulatory actions and intervention, noting that mortgage-related complaints constitute the largest consumer complaint category in the banking sector (Deloitte 2015). The 2014 EBA's Consumer Trends Report also highlights that consumer complaints regarding financial institutions are growing over time and that mortgages and loans represent the largest share of complaints. We expect that, under the transparent reporting, a higher intensity of consumer complaints is likely to pressure banks to harmonize the credit terms that they offer in different regions to alleviate extensive regulatory oversight regarding disparities in their lending practices.

We retrieve data on consumer complaints in the banking sector at the country-year level from

the European Consumer Complaints Registration System (ECCRS), which is the largest EU-wide consumer complaint database (there is no firm-level coverage). We measure the intensity of complaints using an indicator variable for whether the number of consumer complaints in the banking sector within a bank's country over the year prior to the year of a loan's origination falls in the top quintile of this variable's sample distribution (*High consumer complaints).* We augment Model 1 with *High consumer complaints* and its interaction term with *Transparency.* In Panel A of Table 7, we find negative and significant coefficients on the interaction term between *Transparency* and *High consumer complaints* in the interest rate and maturity divergence specifications. Economically, relative to mortgages originated by banks that are under relatively low regulatory scrutiny, mortgages originated by banks under high regulatory scrutiny exhibit greater interest rate and maturity convergence by about 22.7% and 13.8%, respectively.

4.4.2 Predatory lending

Regulators extensively monitor whether financial institutions engage in predatory lending (e.g., Carr and Kolluri 2001). These practices typically include excessively high interest rates, high loan origination fees and unnecessary provisions to the detriment of borrowers, such as balloon payments or pre-payment penalties. Prior studies also find that predatory lending in general, and excessively high rates in particular, are mostly common for low-income and low-credit-quality borrowers that lack effective search and negotiation capabilities (Carr and Kolluri 2001; Allen et al. 2014; Argyle et al. 2017; Bhutta et al. 2018). There is also evidence that predatory lending is common for securitized mortgages (Engel and McCoy 2006). Although identifying predatory lending is challenging for regulators (e.g., Carr and Kolluri 2001), loan-level reporting to ECB can facilitate regulators' assessment of whether reporting banks engage in predatory lending. Thus, we expect ECB to impose greater pressure on banks to harmonize their credit practices when these

banks potentially pursue predatory lending practices.

Building on prior literature, we measure predatory lending based on the excessive interest rates banks charge their low-income borrowers. To proxy for excessively high interest rates, for each bank, we regress loan interest rate on observable borrower and loan characteristics, as well as property region, loan purpose and borrower type fixed effects over the three-year period prior to the year when the bank adopted the ECB loan-level reporting requirements. Specifically, for each sample bank, we estimate the following model:

$$\begin{aligned} \textit{Mortgage interest rate} = \alpha &+ \beta_1 \textit{LTV ratio} + \beta_2 \textit{Mortgage maturity} + \beta_3 \textit{Mortgage amount} \\ &+ \beta_4 \textit{Mortgage guarantee} + \beta_5 \textit{Borrower income} + \beta_6 \textit{Borrower employment} \\ &+ \beta_7 \textit{Borrower age} + \textit{Fixed effects} \end{aligned} \quad \text{(Model 2)}$$

Next, for each bank, we estimate the mean value of the residuals from Model 2 for loans issued to borrowers whose annual income is in the bottom quintile of this measure's sample distribution.[19] We define *Predatory lending* as an indicator variable equal to one if the loan is issued by a bank for which the average residual measure for loans to low-income borrowers falls in the top quintile of this measure's sample distribution, and zero otherwise.[20] We augment Model 1 with *Predatory lending* and its interaction term with *Transparency*. In Panel B of Table 7, we find negative and significant coefficients on the interaction term between *Transparency* and *Predatory lending* in the interest rate and maturity divergence specifications. Economically, relative to mortgages originated by banks under relatively low regulatory scrutiny, mortgages originated by banks under high scrutiny due to their predatory lending practices, exhibit interest rate and maturity

[19] Borrowers in this bottom quintile have an average annual income of EURO 19,284, relative to the average annual sample average of EURO 50,856, highlighting that these borrowers indeed have relatively low income.

[20] Note that positive interest rate residuals in Model 2 indicates higher interest rates charged by banks. The average residual for low-income borrowers of banks in this top quintile is 0.114, which is almost five times higher than the average sample residual for low-income borrowers of 0.024, further supporting our proposition that *Predatory lending* captures excessively high interest rates charged by banks.

convergence that is greater by about 20.4% and 36.7%, respectively.

4.4.3 Low economic growth regions

Finally, we expect ECB to more closely monitor credit term divergence in a country's economically weak regions, where borrowers are likely to have weaker access to credit and discrepancies in credit standards can have a greater adverse impact on economic activity. Transparent reporting is likely to expose such discrepancies, incentivizing banks to harmonize lending practices across regions and thus alleviate regulatory scrutiny.

We assess regional economic activity based on Eurostat data on GDP per capita, with less- (well-) developed regions (NUTS3) defined as those for which annual GDP per capita falls in the bottom two quintiles (upper quintile) of the distribution of annual GDP per capita across a country's regions. To alleviate the concern that our measure for regional economic growth is biased by our mortgage sample distribution, we rank regional GDP per capita across all NUTS3 within a country. As a result, defining low-developed regions by the bottom two quintiles of the annual GDP per capita distribution allows us to have a more balanced sample size of mortgages issued in well- and less-developed regions, as significantly fewer mortgages are issued in less economically developed than in well-developed regions.[21] We measure the divergence of credit standards across a country's well- and less-developed regions by redefining *Interest rate divergence, less- (well-) developed regions* as the absolute value of the difference between a mortgage's interest rate (in percentage points) issued in a less- (well-) developed region (NUTS3) and the mean interest rate of mortgages issued by the same bank for the same purpose in well- (less-) developed regions. Also, we employ similar definitions for measuring *LTV ratio divergence, less (well-) developed regions* and *Maturity divergence, less (well-) developed*

[21] Our findings are robust when we categorize less-developed regions using the bottom quintile of the distribution of annual GDP per capita across a country's regions (untabulated test).

regions, and we test our predictions using Model 1 with these new dependent variables.

In Panel C, we present the results for the less-(well-) developed regions in columns 1-3 (4-6). We show that transparency is significantly more effective in converging credit terms that a bank offers in less-developed regions compared to those in well-developed ones, suggesting that regulatory scrutiny likely incentivizes banks to revisit and harmonize lending practices in regions with low economic growth. Mortgages originated post-transparency by a bank in less-developed regions exhibit more similar interest rate, LTV ratio and maturity by about 64.6%, 15.8% and 11.2%, respectively, than benchmark mortgages issued by the same bank in well-developed regions. While mortgages originated post-transparency by a bank in well-developed regions also exhibit more similar interest rate to mortgages in less-developed regions, we do not find a statistically significant effect of transparency on LTV ratio and maturity convergence for such mortgages. Overall, our findings in Table 7 show that regulatory scrutiny is an important channel through which transparent reporting affects the within-bank convergence of credit practices.

5. Supplemental analyses

5.1. Transparency, mortgage term convergence and borrowing terms

So far, we provide robust evidence of the positive association between transparent reporting and credit term convergence, which is likely to be driven by the greater regulatory scrutiny and banks' learning under the transparency regime. Although we abstain from concluding whether this effect is a positive development in the private debt market, we provide preliminary evidence of the potential benefits of credit standard harmonization for both borrowers and lenders.

We first examine the effect of credit standard convergence under the transparency regime on borrowing terms. On one hand, credit term dispersion has been linked to loan officers overcharging some borrowers relative to others of similar credit risk (e.g., Allen et al. 2014; Stango and Zinman

2016; Argyle et al. 2017; Bhutta et al. 2018). As we show in Section 4.4, banks are likely to harmonize their credit standards due to tighter regulatory scrutiny, which can force banks to attenuate inconsistencies in lending practices that make credit less affordable to borrowers. On the other hand, credit term dispersion may arise when loan officers offer more favorable credit terms to some borrowers compared to the standard terms used for loans to borrowers of similar credit risk. In this case, since transparency reduces divergence in credit standards, borrowers will on average experience more adverse credit terms post-transparency.

To examine this question, we estimate the following OLS model:

$$\begin{aligned} \textit{Mortgage term} = \alpha &+\beta_1 \textit{Transparency} +\beta_2 \textit{High mortgage term convergence} \\ &+\beta_3 \textit{Transparency} \times \textit{High mortgage term convergence} \\ &+\textit{Controls} +\textit{Fixed effects} \end{aligned} \qquad \text{(Model 3)}$$

where the dependent variables are the three main borrowing terms: mortgage interest rate (*Mortgage interest rate*), the natural logarithm of loan-to-value ratio in percentage points (*LTV ratio*) and the natural logarithm of mortgage maturity in months (*Mortgage maturity*). *High mortgage term convergence* is an indicator variable for whether the *Mortgage term divergence* measure, averaged at the bank-quarter level, falls in the bottom quintile of this variable's sample distribution. To exemplify, for mortgage interest rate analyses, we define *High mortgage term convergence* as equal to one if *Interest rate divergence*, averaged at the bank-quarter level, falls in the bottom quintile of this variable's sample distribution, and zero otherwise. We control for mortgage terms (*Mortgage amount* and *Mortgage guarantee*) and borrower characteristics (*Borrower income*, *Borrower employment* and *Borrower age*), as defined in Appendix A.

In Table 8, we find negative (positive) and significant coefficients on *Transparency* in *Mortgage interest rate* (*Mortgage maturity*) specification, which indicates that borrowers on average experience lower interest rates and longer maturity under the transparency regime.

Importantly, the coefficient on *Transparency* × *High mortgage term convergence* in the *Mortgage interest rate* (*Mortgage maturity*) specification is negative (positive) and significant, suggesting that the effect of transparency on mortgage terms is more pronounced for banks that experience greater convergence in their credit terms. Relative to other banks, high-convergence banks further decrease (increase) mortgage interest rate (maturity) by about 2.69% (8.14%) post-transparency. Our findings suggest that credit standard harmonization benefits borrowers via lower cost of debt and longer debt maturity. This evidence is consistent with our conjecture that banks' transparent reporting can be an important mechanism through which credit term convergence and subsequent more favorable loan terms for borrowers can be achieved. Thus, we add to prior research that proposes different mechanisms to achieve this objective, such as enhancing borrowers' financial literacy and reducing search cost (e.g., Lacko and Pappalardo 2010; Allen et al. 2014; Argyle et al 2017; Stango and Zinman 2016; Alexandrov and Koulayev 2018; Bhutta et al. 2018).

5.2. Transparency, mortgage term convergence and banks' financial performance

We next assess whether harmonizing lending standards affects banks' financial performance. On one hand, we show that the new reporting requirements facilitate greater learning within banks. We also provide some evidence that, for banks with weak internal reporting systems, regional branches with weaker credit performance converge to the lending practices of their better-performing peers. These arguments are indicative of a stronger performance of banks with greater mortgage term convergence post-transparency. On the other hand, we show that under the transparency regime, banks charge lower interest rates, which can be attributed, at least partially, to regulatory pressure to harmonize their lending standards. Moreover, banks that are susceptible to tighter regulatory pressure are more likely to harmonize their lending standards, which may push them to inefficiently eliminate deviations in regional credit standards in order to mitigate this

pressure. Collectively, these arguments suggest that lending term convergence will lead to worse performance of banks with greater mortgage term convergence.

To address this question, we obtain bank-level data from BankScope.[22] We focus on two primary aspects of bank performance: (1) the quality of loan portfolio, measured by the ratio of non-performing loans to total loan amount (*NPL ratio*), and (2) the return on assets, measured by the ratio of net income to total assets (*Return on assets*). We estimate the following OLS model at the bank-year level, where the dependent variable is one of the bank performance measures.

$$\begin{aligned} \textit{NPL ratio (Return on assets)} = \; & \alpha + \beta_1 \textit{Transparency} + \beta_2 \textit{High convergence} \\ & + \beta_3 \textit{Transparency} \times \textit{High convergence} + \textit{Controls} \\ & + \textit{Fixed effects}. \end{aligned} \qquad \text{(Model 4)}$$

The primary independent variable of interest is the interaction term between *Transparency* and *High convergence*, defined as an indicator variable equal to one if at least one of the *Interest rate divergence*, *LTV ratio divergence* or *Maturity divergence* measures, averaged at the bank-year level, falls in the bottom quintile of the respective variable's sample distribution, and zero otherwise. Control variables include the natural logarithm of a bank's total assets (*Size*), the ratio of cash to short-term borrowing and deposits (*Liquidity*), the ratio of gross loans to prior year's gross loans (*Loan growth*) and Tier 1 capital ratio (*Tier 1 capital*). We include bank and year fixed effects and cluster standard errors at the bank level.[23]

As we report in Table 9, we find that the coefficient on *Transparency* × *High convergence* is negative and significant in NPL specification, indicating 4.1% lower *NPL ratio* for high-convergence banks post-transparency. This evidence suggests that greater learning under the

[22] BankScope data is available for 21 sample banks.
[23] While a large number of fixed effects may bias the results due to a small sample size (Angrist and Pischke 2008), our findings are very similar when we exclude bank fixed effects (untabulated).

transparency regime improves banks' loan quality. In the *Return on assets* specification, the coefficient on *Transparency* × *High convergence* is insignificant, suggesting that the profitability of high-convergence banks does not differ significantly from that of other banks in the post-transparency period. Thus, the lower interest rate charged by high-convergence banks is likely compensated, at least partially, by efficiency gains obtained from better credit practices under the transparency regime. Overall, an important implication of our results is that greater mortgage term convergence under the transparency regime does not lead to a deterioration in banks' financial performance. We rather show that the new reporting requirements likely alleviate inefficient inconsistencies in local lending standards and allow banks to improve their credit quality.

5.3. Other supplemental analyses

5.3.1. Transparency, competitive pressure and lending term convergence

We address the possibility that our findings of within-bank credit term convergence can be explained by the greater competitive pressure across a bank's regional branches under the transparency regime. Indeed, using a *cross-lender* setting where lenders share information through a U.S. credit bureau, Darmouni and Sutherland (2019) show that lenders that face greater competitive pressures are more likely to adjust loan maturity towards what their rivals offer.

We measure competitive pressure across a bank's regional branches using an indicator variable for whether the quarterly Herfindahl-index (HHI) of a bank's proximal regional branches (i.e., local branches [NUTS3] belonging to the same wider region [NUTS1]) falls below the variable's median value within a country (*High within-bank competition*). The HHI of a bank's proximal regional branches is estimated based on their quarterly mortgage issuance volume. We augment Model 1 with the *High within-bank competition* indicator variable and its interaction term with *Transparency*. As we report in Table B2 of Appendix B, across all specifications, there is no

evidence supporting the argument that credit term convergence post-transparency is higher in more competitive credit market segments, suggesting that our primary findings cannot be attributed to within-bank competitive pressures. Although these results differ from those of Darmouni and Sutherland (2019) in the *cross-lender* setting, there is a potentially important conclusion: the economic mechanisms that link transparency to lending standard harmonization likely vary based on institutional features and reporting frameworks. We leave for future research to explore the factors that drive the relative importance of these mechanisms across different settings.

5.3.2. Transparency and lending term convergence: auto loans

Next, we explore whether our primary findings generalize to different credit market segment of auto loans. We focus on this segment because auto-loan securitizations constitute the second-largest ABS category of European banks. We measure auto-loan term divergence similar to our primary analyses: for each sample auto loan, we construct a benchmark loan group by selecting auto loans originated by the *same lender* for the *same borrower type* (corporate, individual and other) and *same vehicle condition* (new, used, demo and other car) in *different regions* (NUTS3) within the *same country* over the *previous quarter*.[24]

We test the association between transparent reporting and auto-loan term divergence using an OLS model where the dependent variables are *Interest rate divergence*, *LTV ratio divergence* and *Maturity divergence*. Similar to Model 1, our main variable of interest is *Transparency*, which is an indicator variable for whether an auto loan is originated after the bank initiated transparent reporting. We control for the divergence of loan terms and borrower characteristics from their corresponding benchmark mortgages (control variable definitions are provided in Table B3 in

[24] Since auto-loan maturity is significantly shorter than maturity of mortgages, we measure *Maturity divergence* as the distance between an auto loan's maturity in years and the mean maturity in years of benchmark auto loans (rather than by the natural logarithm of this distance).

Appendix B).[25] We also include fixed effects for loan origination year, property region (NUTS1), borrower type (corporate, individual and other) and lender (26 unique lenders) to control for differences in credit standards over time and across regions, borrowers and lenders. Standard errors are clustered at the lender level. In Table B3 of Appendix B, we show that our primary findings for mortgages are mostly robust to the auto-loan sample. Although we find that LTV ratio divergence is not affected by the new reporting standards, divergence of auto loans' interest rate and maturity decreases by about 23.3% and 7.9% under the transparency regime, respectively.

5.3.3. Transparency and lending term convergence across banks

Although our study focuses on the effect of transparency on credit standard harmonization *within a bank*, transparency can also facilitate the convergence of lending practices *across banks*, since banks have access to loan information shared by other banks. We measure cross-bank mortgage term divergence—*Interest rate divergence across banks*, *LTV ratio divergence across banks* and *Maturity divergence across banks*—by the distance between a mortgage's terms and the average terms of similar mortgages issued by different banks in the same region (NUTS1) over the prior quarter.[26] Thus, for each sample mortgage, we construct a group of benchmark mortgages (*benchmark mortgages by different banks* hereafter) by selecting mortgages originated by *different banks* for the *same purpose* in the *same region* over the *previous quarter*.

We employ Model 1 with cross-bank dependent variables and divergence control variables measured relative to the respective mean value of benchmark mortgages of different banks. In Table B4 of Appendix B, we show that transparent reporting leads to greater interest rate and

[25] Variable coverage for RMBS and auto-loan ABS does not perfectly overlap; thus, we cannot use the same control variables as the ones used in our primary tests.

[26] We define benchmark regions more broadly at the NUTS1 level to increase the size of benchmark mortgage groups by different banks. Our results continue to hold when we define benchmark regions at the NUTS2 or NUTS3 level (untabulated).

maturity convergence across banks. Economically, mortgages under the transparency regime have a more similar interest rate and maturity by about 48.0% and 20.8%, respectively, to mortgages issued by other banks in the same region.

6. Conclusion

Recent literature suggests that pricing of household debt shows a significant dispersion, which entails substantially negative economic consequences both at the borrower and macroeconomic level. To alleviate the credit dispersion problem, prior studies suggest enhancing borrowers' financial literacy and reducing search costs (e.g., Lacko and Pappalardo 2010; Allen et al. 2014; Stango and Zinman 2016; Argyle et al 2017; Alexandrov and Koulayev 2018; Bhutta et al. 2018). In this paper, we explore an additional potential solution to the credit term dispersion problem — greater bank's reporting transparency.

We use the introduction of the ECB's loan-level reporting initiative in January 2013 for banks that obtain repo financing using their ABS as collateral and explore whether greater transparency leads to the harmonization of the credit standards that a bank employs across its regions. Using a sample of mortgages issued over the 2009-2017 period, we find that transparency mortgages share more similar credit terms with same-purpose mortgages issued by the same bank in different geographic regions over the prior quarter. We also show that transparent reporting enhances both bank internal and external discipline—bank learning and regulatory scrutiny—which facilitate credit term convergence. Finally, we provide evidence that credit term convergence leads to beneficial lending terms for borrowers and improves banks' loan portfolio quality.

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Appendix A: Definitions of variables in the primary analyses

Variable	Definition
Across the variable definitions, *benchmark group loans* are residential mortgages issued by the same bank for the same purpose (house purchase or home equity) in different regions (NUTS3) within the same country over the previous quarter.	
Mortgage characteristic divergence	
Interest rate divergence	The absolute value of the difference between a residential mortgage's interest rate (in percentage points) and the mean interest rate of benchmark group loans.
LTV ratio divergence	The natural logarithm of the absolute value of the difference between a residential mortgage's loan-to-collateral-value (LTV) ratio (in percentage points) and the mean LTV of benchmark group loans.
Maturity divergence	The natural logarithm of the absolute value of the difference between a residential mortgage's maturity (in months) and the mean maturity of benchmark group loans.
Interest rate divergence, less (well-)developed regions	The absolute value of the difference between a residential mortgage's interest rate (in percentage points) issued in a region (NUTS3), for which annual GDP per capita falls in the bottom two quintiles (upper quintile) of the distribution of annual GDP per capita across a country's regions, and the mean interest rate of benchmark mortgages issued in regions, for which annual GDP per capita falls in the upper quintile (bottom two quintiles) of annual GDP per capita across a country's regions.
LTV ratio divergence, less (well-)developed regions	The natural logarithm of the absolute value of the difference between a residential mortgage's LTV issued in a region (NUTS3), for which annual GDP per capita falls in the bottom two quintiles (upper quintile) of the distribution of annual GDP per capita across a country's regions, and the mean LTV of benchmark mortgages issued in regions, for which annual GDP per capita falls in the upper quintile (bottom two quintiles) of annual GDP per capita across a country's regions.
Maturity divergence, less (well-)developed regions	The natural logarithm of the absolute value of the difference between a residential mortgage's maturity (in months) issued in a region (NUTS3), for which annual GDP per capita falls in the bottom two quintiles (upper quintile) of the distribution of annual GDP per capita across a country's regions, and the mean maturity of benchmark mortgages issued in regions, for which annual GDP per capita falls in the upper quintile (bottom two quintiles) of annual GDP per capita across a country's regions.
Mortgage amount divergence	The natural logarithm of the absolute value of the difference between a residential mortgage's principal amount (in Euros) and the mean principal amount of benchmark group loans.
Mortgage guarantee divergence	The absolute value of the difference between the probability that a residential mortgage is guaranteed and the mean probability of benchmark group loans.

Appendix A (continued)

Variable	Definition
Borrower characteristic divergence	
Borrower age divergence	The absolute value of the difference between a borrower's age (in years) and the mean age of borrowers in the benchmark group loans.
Borrower employment divergence	The absolute value of the difference between the probability that a borrower is unemployed or a student and the mean probability of borrowers being unemployed or students in the benchmark group loans.
Borrower income divergence	The natural logarithm of the absolute value of the difference between a borrower's annual income (in euros) and mean income of borrowers in the benchmark group loans.
Mortgage and borrower characteristics	
Borrower age	The natural logarithm of a borrower's age (in years).
Borrower employment	An indicator variable equal to one if a borrower is unemployed or a student, zero otherwise.
Borrower income	The natural logarithm of a borrower's annual income (in euros).
LTV ratio	The natural logarithm of the loan-to-collateral-value ratio (in percentage points).
Mortgage amount	The natural logarithm of mortgage principal amount (in euros).
Mortgage guarantee	An indicator variable equal to one if a mortgage is guaranteed, zero otherwise.
Mortgage interest rate	Mortgage interest rate (in percentage points).
Mortgage maturity	The natural logarithm of a mortgage's maturity (in months).
Transparency	An indicator variable equal to one if a mortgage is issued after the bank adopted the ECB loan-level reporting, zero otherwise.
Learning and regulatory pressure measures	
Heterogeneous internal reporting	The absolute value of the difference between the number of data items collected for a mortgage but not reported in the bank's central reporting system (i.e., kept in local reporting systems: ND2 +ND3 +ND4) and the mean value of this number for its benchmark group loans.
High consumer complaints	An indicator variable equal to one if the number of consumer complaints in the banking sector within a bank's country over the year prior to the year of a loan's origination falls in the top quintile of this measure's sample distribution, zero otherwise.
High operational risk	An indicator variable equal to one if the ratio of risk-weighted assets (RWA) for operational risk to total RWA in the year preceding the year when the bank adopted the ECB loan-level-reporting falls in the top quintile of this ratio's sample distribution, zero otherwise.
Internal control deficiencies	An indicator variable equal to one if a bank discloses an operational system disruption, internal control system deficiency, or breaching of internal control procedures and related regulatory penalties within the three-year period prior to the year when the bank adopted the ECB loan-level reporting, zero otherwise.

Appendix A (continued)

Variable	Definition
Medium capital resources	An indicator variable equal to one if the ratio of total equity to total assets in the year preceding the year when the bank adopted the ECB loan-level reporting falls in the middle tercile of this ratio's sample distribution, zero otherwise.
M&A activity	An indicator variable equal to one if a bank engaged in M&A transactions within the three-year period prior to the year when the bank adopted the ECB loan-level reporting, zero otherwise.
Predatory lending	An indicator variable equal to one if the average value of the residuals from the regression of the mortgage interest rates that a bank charges low-income borrowers on mortgage and borrower characteristics falls in the top quintile of this measure's sample distribution, zero otherwise. Low-income borrowers are those whose annual income falls in the bottom quintile of this measure's sample distribution.
Region loan defaults	An indicator variable equal to one if the percentage difference between the mortgage default rate in a loan's region (NUTS3) and the mean default rate in the regions of benchmark mortgages falls in the upper quartile of this ratio's sample distribution, zero otherwise.
Weak internal reporting	An indicator variable equal to one if at least two of the *High operational risk, Internal control deficiencies, or M&A activity* measures take the value of one, zero otherwise.

Appendix B: Additional analyses

Table B1

Transparency and changes in borrower characteristics

This table reports the results of univariate tests that compare the borrower characteristics in the pre- and post-transparency periods. Variables are defined in Appendix A. The values of continuous variables are winsorized at 1% and 99%. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Variable	*Transparency* = 0 (N = 1,653,695)	*Transparency* = 1 (N= 953,347)	Difference
	(a)	(b)	(b) − (a)
Borrower income (mean in Euros)	49,831	51,241	1,410
Borrower income (median in Euros)	42,788	42,788	0.000
Borrower employment (mean)	0.015	0.011	-0.004
Borrower employment (median)	0.000	0.000	0.000
Borrower age (mean in years)	39.872	43.245	3.374
Borrower age (median in years)	40.000	40.000	0.000

Table B2

Transparency, competitive pressure and lending term convergence

This table reports the results of the tests of whether the effect of transparency on lending term convergence is more pronounced in competitive regional credit markets. We measure competitive pressure across a bank's regional branches using an indicator variable for whether the quarterly Herfindahl-index (HHI) of a bank's proximal regional branches (i.e., local branches [NUTS3] belonging to the same wider region [NUTS1]) falls below the variable's median value within a country (*High within-bank competition*). HHI of a bank's proximal regional branches is estimated based on their quarterly mortgage issuance volume. Control variables (untabulated) and other model specifications are the same as in Model 1. All other variables are defined in the Appendix A. The values of continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.275***	-0.110**	-0.046
	(-4.56)	(-2.41)	(-0.80)
High within-bank competition	0.009	0.018	0.026
	(0.70)	(0.49)	(0.55)
Transparency x High within-bank competition	0.005	-0.004	-0.123
	(0.17)	(-0.06)	(-1.16)
Controls	Yes	Yes	Yes
Obs.	2,607,042	2,607,042	2,607,042
R^2	17.92%	12.20%	16.70%

Table B3

Transparency and lending term convergence: auto loans

This table reports the results of the tests on the effect of transparency on the convergence of credit terms offered by a lender for auto loans across different geographic regions. Benchmark auto loans are auto loans issued by the same lender for the same borrower type (corporate, individual and other) and vehicle condition (new, used, demo and other car) in different regions (NUTS3) within the same country over the previous quarter. In specification (1), the dependent variable is the absolute value of the difference between an auto loan's interest rate (in percentage points) and the mean interest rate of benchmark auto loans (*Interest rate divergence*). In specification (2), the dependent variable is the natural logarithm of the absolute value of the difference between an auto loan's loan-to-collateral-value ratio (in percentage points) and the mean loan-to-collateral-value ratio of benchmark auto loans (*LTV ratio divergence*). In specification (3), the dependent variable is the absolute value of the difference between an auto loan's maturity (in years) and the mean maturity of benchmark auto loans (*Maturity divergence*). We control for the natural logarithm of the absolute value of the difference between a residential mortgage's principal amount (in Euros) and the mean principal amount of benchmark loans (*Loan amount divergence*), the absolute value of the difference between the probability that a borrower made a down payment on the auto loan and its mean probability of borrowers in the benchmark loans (*Down-payment divergence*), the natural logarithm of the absolute value of the difference between a borrower's annual income (in euros) and the mean income of borrowers in the benchmark loans (*Borrower income divergence*), the absolute value of the difference between the probability that the auto loan is for a used or new vehicle and its mean probability of the benchmark loans (*Vehicle condition divergence*), the absolute value of the difference between the probability that the loan is for a vehicle purchase and its mean probability of benchmark loans (*Purchase contract divergence*). The values of the continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of auto-loan origination, bank, property region (NUTS1) and borrower type (corporate, individual and other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.268*	0.003	-0.062**
	(-1.75)	(0.95)	(-2.58)
Loan interest rate divergence		0.002*	0.036
		(1.90)	(1.61)
LTV ratio divergence	0.120*		0.595***
	(1.98)		(6.49)
Loan maturity divergence	0.054	0.016***	
	(1.67)	(6.41)	
Loan amount divergence	0.025***	0.004***	0.038***
	(3.21)	(4.96)	(3.59)
Down-payment divergence	0.016	0.113***	0.044
	(0.28)	(7.91)	(0.90)
Borrower income divergence	0.009	0.001**	-0.003
	(1.33)	(2.44)	(-0.80)
Vehicle condition divergence	-0.090	-0.000	-0.056**
	(-0.83)	(-0.20)	(-2.09)
Purchase contract divergence	0.155	-0.059***	0.381***
	(1.01)	(-3.46)	(6.27)
Obs.	2,576,234	2,576,234	2,576,234
R^2	15.43%	22.02%	13.14%

Table B4

Transparency and lending term convergence across banks

This table reports the results of the tests on the effect of transparency on cross-bank mortgage term convergence. In specification (1), the dependent variable is the absolute value of the difference between a residential mortgage's interest rate (in percentage points) and the mean interest rate of benchmark mortgages (*Interest rate divergence across banks*). Benchmark mortgages are residential mortgages issued by different banks for the same purpose (house purchase or home equity) in the same region (NUTS1) over the previous quarter. In specification (2), the dependent variable is the natural logarithm of the absolute value of the difference between a residential mortgage's loan-to-collateral-value ratio (in percentage points) and the mean loan-to-collateral-value ratio of benchmark mortgages (*LTV ratio divergence across banks*). In specification (3), the dependent variable is the natural logarithm of the absolute value of the difference between a residential mortgage's maturity (in months) and the mean maturity of benchmark mortgages (*Maturity divergence across banks*). The independent variable of interest is an indicator variable for whether a loan is issued after the bank adopted the ECB loan-level reporting (*Transparency).* Control variables are defined similarly to those in Model 1 (Table 3, Panel A), except for benchmark mortgages being defined as residential mortgages issued by different banks for the same purpose in the same region over the previous quarter. The values of the continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Interest rate divergence across banks	*LTV ratio divergence across banks*	*Maturity divergence across banks*
	(1)	(2)	(3)
Transparency	-0.295***	-0.088	-0.233**
	(-5.06)	(-1.62)	(-2.60)
Interest rate divergence across bank		0.033*	0.099**
		(1.81)	(2.57)
LTV ratio divergence across bank	0.010*		0.042**
	(1.70)		(2.52)
Maturity divergence across bank	0.024**	0.035**	
	(2.52)	(2.50)	
Mortgage amount divergence across bank	-0.026**	-0.076***	-0.068**
	(-2.54)	(-2.93)	(-2.34)
Mortgage guarantee divergence across bank	0.085*	0.113**	0.309***
	(1.89)	(2.52)	(4.04)
Borrower income divergence across bank	0.030***	-0.007	-0.014
	(4.28)	(-1.12)	(-0.73)
Borrower employment divergence across bank	-0.015*	0.071**	-0.026
	(-1.71)	(2.12)	(-0.78)
Borrower age divergence across bank	-0.011**	0.116***	-0.001
	(-2.54)	(4.42)	(-0.04)
Obs.	2,607,042	2,607,042	2,607,042
R^2	17.52%	12.93%	11.84%

TABLE 1
Descriptive statistics

Panel A: Sample selection.

	Mortgages	Borrowers
Mortgages in RMBS reported to ED and issued over 2009-2017	3,523,512	2,279,917
Less :		
Mortgages by banks reporting only loans issued in the pre-transparency period	255,559	221,448
Mortgages in restructured RMBS	221,724	76,923
Mortgages in regions (NUTS3) where sample banks scarcely report mortgage issuance volumes	439,187	361,160
Total	2,607,042	1,620,386

Panel B: Number of mortgages by country in the pre- and post-transparency period.

Country	Total mortgages	Pre-transparency	Post-transparency
Belgium	500,324	346,500	153,824
France	653,702	381,756	271,946
Ireland	4,651	2,202	2,449
Italy	71,493	65,837	5,656
Spain	75,627	67,422	8,205
The Netherlands	1,301,245	789,978	511,267
Total	2,607,042	1,653,695	953,347

TABLE 2

Descriptive statistics

This table reports the summary statistics of the variables used in our analysis. The values of continuous variables are winsorized at 1% and 99%. Variables are defined in the Appendix A.

Variable	Obs.	Mean	Median	S.D.
Mortgage characteristic divergence				
Interest rate divergence	2,607,042	0.562	0.433	0.459
LTV ratio divergence	2,607,042	2.664	2.864	0.969
Maturity divergence	2,607,042	3.823	3.902	0.956
Interest rate divergence, less-developed regions	447,671	0.541	0.415	0.446
LTV ratio divergence, less-developed regions	447,671	2.749	2.957	0.944
Maturity divergence, less-developed regions	447,671	3.729	3.812	0.900
Interest rate divergence, well-developed regions	705,889	0.539	0.413	0.452
LTV ratio divergence, well-developed regions	705,889	2.601	2.891	1.252
Maturity divergence, well-developed regions	705,889	3.710	3.840	0.989
Mortgage amount divergence	2,607,042	10.459	10.688	1.081
Mortgage guarantee divergence	2,607,042	0.436	0.249	0.442
Borrower characteristic divergence				
Borrower age divergence	2,607,042	1.741	1.992	0.939
Borrower employment divergence	2,607,042	0.025	0.011	0.109
Borrower income divergence	2,607,042	9.452	9.655	1.148
Mortgage and borrower characteristics				
Borrower age	2,607,042	3.701	3.682	0.246
Borrower employment	2,607,042	0.013	0.000	0.114
Borrower income	2,607,042	9.523	10.594	3.686
LTV ratio	2,607,042	4.150	4.419	0.822
Mortgage amount	2,607,042	11.260	11.416	1.034
Mortgage guarantee	2,607,042	0.406	0.000	0.491
Mortgage interest rate	2,607,042	3.588	3.650	1.094
Mortgage maturity	2,607,042	3.065	3.205	0.475
Transparency	2,607,042	0.366	0.000	0.482
Learning and regulatory pressure measures				
Heterogeneous internal reporting	2,607,042	1.999	0.502	4.733
High consumer complaints	2,607,042	0.196	0.000	0.409
High operational risk	1,520,342	0.258	0.000	0.437

TABLE 2 (Continued)

Variable	Obs.	Mean	Median	S.D.
Internal control deficiencies	1,905,543	0.309	0.000	0.462
Medium capital resources	1,905,543	0.319	0.000	0.466
M&A activity	2,607,042	0.506	1.000	0.500
Predatory lending	2,607,042	0.244	0.000	0.429
Region loan defaults	2,607,042	0.116	0.000	0.320
Weak internal reporting	1,520,342	0.375	0.000	0.484

TABLE 3

Transparency and lending term convergence

This table reports the results of the tests on the effect of transparency on the convergence of lending terms offered by a bank for residential mortgages across geographic regions. In Panel A, we use all loans in our sample. In Panel B, we restrict our sample to mortgages issued by banks with high reported mortgage securitization volume (i.e., banks for which the ratio of reported securitized mortgage balance to total mortgage balance outstanding falls in the top tercile of this ratio's sample distribution). In Panel C, we restrict our sample to mortgages issued by banks that borrowed from the ECB repo facility before the initiation of the ECB's loan level reporting standards. In Panel D, we restrict our sample to mortgages issued in 2011-2014. In Panel E, we restrict our sample to mortgages issued in the first two quarters of 2013 and compare the credit term convergence of mortgages issued by reporting and non-reporting banks. Across all panels, in specification (1), the dependent variable is the absolute value of the difference between a residential mortgage's interest rate (in percentage points) and the mean interest rate of benchmark mortgages (*Interest rate divergence*). Benchmark mortgages are residential mortgages issued by the same bank for the same purpose (house purchase or home equity) in different regions (NUTS3) within the same country over the previous quarter. In specification (2), the dependent variable is the natural logarithm of the absolute value of the difference between a residential mortgage's loan-to-collateral-value ratio (in percentage points) and the mean loan-to-collateral-value ratio of benchmark mortgages (*LTV ratio divergence*). In specification (3), the dependent variable is the natural logarithm of the absolute value of the difference between a residential mortgage's maturity (in months) and the mean maturity of benchmark mortgages (*Maturity divergence*). The independent variable of interest is an indicator variable for whether a loan is issued after the bank adopted the ECB loan-level reporting (*Transparency)*. All variables are defined in the Appendix A. The values of continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

Panel A: The effect of transparency on lending term convergence.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.273***	-0.111*	-0.108**
	(-4.84)	(-1.81)	(-2.41)
Interest rate divergence		0.081***	0.158***
		(4.50)	(4.47)
LTV ratio divergence	0.017***		0.054***
	(4.51)		(8.05)
Maturity divergence	0.036***	0.059***	
	(5.16)	(7.15)	
Mortgage amount divergence	0.008***	0.047***	0.044***
	(3.34)	(3.89)	(5.12)
Mortgage guarantee divergence	0.097***	-0.029	0.401***
	(4.27)	(-0.85)	(5.99)
Borrower income divergence	0.007*	0.005	-0.005
	(1.81)	(1.12)	(-1.03)
Borrower employment divergence	0.011	0.121**	0.053***
	(0.89)	(2.52)	(3.02)
Borrower age divergence	-0.009***	0.101***	0.100
	(-3.00)	(6.37)	(1.26)
Obs.	2,607,042	2,607,042	2,607,042
R^2	17.84%	12.11%	16.56%

TABLE 3 (Continued)

Panel B: The effect of transparency on lending term convergence for banks with high securitized mortgage volume.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.389***	-0.014*	0.017
	(-5.47)	(-1.69)	(0.84)
Controls	Yes	Yes	Yes
Obs.	857,813	857,813	857,813
R^2	15.83%	23.04%	6.45%

Panel C: The effect of transparency on lending term convergence for banks that used ECB repo financing before the initiation of the ECB's loan level reporting standards.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.362***	-0.132***	-0.257**
	(-7.37)	(-3.27)	(-2.63)
Controls	Yes	Yes	Yes
Obs.	1,093,515	1,093,515	1,093,515
R^2	18.50%	20.40%	27.40%

Panel D: The effect of transparency on the lending term convergence of mortgages issued in 2011-2014.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.190***	-0.020	-0.151*
	(-3.12)	(-0.34)	(-1.83)
Controls	Yes	Yes	Yes
Obs.	1,274,570	1,274,570	1,274,570
R^2	12.87%	11.95%	10.17%

Panel E: The effect of transparency on the lending term convergence of mortgages originated in the first two quarters of 2013 by reporting and non-reporting banks.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.025**	-0.001	-0.178***
	(-2.34)	(-0.05)	(-8.35)
Controls	Yes	Yes	Yes
Obs.	134,310	134,310	134,310
R^2	15.02%	12.84%	7.85%

TABLE 4

Sensitivity analyses

This table reports the results of the tests on the effect of transparency on the convergence of lending terms offered by a bank for residential mortgages across geographic regions using different model specifications. In Panel A, we measure mortgage term divergence based on benchmark mortgage groups using residential mortgages issued to borrowers with similar income and age (within the same tercile rank) by the same bank for the same purpose (house purchase or home equity) in different regions (NUTS3) within the same country over the previous quarter. In Panel B, we control for borrower fixed effects and restrict the sample to borrowers that took a mortgage both before and after a bank initiated loan-level reporting, with at least three mortgages in total. In Panel C, we use a sample of residential mortgages issued post-transparency and mortgages issued before the bank initiated the loan-level reporting matched on interest rate, loan-to-collateral-value ratio and maturity. The one-to-one propensity score matching of treated mortgages is done in random order and without replacement. Matched mortgages are within a distance ("caliper") of 0.01 of the propensity score of the mortgages in the treatment group. All other model specifications and control variables (untabulated) are the same as in Model 1. In Panel B, we exclude bank, region and borrower type fixed effects. *Transparency* is an indicator variable for whether a loan is issued after the bank adopted the ECB loan-level reporting. Variables are defined in the Appendix A. The values of the continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

Panel A: The effect of transparency on lending term convergence based on benchmark mortgages of similar borrowers.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.288***	-0.085	-0.066*
	(-5.24)	(-1.41)	(-1.73)
Controls	Yes	Yes	Yes
Obs.	2,262,083	2,262,083	2,262,083
R^2	17.86%	13.34%	10.32%

Panel B: The effect of transparency on lending term convergence controlling for borrower fixed effects.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.101***	0.162	-0.093***
	(-2.86)	(1.44)	(-2.94)
Controls	Yes	Yes	Yes
Obs.	185,584	185,584	185,584
R^2	49.83%	77.01%	46.62%

TABLE 4 (Continued)

Panel C: The effect of transparency on lending term convergence using a matched mortgage sample.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.249***	-0.083**	-0.175***
	(-6.65)	(-2.11)	(-3.98)
Controls	Yes	Yes	Yes
Obs.	1,305,843	1,305,843	1,305,843
R^2	14.72%	15.40%	11.34%

TABLE 5

Transparency, learning and lending term convergence

This table reports the results of the tests that explore whether banks' learning through new reporting requirements is more pronounced for banks with more heterogeneous reporting, weaker internal reporting systems, and medium level of capital resources. In Panel A, *Heterogeneous internal reporting* is the absolute value of the difference between the number of data items collected for a mortgage but not reported in the bank's central reporting systems (i.e. kept in local reporting systems: ND2 +ND3 +ND4) and the mean value of this number for its benchmark group mortgages loans. In Panel B, *High operational risk* is an indicator variable equal to one if the ratio of risk-weighted assets (RWA) for operational risk to total RWA in the year preceding the year when the bank adopted the ECB loan-level reporting falls in the top quintile of this ratio's sample distribution, zero otherwise. *Internal control deficiencies* is an indicator variable equal to one if a bank discloses an operational system disruption, internal control system deficiency, or breaching of internal control procedures and related regulatory penalties within the three-year period prior to the year when the bank adopted the ECB loan-level reporting, zero otherwise. *M&A activity* is an indicator variable equal to one if a bank engaged in M&A transactions within 3 years before the bank adopted the ECB loan-level reporting, zero otherwise. *Weak internal reporting* is an indicator variable equal to one if at least two of the *High operational risk*, *Internal control deficiencies*, or *M&A activity* measures take the value of one, zero otherwise. In Panel C, *Medium capital resources* is an indicator variable equal to one if the ratio of total equity to total assets in the year preceding the year when the bank adopted the ECB loan-level reporting falls in the middle tercile of the distribution, zero otherwise. Control variables (untabulated) and other model specifications are the same as in Model 1. Variables are defined in the Appendix A. The values of continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

Panel A: The effect of transparency on lending term convergence when banks have heterogeneous internal reporting.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.256***	-0.100*	-0.038
	(-4.44)	(-1.72)	(-0.77)
Heterogeneous internal reporting	0.010***	0.008***	0.050***
	(5.25)	(2.88)	(5.57)
Transparency × *Heterogeneous internal reporting*	-0.009***	-0.006*	-0.040***
	(-3.24)	(-2.01)	(-5.51)
Controls	Yes	Yes	Yes
Obs.	2,607,042	2,607,042	2,607,042
R^2	18.16%	12.16%	18.24%

Panel B: The effect of transparency on lending term convergence when banks have weak internal reporting systems.

	Interest rate divergence				*LTV ratio divergence*				*Maturity divergence*			
	(1)	(2)	(3)	**(4)**	(5)	(6)	(7)	**(8)**	(9)	(10)	(11)	**(12)**
Internal reporting measure	*High operational risk*	*Internal control deficiencies*	*M&A activity*	***Weak internal reporting***	*High operational risk*	*Internal control deficiencies*	*M&A activity*	***Weak internal reporting***	*High operational risk*	*Internal control deficiencies*	*M&A activity*	***Weak internal reporting***
Transparency	-0.311***	-0.309***	-0.208***	**-0.306*** **	-0.091	-0.085	-0.199***	**-0.092**	-0.083***	-0.026	0.090	**-0.075*** **
	(-7.99)	(-6.91)	(-3.80)	**(-7.54)**	(-0.86)	(-0.90)	(-4.76)	**(-0.82)**	(-3.64)	(-0.28)	(0.81)	**(-3.33)**
Transparency × Internal reporting measure	-0.159***	-0.174***	-0.120***	**-0.144*** **	-0.047	-0.029	0.164	**-0.021**	-0.699***	-0.762***	-0.377*	**-0.563*** **
	(-9.80)	(-5.28)	(-2.99)	**(-4.13)**	(-0.38)	(-0.31)	(1.48)	**(-0.15)**	(-7.58)	(-4.67)	(-1.83)	**(-6.75)**
Controls	Yes	Yes	Yes	**Yes**	Yes	Yes	Yes	**Yes**	Yes	Yes	Yes	**Yes**
Observations	1,520,342	1,905,543	2,607,042	**1,520,342**	1,520,342	1,905,543	2,607,042	**1,520,342**	1,520,342	1,905,543	2,607,042	**1,520,342**
R^2	20.25%	19.21%	18.18%	**20.25%**	15.54%	14.12%	12.29%	**15.56%**	26.01%	20.71%	17.28%	**25.59%**

Panel C: The effect of transparency on lending term convergence when banks have medium capital resources.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.309***	-0.077	0.001
	(-6.88)	(-0.78)	(0.02)
Transparency × *Medium capital resources*	-0.148***	-0.063	-0.779***
	(-3.26)	(-0.63)	(-4.76)
Controls	Yes	Yes	Yes
Obs.	1,905,543	1,905,543	1,905,543
R^2	19.11%	14.13%	20.92%

TABLE 6

Transparency, learning from bank branches with low defaults and lending term convergence

This table reports the results of the tests that explore whether banks with more heterogeneous reporting, weaker internal reporting systems, and medium level of capital resources are more likely to learn from regional branches with lower mortgage default rates. *Region loan defaults* is an indicator variable equal to one if the percentage difference between the mortgage default rate in a loan's region (NUTS3) and mean default rate in the regions of benchmark mortgages falls in the upper quartile of this ratio, and zero otherwise. In specifications 1, 4, 7 (2, 5, 8 and 3, 6, 9, respectively), we use *Heterogeneous internal reporting (Weak internal reporting* and *Medium capital resources*, respectively) as a measure of *Internal reporting system*. Control variables (untabulated) and other model specifications are the same as in Model 1. Variables are defined in the Appendix A. The values of continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Interest rate divergence			*LTV ratio divergence*			*Maturity divergence*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Internal reporting system	*Heterogeneous internal reporting*	*Weak internal reporting*	*Medium capital resources*	*Heterogeneous internal reporting*	*Weak internal reporting*	*Medium capital resources*	*Heterogeneous internal reporting*	*Weak internal reporting*	*Medium capital resources*
Transparency	-0.261***	-0.307***	-0.312***	-0.108*	-0.088	-0.074	-0.073*	-0.076**	-0.010
	(-4.53)	(-7.31)	(-6.85)	(-1.68)	(-0.76)	(-0.72)	(-1.70)	(-3.07)	(-0.12)
Region loan defaults	0.103**	-0.026	-0.007	0.003	0.014	0.062**	0.154	-0.010	0.015
	(2.58)	(-1.42)	(-0.34)	(0.08)	(0.39)	(2.42)	(0.61)	(-0.43)	(0.53)
Transparency	-0.104**	0.025	-0.001	-0.011	-0.072	-0.109	-0.117	0.047**	-0.055
× *Region loan defaults*	(-2.08)	(1.11)	(-0.03)	(-0.17)	(-0.71)	(-1.37)	(-0.46)	(2.78)	(-1.02)
Transparency × *Region loan defaults* × *Internal reporting system*	-0.008**	-0.100***	-0.142***	-0.016***	-0.092	-0.021	-0.081***	-0.449	-0.489
	(-2.25)	(-4.13)	(-3.20)	(-3.16)	(-0.80)	(-0.21)	(-5.33)	(-0.86)	(-0.92)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,607,042	1,520,342	1,905,543	2,607,042	1,520,342	1,905,543	2,607,042	1,520,342	1,905,543
R^2	18.78%	20.30%	19.35%	12.63%	15.58%	14.11%	18.75%	25.89%	21.50%

TABLE 7

Transparency, regulatory scrutiny and lending term convergence

This table reports the results of the tests of whether regulatory scrutiny is instrumental to the relation between transparency and lending term convergence. In Panel A, *High consumer complaints* is an indicator variable equal to one if the number of consumer complaints in the banking sector within a bank's country over the year prior to the year of a loan's origination falls in the top quintile of this measure's sample distribution, zero otherwise. In Panel B, *Predatory lending* is an indicator variable equal to one if the average value of the residuals from the regression of the mortgage interest rates that a bank charges low-income borrowers on mortgage and borrower characteristics falls in the top quintile of this measure's sample distribution, zero otherwise. In both panels, control variables (untabulated) and other model specifications are the same as in Model 1. In Panel C, we measure lending standard divergence using the distance between the terms (interest rate, loan-to-collateral-value and maturity in specifications (1), (2) and (3), respectively) of a residential mortgage issued in a less (well-) developed region (NUTS3) and the terms of benchmark mortgages issued in well-(less) developed regions. Less (well-) developed regions are regions (NUTS3) for which annual GDP per capita falls in the bottom two quintiles (upper quintile) of the distribution of GDP per capita across a country's regions. Across all panels, the independent variable of interest is an indicator variable for whether a loan is issued after the bank adopted the ECB loan-level reporting (*Transparency)*. Variables are defined in the Appendix A. The values of continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

Panel A: The effect of transparency on lending term convergence, conditional on the high volume of consumer complaints in the banking sector.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.253***	-0.084	-0.012
	(-5.05)	(-1.21)	(-0.26)
High consumer complaints	-0.017	0.035	0.114*
	(-0.32)	(0.99)	(1.91)
Transparency x High consumer complaints	-0.109**	-0.036	-0.149*
	(-2.51)	(-0.60)	(-1.82)
Controls	Yes	Yes	Yes
Obs.	2,607,064	2,607,064	2,607,064
R^2	18.06%	12.13%	16.62%

TABLE 7 (continued)

Panel B: The effect of transparency on lending term convergence, conditional on the bank's higher likelihood to engage in predatory lending.

	Interest rate divergence	*LTV ratio divergence*	*Maturity divergence*
	(1)	(2)	(3)
Transparency	-0.246***	-0.093	-0.019
	(-4.22)	(-1.32)	(-0.26)
Transparency × *Predatory lending*	-0.133**	-0.097	-0.467*
	(-2.38)	(-1.27)	(-1.69)
Controls	Yes	Yes	Yes
Obs.	2,607,042	2,607,042	2,607,042
R^2	18.16%	12.19%	17.43%

TABLE 7 (continued)

Panel C: The effect of transparency on lending term convergence for residential mortgages issued in less (well-) developed regions compared to mortgages issued in well-(less) developed regions.

	Interest rate divergence, less developed regions	*LTV ratio divergence, less developed regions*	*Maturity divergence, less developed regions*	*Interest rate divergence, well-developed regions*	*LTV ratio divergence, well-developed regions*	*Maturity divergence, well-developed regions*
	(1)	(2)	(3)	(4)	(5)	(6)
Transparency	-0.363***	-0.172***	-0.119**	-0.257***	-0.060	-0.019
	(-8.57)	(-3.28)	(-2.34)	(-4.97)	(-1.46)	(-0.31)
Interest rate divergence		0.075***	0.106***		0.083***	0.165***
		(4.63)	(3.23)		(2.86)	(4.80)
LTV ratio divergence	0.014***		0.033***	0.016***		0.046***
	(3.42)		(2.95)	(3.02)		(3.38)
Maturity divergence	0.023***	0.032**		0.028***	0.055***	
	(4.47)	(2.18)		(5.02)	(4.77)	
Mortgage amount divergence	0.010**	0.060***	0.062***	0.007**	0.030***	0.039***
	(2.09)	(3.95)	(5.32)	(2.58)	(4.81)	(5.10)
Mortgage guarantee divergence	0.142***	-0.042	0.289***	0.104***	-0.030	0.396***
	(7.49)	(-0.87)	(7.45)	(4.10)	(-0.70)	(8.05)
Borrower income divergence	0.008***	0.005	0.013	0.011***	0.008*	0.010
	(5.57)	(0.94)	(1.15)	(3.09)	(1.91)	(0.77)
Borrower employment divergence	0.040**	0.109*	0.062**	0.00	0.144***	0.030*
	(2.11)	(1.90)	(2.62)	(0.21)	(3.36)	(1.95)
Borrower age divergence	-0.006***	0.096***	0.074*	-0.006***	0.116***	0.050
	(-3.15)	(3.70)	(1.82)	(-2.81)	(5.63)	(1.11)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	447,671	447,671	447,671	705,889	705,889	705,889
R^2	16.48%	8.47%	7.67%	13.76%	30.27%	9.20%

TABLE 8

Transparency, lending term convergence and borrowing terms

This table reports the results of the tests on the effect of lending term convergence under the transparent reporting on borrowers' mortgage terms. In specification (1), *High interest rate convergence* is an indicator variable equal to one if *Interest rate divergence*, averaged at the bank-quarter level, falls in the bottom quintile of this variable's sample distribution. In specification (2), *High LTV ratio convergence* is an indicator variable equal to one if *LTV ratio divergence*, averaged at the bank-quarter level, falls in the bottom quintile of this variable's sample distribution. In specification (3), *High maturity convergence* is an indicator variable equal to one if *Maturity divergence* averaged at the bank-quarter level falls in the bottom quintile of this variable's sample distribution. All other variables are defined in the Appendix A. The values of the continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Year of mortgage origination, bank, property region (NUTS1), purpose (house purchase or home equity) and borrower type (individual, other) fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	Mortgage interest rate	*LTV ratio*	*Mortgage maturity*
	(1)	(2)	(3)
Transparency	-0.780***	0.178	0.086**
	(-4.43)	(1.07)	(2.57)
High interest rate convergence	-0.070		
	(-1.63)		
Transparency	-0.106*		
× *High interest rate convergence*	(-1.93)		
High LTV ratio convergence		-0.223	
		(-1.03)	
Transparency		0.101	
× *High LTV ratio convergence*		(0.97)	
High Maturity convergence			-0.006
			(-0.49)
Transparency			0.078***
× *High Maturity convergence*			(3.35)
Mortgage interest rate		0.029	0.029
		(1.41)	(1.32)
LTV ratio	0.060		0.084***
	(1.14)		(4.67)

TABLE 8 (continued)

Transparency, lending term convergence and borrowing terms

	Mortgage interest rate	*LTV ratio*	*Mortgage maturity*
	(1)	(2)	(3)
Mortgage maturity	0.145	0.226***	
	(1.36)	(4.12)	
Mortgage amount	-0.046*	0.132***	0.098***
	(-1.92)	(5.01)	(4.54)
Mortgage guarantee	-0.043	0.127***	-0.004
	(-1.22)	(3.65)	(-0.14)
Borrower income	-0.003	0.001	0.006**
	(-1.04)	(0.41)	(2.39)
Borrower employment	0.068***	-0.055**	-0.024
	(5.89)	(-2.44)	(-1.43)
Borrower age	-0.210**	-0.332***	-0.392***
	(-2.06)	(-3.52)	(-3.89)
Fixed effects	Yes	Yes	Yes
Obs.	2,607,042	2,607,042	2,607,042
R^2	54.38%	55.61%	51.32%

TABLE 9

Transparency, lending term convergence and banks' financial performance

This table reports the results of the tests on the effect of lending term convergence under the transparent reporting on a bank's financial performance. *High convergence* is an indicator variable for whether at least one of the *Interest rate divergence, LTV ratio divergence* or *Maturity divergence* measures, averaged at the bank-year level, falls in the bottom quintile of the distribution of these variables. *NPL ratio* is the ratio of non-performing loans to gross loans. *Return on assets* is the ratio of net income to total assets. *Transparency* is an indicator variable for whether a bank reports loan-level data during a year. We control for the natural logarithm of bank's total assets (*Size*), cash to short-term borrowing and deposits (*Liquidity*), gross loans to prior year's gross loans (*Loan growth*) and Tier 1 capital ratio (*Tier 1 capital*). The values of the continuous variables are winsorized at 1% and 99%. OLS regressions are used to estimate the models, with t-statistics reported in parentheses. Bank and year fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the bank level. ***, ** and * denote significance at the 1%, 5% and 10% (two-sided) levels, respectively.

	NPL ratio	*Return on assets*
	(1)	(2)
Transparency	0.011	0.004*
	(0.64)	(1.83)
High convergence	0.002	0.001
	(0.36)	(1.32)
Transparency × *High convergence*	-0.041***	-0.002
	(-4.15)	(-1.30)
NPL ratio		-0.102***
		(-3.87)
Return on assets	-2.051***	
	(-3.17)	
Size	0.002	0.005
	(0.15)	(0.92)
Liquidity	-0.108	-0.017
	(-1.04)	(-0.72)
Loan growth	0.001*	0.000**
	(1.74)	(2.53)
Tier 1 capital	-0.07	-0.037
	(-1.02)	(-0.82)
Fixed effects	Yes	Yes
Obs.	118	118
R^2	83.20%	38.80%