

Lifting the Banking Veil: Credit Standards' Harmonization through Lending Transparency

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ABSTRACT

We explore whether transparency in banks' lending activities enhances the harmonization of credit terms a bank offers across its different geographic regions. We take advantage of a novel loan-level reporting initiative mandated by the European Central Bank, which requires repo borrowing banks that pledge their asset-backed securities as collateral to disclose granular and standardized information on loan characteristics and performance. We find that loans originated under the transparency regime share more similar interest rates, loan-to-collateral value ratio and maturity compared to same-purpose loans issued by the same bank in different regions. Underperforming local branches and those with less easily accessible benchmark regions experience greater convergence in their credit terms, suggesting that transparency facilitates learning across branches in the different geographic regions in which a bank operates. Additionally, banks that face stronger regulatory scrutiny are more likely to alleviate credit term disparities under the transparency regime. Overall, our findings suggest that transparency enhances within-bank harmonization of lending practices.

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

JEL Classifications: M41, G21, D83

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1. Introduction

A large body of literature on credit markets has shown 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 been able to alleviate information frictions about borrowers by exchanging information with other lenders through credit bureaus and other loan reporting platforms (e.g., Pagano and Jappelli 1993). Greater transparency has been documented to increase credit availability (e.g., Jappelli and Pagano 2006; Djankov et al. 2007; Liberti et al. 2018) and enhance lending quality (Ertan et al. 2017; Sutherland 2018). In this literature, less attention has been given to the effect of transparency on how banks internally process and assimilate information in their lending decisions. Our paper attempts to provide initial evidence on this topic by examining whether transparency can foster the harmonization of credit standards across the different geographic regions in which a bank operates. Such an effect can have significant economic implications since the fragmentation of lending practices can lead to substantial disparities in regional economic activity and growth (e.g., European Central Bank [ECB] 2017).¹

We address our research question by taking advantage of the new loan-level reporting requirements mandated by the ECB for banks that pledge their asset-backed securities (ABS) as repo collateral. Since January 2013, repo borrowing banks have been required to disclose quarterly loan-level data on the ABS portfolio structure (i.e., loan characteristics such as interest rate, loan-to-collateral value ratio and maturity) and performance (e.g., loan defaults and delinquencies) in a granular and standardized format determined by the ECB. A central information repository, European DataWarehouse (ED), administers the data collection, monitoring and compliance

¹ Benoit Coeure, “The local impact of the ECB’s monetary policy”, 4 October 2018, https://www.ecb.europa.eu/pub/pdf/annex/ecb.sp181004_slides.en.pdf

process under the transparency regime. The ECB's objective for introducing the new reporting requirements is to facilitate greater transparency and better risk assessment in banks' securitization activities. Additionally, the new reporting standards incentivized banks to significantly increase the disclosure volume and quality by enhancing their information collection and reporting processes.

We predict that loans issued by a bank in different geographic regions will have more similar terms under the transparency regime. We presume that the detailed and standardized reporting of borrower characteristics, loan terms and performance is likely to facilitate greater learning across a bank's different regional branches by allowing loan officers to compare their credit decisions to what their colleagues offer for similar loans and borrowers in different regional branches. Thus, transparent reporting can facilitate the transmission of best or more efficient credit practices within a bank, leading to lower disparities in the credit standards employed across the different regions in which a bank operates. Moreover, transparency is likely to highlight and expose material discrepancies in regional credit standards. Alleviating excessive discrepancies is one of the ECB's central objectives, which aims to identify and correct divergent credit standards across European regions. While such discrepancies can be driven by region-specific risk factors, heterogeneity in credit standards has also been linked to information frictions and differences in credit risk perceptions and evaluations (e.g., ECB 2009; Van den Heuvel 2009; Murfin 2012; Khan and Lo 2017). We thus expect that greater regulatory scrutiny under the new reporting requirements is also likely to contribute to the harmonization of lending standards that a bank employs across different regions.

We test our research question by employing data on residential mortgages reported to the ED over the period 2013-2017. We focus on residential mortgages since housing finance constitutes

the largest liability of households and a substantial proportion of bank lending.² Also, residential mortgages are the largest loan category reported by banks to the ECB under the transparency regime. Our sample covers 2,607,042 unique residential mortgages issued by 49 commercial 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 collateral value (LTV) ratio and maturity. For each sample mortgage, we construct a benchmark loan group by selecting residential mortgages originated 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 the benchmark mortgages.

Supporting our prediction that transparency increases the harmonization of lending terms across a bank’s geographic regions, we find that residential mortgages originated under the transparency regime share more similar terms to benchmark mortgages, controlling for loan and borrower characteristics, region-specific risk factors, year of loan origination and bank fixed effects. Economically, relative to pre-transparency mortgages, mortgages originated post-transparency have about 45.1% lower interest rate divergence compared to their benchmark mortgages. Also, mortgage LTV ratio and maturity divergence drops by about 10.0% and 13.2% for mortgages issued post-transparency compared to their benchmark mortgage group, respectively. We note that our findings are overall robust to using a propensity score matching methodology where we match transparency with pre-transparency mortgages on their characteristics, as well as to controlling for borrower fixed effects. These sensitivity analyses help us alleviate the concern that our results can be attributed to a shift in borrower characteristics or an overall change in credit standards under

² Household lending constitutes 47% of the EU’s GDP (European Mortgage Federation 2017).

the transparency regime. Further, we show that the positive association between transparency and mortgage term convergence continues to hold when examining a shorter time window around the introduction of the new reporting standards, providing additional credibility to our findings.

In the next set of analyses, we attempt to delineate the channels through which transparency affects credit standards harmonization. Consistent with our expectations that the new transparent reporting mandated by the ECB enhances learning across the different geographic regions in which a bank operates, we find that mortgage term convergence post-transparency is greater for banks' low-performing regional branches, suggesting that these branches learn from and converge to the lending practices of the better performing branches. Specifically, we show that regional branches with a substantially higher volume of mortgage defaults or delinquencies relative to that of their benchmark regions are more likely to issue mortgages with more similar terms to those offered in their benchmark regions. Also, we find that credit term convergence under the transparency regime is greater when accessing information about the lending practices of benchmark regions was more difficult prior to the ECB's disclosure mandate. Thus, we document that mortgage term convergence is greater post-transparency when benchmark regions are spatially remote, consistent with reporting transparency allowing a bank's regional branches to learn about the contractual terms of similar loans offered by their colleagues located in not easily accessible regions.

Moreover, we examine our prediction that regulatory scrutiny further enhances credit term convergence under the transparency regime. We focus on the mortgage term convergence of highly profitable banks, as these banks are more likely to face greater regulatory scrutiny regarding disparities in their lending practices (e.g., ECB 2018; Deloitte 2018; Steil et al. 2018). Consistently, we find that banks with high profitability are more likely to harmonize their credit standards across the different regions post-transparency. In addition, material credit term deviations among a

country's economically advanced and anemic regions are likely to attract closer monitoring by the ECB due to its initiatives for greater credit market integration. We document that under the transparency regime, banks are more likely to converge the credit standards in their less-developed regions towards those in well-developed ones, in line with regulatory scrutiny incentivizing banks to revisit and harmonize lending practices in regions with low economic growth.

In supplemental analyses, we examine whether the harmonization of lending standards post-transparency helps banks improve their financial performance. We show that banks with a higher degree of credit term convergence under the transparency regime decrease their non-performing loan intensity and do not experience significant changes in their profitability. This evidence suggests that the harmonization of regional lending practices overall improved banks' credit decisions. Moreover, while our primary analyses focus on within-bank harmonization of credit standards, we provide further evidence suggesting that transparency promotes greater convergence of the lending practices across different banks that operate in the same geographic region. Importantly, we find that in the cross-bank setting, learning and regulatory scrutiny are also instrumental to the association between transparency and lending standards harmonization. Finally, we show that our primary findings are robust when we examine a different credit market segment—auto-loans.

The most closely related work to ours is Darmouni and Sutherland (2018), who document that information sharing motivates lenders to issue loans to small- and medium-size enterprises (SMEs) with more similar terms to what other lenders offer. Specifically, the authors provide evidence of greater convergence in loan maturities across lenders after they join a U.S. commercial credit bureau and attribute their findings to lenders' incentives to preserve market share by matching their competitors' lending terms. Our paper extends their work by examining the effect of

transparency on harmonizing credit standards *within banks*. Investigating ECB’s new loan-level reporting initiative, we document greater convergence of various credit terms—loan pricing, credit availability and repayment frequency—offered by a bank in different geographic regions under the transparency regime. Importantly, we show that learning and regulatory scrutiny, rather than competitive pressures, are the primary channels that link transparency with credit term harmonization. Lastly, while Darmouni and Sutherland (2018) examine credit term similarity in SME loans, our study focuses on household lending (residential mortgages and auto-loans), further highlighting the importance of transparency in loan term convergence across different credit market segments.

We also contribute to prior research that examines the influence of information sharing across peer banks on credit availability and lending efficiency (Jappelli and Pagano 2006; Djankov et al. 2007; Doblas-Madrid and Minetti 2013; Ertan et al. 2017; Liberti et al. 2018; Sutherland 2018). We add to these studies by documenting how transparent reporting can foster the harmonization of credit practices across a bank’s different geographic regions through greater learning across local branches and regulatory scrutiny. In this respect, we further extend recent studies that investigate the role of bank regulators in promoting more transparent reporting practices and thus influencing lending decisions (e.g., Granja 2018; Granja and Leuz 2018; Costello et al. 2018). Finally, there is a literature that discusses the importance of internal reporting technology in enhancing banks’ efficiency (Beccalli 2007; Koetter and Tigran 2009), geographic expansion of lending activities (e.g., Petersen and Rajan 2002; Berger 2003; Degryse and Ongena 2005) and the transmission of loan officers’ private information (Campbell et al. 2018). Our contribution lies in showing a direct link between reporting transparency and within-bank learning from and adoption of high-quality lending practices.

2. Institutional background and predictions

2.1. Transparency initiatives in the banking sector

Bank lending has traditionally relied on the collection and production of private information about borrowers, with loan contractual terms not being publicly disclosed. Opacity has thus allowed banks to retain their proprietary information advantage and to provide a source of stable liquidity to borrowers (e.g., Dang et al. 2013; Dang et al. 2017). However, over the past two decades, the introduction of many transparency initiatives in the banking sector has shed light on lenders' "black boxes," aiming to help creditors, investors and regulators better understand and monitor banks' credit decisions. These transparency initiatives have motivated a growing literature that examines the benefits of transparency for borrowers as well as the effect of transparency on banks' lending decisions.

First, a significant credit market development has been the introduction of credit bureaus, where banks can report specific characteristics about their borrowers. Using a large sample of countries, Jappelli and Pagano (2006) and Djankov et al. (2007) show that banks' information sharing through private or public credit registries can alleviate borrowing frictions. Similarly, Love et al. (2015) employ World Bank's firm-level data and document a positive effect of movable asset collateral registries on companies' access to bank credit, especially for smaller borrowers. Moreover, Calomiris et al. (2017) show that weak collateral laws, including the absence of national credit registries for movable collateral, decrease the loan-to-collateral value ratio of loans secured by movable assets relative to those secured by immovable assets. Relatedly, the cost of borrowing (access to credit) is likely to increase (decrease) for good-quality borrowers with limited credit history after credit bureaus mandatorily stop reporting details on borrower credit performance (Lieberman et al. 2018). Examining lenders' voluntary loan-level information sharing, Liberti et al.

(2018) find that lenders learn about and enter new loan markets by expanding their credit availability after joining a U.S. commercial credit bureau.³

Another strand of research has explored the beneficial effect of banks' transparent reporting on banks' credit risk. Doblas-Madrid and Minetti (2013) examine the staggered entry of lenders into a U.S. credit bureau and show that information sharing reduces loan delinquencies and defaults, especially when borrowers are informationally opaque. On the same note, Sutherland (2018) finds that lenders stop lending to their delinquent bad-quality borrowers after they adopt information sharing. Moreover, Ertan et al. (2017) document that banks issue less risky securitized loans following the introduction of loan-level reporting requirements of asset-backed securities' portfolio structure mandated by the ECB. Collectively, the findings in these papers indicate that banks reduce credit risk-taking under the transparency regime.

Less attention has been given, however, to the role of transparency in promoting the integration and harmonization of credit markets. To the best of our knowledge, Darmouni and Sutherland (2018) is the only study that examines the maturity convergence of loans issued by lenders after joining a U.S. commercial credit bureau. This lack of empirical evidence is surprising in light of many regulatory agencies and financial industry commentators reporting the need for greater transparency to alleviate divergence in credit products and services, particularly in the EU lending context where credit markets remain highly fragmented.⁴ Indeed, significant differences in

³ Few papers also outline the costs of greater transparency. Hertzberg et al. (2011) show that transparency may incentivize a run-like behavior by banks, leading to a borrower's financial distress. Sutherland (2018) finds that joining credit bureaus deters banks from establishing strong lending relationships with borrowers.

⁴ To exemplify, lack of transparency has been identified by the European Commission's Capital Markets Union Initiative as a key determinant of credit market fragmentation (PwC 2015). Moreover, recent transparency initiatives by the ECB that promote more detailed reporting of banks' credit decisions aim to "support the soundness and transparency of the European financial system, (...) foster the funding of the economy, (...) help provide an understanding of supply and demand factors in credit developments, both at the aggregated level and at regional or sectoral levels, (and) provide banks with feedback loops" (ECB, "Financial integration in Europe", May 2017, https://www.ecb.europa.eu/pub/pdf/other/ecb_financialintegrationineurope201705.en.pdf).

borrowers' access to credit also exist across regions within the same country.⁵ Although credit term divergence is largely driven by region-specific risk and socioeconomic factors, credit conditions and standards remain highly heterogeneous across European regions, even after taking these factors into account (PwC 2015). Thus, the heterogeneity in credit standards has further been attributed to regional differences in banks' risk perceptions and evaluation, information asymmetry and local habits related to lending practices.⁶ In this respect, transparency can alleviate regional disparities in borrowers' credit risk assessments and credit term offerings.

Studying the mechanisms that can potentially attenuate credit standard divergence can provide important insights, since this divergence imposes significant constraints on economic growth. De Santis (2016) finds substantial heterogeneity of borrowing costs for European companies around the financial and the sovereign debt crisis, which is unrelated to changes in systemic and idiosyncratic risk. He further shows that this fragmentation in credit risk pricing is negatively associated with future economic growth. Relatedly, risk perceptions and banks' risk aversion have been documented to contribute to the substantial divergence in lending rates across European regions, resulting in fluctuations of regional economic activity (ECB Monthly Bulletin 2013). Valiante (2016) also suggests that information asymmetry about borrowers and lack of common credit risk information platforms restricts comparability in credit risk assessments and thus adversely affects the price discovery process by banks. Lastly, lending market fragmentation creates perpetuating discrepancies in borrowing costs and access to credit, thus impeding the

⁵ These results are based on SMEs' responses to the survey question on whether "would you say that the availability of bank loans has improved, remained unchanged or deteriorated for your enterprise over the past six months?" Significant divergence in credit availability is documented in the EU core and periphery countries (e.g., between North and South Italy; between Brittany, Ile-de-France and Southern France; and between North Brabant and Friesland in The Netherlands). Despite the improvement in credit availability as documented in the 2018 ECB's survey results, the regional disparities continue to hold (Benoit Coeure, "The local impact of the ECB's monetary policy", 4 October 2018, https://www.ecb.europa.eu/pub/pdf/annex/ecb.sp181004_slides.en.pdf).

⁶ A detailed discussion of the drivers of financial market fragmentation is included in: http://www.europarl.europa.eu/cmsdata/116963/COMPILATION_Sept%202016_TOPIC_2_FINAL_online.pdf.

effective transmission of macroeconomic financial policies, which are critical for promoting economic growth in general and mitigating the adverse effects of recessions in particular.

In this study, we attempt to provide preliminary evidence of how transparent reporting can lead to greater harmonization in credit standards that a bank employs across its different regions. Thus, we explore whether greater information disclosure and sharing across a bank's regional branches can have a real effect on banks' credit decisions (e.g., Kanodia and Sapra 2016).

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 new loan-level reporting requirements for the ECB's repo borrowers. Starting in January 2013, the ECB mandated that banks quarterly disclose granular and standardized data on the portfolio structure (i.e., loan characteristics and terms) and performance (e.g., loan defaults and delinquencies) of the asset-backed securities (ABS) that they originated and pledge as repo collateral. These ABS primarily cover residential mortgage-backed securities (RMBS), auto-loan, SME-loan and consumer finance loan/credit card-backed securities. The framework of the new reporting requirements was designed and negotiated among banks, ECB representatives, institutional investors and credit rating agencies over the period 2010-2011. This technical group decided on the data templates that banks must use to comply with the reporting mandate. Standardization was a central component of the transparency regime, which aimed to make banks' data collection and reporting comparable.⁷

The new disclosure requirements were first introduced in April 2011 for RMBS and SME-loan ABS, to which banks participating in repo borrowing had to adhere from January 2013.⁸ Loan-

⁷ 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).

⁸ The loan-level reporting requirements were expanded to other ABS classes after the first quarter of 2013.

level reporting is facilitated by the European DataWarehouse (ED). Launched in June 2012, the ED is the central repository of ABS information that administers data collection and compliance with ECB reporting standards. The ED also monitors data consistency and accuracy, including checking for inappropriate or excessive missing variable values and for material deviations in key data compared to previous submissions. The ED data is accessible and used by the ECB, banks (data providers and others), institutional investors and credit rating agencies.⁹ The ECB's goal of implementing the new reporting 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."

Although information on banks' loan decisions has been traditionally collected by national central banks and stored in credit registries (to which commercial banks had access), loan-level disclosure volume and quality significantly improved when the ECB took over the oversight of the information collection and reporting process.¹⁰ To exemplify, the RMBS disclosure framework includes the coverage of 183 loan-level variables, with reporting requirements for other ABS categories being similarly extensive. In addition, the ECB granted banks a nine-month grace period to improve their information collection and fully comply with the new reporting mandate. Indeed, 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 over time. At the same

⁹ As of August 2018, the ED covered loan-level data on 1,214 ABS of EU banks (675 residential mortgage, 206 auto loan, 178 SME loan, 109 consumer finance/credit card-backed securities, and 46 other deals). The ED has more than 160 institutional subscribers.

¹⁰ The stricter monitoring and oversight on banks by central and stricter regulators has been also documented in prior studies that examine the U.S. banking sector (e.g., Granja and Leuz 2017; Costello et al. 2018) and in European countries (e.g., Behn et al. 2015).

time, as we note above, the ED's close monitoring of reported variable values also increased disclosure accuracy and reliability.¹¹

Moreover, we interviewed two credit managers in large European banks that are directly involved with reporting loan-level data to the ED. As these managers conveyed in our discussions, prior to the transparency regime, many information items had never been collected and others had been kept in decentralized local branch reporting systems or in hardcopy format, and thus had not been effectively used by banks in loan underwriting and monitoring. The adoption of transparent reporting motivated banks to improve their internal information reporting systems and data collection process.

2.3. Predictions

Transparency in a bank's lending decisions under the ECB's reporting initiative is likely to lead to greater harmonization and convergence in the credit standards of its regional branches. We predict that loans originated under the transparency regime will have more similar terms to loans issued by the same bank to borrowers across different regions. We expect the positive association between transparency and credit term harmonization to be driven primarily by two channels. First, granular and standardized information reporting of loan officers' credit decisions, borrower-specific information and loan outcomes can facilitate greater learning across a bank's different regional branches, allowing loan officers to gain insight into what their colleagues offer for similar loans and borrowers in different regional branches (i.e., by creating a feedback loop for their own lending decisions). Specifically, this transparent reporting is likely to facilitate the learning of better or more efficient credit practices across regional branches, leading to smaller contractual

¹¹ Moreover, the ED pressures banks for greater reporting compliance by backdating quarterly missing observations. In a field visit to the ED headquarters in June 2014, a significant component of analysts' tasks was the development of new data verification and accuracy checks as well as the improvement of existing ones.

differences in the terms a bank's loan officers offer to borrowers across different regions in which the bank operates. Although these outcomes could be achieved by the adoption of effective internal reporting systems, transparent and standardized reporting under the ECB's mandate is likely to be instrumental in facilitating better accuracy, consistency and accountability in the information collection and reporting process.

Second, greater regulatory scrutiny under the new reporting requirements is also likely to contribute to the harmonization of the lending terms that a bank offers to its borrowers across different regions. A central objective in the ECB's agenda is to monitor and correct material divergence in borrowing costs and credit availability across households and companies located in different European regions.¹² Recent reports on the EC's Capital Markets Union Initiative suggest that differences in credit conditions are likely to remain even after controlling for region-specific risk factors.¹³ Relatedly, divergence in credit standards can result from differences in loan officers' credit risk perceptions and tolerance (e.g., ECB 2009; Van den Heuvel 2009; Murfin 2012; Khan and Lo 2017).¹⁴ Although the new reporting requirements mandated by the ECB did not directly aim to alleviate banks' divergence in regional lending practices, the granular standardized and recurring loan data collection and reporting likely highlights and exposes material discrepancies in regional credit standards. We therefore expect transparency to increase regulatory scrutiny related to banks' credit decisions, potentially incentivizing them to identify and alleviate excessive heterogeneity in the loan terms offered to borrowers across different regions.

Although we expect that greater transparency will harmonize banks' lending practices across the different regions in which they operate, we recognize several factors that may confound our

¹² European Central Bank, "Financial Integration In Europe," May 2017.

¹³ PwC, "Capital Markets Union: Integration of Capital Markets in the European Union," September 2015.

¹⁴ European Central Bank Financial Stability Review, "Special features: Determinants of Bank Lending Standards and the Impact of the Financial Turmoil," June 2009.

prediction. First, while transparency can provide a feedback loop on what other regional branches offer to borrowers and enhance regulatory oversight, regional characteristics and risk factors, which lead to strong and persistent differences in lending terms, may not be alleviated by transparent reporting. Second, transparent reporting includes loans such as residential mortgages or auto-loans that are usually issued locally; thus, a bank's regional branches are not likely to compete for the same borrowers. The extent to which competitive pressure is the primary mechanism that links transparency with credit standard convergence (Darmouni and Sutherland 2018) suggests that the ECB's new reporting requirements will not lead to more similar lending practices by banks. Thus, whether transparency can lead to greater harmonization of a bank's lending terms across different regions remains an open question.

3. Data methodology

We obtain data on the terms and borrower characteristics of securitized residential mortgages (RMBS) from the European DataWarehouse (ED). Since January 2013, the ED has retrieved loan-level information on the portfolio structure and performance of asset-backed securities (e.g., residential mortgage, SME loan, auto loan, credit card/consumer finance and commercial mortgage ABS), which are pledged by European banks as collateral for repo financing from the ECB. Given that this form of repo borrowing 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 focus on residential mortgage-backed securities for at least two reasons. First, housing finance constitutes the largest liability of households and a significant proportion of bank lending, accounting for 47% of the EU's GDP (European Mortgage Federation 2017). Despite the initiatives for cross-regional financial integration, residential mortgage lending standards remain

substantially heterogeneous, posing divergent financial burdens for households (e.g., Deutsche Bundesbank 2011). Thus, delineating the mechanisms that may lead to greater convergence in mortgage lending practices can have important economic implications for the household sector. Second, with respect to residential mortgage securitizations, the ED covers detailed information on borrowers' profiles (e.g., age, employment) and financial performance (e.g., annual income), as well as loan collateral type (e.g., property region, loan guarantee). We are thus able to control in our empirical analyses for a battery of borrower and collateral characteristics that can affect banks' choices in setting credit terms. Moreover, ED reports detailed data on mortgage terms (e.g., interest rate, loan-to-value ratio, maturity) and performance (e.g., defaults, delinquencies).¹⁵

Our primary sample includes 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 on lending term similarity are affected by the greater standardization of securitized lending contracts during the credit expansion (e.g., Ayotte and Bolton 2011; Bozanic et al. 2018). Moreover, we exclude banks that only report mortgages issued in the pre-transparency period (255,559 mortgages), as we cannot test the effect of the new reporting standards on their lending practices. We further exclude mortgages in restructured RMBS to mitigate the concern that RMBS renegotiations can affect securitized mortgage pool characteristics (221,724 mortgages).¹⁶ Last, we eliminate 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

¹⁵ In supplemental analyses, we examine whether our findings are generalizable to other loan categories such as auto loans (Table 9).

¹⁶ These mortgages are related to RMBS Bass Master N.V.S.A. Series-2008, restructured in 2015.

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.¹⁷ The sample process criteria are described in Panel A of Table 1.

We report sample statistics in Panel B. 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%). Further, following the RMBS issuance contraction related to the European sovereign bond crisis in 2011 (e.g., SIFMA 2018), the number of securitized residential mortgages in our sample is substantially lower post-transparency, especially in South Europe; about 37% of the sample mortgages are issued under the new reporting standards.

4. Research design and empirical results

4.1. Transparency and mortgage term convergence

We first examine the effect of transparent reporting on mortgage term divergence (interest rate, loan-to-collateral value ratio and maturity), which we measure by using the distance between a mortgage's terms and the average terms of similar mortgages issued by the bank over the prior quarter. Thus, for each sample mortgage, we construct a group of mortgages (*benchmark mortgages* hereafter) by selecting residential mortgages originated by the *same bank* for the *same purpose* (house purchase or home equity) in *different regions* (NUTS3) of the *same country* over the previous quarter.¹⁸ Specifically, we measure *Interest rate divergence* by taking the absolute

¹⁷ The RMBS volume in the sample countries accounts for about 91.5% of the Eurozone RMBS balance outstanding (AFME 2017).

¹⁸ 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 referencing smaller regional subdivisions. Our choice to measure within-bank mortgage term convergence at the more granular NUTS3 level allows us to select a greater number of benchmark mortgages and likely biases against finding results supporting our predictions (i.e., the characteristics of mortgages issued in proximal regions are likely very similar independent of transparent reporting). Also, we compare mortgage terms across regions of the same country to alleviate the concerns

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*.

$$\begin{aligned}
 \text{Mortgage term divergence} = & \alpha + \beta_1 \text{Transparency} + \beta_2 \text{Mortgage interest rate} \\
 & + \beta_3 \text{LTV ratio} + \beta_4 \text{Mortgage maturity} \\
 & + \beta_5 \text{Mortgage amount} + \beta_6 \text{Mortgage guarantee} \\
 & + \beta_7 \text{Borrower income} + \beta_8 \text{Borrower employment} + \beta_9 \text{Borrower age} \\
 & + \text{Fixed effects.}
 \end{aligned}
 \tag{Model 1}$$

The analysis is at the mortgage level. The primary independent variable of interest in Model 1 is an indicator variable of whether a mortgage is originated after the bank initiated transparent reporting (*Transparency*). Based on our predictions, β_1 should be negative. We control for mortgage terms, including mortgage interest rate in percentage points (*Mortgage interest rate*), the natural logarithm of loan-to-value ratio in percentage points (*LTV ratio*), the natural logarithm of mortgage maturity in months (*Mortgage maturity*) and an indicator variable of whether the mortgage is guaranteed (*Mortgage guarantee*). We further control for borrower characteristics measured at mortgage origination, such as the natural logarithm of a borrower’s annual income in euros (*Borrower income*), an indicator variable of whether the borrower is unemployed or a student (*Borrower employment*) and the natural logarithm of a borrower’s age in years (*Borrower age*).

that our results are driven by international banks and influenced by cross-country economic heterogeneity (Higgins et al. 2006).

The variables are described in detail in the Appendix, and Table 2 reports their summary statistics. Moreover, we include in our tests year of mortgage origination, property region (NUTS1) and bank fixed effects (49 unique banks) to control for changes in credit standards over time, across regions (e.g., institutional frictions, socioeconomic environment) and banks.¹⁹ 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.

We report the results of these analyses in Table 3. Across all specifications, we show that transparent reporting significantly decreases mortgage term divergence. Economically, relative to pre-transparency mortgages, mortgages originated post-transparency have about 45.1% lower interest rate divergence compared to their benchmark mortgages (specification 1). Also, *LTV ratio divergence* and *Maturity divergence* drops by about 10.0% and 13.2% for mortgages issued post-transparency compared to their benchmark mortgage group, respectively (specifications 2 and 3). Thus, while in the post-transparency period banks offer mortgages with more similar terms across the geographic regions where they operate, transparent reporting has a greater effect on the convergence of loan yields rather than of loan-to-collateral value or maturity. This finding is consistent with prior evidence that credit availability divergence narrows at a slower pace than price-based divergence.^{20,21}

In terms of our control variables, we find that guaranteed mortgages and those issued to high-

¹⁹ We control for NUTS1 rather than NUTS3 fixed effects to mitigate the concern of biased estimates due to controlling for a very large number of dummies for NUTS3 (e.g., Angrist and Pischke 2008). However, our results are robust to controlling for NUTS2, NUTS3 or country fixed effects as well as year-quarter—instead of year—fixed effects (untabulated tests).

²⁰ European Central Bank, “Financial Integration in Europe,” 2015 (<https://www.ecb.europa.eu/pub/pdf/other/financialintegrationineurope201504.en.pdf>).

²¹ 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).

income borrowers have on average more similar terms, consistent with the view that evaluating credit risk of high-quality loans and borrowers is more straightforward and standardized than determining lending practices related to risky borrowers (e.g., Stulz 2014). Similarly, we find that that mortgage term divergence increases with the borrower's age, potentially because the borrowers' delinquency risk increases as they approach retirement.²²

4.2. Transparency, learning and mortgage term convergence

We next examine the channels through which transparency can lead to greater convergence of the credit standards a bank employs across geographic regions. We first investigate whether the comprehensive and standardized lending data collection and reporting mandated by the ECB can facilitate greater learning across a bank's different regional branches. As we note in Section 2, the new reporting requirements incentivized banks to enhance their information collection and processing, potentially facilitating the learning of best or more efficient credit practices across geographic regions.

We expect that the effect of transparent reporting on learning will be more pronounced for low performing regional branches. Specifically, the new reporting requirements can allow these branches to access information about credit decisions and terms that highly performing regional branches typically offer for similar loans. In an effort to mitigate bad credit decisions, these low-performing regional branches may learn from the credit practices of their highly performing peers. Thus, banks will harmonize their credit standards across the different regions where they operate, with low-performing regional branches converging to the lending practices of better performing ones. Therefore, mortgage term convergence post-transparency is likely greater for banks' low-

²² For example, recent studies by the Consumer Financial Protection Bureau (2015) and the American Association of Retired Persons (2016) highlight the highly increasing delinquency rates in U.S. by borrowers age 50 and older on their student loans and mortgages.

performing regional branches.

We measure a bank's low regional performance using an indicator variable of 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 ranks in the upper quartile of this ratio (*Underperforming region*).²³ Mortgage default rates at the regional level are measured using loan performance 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 augment Model 1 with the *Underperforming region* indicator variable and its interaction term with *Transparency*. All other control variables and specifications are the same as in Model 1.

We report the results of these tests in Panel A of Table 4. Consistent with our expectations, we find that mortgage term convergence post-transparency is greater for regional branches that underperform their peers, as reflected by the negative and significant coefficients on the interaction term in specifications 1 and 2. Relative to mortgages originated by highly performing branches, mortgages originated by underperforming regional branches exhibit interest rate and LTV ratio convergence with benchmark mortgages that are greater by about 27.7% and 13.0%, respectively (our results on LTV ratio convergence are statistically significant at 10%). We find no evidence of greater mortgage maturity convergence in a bank's low-performing regional branches. Overall, these findings suggest that the new reporting requirements and data collection allowed loan officers in a bank's low-performing regional branches to learn from their colleagues in better-performing branches and adjust their lending practices accordingly.

Furthermore, we expect that transparent reporting will be more effective in facilitating learning

²³ The quartile cut-off is 83%, i.e., the percentage difference between a bank region's defaulted or delinquent mortgages and those in the regions of benchmark mortgages is 83%. Our results are robust when using a quintile ranking (untabulated test).

across a bank's regional branches when accessing information about lending practices of benchmark regions was harder prior to the ECB's disclosure mandate. As we highlight in Section 2, prior to the mandate for detailed and recurring data collection and reporting, much credit information was stored in local branches' data systems or in hard-copy format and in many cases was not collected at all. Thus, the extent to which a bank operates branches in more remote or not easily accessible regions, communicating information about credit standards and lending practices may have been challenging. To that end, transparent reporting mitigates information frictions by allowing a bank's regional branches to learn about the contractual terms of similar loans offered by their colleagues located in not easily accessible regions.

We measure a bank's regional branch spatial accessibility using Eurostat data on inland transport network at the regional level. Specifically, *Spatial accessibility* is an indicator variable of whether benchmark regions' (NUTS2) average motorway and railroad network density (km/km²) is lower than the EU's median regional network density.²⁴ Our variable thus captures a loan officer's effort to visit the bank's branches in different geographic regions that issue similar-type loans. Based on Eurostat's data on passenger transport statistics, passenger car and train are the most popular means of transport for national trips within our sample countries. We augment Model 1 with the *Spatial accessibility* indicator variable and its interaction term with *Transparency*. All other control variables and specifications are the same as in Model 1. Sample size decreases due to limited data availability on the infrastructure characteristics for some of our sample regions.

²⁴ We benchmark a bank's regional spatial accessibility against the EU median regional infrastructure to effectively capture scarce motorway and railroad density without our measure being biased by our sample distribution. Data is only reported at NUTS2 level (https://ec.europa.eu/eurostat/statistics-explained/index.php/Inland_transport_infrastructure_at_regional_level). Eurostat passenger statistics can be found at: https://ec.europa.eu/eurostat/statisticsexplained/index.php/Passenger_transport_statistics#Air_passengers.

We report the results of these tests in Panel B of Table 4. Consistent with our predictions, we find that mortgage term convergence is greater post-transparency when benchmark regions have scarce infrastructure network and are thus not easily accessible. To exemplify, following the ECB's mandate, interest rate and maturity convergence is greater for mortgages issued by branches with less spatially accessible benchmark regions by about 15.9% and 22.7%, respectively (our results on interest rate convergence are statistically significant at 10%). We find no evidence of greater LTV ratio convergence for mortgages issued in regions with more remote benchmark peers. Collectively, our findings in Panels A and B suggest that transparent reporting can effectively facilitate learning among the different regional branches in which a bank operates, leading to greater harmonization and convergence in their credit standards.²⁵

4.3. 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. Specifically, significant inconsistencies in credit standards across different regions are likely to capture the ECB's attention, given its goal of promoting financial integration and equal treatment of market participants with similar characteristics (ECB 2018). Importantly, while the new disclosure requirements did not explicitly aim to incentivize banks to revisit their lending practices, the granular standardized and recurring loan data collection and reporting likely underlines and exposes material discrepancies in regional credit standards, suggesting that banks that face greater regulatory scrutiny under the transparency regime are likely to correct these discrepancies.

We expect that under transparent reporting, banks with high profitability are more likely to

²⁵ In untabulated analyses, we find no evidence that loan officers adjust the credit terms towards those offered by their colleagues in larger regional branches (measured by the volume of new residential mortgage issuance), potentially suggesting that credit term convergence across the different regions in which a bank operates is unlikely to be driven by regional branches that aim to increase their lending volume.

harmonize the credit terms they offer to borrowers in different regions, since such banks are more likely to face extensive regulatory scrutiny regarding disparities in their lending practices. To exemplify, the ECB regularly reviews commercial bank business models and profitability drivers, including thorough monitoring of the most profitable banks to understand the drivers of their financial performance and the extent to which their lending practices are sensible and sustainable (e.g., ECB 2018; Deloitte 2018; Steil et al. 2018).²⁶ Thus, profitable banks are likely to be under greater pressure to soften material discrepancies or inconsistencies in their credit standards across their regional branches.

We measure banks' profitability using accounting data from Bankscope and an indicator variable of whether a bank's ratio of annual interest and non-interest income to total assets ranks in the upper quintile of the distribution of this ratio among banks within the same country (*Bank profitability*). We augment Model 1 with the *Bank profitability* variable and its interaction term with *Transparency*. All other control variables and specifications are the same as in Model 1. Sample size decreases due to limited data availability on banks' accounting performance (Bankscope covers financial data for 21 out of the 49 banks in our sample). We report our findings in Panel A of Table 5. Consistent with our predictions, we show that mortgage term convergence post-transparency is greater for highly profitable banks. Economically, for these banks, transparency mortgages have greater interest rate, LTV ratio and maturity convergence compared to benchmark mortgages by about 18.6%, 15.9% and 45.7%, respectively.

Moreover, the ECB closely monitors material divergence in borrowing costs and access to credit for households across European regions since lending market fragmentation typically

²⁶ European Central Bank, "SSM thematic review on profitability and business models. Report on the outcome of the assessment," September 2018; Deloitte Center for Regulatory Strategy "Halfway there: Financial Markets Regulatory Outlook 2018: a mid-year update," 2018.

impedes the effective transmission of the ECB's financial policies. Deviations in credit standards perpetuate, given the significant differences in regional socioeconomic characteristics and institutional frictions. However, borrower screening and loan monitoring are also affected by loan officers' credit risk perceptions and tolerance, further leading to divergent lending practices (e.g., ECB 2009; Van den Heuvel 2009; Murfin 2012; Khan and Lo 2017).²⁷ Such deviations can be more pronounced among a country's economically advanced and anemic regions, which are of particular interest to the ECB for its initiatives towards credit market integration. We therefore expect that transparent reporting can highlight such discrepancies, potentially incentivizing banks to harmonize lending practices across these regions and thus alleviate regulatory pressure and 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 ranks 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 likely 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 quintile of annual GDP per capita distribution allows us to have more similar 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.²⁸ We measure the divergence of credit standards across a country's well- and less-developed regions by re-defining *Interest rate divergence, less- (well-) developed regions* as the absolute value of the difference between a

²⁷ European Central Bank Financial Stability Review, "Special features: Determinants of Bank Lending Standards and the Impact of the Financial Turmoil," June 2009.

²⁸ 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).

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

We report the results of these tests in Panel B of Table 5. We present the results for the less (well) developed regions in columns 1-3 (4-6). We document 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%, 15.7% and 12.2%, respectively, relative to 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 economically developed regions, we do not find a statistically significant effect of transparency on LTV ratio and maturity convergence for such mortgages. Overall, we show that regulatory scrutiny is instrumental to the relation between transparent reporting and the convergence of credit practices across a bank's regional branches.

4.4. Sensitivity analyses

To support the robustness of our findings, we perform a battery of sensitivity tests reported in Table 6. The first concern we need to address is whether changes in borrower characteristics over time increase mortgage term convergence. For instance, the extent to which transparent reporting leads banks to issue better-quality mortgages (e.g., Ertan et al. 2018) suggests that greater

convergence may be attributed to a shift in the composition of banks' loan portfolios rather than to banks actively harmonizing credit standards across regional branches. To alleviate this concern, 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 mortgages (pre-transparency 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.²⁹ We replicate our primary analyses within the sample of matched loans using Model 1 and report the results of these tests in Panel A of Table 6. We show that our findings continue to hold in this specification.³⁰

Moreover, to further alleviate this concern, we restrict our sample to borrowers that take on at least three mortgages over our sample period and re-estimate Model 1 controlling for borrower fixed effects (all other control variables and model specifications remain the same). We thus compare credit standard convergence of mortgages issued in the pre- and post-transparency period to the same borrowers. We report our findings in Panel B of Table 6. Although the sample size in these analyses declines drastically, our findings continue to hold for two out of the three loan terms we explore. We show that interest rate and LTV ratio of mortgages issued by a bank across different regions converge more under the new transparent reporting requirements, even after controlling for borrower fixed effects.

Second, we also recognize the possibility that our results can be driven by changes in credit market dynamics over time (e.g., changes in banks' loan issuance activities). We address this

²⁹ 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.

³⁰ Although we tabulate in Table 6 sensitivity tests related to the primary analyses in Table 3, our findings on the role of learning and regulatory scrutiny in facilitating greater credit standard harmonization in the transparency period continue to hold for the matched sample analyses (untabulated tests).

concern by restricting our sample to mortgages issued within a two-year period around the initiation of transparent reporting standards in January 2013 (i.e., during the 2011-2014 period). We show that our findings on mortgage interest rate and maturity convergence continue to hold within this significantly shorter sample period (Panel C of Table 6). This robustness check further alleviates the concern that our findings are driven by the adoption of the Mortgage Credit Directive in 2016, under which banks must provide borrowers with information about mortgage terms in a standardized and comparable format (the European standardized information sheet). Collectively, our results on the association between transparency and lending term harmonization remain mostly robust to addressing changes in mortgage and borrower characteristics and changes in banks' lending activity over time.

5. Supplemental analyses

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

In supplemental analyses, we explore whether harmonizing lending standards post-transparency can help banks improve their financial performance. On one hand, we show that the new reporting requirements facilitate greater learning by low-performing and across less easily accessible regional branches, leading to greater mortgage term convergence. Thus, to the extent that convergence allows banks to identify and promote better-quality lending practices, we expect that banks with greater mortgage term convergence will have better financial performance post-transparency. On the other hand, learning about what bank branches in different geographic regions offer may lead to herding towards and mimicking lending practices that do not match well with local borrowers' characteristics. In this case, credit term convergence can result in worse credit outcomes (e.g., Murfin and Pratt 2017). Also, we show that under the transparency regime, banks and regional branches that are susceptible to regulatory scrutiny are more likely to

harmonize their lending standards. Banks may thus inefficiently eliminate deviations in regional credit standards to mitigate external monitoring pressure, potentially resulting in worse financial performance.

To address this question, we examine whether banks' performance under the transparency regime varies with the extent of their mortgage term convergence. We obtain banks' accounting data from BankScope (as we mention in Section 4.3, the data is available for 21 sample banks). We focus on the 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) lending profitability, measured by the ratio of interest income to gross loans (*Interest margin*). We estimate the following OLS model at the bank-year level, where the dependent variable is one of the bank performance measures.

$$\begin{aligned}
 \text{NPL ratio (Interest margin)} = & \alpha + \beta_1 \text{Transparency} + \beta_2 \text{High convergence} \\
 & + \beta_3 \text{Transparency} \times \text{High convergence} + \text{Controls} \\
 & + \text{Fixed effects.}
 \end{aligned}
 \tag{Model 2}$$

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, ranks in the bottom quintile of the respective variable's sample distribution, and zero otherwise. Control variables include the natural logarithm of 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.

We present the results of these analyses in Table 7. In specification 1, we find a negative and

significant coefficient on *Transparency* \times *High convergence*; thus, high convergence banks have lower *NPL ratio* by about 4.3% post-transparency. Also, we show that the profitability of high-convergence banks does not differ significantly from that of other banks in the post-transparency period (specification 2). Overall, we find no evidence that greater mortgage term convergence under the transparency regime leads to the deterioration in banks' financial performance. We rather show that the new reporting requirements alleviated inefficient inconsistencies in local lending standards and allowed banks to improve their credit practices.

5.2. Transparency and lending term convergence across banks

Although our study focuses on the effect of transparent reporting on credit standard harmonization across the different regions in which a bank operates, transparency can also foster greater convergence of the lending practices across different banks that operate in the same geographic region. European banks have access to the granular credit information that other banks submit to the ED platform. Darmouni and Sutherland (2018) document a greater similarity in the maturity of leases offered to small- and medium-sized companies by lenders after they initiate information sharing of their credit decisions. They further show that the effect of transparency on loan term convergence is stronger in competitive credit market segments, suggesting that lenders who face greater competitive pressure are likely to adjust their terms towards what their rivals offer.

To examine the effect of transparent reporting on the convergence of credit practices across different banks, we measure mortgage term divergence (interest rate, loan-to-collateral value ratio and maturity) 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.³¹ Thus, for each sample mortgage, we construct a group of benchmark mortgages (*benchmark mortgages by different banks* hereafter) by selecting residential mortgages originated by *different banks* for the *same purpose* (house purchase or home equity) in the *same region* over the previous quarter. Specifically, we measure *Interest rate divergence across banks* 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 by different banks. Similarly, we proxy for *LTV ratio divergence across banks* (*Maturity divergence across banks*) 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 different banks' benchmark mortgages. We employ Model 1 where the dependent variables are *Interest rate divergence across banks*, *LTV ratio divergence across banks* and *Maturity divergence across banks* (all other model specifications and control variables remain unchanged).

We report the results of these tests in Panel A of Table 8. Across all specifications, we show that transparent reporting and credit information sharing leads to banks issuing mortgages with terms similar to those offered by other banks to households in the same region. Economically, transparency mortgages have more similar interest rate, LTV ratio and maturity by about 48.6%, 9.2% and 18.8%, respectively, relative to mortgages issued by other banks in the same region.

Next, we investigate the mechanisms that can facilitate the greater cross-bank lending convergence under the new reporting requirements. First, similar to our hypothesis on the within-bank lending practice harmonization, we predict that banks are likely to learn from their better

³¹ We define benchmark regions more broadly at the NUTS1 level to increase the size of benchmark mortgage group by different banks. Our results continue to hold when we define benchmark regions using NUTS3 benchmark regions (untabulated test).

performing peers. To test for the role of learning in fostering lending standard convergence, we construct an indicator variable of whether *benchmark banks*' mean ratio of non-performing loans to total assets ranks in the bottom quintile of the distribution of this ratio across banks within the same country (*High loan quality benchmark banks*). Benchmark banks are banks that issue same-purpose (house purchase or home equity) residential mortgages in the same region (NUTS1) over the previous quarter. Second, in line with our within bank analyses, we expect regulatory scrutiny to affect the link between transparency and lending standard harmonization. We expect that banks are more likely to converge on their credit standards in regions where they potentially face greater regulatory scrutiny. *Well-developed region* is an indicator variable of whether annual GDP per capita of the region (NUTS1) in which a mortgage is originated ranks in the upper quintile of the variable's distribution. We augment Model 1 with the indicator variables *High loan quality benchmark banks* and *Well-developed region* and their interaction terms with *Transparency* (all other model specifications and control variables remain unchanged). We predict a negative (positive) coefficient on the interaction term for the *High loan quality benchmark banks* (*Well-developed region*).

We present our results in Panel B and C of Table 8. In most specifications, we find that the two channels (learning and regulatory scrutiny) are instrumental to the association between transparency and lending standard harmonization across banks. To exemplify, in Panel B, we show that cross-bank credit standard convergence is greater when benchmark banks issue high-quality loans. Specifically, transparency mortgages have by about 14.8% and 7.4% more similar interest rate and LTV ratio, respectively, relative to mortgages issued by benchmark banks in the same region when these benchmark banks have on average a low ratio of non-performing loans. Moreover, in Panel C, we document that cross-bank lending harmonization is significantly lower

in well-developed regions potentially because credit standard divergence among affluent households are less likely to receive close regulatory scrutiny by the ECB. We find that LTV ratio and maturity convergence of mortgages issued by different banks in well-developed regions under the transparency regime is by about 11.7% and 15.6% lower compared to mortgage credit term convergence in other regions, respectively.

In untabulated supplemental analyses, we investigate whether banks facing greater competitive pressure are more likely to adjust their terms towards what their rivals offer (Darmouni and Sutherland 2018). We measure competitive pressure using a region's (NUTS1) average Herfindahl-index based on the mortgage issuance volume of our sample banks, as well as the average profitability (interest and non-interest income to total assets) of benchmark banks. We do not find evidence consistent with the view that credit market competition significantly affects the association between transparency and cross-bank lending practice convergence.

Overall, we document that transparency leads to more harmonized credit standards across the different banks that lend to households in a region. While we show that the primary findings in Darmouni and Sutherland (2018) continue to hold in different geographies and credit market segments, cross-bank lending term convergence in our setting is facilitated by banks' learning of best credit practices and regulatory scrutiny, not competitive pressures. Our results thus highlight that the economic mechanisms that link transparency to lending standard harmonization likely varies based on institutional features and reporting frameworks. We leave for future research to explore what drives the relative importance of these mechanisms in different settings.

5.3. Transparency and lending term convergence: auto-loans

In our last set of supplemental analyses, we explore whether our primary findings can be generalizable to different credit segments. We thus examine the effect of transparency on the

harmonization of credit terms that a lender offers for auto-loans across its different regional branches. We focus on this credit segment given that auto-loan securitizations constitute the second-largest ABS category of European banks, and its reporting structure and content is similar to the one of RMBS that we investigate in our primary analyses.³²

We measure auto-loan term divergence (interest rate, loan-to-collateral value ratio and maturity) by using the distance between an auto-loan's terms and the average terms of similar auto-loans issued by the bank over the prior quarter. Specifically, 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. Thus, *Interest rate divergence*, *LTV ratio divergence* and *Maturity divergence* of auto-loans are defined similar to the dependent variables used in our primary analyses.³³ 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*.

$$\begin{aligned}
 \text{Auto-loan term divergence} = & \alpha + \beta_1 \text{Transparency} + \beta_2 \text{Loan interest rate} + \beta_3 \text{LTV ratio} \\
 & + \beta_4 \text{Loan maturity} + \beta_5 \text{Loan amount} + \beta_6 \text{Down payment} \\
 & + \beta_7 \text{Borrower income} + \beta_8 \text{Vehicle condition} \\
 & + \beta_9 \text{Purchase contract} + \text{Fixed effects.}
 \end{aligned}
 \tag{Model 3}$$

Similar to Model 1, *Transparency* is an indicator variable of whether an auto-loan is originated after the bank initiated transparent reporting. We control for auto-loan characteristics, including

³² Our primary securitized auto-loan sample includes about 9 million unique loans. The sample selection criteria for auto-loans are similar to the ones used for mortgages and described in Section 3. However, to facilitate empirical estimations, we restrict this sample to randomly selected 200,000 auto-loans by lender (this sample size is also comparable to the number of mortgages per lender used in our primary tests).

³³ Since auto-loan maturity is significantly shorter compared to 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.

auto-loan interest rate in percentage points (*Loan interest rate*), the natural logarithm of loan-to-value ratio in percentage points (*LTV ratio*), auto-loan maturity in years (*Loan maturity*), an indicator variable of whether the loan was issued for a used or new vehicle (*Vehicle condition*) and an indicator variable of whether the loan is for a vehicle purchase (*Purchase contract*). We further control for borrower characteristics measured at loan origination, such as the natural logarithm of a borrower's annual income in euros (*Borrower income*) and an indicator variable of whether the borrower submitted a down-payment for the auto-loan (*Down payment*).³⁴ We 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.

We report the results of the analyses in Panel A of Table 9. 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. Moreover, we replicate our primary analyses reported in Table 4 and Table 5 on the role of learning and regulatory scrutiny in promoting greater credit standard convergence under the new reporting standards. Our findings are mostly robust using the auto-loan sample (Panels B-E of Table 9). In addition, in untabulated analyses, we find that our results on the greater cross-bank credit term harmonization continue to hold in the auto-loan sample. Thus, auto-loan analyses provide further evidence that transparent reporting incentivizes banks to revisit and adjust their lending standards across different credit segments.

³⁴ Variable coverage for RMBS and auto ABS does not perfectly overlap; thus, we cannot use the same control variables as the ones used in our primary tests.

6. Conclusion

We explore whether greater transparency in banks' lending activities can facilitate the harmonization of the credit standards the banks employ across the different regions in which they operate. We take advantage of the introduction of the ECB's loan-level reporting initiative for banks that borrow from its repo financing using their ABS as collateral. Starting from January 2013, these banks are required to disclose quarterly, comprehensive and standardized information on the ABS' loan characteristics and performance. Using a sample of residential mortgages issued over the period 2009-2017, we find that, compared to mortgages issued in the pre-transparency period, mortgages originated under the transparency regime share more similar credit terms (interest rate, loan-to-collateral value ratio and maturity) to same-purpose mortgages issued by the same bank in different geographic regions over the prior quarter.

Examining the economic mechanisms that likely explain the positive association between transparent reporting and lending practices' harmonization, we show that convergence of credit standards under the transparency regime is stronger for regional branches that underperform their peer-branches and across banks' regional branches that are not easily accessible. Thus, under the transparency regime, regional branches can effectively learn about the credit practices in banks' other regions and adjust the lending terms they offer. Moreover, greater regulatory scrutiny is instrumental to the association between transparency and credit term convergence. We find that banks with high profitability are more likely to harmonize their credit standards potentially because these banks are subject to stronger monitoring pressure about disparities in their lending practices. Additionally, under the transparency regime, banks are more likely to converge the credit standards in their less-developed regions towards those in well-developed ones, consistent with greater regulatory scrutiny of regions with low economic growth. We supplement these results by

providing evidence of credit term convergence improving banks' loan portfolio quality. Further, we find that transparent reporting facilitates the harmonization of credit standards that different banks offer to households in the same region and that this effect is also explained by learning and regulatory scrutiny. Last, we show that our findings are generalizable to different credit market segments, such as auto-loans.

To the best of our knowledge, our paper is the first to document the effect of transparency on harmonizing a bank's credit standards across different geographic regions. Our findings suggest that greater transparency in the banking sector can alleviate ineffective or extensive regional credit standards disparities. Although we document that lending term harmonization improves banks' credit practices, additional research is required to delineate the potential costs of greater transparency. For instance, by increasing credit term convergence, banks are likely to hold more homogenous loan portfolios, which may exacerbate credit cycles and make banks' balance sheets more procyclical. We leave it for future research to explore these avenues.

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APPENDIX

Definitions of variables in our primary analyses

Variable	Definition
Mortgage term divergence	
<i>Interest rate divergence</i>	The absolute value of the difference between a residential mortgage's interest rate (in percentage points) and the mean interest rate of 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.
<i>LTV ratio divergence</i>	The natural logarithm of the absolute value of the difference between a residential mortgage's loan to collateral value ratio (LTV) and the mean LTV of 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.
<i>Maturity divergence</i>	The natural logarithm of the absolute value of the difference between a residential mortgage's maturity (in months) and the mean maturity of 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.
<i>Interest rate divergence, less (well-)developed regions</i>	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 ranks 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 ranks in the upper quintile (bottom two quintiles) of annual GDP per capita across a country's regions.
<i>LTV ratio divergence, less (well-)developed regions</i>	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 ranks 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 ranks in the upper quintile (bottom two quintiles) of annual GDP per capita across a country's regions.
<i>Maturity divergence, less (well-)developed regions</i>	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 ranks 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 ranks in the upper quintile (bottom two quintiles) of annual GDP per capita across a country's regions.

APPENDIX (continued)

Variable	Definition
Mortgage characteristics	
<i>LTV ratio</i>	The natural logarithm of the loan to collateral value ratio (in percentage points).
<i>Mortgage amount</i>	The natural logarithm of mortgage amount (in euros).
<i>Mortgage interest rate</i>	Mortgage interest rate (in percentage points).
<i>Mortgage maturity</i>	The natural logarithm of a mortgage's maturity (in months).
<i>Mortgage guarantee</i>	An indicator variable of whether a mortgage is guaranteed.
<i>Transparency</i>	An indicator variable of whether a mortgage is issued after the bank adopted the ECB loan level reporting.
Borrower characteristics	
<i>Borrower age</i>	The natural logarithm of a borrower's age (in years).
<i>Borrower employment</i>	An indicator variable of whether a borrower is unemployed or a student.
<i>Borrower income</i>	The natural logarithm of a borrower's annual income (in euros).
Bank characteristics	
<i>Bank profitability</i>	An indicator variable of whether a bank's ratio of annual interest and non-interest income to total assets ranks in the upper quintile of the distribution of this ratio among banks within the same country.
<i>Spatial accessibility</i>	An indicator variable of whether benchmark regions' (NUTS2) average motorway and railroad network density (km/km ²) is lower than the EU median regional motorway and railroad network density.
<i>Underperforming region</i>	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 ranks in the upper quartile of this ratio's sample distribution, zero otherwise.

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
<i>Less :</i>		
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 primary analysis. The values of continuous variables are winsorized at 1% and 99%. Variables are defined in the Appendix.

Variable	Obs.	Mean	Median	S.D.
Mortgage term divergence				
<i>Interest rate divergence</i>	2,607,042	0.562	0.433	0.459
<i>LTV ratio divergence</i>	2,607,042	2.664	2.864	0.969
<i>Maturity divergence</i>	2,607,042	3.823	3.902	0.956
<i>Interest rate divergence, less developed regions</i>	447,671	0.541	0.415	0.446
<i>LTV ratio divergence, less developed regions</i>	447,671	2.749	2.957	0.944
<i>Maturity divergence, less developed regions</i>	447,671	3.729	3.812	0.900
<i>Interest rate divergence, well-developed regions</i>	705,889	0.539	0.413	0.452
<i>LTV ratio divergence, well-developed regions</i>	705,889	2.601	2.891	1.252
<i>Maturity divergence, well-developed regions</i>	705,889	3.710	3.840	0.989
Mortgage characteristics				
<i>Transparency</i>	2,607,042	0.366	0.000	0.482
<i>Mortgage interest rate</i>	2,607,042	3.588	3.650	1.094
<i>LTV ratio</i>	2,607,042	4.150	4.419	0.822
<i>Mortgage maturity</i>	2,607,042	3.065	3.205	0.475
<i>Mortgage amount</i>	2,607,042	11.260	11.416	1.034
<i>Mortgage guarantee</i>	2,607,042	0.406	0.000	0.491
Borrower characteristics				
<i>Borrower income</i>	2,607,042	9.523	10.594	3.686
<i>Borrower employment</i>	2,607,042	0.013	0.000	0.114
<i>Borrower age</i>	2,607,042	3.701	3.682	0.246
Bank characteristics				
<i>Bank profitability</i>	1,541,131	0.193	0.000	0.341
<i>Spatial accessibility</i>	2,236,794	0.353	0.000	0.478
<i>Underperforming region</i>	2,607,042	0.116	0.000	0.320

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 different geographic regions. 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 of whether a loan is issued after the bank adopted the ECB loan level reporting (*Transparency*). All variables are defined in the Appendix. 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.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.275*** (-5.20)	-0.105** (-2.08)	-0.142*** (-2.73)
<i>Mortgage interest rate</i>		-0.002 (-0.19)	0.023 (1.46)
<i>LTV ratio</i>	0.021* (2.00)		-0.036 (-1.53)
<i>Mortgage maturity</i>	-0.015 (-0.73)	-0.068 (-1.57)	
<i>Mortgage amount</i>	-0.027** (-2.59)	-0.103*** (-4.53)	-0.048*** (-4.64)
<i>Mortgage guarantee</i>	-0.099*** (-7.05)	-0.077 (-1.54)	-0.114** (-2.06)
<i>Borrower income</i>	-0.005*** (-3.13)	-0.003* (-1.78)	-0.031** (-2.29)
<i>Borrower employment</i>	-0.011 (-1.02)	0.071** (2.42)	-0.017 (-0.47)
<i>Borrower age</i>	0.022 (0.79)	0.208*** (3.20)	0.305** (2.05)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,607,042	2,607,042	2,607,042
<i>R²</i>	17.81%	12.58%	16.20%

TABLE 4

Transparency, learning 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 a bank's geographic regions where transparent reporting can facilitate greater learning about the lending practices in different regions in which the bank operates. In Panel A, *Underperforming region* 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 ranks in the upper quartile of this ratio, zero otherwise. 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 Panel B, *Spatial accessibility* is an indicator variable of whether benchmark regions' (NUTS2) average motorway and railroad network density (km/km²) is lower than the EU median regional motorway and railroad network density. Across both 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*). 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*). *Transparency* is an indicator variable of whether a loan is issued after the bank adopted the ECB loan level reporting. All variables are defined in the Appendix. 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 in underperforming bank regions.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.262*** (-4.93)	-0.096* (-1.84)	-0.095* (-1.82)
<i>Underperforming region</i>	0.143*** (2.80)	0.073* (1.72)	0.508 (1.31)
<i>Transparency x Underperforming region</i>	-0.169** (-2.55)	-0.139* (-1.81)	-0.620 (-1.40)
<i>Mortgage interest rate</i>		-0.002 (-0.19)	0.023 (1.43)
<i>LTV ratio</i>	0.021* (2.00)		-0.037* (-1.71)
<i>Mortgage maturity</i>	-0.016 (-0.77)	-0.069 (-1.57)	
<i>Mortgage amount</i>	-0.027** (-2.59)	-0.103*** (-4.53)	-0.048*** (-4.58)
<i>Mortgage guarantee</i>	-0.095*** (-7.14)	-0.075 (-1.49)	-0.102* (-1.97)
<i>Borrower income</i>	-0.005*** (-2.97)	-0.003 (-1.63)	-0.030** (-2.19)

TABLE 4 (continued)**Panel A: The effect of transparency on lending term convergence in underperforming bank regions (continued).**

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Borrower employment</i>	-0.010 (-0.97)	0.071** (2.43)	-0.014 (-0.40)
<i>Borrower age</i>	0.021 (0.78)	0.208*** (3.19)	0.305** (2.04)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,607,042	2,607,042	2,607,042
<i>R²</i>	18.13%	12.60%	17.17%

Panel B: The effect of transparency on lending term convergence when benchmark bank regions are not easily spatially accessible.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.218*** (-4.22)	-0.074 (-1.01)	0.054 (1.08)
<i>Spatial accessibility</i>	0.079** (2.51)	0.043 (0.99)	0.151*** (4.40)
<i>Transparency × Spatial accessibility</i>	-0.097* (-1.70)	-0.036 (-0.61)	-0.257*** (-3.56)
<i>Mortgage interest rate</i>		-0.007 (-0.63)	0.041** (2.55)
<i>LTV ratio</i>	0.019* (1.84)		-0.041* (-1.93)
<i>Mortgage maturity</i>	-0.017 (-0.74)	-0.061 (-1.34)	
<i>Mortgage amount</i>	-0.029** (-2.57)	-0.110*** (-4.26)	-0.042*** (-3.67)
<i>Mortgage guarantee</i>	-0.094*** (-6.96)	-0.075 (-1.19)	-0.138** (-2.63)
<i>Borrower income</i>	-0.004** (-2.54)	-0.002 (-1.12)	-0.030** (-2.33)
<i>Borrower employment</i>	-0.008 (-0.80)	0.071** (2.26)	-0.024 (-0.70)
<i>Borrower age</i>	0.036 (1.16)	0.212*** (2.84)	0.380** (2.50)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,236,794	2,236,794	2,236,794
<i>R²</i>	14.55%	13.60%	11.89%

TABLE 5

Transparency, regulatory scrutiny 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 for banks and geographic regions that are under greater regulatory scrutiny. In Panel A, *Bank profitability* is an indicator variable of whether a bank's ratio of annual interest and non-interest income to total assets ranks in the upper quintile of the distribution of this ratio among banks within the same country. 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*). In Panel B, 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 ranks in the bottom two quintiles (upper quintile) of the distribution of GDP per capita across a country's regions. Across both panels, the independent variable of interest is an indicator variable of whether a loan is issued after the bank adopted the ECB loan level reporting (*Transparency*). All variables are defined in the Appendix. 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 for highly profitable banks.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.296*** (-5.03)	-0.037 (-1.25)	-0.121* (-1.81)
<i>Bank's profitability</i>	0.076* (1.87)	0.132** (2.48)	0.528*** (4.84)
<i>Transparency x Bank's profitability</i>	-0.113* (-1.83)	-0.173* (-2.00)	-0.611*** (-7.27)
<i>Mortgage interest rate</i>		-0.003 (-0.28)	0.015 (1.02)
<i>LTV ratio</i>	0.022** (2.63)		-0.042** (-2.27)
<i>Mortgage maturity</i>	-0.001 (-0.05)	-0.065 (-1.20)	
<i>Mortgage amount</i>	-0.028* (-2.06)	-0.112*** (-3.40)	-0.055*** (-7.60)

TABLE 5 (continued)**Panel A: The effect of transparency on lending term convergence for highly profitable banks (continued).**

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Mortgage guarantee</i>	-0.095*** (-6.21)	-0.112* (-2.08)	-0.072 (-1.56)
<i>Borrower income</i>	-0.006*** (-6.37)	-0.003 (-1.23)	-0.036** (-2.56)
<i>Borrower employment</i>	-0.002 (-0.30)	0.051* (2.00)	-0.001 (-0.03)
<i>Borrower age</i>	-0.015 (-0.88)	0.121* (1.89)	0.183 (1.61)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	1,541,131	1,541,131	1,541,131
<i>R²</i>	17.70%	15.12%	18.82%

TABLE 5 (continued)

Panel B: 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.

	<i>Interest rate divergence, less developed regions</i>	<i>LTV ratio divergence, less developed regions</i>	<i>Maturity divergence, less developed regions</i>	<i>Interest rate divergence, well-developed regions</i>	<i>LTV ratio divergence, well-developed regions</i>	<i>Maturity divergence, well-developed regions</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Transparency</i>	-0.371*** (-8.816)	-0.171*** (-4.404)	-0.130*** (-3.520)	-0.240*** (-5.026)	-0.024 (-0.795)	-0.028 (-0.482)
<i>Mortgage interest rate</i>		-0.003 (-0.311)	0.022 (1.639)		-0.010 (-0.624)	0.038** (2.123)
<i>LTV ratio</i>	0.024** (2.338)		-0.056*** (-3.707)	0.023 (1.520)		-0.031** (-2.066)
<i>Mortgage maturity</i>	0.053 (1.677)	-0.001 (-0.012)		-0.044** (-2.583)	-0.154*** (-2.916)	
<i>Mortgage amount</i>	-0.036** (-2.596)	-0.100*** (-3.378)	-0.048** (-2.533)	-0.032* (-1.877)	-0.140*** (-4.268)	-0.034* (-1.859)
<i>Mortgage guarantee</i>	-0.125*** (-7.451)	-0.115 (-1.365)	-0.088 (-1.659)	-0.110*** (-5.182)	-0.081 (-1.229)	-0.199*** (-3.637)
<i>Borrower income</i>	-0.005*** (-2.942)	-0.001 (-0.282)	-0.026** (-2.199)	-0.003 (-1.487)	-0.004 (-1.136)	-0.031** (-2.029)
<i>Borrower employment</i>	0.014 (0.767)	0.080** (2.075)	-0.001 (-0.034)	-0.018* (-1.742)	0.074*** (3.665)	-0.039 (-1.143)
<i>Borrower age</i>	0.047* (1.689)	0.058 (0.719)	0.348** (2.310)	0.027 (0.739)	0.257*** (5.110)	0.344 (1.601)
<i>Fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Obs.</i>	447,671	447,671	447,671	705,889	705,889	705,889
<i>R²</i>	16.90%	8.47%	8.45%	14.08%	31.52%	9.88%

TABLE 6
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 different geographic regions using different model specifications. In Panel A, 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. 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. In Panel C, we restrict the sample to mortgages issued in 2011-2014 (i.e., within the two-year period around the initiation of transparent reporting). All other model specifications and control variables (untabulated) are the same as in Model 1 (Table 3). In Panel B, we exclude bank, region and borrower type fixed effects. All variables are defined in the Appendix. 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 using a matched mortgage sample.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.244*** (-6.883)	-0.084** (-2.225)	-0.217*** (-3.496)
<i>Controls</i>	Yes	Yes	Yes
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	1,305,843	1,305,843	1,305,843
<i>R</i> ²	14.59%	15.68%	12.70%

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

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.161*** (-4.705)	-0.033** (-2.448)	-0.003 (-0.036)
<i>Controls</i>	Yes	Yes	Yes
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	185,584	185,584	185,584
<i>R</i> ²	50.58%	76.46%	50.96%

TABLE 6 (continued)**Panel C: The effect of transparency on lending term convergence for residential mortgages issued in 2011-2014.**

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.194*** (-3.254)	-0.042 (-0.733)	-0.073* (-1.832)
<i>Controls</i>	Yes	Yes	Yes
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	1,274,570	1,274,570	1,274,570
<i>R²</i>	13.00%	12.64%	9.55%

TABLE 7

Transparency, a bank’s financial performance and lending term convergence

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 of whether at least one of the *Interest rate divergence*, *LTV ratio divergence* or *Maturity divergence* measures, averaged at the bank-year level, ranks in the bottom quintile of the distribution of these variables. *NPL ratio* is the ratio of non-performing loans to gross loans. *Interest margin* is the ratio of gross interest income to gross loans. The independent variable of interest is an indicator variable of whether a bank reports loan-level data during a year (*Transparency*). 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*). Variables are defined in the Appendix. 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.

	<i>NPL ratio</i>	<i>Interest margin</i>
	(1)	(2)
<i>Transparency</i>	-0.007 (-0.31)	0.007* (2.06)
<i>High convergence</i>	0.005 (1.00)	0.002 (0.75)
<i>Transparency × High convergence</i>	-0.043*** (-3.53)	-0.005 (-0.89)
<i>Size</i>	0.010 (0.52)	-0.004 (-0.37)
<i>Liquidity</i>	0.015 (0.14)	-0.008 (-0.18)
<i>Interest margin</i>	0.192 (0.81)	
<i>NPL ratio</i>		0.028 (0.91)
<i>Loan growth</i>	0.001 (1.68)	0.000 (1.36)
<i>Tier 1 capital</i>	0.001 (0.01)	-0.182** (-2.21)
<i>Fixed effects</i>	Yes	Yes
<i>Obs.</i>	118	118
<i>R²</i>	75.80%	88.03%

TABLE 8

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. Panel A reports the results of the tests on the effect of transparency on the convergence of lending terms offered for residential mortgages by different banks within a geographic region. Panel B reports the results of the tests of whether the effect of transparency on lending term convergence across banks is more pronounced in regions where benchmark banks report a low non-performing loan intensity. Benchmark banks are banks that issue same-purpose (house purchase or home equity) residential mortgages in the same region (NUTS1) over the previous quarter. *High loan quality benchmark banks* is an indicator variable of whether benchmark banks' mean ratio of non-performing loans to total assets ranks in the bottom quintile of the distribution of this ratio across banks within the same country. Panel C reports the results of the tests of whether the effect of transparency on lending term convergence across banks is less pronounced for more developed regions. *Well-developed region* is an indicator variable of whether annual GDP per capita of the region (NUTS1) a mortgage is originated in ranks in the upper quintile of this variable's distribution. 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 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*). 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*). *Transparency* is an indicator variable of whether a loan is issued after the issuing bank adopted the ECB loan-level reporting *Transparency*. All other variables are defined in the Appendix. 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) (except Panel C), 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 across banks.

	<i>Interest rate divergence across banks</i>	<i>LTV ratio divergence across banks</i>	<i>Maturity divergence across banks</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.299*** (-5.06)	-0.097* (-1.83)	-0.208** (-2.09)
<i>Mortgage interest rate</i>		0.006 (0.34)	0.037* (1.90)
<i>LTV ratio</i>	0.021** (2.07)		-0.011 (-0.43)
<i>Mortgage maturity</i>	-0.015 (-0.91)	-0.019 (-0.39)	
<i>Mortgage amount</i>	-0.025** (-2.29)	-0.058*** (-4.33)	-0.054*** (-2.90)
<i>Mortgage guarantee</i>	-0.113*** (-6.08)	-0.094** (-2.33)	-0.103** (-2.42)
<i>Borrower income</i>	-0.004 (-1.50)	-0.001 (-0.86)	-0.030*** (-2.73)

TABLE 8 (continued)**Panel A: The effect of transparency on lending term convergence across banks (continued)**

	<i>Interest rate divergence across banks</i>	<i>LTV ratio divergence across banks</i>	<i>Maturity divergence across banks</i>
	(1)	(2)	(3)
<i>Borrower employment</i>	-0.016 (-1.63)	0.052* (1.91)	-0.065 (-1.51)
<i>Borrower age</i>	0.047 (1.42)	0.281*** (3.29)	0.093 (0.45)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,607,042	2,607,042	2,607,042
<i>R²</i>	17.20%	12.67%	12.26%

TABLE 8 (continued)

Panel B: The effect of transparency on lending term convergence across banks when benchmark banks issue higher quality loans.

	<i>Interest rate divergence across banks</i>	<i>LTV ratio divergence across banks</i>	<i>Maturity divergence across banks</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.317*** (-4.49)	-0.095 (-1.32)	-0.271** (-2.53)
<i>High loan quality benchmark banks</i>	0.087* (1.68)	-0.053*** (-4.36)	0.029 (0.21)
<i>Transparency × High loan quality benchmark banks</i>	-0.091** (-2.11)	-0.077* (-1.79)	-0.211 (-1.44)
<i>Mortgage interest rate</i>		0.007 (0.39)	0.033 (1.05)
<i>LTV ratio</i>	0.014 (1.01)		-0.028 (-0.56)
<i>Mortgage maturity</i>	-0.010 (-0.63)	0.009 (0.15)	
<i>Mortgage amount</i>	-0.028** (-2.15)	-0.053** (-2.58)	-0.054** (-2.52)
<i>Mortgage guarantee</i>	-0.164*** (-8.81)	-0.100* (-1.96)	-0.075 (-1.10)
<i>Borrower income</i>	-0.006*** (-3.91)	-0.001 (-0.68)	-0.034*** (-5.50)
<i>Borrower employment</i>	-0.016*** (-2.90)	0.053 (1.60)	-0.074 (-1.32)
<i>Borrower age</i>	0.045 (0.95)	0.255*** (2.91)	0.157 (0.73)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	1,716,290	1,716,290	1,716,290
<i>R²</i>	21.23%	10.65%	10.74%

TABLE 8 (continued)

Panel C: The effect of transparency on lending term convergence across banks in well-developed regions.

	<i>Interest rate divergence across banks</i>	<i>LTV ratio divergence across banks</i>	<i>Maturity divergence across banks</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.329*** (-5.328)	-0.126** (-2.481)	-0.309*** (-2.825)
<i>Well-developed region</i>	0.011 (0.915)	-0.049 (-1.610)	-0.120** (-2.202)
<i>Transparency</i> × <i>Well-developed region</i>	-0.004 (-0.221)	0.072*** (2.781)	0.170** (2.504)
<i>Mortgage interest rate</i>		-0.009 (-0.442)	0.037** (2.080)
<i>LTV ratio</i>	0.011 (1.458)		-0.008 (-0.402)
<i>Mortgage maturity</i>	-0.007 (-0.352)	-0.060 (-1.034)	
<i>Mortgage amount</i>	-0.023** (-2.018)	-0.047*** (-3.501)	-0.054*** (-2.855)
<i>Mortgage guarantee</i>	-0.100*** (-5.866)	-0.112** (-2.546)	-0.121*** (-3.213)
<i>Borrower income</i>	-0.003 (-1.259)	-0.004 (-1.142)	-0.030** (-2.637)
<i>Borrower employment</i>	-0.010 (-0.906)	0.094*** (3.004)	-0.068 (-1.550)
<i>Borrower age</i>	0.054* (1.902)	0.235** (2.456)	0.079 (0.378)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,607,064	2,607,064	2,607,064
<i>R²</i>	16.63%	10.60%	11.30%

TABLE 9

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. Using a sample of auto-loans in 2009-2017, in Panel A, we replicate our primary transparency tests (similar to the tests in Table 3); in Panel B (C), we replicate the tests of whether transparent reporting can facilitate greater learning about the lending practices in different regions in which the bank operates (similar to the tests tabulated in Table 4, Panel A (B)); in Panel D (E), we replicate the tests of whether the effect of transparency on lending term convergence is more pronounced for banks and geographic regions that are under greater regulatory scrutiny (similar to the tests tabulated in Table 5, Panel A (B)). In Panels A to D, 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*). 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 (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*). In Panel E, 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 an auto-loan issued in a less (well-) developed region (NUTS3) and the terms of benchmark auto-loans issued in well- (less) developed regions. Less (well-) developed regions are regions (NUTS3) for which annual GDP per capita ranks 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 of whether a loan is issued after the issuing bank adopted the ECB loan-level reporting (*Transparency*). We further control for an indicator variable of whether a borrower made a down-payment on the auto-loan (*Down payment*), whether the auto loan is for a used or new vehicle (*Vehicle condition*), whether the loan is for a vehicle purchase (*Purchase contract*) and an auto-loan’s maturity in years (*Loan maturity*). All other variables are defined in the Appendix. 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.

Panel A: The effect of transparency on auto-loan term convergence.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.236** (-2.110)	0.004 (0.094)	-0.062*** (-3.452)
<i>Loan interest rate</i>		-0.020 (-1.035)	0.030** (2.745)
<i>LTV ratio</i>	-0.090** (-2.688)		-0.019 (-1.183)
<i>Loan maturity</i>	-0.096** (-2.166)	-0.079 (-1.271)	
<i>Loan amount</i>	0.059 (1.298)	-0.235*** (-4.126)	0.018 (0.588)
<i>Down payment</i>	-0.008 (-0.252)	-0.537*** (-4.131)	-0.019 (-1.037)

<i>Borrower income</i>	-0.000 (-0.000)	-0.004 (-0.289)	-0.010 (-1.601)
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TABLE 9 (continued)

Panel A: The effect of transparency on auto-loan term convergence (continued)

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Vehicle condition</i>	0.034 (0.446)	-0.003 (-0.066)	0.055* (1.893)
<i>Purchase contract</i>	-0.148 (-1.151)	-0.217 (-1.496)	0.088 (1.460)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,576,234	2,576,234	2,576,234
<i>R²</i>	15.23%	30.69%	12.24%

TABLE 9 (continued)

Panel B: The effect of transparency on auto-loan term convergence in underperforming bank regions.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.231** (-2.110)	-0.000 (-0.009)	-0.061*** (-3.416)
<i>Underperforming region</i>	0.017 (0.861)	-0.144 (-1.717)	0.006 (0.486)
<i>Transparency × Underperforming region</i>	-0.131*** (-2.894)	0.165** (2.223)	-0.030* (-1.753)
<i>Loan interest rate</i>		-0.020 (-1.035)	0.030** (2.744)
<i>LTV ratio</i>	-0.090** (-2.687)		-0.019 (-1.183)
<i>Loan maturity</i>	-0.096** (-2.162)	-0.080 (-1.282)	
<i>Loan amount</i>	0.059 (1.298)	-0.234*** (-4.118)	0.018 (0.585)
<i>Down payment</i>	-0.008 (-0.260)	-0.537*** (-4.128)	-0.019 (-1.041)
<i>Borrower income</i>	-0.000 (-0.002)	-0.004 (-0.291)	-0.010 (-1.602)
<i>Vehicle condition</i>	0.034 (0.451)	-0.003 (-0.072)	0.055* (1.895)
<i>Purchase contract</i>	-0.148 (-1.155)	-0.216 (-1.489)	0.088 (1.458)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	2,576,234	2,576,234	2,576,234
<i>R²</i>	15.26%	30.70%	12.25%

TABLE 9 (continued)

Panel C: The effect of transparency on auto-loan term convergence when benchmark bank regions are not easily spatially accessible.

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.153** (-2.106)	0.075 (0.597)	-0.097*** (-3.962)
<i>Spatial accessibility</i>	0.127*** (4.121)	0.026 (0.220)	0.004 (0.159)
<i>Transparency × Spatial accessibility</i>	-0.127** (-2.509)	-0.147 (-0.835)	-0.008 (-0.285)
<i>Loan interest rate</i>		-0.041 (-1.415)	0.027* (1.722)
<i>LTV ratio</i>	-0.081** (-2.577)		-0.029 (-0.963)
<i>Loan maturity</i>	-0.166** (-2.120)	-0.032 (-0.320)	
<i>Loan amount</i>	0.012 (0.340)	-0.233*** (-3.676)	0.055 (0.984)
<i>Down payment</i>	-0.035 (-1.183)	-0.616*** (-8.492)	0.010 (0.427)
<i>Borrower income</i>	0.004 (1.434)	-0.019 (-0.657)	-0.006 (-1.676)
<i>Vehicle condition</i>	-0.089 (-1.247)	-0.035 (-0.484)	0.000 (0.013)
<i>Purchase contract</i>	-0.382*** (-4.920)	-0.531*** (-4.686)	0.048 (0.968)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	1,035,048	1,035,048	1,035,048
<i>R²</i>	16.88%	33.49%	7.50%

TABLE 9 (continued)**Panel D: The effect of transparency on auto-loan term convergence for highly profitable banks.**

	<i>Interest rate divergence</i>	<i>LTV ratio divergence</i>	<i>Maturity divergence</i>
	(1)	(2)	(3)
<i>Transparency</i>	-0.189* (-1.698)	-0.043 (-0.671)	-0.025* (-1.885)
<i>Bank profitability</i>	0.102 (0.537)	-0.495 (-0.947)	-0.035 (-0.558)
<i>Transparency × Bank profitability</i>	0.132 (1.092)	0.044 (0.309)	-0.088** (-2.163)
<i>Loan interest rate</i>		-0.018 (-1.196)	0.037* (2.026)
<i>LTV ratio</i>	-0.182*** (-3.291)		-0.045** (-2.354)
<i>Loan maturity</i>	0.023 (0.231)	-0.103 (-1.426)	
<i>Loan amount</i>	0.058* (2.073)	-0.267*** (-4.468)	-0.018 (-0.914)
<i>Down payment</i>	-0.009 (-0.251)	-0.474*** (-3.015)	-0.004 (-0.246)
<i>Borrower income</i>	-0.001 (-0.078)	-0.001 (-0.047)	-0.014* (-1.874)
<i>Vehicle condition</i>	0.042 (0.436)	0.024 (0.374)	0.029 (1.311)
<i>Purchase contract</i>	-0.172 (-1.122)	0.065 (0.375)	0.094 (1.273)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Obs.</i>	1,536,799	1,536,799	1,536,799
<i>R²</i>	27.85%	33.23%	12.25%

TABLE 9 (continued)

Panel E: The effect of transparency on credit term convergence for auto-loans issued in less (well-) developed regions compared to auto-loans issued in well- (less) developed regions.

	<i>Interest rate divergence, less developed regions</i>	<i>LTV ratio divergence, less developed regions</i>	<i>Maturity divergence, less developed regions</i>	<i>Interest rate divergence, well-developed regions</i>	<i>LTV ratio divergence, well-developed regions</i>	<i>Maturity divergence, well-developed regions</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Transparency</i>	-0.296** (-2.527)	-0.002 (-0.582)	-0.070** (-2.106)	-0.135** (-2.749)	-0.003 (-0.971)	-0.085*** (-2.691)
<i>Loan interest rate</i>		-0.003** (-2.192)	0.033*** (2.919)		-0.003** (-2.098)	0.021* (1.954)
<i>LTV ratio</i>	0.017 (0.779)		0.007 (0.241)	-0.011 (-0.346)		-0.020 (-0.802)
<i>Loan maturity</i>	-0.029 (-0.512)	-0.009 (-1.178)		-0.145** (-2.145)	-0.006 (-0.637)	
<i>Loan amount</i>	0.019 (0.514)	-0.031*** (-5.821)	0.065 (1.215)	0.030 (1.173)	-0.022*** (-3.298)	-0.024 (-0.796)
<i>Down payment</i>	-0.013 (-0.359)	-0.040*** (-3.869)	-0.001 (-0.064)	0.029 (0.677)	-0.028** (-2.530)	0.025 (1.210)
<i>Borrower income</i>	-0.001 (-0.187)	0.001 (1.571)	-0.009 (-1.331)	-0.002 (-0.234)	0.001 (0.769)	-0.013* (-1.856)
<i>Vehicle condition</i>	-0.025 (-0.290)	-0.007* (-1.887)	0.054* (1.848)	-0.006 (-0.086)	-0.001 (-0.155)	0.056 (1.427)
<i>Purchase contract</i>	-0.164 (-1.008)	-0.014 (-1.143)	0.140* (1.902)	-0.279** (-2.690)	-0.045*** (-3.379)	0.047 (0.856)
<i>Fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Obs.</i>	358,661	358,661	358,661	499,864	499,864	499,864
<i>R²</i>	16.81%	18.96%	11.69%	14.27%	23.78%	12.03%