REPORT ON THE BENCHMARKING OF NATIONAL LOAN ENFORCEMENT FRAMEWORKS

RESPONSE TO THE EUROPEAN COMMISSION'S CALL FOR ADVICE ON BENCHMARKING OF NATIONAL LOAN ENFORCEMENT FRAMEWORKS (INCLUDING INSOLVENCY FRAMEWORKS) FROM A BANK CREDITOR PERSPECTIVE

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EBA EUROPEAN BANKING AUTHORITY

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Executive summary

On 7 January 2019, the European Banking Authority (EBA) received a Call for Advice (CfA) from the Commission on Benchmarking of National Loan Enforcement Frameworks. The EBA was invited to conduct ad hoc data collection from a sample of institutions, covering all EU Member States, and to analyse the obtained data, by presenting EU benchmarks on recovery outcomes regarding bank loans and by studying the characteristics of country-level loan enforcement procedures in terms of recovery rates and times to recovery.

The background for the current CfA, as a follow-up to the Council's request in the context of its action plan to tackle non-performing loans (NPLs) in Europe[1], is the Communication on completing the Banking Union[2], as well as the longstanding and ongoing work towards delivering the Capital Markets Union (CMU).[3] The report concludes that at present, there is significant variability across Member States in the effectiveness of national insolvency practices as measured by recovery rates, times of recovery and costs of recovery. It is important that EU banks act proactively and take advantage of the best practices in local insolvency regimes to ensure speedy recoveries and to minimise the risk of accumulating non-performing loans (NPLs).[4]

The EBA and the national competent authorities (NCAs) collected data on loans under insolvency proceedings from more than 160 banks located in 27 Member States.[5] The average of the country´s simple ratio of total assets of the participating banks over the total assets of the respective banking sector is above 30% for all the grouped asset classes. Despite the number of banks and the coverage ratio in terms of total assets, as well as the consistency of the results, it should be stressed that this is the first time that individual loan level information has been collected on voluntary basis by the EBA across the EU, and some remaining data quality issues suggest that the results should be interpreted with appropriate caution. The level of data quality assurance and support provided by the EBA has exceeded the usual levels for other EBA ad-hoc data collections so as to mitigate the issues that are typical of all ad-hoc data collections. However, due to low participation for some asset classes in some Member States, is the reported results may not be fully representative for the respective asset classes in those Member States' judicial systems. The reference date of the data collected is the period before December 2018, therefore prior to the COVID-19 event.

The loans are divided in the following asset classes: corporate, small and medium-sized enterprises (SMEs), commercial real estate (CRE), residential real estate (RRE), retail-credit cards and retail-

[1] ECOFIN, Action Plan to tackle non-performing loans in Europe (2017), available at: http://www.consilium.europa.eu/en/press/press-releases/2017/07/11/conclusions-non-performing-loans/pdf
[2] COM, Communication on completing the Banking Union (2017), available at: http://ec.europa.eu/finance/docs/law/171011-communication-banking-union_en.pdf.
[3] Economic and Financial Affairs Council, 11 July 2017.
[4] José Manuel Campa's speech at the Italian Banking Association (ABI) on the regulatory response to the Covid-19 crisis: a test for post GFC reforms.
[5] See Annexes 5 and 6 for details regarding data collection.

other consumer loans. Table 1 shows the recovery rates (gross and net), the time to recovery and the judicial cost to recovery for each asset class.

Table 1: Recovery rates (gross and net), time to recovery and judicial cost to recovery by asset class (EU27 simple average: two indicators)[6]

	Gross Recovery Rate (%)		Net Recovery Rate (%)		Time to Recovery (years)		Judicial Cost to Recovery (%)	
Asset class	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country
Corporates	40.4	44.6	36.8	41.6	3.4	3.3	1.4	2.7
SMEs	33.8	41.4	31.5	39.6	3.3	3.0	3.5	3.9
RRE	46.1	53.5	43.9	51.3	3.1	3.0	2.0	1.6
CRE	42.2	50.9	38.4	49.1	4.1	3.0	1.6	1.4
Retail – credit cards	25.2	52.1	21.0	48.7	2.3	2.3	5.4	6.4
Retail – other consumer loans	38.2	41.7	32.9	38.3	2.9	3.0	6.7	7.0

As could be expected, collateralised lending including RRE and CRE present higher recovery rates than the remaining asset classes. Conversely, and also as expected, retail credit cards present the lowest recovery rates, but are characterised by the shortest recovery times. Retail in general (credit cards and other consumer loans) show the highest levels of judicial cost to recovery. As regards banks' lending to firms, loans to corporates always present higher recovery rates than loans to SMEs, whereas the time to recovery tends to be similar for the two loan categories. Loans to SMEs also show one of the highest judicial costs to recovery. Crucially, the dispersion among different categories of loans and across the EU27 is high for most of the benchmarks in most loan categories.

Table 2 shows the dispersion using a more specific sub-sample of secured loans that concluded the enforcement process between end-2015 and end-2018. As expected (also seen in other studies), the recovery rates show a strong dispersion, with many observations with low recovery and many with complete recovery (particularly evident in the case of unsecured loans). As expected, the dispersion in the recovery rates is higher for SMEs and Corporate than for Real Estate (commercial and residential).[7] The dispersion in the judicial costs to recovery is higher in RRE and CRE.

[6] To create the EU27 benchmarks for the recovery rates (gross and net), Time to recovery and judicial cost to recovery for each asset classes, the simple averages are calculated in two different ways. The main 'simple average at loan level' (shown in Table 1 and in additional tables of the report) is based on the total number of observations per variable (i.e., a simple average over the total number of loans in the 27 EU Member States), and it is therefore influenced by the EU Members States with the highest number of observations in the sample. In contrast, the 'simple average by country' is calculated as a simple average of all EU Member States' simple averages and it is therefore less biased towards the countries with the highest number of observations.

[7] For Retail, the 25th percentile is not shown because the total number of loans represent less than 4.5% of the total loans in those asset classes.

Table 2: Recovery rates (gross and net), time to recovery and judicial cost to recovery for each asset class (EU27 simple average at loan level) for secured loans that have completed the enforcement procedure

Asset class	Gross Recovery Rate (%)		Net Recovery Rate (%)		Time to Recovery (years)		Judicial Cost to Recovery (%)	
	25th percentile	75th percentile	25th percentile	75th percentile	25th percentile	75th percentile	25th percentile	75th percentile
Corporate	17.5	100.0	16.6	100.0	1.6	5.7	0.0	0.1
SMEs	13.9	100.0	7.4	100.0	1.2	5.0	0.0	1.2
RRE	42.5	100.0	37.8	100.0	1.2	5.2	0.2	3.1
CRE	41.2	100.0	36.0	100.0	1.5	5.7	0.0	2.1
Retail –credit cards	–	100.0	–	100.0	0.4	3.3	0.0	1.6
Retail –other consumer loans	–	95.0	–	86.7	2.1	6.9	0.0	0.7

The calculated benchmarks were further scrutinised by a thorough econometric analysis. The results of this analysis indicate that reforms pertaining to both legal framework characteristics and to judicial capacity are important to improve the recovery outcomes. The results do not consider other economic and social implications of these positive characteristics, as they are not the purpose of this report.

Table 3 summarises the positive characteristics of the enforcement frameworks that are common to three or more asset classes. The positive characteristics in the enforcement frameworks tend to improve the recovery rate averages.

Table 3: Positive characteristics of the enforcement frameworks that are common to three or more asset classes

- Legal instruments to enable out-of-court enforcement of collateral available.
- Absence of long moratoria that suspend enforcement of collateral.
- Possibility for creditors to influence the proceedings through creditor committees.
- Absence of privileges (prior rank) for debt towards specific types of creditors/debt (such as government, social security, wages, pension schemes).
- Triggers for collective insolvency proceedings taking into consideration debtor's future positive/negative cash flow.

Moreover, the legal system that forms the basis of the enforcement framework (i.e. Germanic, French, Anglo-Saxon or Nordic, referred to as legal origin throughout the report) was found to be an important factor in recovery rates and time to recovery. The importance of legal origin has also been confirmed in other studies of recovery rates.

Introduction

On 7 January 2019, the EBA received a CfA from the Commission on Benchmarking of National Loan Enforcement Frameworks.[8] In the CfA, the EBA was invited to conduct an ad hoc data collection and analysis. Information was to be collected from a sample of institutions, covering all EU Member States and the following asset classes: corporate, SMEs, CRE, RRE, retail - credit cards and retail - other consumer loans. The CfA stems from the Communication on Completing the Banking Union (October, 2017)[9] and is a follow-up to the Council´s request in the context of its action plan to tackle NPLs in the EU (ECOFIN, 2017).[10]

This report responds to the CfA by providing insights on the formal enforcement procedures, enacted both by creditors individually and by collective insolvency proceedings. The report by the High-Level Group of Wise Persons on the European financial architecture for development[11] provides a stock-take of the current state of the project and the many challenges and hurdles that remain. Among the report's conclusions is the finding that a thorough bottom-up approach is required to create a successful CMU. In the 24 September 2020 CMU Action Plan[12], the Commission announced measures to make real progress to complete the CMU, including increased convergence or harmonisation of targeted elements of insolvency rules. This report discusses certain positive characteristics in insolvency regimes across the EU as to help identify areas where the divergence in the effectiveness of the national insolvency regimes is particularly wide. The current report, despite using data from before 2020, provides a useful review of national insolvency practices in the EU at a time when the COVID-19 pandemic can be expected to contribute to an increase in borrower defaults and insolvencies in the EU. The analysis provides national and EU benchmarks in recovery rates, recovery times and cost of recovery. The report also identifies a number of variables that help to explain the observed differences in the benchmarks and contribute to the identification of best practices among the national regimes.

The present document is the final report of the project. Its main purpose is to present the EU benchmarks for the main variables of interest, namely recovery rate, time to recovery and judicial cost to recovery. The 'recovery rate' is reported in two ways, 'gross recovery rate' and 'net recovery rate'. The gross recovery rate is defined as the total amount recovered through the formal enforcement process before or after its completion, as a share of the total defaulted exposure (in

[8] See https://ec.europa.eu/info/publications/190107-eba-call-for-advice_en.
[9] Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions 'Completing the Banking Union'. 11.10.2017. COM(2017) 592 final, available at: https://ec.europa.eu/info/publications/171011-communication-banking-union_en.
[10] Council of the European Union, 'Banking: Council sets out action plan for non-performing loans'. Press release, 11 July 2017, available at: https://www.consilium.europa.eu/en/press/press-releases/2017/07/11/banking-action-plan-non-performing-loans/.
[11] Council of the European Union, Europe in the world. The future of the European financial architecture for development. An independent report by the High-Level Group of Wise Persons on the European financial architecture for development, Brussels, 2019.
[12] Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions 'A Capital Markets Union for people and businesses-new action plan', 24.9.2020. COM(2020) 590 final.

terms of notional amount outstanding at time of default). The net recovery rate is defined as the total net recovered (i.e. net of total costs for recovery through the formal enforcement process before or after its completion) as a share of the total defaulted exposure (again, in terms of notional amount outstanding at time of default). 'Time to recovery' is defined as the length (in days) of the recovery period. Specifically, as part of the recovery process, the time is recorded from the start of the formal enforcement status to the date of ultimate recovery from the formal enforcement procedures. The 'judicial cost to recovery' is defined by measuring the judicial costs as a share of the notional amounts at the time of default. Owing to the nature and purpose of the exercise, the data collected had to be representative of the national loan enforcement and recovery processes across the EU Member States. To this end, the EBA collected loan-level data on observed and estimated recovery rates, times to recovery and costs to recovery, as well as sub-components of these variables and other variables, across the EU Member States[13].

The exercise does not take into account non-judicial settlements through voluntary sales/surrenders. This means that the final benchmarks for some countries may not be fully comparable to actual recovery rates, time to recovery and judicial costs that are observed via other sources. In addition, this is the first time that such type information has been collected by the EBA at loan level across the EU. As noted in the CfA, several data fields at the individual loan level are necessary for the completion of the exercise and were collected accordingly. These data fields include data on borrower identity, loan characteristics, type of collateral, as well as specific information regarding the defaulted status and the recovery process, such as costs and dates. The purpose of the requested information is to help to characterise the enforcement procedures (i.e. the business or non-business nature of the borrower, the type of insolvency, the stage reached in the insolvency procedure) and to describe their overall outcome and the costs and length of the formal enforcement processes in the EU Member States. Data quality reports were provided to the NCAs to further clarify some reported values.

Some remaining data quality issues suggest that the results of the analyses should be interpreted with caution. These issues include the following:

i) **low quality of the data reported, for some asset classes, by some participating banks;**
ii) **in certain asset classes, the low number of observations for some EU Member-States; and**
iii) **possible differences in interpretation of the instructions (minimised by the implementation of a pilot-phase before the launch of the exercise and by several interactions with competent authorities and participating banks before and during the data collection).[14]**

For some Member States, the quality of the responses by participating banks was low. In particular, potential bias may be introduced by the process by which the loans are selected and reported and/or by the fact that some recovery processes were not finished at time of reporting. Consequently, for certain EU Member States the EU benchmark indicators may not be fully

[13] In addition to the EU Member States, Norway is included.
[14] Given the ad hoc nature of the data collection, this was the first time that the instructions were used. However, there was a brief test phase involving some participating banks before the start of the data collection.

representative in all asset classes. Furthermore, differences across countries might be driven by other factors than the efficiency of the national insolvency framework, including statistical biases. In addition, the main determinants that explain the recovery outcomes were analysed. The data collected in this study shows that for the recovery rates, the distributions across different asset classes are bimodal, i.e. there are many observations with low rates of recovery and many with high rates of (or complete) recovery.[15] Given the type of distributions, and following similar literature,[16] for the empirical analysis of the recovery rates this study utilises a logit-normal distribution. As regards the time to recovery, the analysis focuses on the observed and expected length of time until the end of the formal process of enforcement (the event of interest). The statistical method applied is survival analysis, and the survival time of the formal process of enforcement is measured in years using the time to recovery variable. The study uses the Cox proportional hazards model (a semi-parametric method) and to validate the model's predictive ability it uses both Kaplan-Meier survival curves and the log-rank test for equality of survivor functions.

The report proceeds as follows. Section 1 presents the sample and the methodology for the selection of loan-by-loan exposures. Section 2 presents the asset classes considered in the exercise. Section 3 presents the data infrastructure, namely the templates and the process for data collection, and the types and definitions of the variables. Section 4 presents the process for data quality assurance. Section 5 presents the EU benchmarks. Section 6 presents the supplementary information collected from other exercises and the main determinants of the enforcement frameworks explaining recovery outcomes across the EU.

1. Sample of participating banks

The time constraints for the exercise and the desire to avoid excessive burden on banks necessitated that a limited sample of banks was included in the exercise. At the same time, the data collected had to be representative of the national loan enforcement and recovery processes across EU Member States. The EBA collected country-by-country observed values and estimates of the recovery rates, times to recovery and costs to recovery based on loan-by-loan data. The intention was for the information to be collected from a sample of institutions, which was designed to ensure

[15] Bimodal distributions of bank loan recoveries are also found in Asarnow, E. and Edwards, D., 'Measuring loss on defaulted bank loans: A 24-year study', Journal of Commercial Lending, Vol. 77, No. 7, 1995, pp. 11-23Asarnow and Edwards (1995); Felsovalyi, A. and Hurt, L., 'Measuring loss on Latin American defaulted bank loans: A 27-year study of 27 countries', Journal of Lending & Credit Risk Management, Vol. 81, No. 2, 1998, pp. 41-46; Felsovalyi and Hurt (1998), Franks et al. (2004) Franks, J. de Servigny, A. and Davydenko, D., 'A comparative analysis of the recovery process and recovery rates for private companies in the UK, France and Germany', Standard and Poor's Risk Solutions, 2004; Araten, M., Jacobs, M. and Varshney, P., 'Measuring LGD on commercial loans: An 18-year internal study', The RMA Journal, Vol. 4., 2004, pp. 96-103 Araten et al. (2004) and Caselli, S., Gatti, S. and Querci, F., 'The sensitivity of the loss given default rate to systematic risk: new empirical evidence on bank loans', Journal of Financial Services Research, Vol. 34, 2008, pp. 1-34.

[16] For details, see Düllmann, K. and Gehde-Trapp, M., 'Systematic risk in recovery rates – an empirical analysis of U.S. corporate credit exposures', Bundesbank Series 2 Discussion paper No. 2004 02.

representativeness of banks in each EU Member State for size and business model. It should be noted that the desired sample sizes were not reached in all Member States, and in addition a significant number of banks later dropped out of the exercise. The loans population used in the final report encompassed all loans from participating banks: loans for which the enforcement process was completed over the last 3 years (from 2015 to 2018), independently of when the enforcement process was initiated (i.e. before 2015 or during the 2015-2018 period), and the loans for which the process has been initiated over the 3 year period (i.e. between 2015 and 2018), even if the process was not completed by 31 December 2018. The EBA needed to address the risk of cherry-picking by banks and to ensure the representativeness of the data collection, as for any future policy actions stemming from this analysis, the national benchmarks must not be biased. Thus, each participating bank was requested to provide all loans (i.e. not a sample of loans) that entered into a formal legal enforcement procedure within the period specified in the exercise.

Data was collected at the individual institution (solo) level rather than on a consolidated basis. This significantly reduced the burden on the reporting institutions because each bank in the sample was expected to report on its own loans and not on those extended by its subsidiaries.

To facilitate the process for the NCAs to identify a sample of participating banks, the EBA bilaterally shared an EU-harmonised distribution of banking population in each jurisdiction with the NCAs. The dataset in question was based on a business model classification exercise carried out in 2015[17]. For the purposes of that exercise[18], the EBA collected the distribution of the banking populations in each jurisdiction according to size and business model classifications on an individual institution level. The assumption was that the distribution of the banking population in a Member State would not have changed significantly over the intervening years. Participating banks in each Member State also include foreign subsidiaries, therefore the countries' benchmarks are influenced not only by domestic but also by foreign bank's enforcement practices in the country of the enforcement procedures.

The NCAs were asked to randomly select a limited number of credit institutions in each bucket, categorised by jurisdiction (country of banking supervision), size and business model, and to check their availability to participate in the exercise. The suggested sampling strategy envisaged different thresholds depending on the size of the banks, which resulted in an overall sample size of up to 300 EU institutions. If the NCAs deemed it appropriate to consider additional criteria that, due to the specific situation in their jurisdiction, allowed collecting more data, they were invited to do so. The banks were chosen randomly within the buckets created using both the EBA and the additional criteria, and the number of banks chosen remained as proposed by the EBA. The NCAs informed the EBA of the shortlisted credit institutions that participated in the data collection. Some of the

[17] Further information regarding the datasets and methodology used in the business model classification exercise, as well as the assumptions made, can be found in in Cernov, M. and Urbano, T., 'Identification of EU bank business models: A novel approach to classifying banks in the EU regulatory framework', EBA Staff Paper Series No. 2, 2018, available at https://eba.europa.eu/documents/10180/2259345/Identification+of+EU+bank+business+models+-+Marina+Cernov%2C%20Teresa+Urbano+-+June+2018.pdf/8a69aed9-3e58-4f81-bc4c-80a48e4c3779.

[18] The dataset does not include the data of Bulgarian institutions as it was based on a voluntary exercise, which the Bulgarian CA did not participate in. EBA's Credit Institutions Register indicates there are 20 relevant institutions in Bulgaria, from which the CA was asked to select the sample based on the criteria outlined in this document and using the information available internally at the CA.

participating banks (defined by the NCAs) were invited to provide both technical comments on the data templates and sample data on a loan-by-loan basis for testing purposes prior to the actual data collection.

The final population of banks was smaller than initially proposed. Some NCAs delivered a smaller sample than requested because of the unwillingness of some credit institutions to participate in data collection, the unavailability of data or difficulties in obtaining it, as well as the burden of collecting all the required information. The final sample consists of more than 160 institutions, of which some sent incomplete templates or sent only partially filled reports (e.g. only for some asset classes). While the sample is representative for most of benchmarks EU Member States, some country's benchmarks may be inadequately represented, especially with regard to the banks' business models and size.[19]

2. Asset classes

Information was collected for the following asset classes: Corporate, SMEs, CRE and RRE, retail - credit cards, and retail - other consumer loans. In the final report detailed analysis of the individual asset classes is provided, wherever possible. The definitions of the asset classes corporate, SMEs, CRE and RRE are similar to the definitions used for the Internal Models Benchmarks.[20]

The size of the borrowers is determined based on the total annual turnover for the consolidated group of which the borrower is a part. The total annual turnover was calculated in accordance with Article 4 of the Annex to Commission Recommendation 2003/361/EC1 and refers to the year ending 1 year before the reporting reference date. For corporate, the size of the borrower was limited to between EUR 50 million and EUR 200 million. For SMEs, the size of the borrower was limited to a maximum of EUR 50 million. For both CRE and RRE the size of the borrower was limited to ≤EUR 200 million. For a size of borrower of > EUR 200 million, there was no need to report as this was not in the scope of the exercise[21]. In addition, for natural persons there was no minimum threshold applicable.

For RRE, indicative characteristics are loans:

i) granted to private individuals to purchase or refinance immovable property used as a residence;
ii) secured by the immovable property an individual uses as their residence; or

[19] See Chapter 6 and Annexes for details.
[20] See the Internal Models Benchmarks and respective ITS and RTS package for 2019 - end 2018 data.
[21] The thresholds are based on previous EBA benchmarking exercises (e.g. EBA Internal Models Benchmarking Exercises: large corporates are defined as firms with annual sales exceeding EUR 200 million). Given the existence of RTF/ITS with similar mandatory data collection, the use of the same thresholds to separate SMEs, Corporate and Large Corporate facilitates the data collection during this exercise.

iii) where the purchased or refinanced immovable property does not generate rental revenues and is either:

   a. the primary residence to the owner; or

   b. a residential investment property that includes holiday homes and second homes; or,

iv) where the loan is to finance the development of immovable property, as defined in (a) or (b).

For CRE, indicative characteristics are loans:

i) granted to a corporate to purchase or refinance commercial immovable property;

ii) secured by the commercial immovable property; or

iii) where the purchased or refinanced property is either:

   a. commercial immovable property; or

   b. residential immovable property that is then rented out and secured by the residential immovable properties being purchased and are therefore used for the development of a commercial immovable property. This includes buy-to-let schemes.

For retail - credit cards and retail - other consumer loans, the asset classes include credit cards and consumer loans (e.g. overdrafts and personal loans), respectively. The loan purpose was defined as the purpose for which the loan was provided, e.g. consumer lending.[22]

Financial institutions as debtors, specialised loans (e.g. project finance loans; infrastructure loans; and public sector loans), and leasing or asset-backed finance loans (e.g. loans granted to corporates to purchase non-property collateral, or loans for asset backed finance such as marine and aviation) were excluded from the exercise.

Finally, if a loan was collateralised by property as well as by another type of collateral, the asset class in which the loan was included was based on the type of collateral with the highest value as well as on the purpose of the loan (e.g. RRE, CRE).

3. Data and variables used

To characterise the enforcement procedures (i.e. the business or non-business nature of the borrower; the type of insolvency, or the stage reached in insolvency procedure), and to describe the overall outcome, costs and length of the process, several data fields at loan level (borrower, loan characteristics, collateral, and information regarding the defaulted status and the recovery process, namely costs and dates) were collected on a best effort basis. For details regarding variables collected see Annex 1.

[22] As mentioned in the CfA, the EBA NPL Transactions templates include similar data fields.

Borrower characteristics were collected only for the asset classes corporate, SMEs, CRE and RRE. The following information was collected on a best effort basis (Table 4): total assets (according to the Capital Requirements Regulation (CRR)/Capital Requirements Directive (CRD); if total assets were not available, it was possible to use the annual turnover) and NACE code[23].

For the loan characteristics the following information was collected: category of loans[24]; security status (secured or unsecured), security type (physical or non-physical), physical type (property or non-property), Loan-to-value (LTV) ratio; country of the formal enforcement and type of enforcement (individual or collective). The benchmarks and the analysis of the main determinants from enforcement frameworks across the EU explaining the recovery outcomes use borrower and loan characteristics (e.g. categories of loans, security status) and try to analyse possible differences whenever possible.

Table 4: Borrower and Loan characteristics

Borrower characteristics		**Loan characteristics**						
Total Assets	NACE	Category of loans	Security status	Security type	LTV at time of credit authorisation	LTV at time of default	Country of the formal enforcement proceeding - judicial system	Type of Enforcement
Category of loans: 1-enforcement has been completed; 2-pending enforcement cases; 3-entered into formal enforcement procedures and that were sold to third parties; 4-formal restructuring processes; 5-situations in which the collateral is repossessed by the bank – after an enforcement procedure - but the asset was not yet sold by the bank.								

The sources of detailed information on recovery details range from factors such as: the recovery rate, the discount rate; the notional amounts; the judicial costs, and the accumulated write-off. For time to recovery details, the sources of detailed information (Table 5) range from factors such as: the time to recovery (in days); the date of default; the date of the initiation and the date of conclusion of formal legal proceedings, and the date of ultimate recovery after formal legal action conclusion.

[23] Statistical classification of economic activities in the European Community. Two-digit code. If not available, the participating bank could use formal national identifiers for sectors (e.g. provided by the respective statistical national entity). If the NACE code or the national identifiers for sectors are not available, the participating bank should use the respective internal identifiers for sectors of activity.

[24] Category of loans: 1 – enforcement has been completed; 2 – pending enforcement cases; 3 – entered into formal enforcement procedures and sold to third parties; 4 – formal restructuring processes; 5 – situations in which the collateral is repossessed by the bank – after an enforcement procedure - but the asset has not yet been sold by the bank. Regarding 'loans characteristics – category of loans', the EBA staff and some BoS members understand that the inclusion of few different types of loans, such as '2 – Pending enforcement cases with the starting date between 31 December 2015 and 31 December 2018, not falling into one of the other existing categories' and '3 – Loans that entered into formal enforcement procedures after 31 December 2015 and that were sold to third parties' will be important for comparison purposes among jurisdictions. The particularities of loans sold to third parties are significant in some Member States. It will allow a better understanding the national benchmarks and the necessary detailed analysis afterwards. The CfA requests not only the development of representative and comparable metrics (benchmarks) but also that the data gathered give insights as regards formal (largely in-court) enforcement procedures, both by creditors individually and in the context of a collective proceeding in insolvency. The CfA mentions on p.2, in the scope of the requested work, that the EBA should provide country-by-country estimates, differentiated by type of loan and by type of enforcement. Annex 1 provides a summary of EU27 benchmarks per category of loans (simple EU27 average by loan and by country). In addition, Annex 3 provides a summary of country benchmarks, for each asset class for Category 1, i.e. loans that concluded the enforcement process between end-2015 and end-2018 (simple EU27 average by loan and by country) for net recovery rate.

Table 5: Time to Recovery details

Time to recovery	Date of Default	Formal legal proceedings	Formal legal proceedings - date of conclusion	Date of ultimate recovery after legal action conclusion

4. Data quality assurance

The quality of the reported data was a concern since from the beginning of the process owing to large number of collected data, the unfamiliarity of banks with the type of non-supervisory data collected, and the collection of data via Excel templates (due to the time constraints of the project). To ensure the quality of the data, a strong interaction with both NCAs and banks was developed during the data collection and data analysis of the data. Owing to a large number of observed data issues, the following steps were taken:

- data quality reports with the most common and easily detectable issues were shared bilaterally with the NCAs;
- incorrectly reported qualitative variables were replaced by EBA staff in the internal database where the meaning of the reported value was certain beyond doubt (e.g. if the name of the EU Member State was reported, it was replaced by the country code);
- loans for which the country of the loan enforcement procedure, currency of the loan or category of loan were unclear were excluded from the analysis.

To ensure that only plausible data was taken into account, only positive values were considered where the value reported was expected to be positive (e.g. for 'time to recovery' and 'Judicial costs'). In addition, for variables describing the nominal amounts of loans (e.g. 'notional amount outstanding at time of default'), only values above 10 in the reported currency were taken into account.[25] For time to recovery, any reported values larger than 40 years were replaced by 40 years to ensure that unexpectedly large values didn't skew the results.

For 'gross recovery rate' and 'net recovery rate', percentage values outside the allowed range (i.e. between 0% and 100%) were limited to the lower/upper bounds of the range to prevent distorted results. Given the data quality issues and for simplification, the range between 0% and 100% was established for Recovery Rates. The same sample of loans was used for both variables, and respectively simple and weighted averages were used (i.e. only loans where all necessary information for both indicators was provided).

Regarding 'judicial cost to recovery' ratio, a simple outlier detection methodology was applied at asset and country levels, then on the whole class asset, by removing all observations more than 2.5 standard deviations from the mean. Given the data quality issues, the use of 2.5 standard deviations allowed the reduction of extreme values with a simple and transparent rule commonly used in outlier analysis. The same sample of loans was then used for both simple and weighted averages.

[25] During the data quality procedures, it was not possible to clarify the plausibility of negative recovery amounts for the majority of loans under enforcement. Some loans showed extreme and implausible negative recovery values. The quantity of loans with negative amounts for recoveries is very low across the EU. In order to guarantee the plausibility of the amounts used in the benchmarking indicators these loans were not used in the calculation of benchmarks.

This is the first time that such information has been collected at loan level across the EU and, therefore, there are no terms of comparison for evaluating how much the results reflect the real characteristics of the judicial system for each country/asset class.

Given the nature of the exercise, the EBA has augmented its efforts to ensure the level of data quality assurance and support as follows:

- the data collection process was ongoing for over 10 months, giving banks and competent authorities sufficient time to work on the identified data quality issues;

- a significant number of resubmissions was processed, especially after the EBA has provided data quality reports with the main identified issues to the competent authorities;

- the EBA has continuously supported both the banks and the competent authorities with guidance on instructions (e.g. implementation of a preliminary pilot-phase), templates, data quality issues and any other aspects of the data collection;

- the EBA staff also provided support by applying a number of data quality assurance steps on the available data, such as outlier analysis and exclusion, thresholds limiting the values to the expected ranges, replacement of incorrectly formatted data with the expected values, and providing feedback to the competent authorities, resulting in a large number of resubmissions.

From the statistical perspective:

- the processes used, as well as the statistical techniques and support for this data collection were comparable or exceeded the ones in similar ad-hoc EBA's data collections;

- the size of the sample (160 banks) is comparable to the one for similar exercises (190 banks reporting Corep and Finrep, 105 for the QIS, 189 for the CfA on Basel 3, …);

- the effort made throughout the whole process allowed to significantly mitigate the issues that are typical of all ad-hoc data collections and that arise from: i) potential differences in interpretation of the instructions (minimised, however, by a pilot-phase process for several participating banks before the beginning of the data collection); ii) reporting issues and errors from data collected in Excel files; or iii) inadequate quality of data reported by some participating banks, triggering the need of managing resubmissions.

However, the sample composition for participating banks did not meet all EBA's expectations to be representative for some Member States by business model and size of the banks, despite the total number of participating banks and the average coverage ratio (higher than 30%) in terms of total assets of the EU banking systems. There are some elements that suggest that the results of the analyses should be interpreted with appropriate caution. The low number of loans leads to low representativeness for some EU Member States in certain asset classes. This shortcoming is reflected and highlighted in some of the reported statistics: large standard deviations; country differences between single and weighted averages and very different distributions (1st, 2nd, 3rd quartile); lack of judicial costs for many observations in some EU Member States.

5. EU benchmarks

The EBA provides the EU asset class-specific, country-by-country benchmarks of national loan enforcement regimes (including insolvency), based on loan-by-loan data for loans that have entered an enforcement process.

The development of EU benchmarks covers the main purpose of the CfA, that is, to gather data of the highest quality, granularity and representativeness on recovery processes across all EU Member States, to pursue a comprehensive benchmarking exercise.

The characteristics of the main variables (recovery rate, time to recovery, and judicial cost to recovery) were calculated at country level.[26] The indicators for the main variables are based on averages (simple and weighted), medians, and percentiles.[27]

In the summary of EU27 benchmarks for the recovery rates (gross and net), time to recovery and judicial cost to recovery per group of asset classes (Table 6), as mentioned before, the simple averages are calculated in two ways. The main 'simple average at loan level' (also used in the remaining tables) is based on the total number of observations for each variable, therefore influenced by the EU Members States with higher number of observations. In addition, the 'simple average by country' is calculated as a simple average of all EU Member States' simple averages.

The use of all loans that entered in enforcement procedures from participating banks allowed a consideration of the respective indicators as EU benchmarks for the respective national loan enforcement regimes. The comprehensiveness and representativeness of the loan-by-loan data ensure important characteristics such as robustness, reliability, replicability, simplicity of interpretation and the possibility (if needed) of future updates. Nevertheless, the data quality issues and lower number of observations for some EU Member States and for some groups of assets classes should be taken into account when interpreting the results. Therefore, it cannot be taken for granted that the final outcome is fully representative for all judicial systems (see chapter 4 for more details).

The main EU benchmarks include both: those loans for which the enforcement process was completed over the past 3 years (from 2015 to 2018) and those loans for which the process was initiated after 2015. The different categories and types of loans were studied in detail whenever possible.[28]

[26] The EU benchmarks are presented only if the number of observations (i.e. loans under a formal enforcement procedure) is above five. The threshold is similar to other public EBA benchmarks. Owing to data limitations, to achieve a high level of country benchmarks, the categories of loans are grouped. The Annexes provide some additional tables per different types of asset class and categories of loans. The type of enforcement (i.e. individual enforcement, collective enforcement), among other possible breakdowns, is presented whenever possible. Individual enforcement refers to single creditor enforcing a claim via judicial court; collective enforcement refers to insolvency proceedings, where all accepted creditors would be entitled to enforce a claim given rules on creditor ranking.

[27] Sensitivity checks of the benchmark metrics could be performed by considering averages rather than the medians.

[28] See Annex 1 for details of EU27 benchmarks for each asset class and category of loans. See Annex 5 for details regarding the number of loans included in the benchmarks and percentage of total reported loans included in the benchmarks. See

Table 6: Recovery rates (gross and net), time to recovery and judicial cost to recovery for each asset class (27 EU simple average – two indicators: Simple Average at loan level and Simple Average by Country)

	CORPORATE			SME		
Asset class	**Simple average at loan level**	**Simple average by country**	**Observations**	**Simple average at loan level**	**Simple average by country**	**Observations**
Gross recovery rate (%)	**40.4**	**44.6**	4,277	**33.8**	**41.4**	168,876
Net recovery rate (%)	**36.8**	**41.6**	4,277	**31.5**	**39.6**	168,876
Time to recovery (years)	**3.4**	**3.3**	4,145	**3.3**	**3.0**	130,717
Judicial cost to recovery (%)	**1.4**	**2.7**	4,448	**3.5**	**3.9**	148,943

	RRE			CRE		
Asset class	**Simple average at loan level**	**Simple average by country**	**Observations**	**Simple average at loan level**	**Simple average by country**	**Observations**
Gross recovery rate (%)	**46.1**	**53.5**	167,576	**42.2**	**50.9**	23,020
Net recovery rate (%)	**43.9**	**51.4**	167,576	**38.4**	**49.1**	23,020
Time to recovery (years)	**3.1**	**3.0**	106,504	**4.1**	**3.0**	16,909
Judicial cost to recovery (%)	**2.0**	**1.6**	129,607	**1.6**	**1.4**	23,199

	Retail – credit cards			Retail – other consumer loans		
Asset class	**Simple average at loan level**	**Simple average by country**	**Observations**	**Simple average at loan level**	**Simple average by country**	**Observations**
Gross recovery rate (%)	**25.2**	**52.1**	338,544	**38.2**	**41.7**	885,349
Net recovery rate (%)	**21.0**	**48.7**	338,544	**32.9**	**38.3**	885,349
Time to recovery (years)	**2.3**	**2.3**	226,866	**2.9**	**3.0**	828,584
Judicial cost to recovery (%)	**5.4**	**6.4**	217,758	**6.7**	**7.0**	869,420

Annex 3 for a summary of country benchmarks, for each asset class for Category 1, i.e. loans that concluded the enforcement process between end-2015 and end-2018 (simple EU27 average by loan and by country) for net recovery rate.

5.1 Recovery rate

The data collection enabled the calculation of the recovery rate based on the 'gross recovery amount' and the 'net recovery amount' as numerators and the 'notional amount outstanding at time of default' as denominator.[29]

The variable 'gross recovery amount' variable was defined as the NPL's notional outstanding amount that had been recovered by the bank (or where applicable, by an external debt collector) only through the formal enforcement process before or after its completion (i.e. before any deduction of costs, including the sales proceeds or total cash recovered and costs incurred). Sales proceeds may include real estate sale after repossession or loan sale. The value of the repossessed collateral should consider the market value, if available, or the book value. For loans that entered into formal enforcement procedures after 31 December 2015, that have not been sold to third parties and in which the collateral is repossessed by the bank – after an enforcement procedure – but the asset has not yet been sold by the bank, the variable may also include the sales proceeds from the collateral or the value of the repossessed collateral or total cash recovered and costs incurred of the notional amount outstanding that been recovered by the bank (or where applicable, by an external debt collector) only through the formal enforcement process before or after its completion (i.e. before any deduction of costs).

The variable 'gross recovery rate' was defined using the gross recovery amount as a share of the notional amounts at time of default, as follows:

$$\text{Gross recovery rate} = \frac{\text{Gross recovery amount}}{\text{Notional amount outstanding at time of default}}$$

The 'net recovery amount' variable was defined as the NPL's notional amount outstanding that has been recovered by the bank (or where applicable, by an external debt collector) only through the enforcement process after its completion (i.e. after any deduction of costs). Economic conditions should be used when considering haircuts. Net amount is defined as the gross recovery amount less all incurred costs associated with the formal enforcement process (such recovery costs include all costs, not only the judicial costs). For instance, fees paid to external legal firms for their activity in the enforcement process should be considered as recovery costs. 'Judicial costs' were collected under a separate variable and do not include other costs/fees. Any incurred costs associated with the formal enforcement process should include staffing costs of the units/departments dedicated to the formal enforcement processes within the respective bank.

[29] The variable 'Notional amount outstanding at time of default' was defined as the notional amount outstanding of the loan at the time of default, i.e. where the loan has a status of Defaulted as defined by CRR Art. 178: a) the institution considers that the obligor is unlikely to pay its credit obligations to the institution, the parent undertaking or any of its subsidiaries in full, without recourse by the institution to actions such as realising security; b) more than 90 days past due.

The variable 'net recovery rate' variable was defined using the net recovery amounts as a share of the notional amounts at time of default, as follows:

$$\text{Net Recovery Rate} = \frac{\text{Net recovery amount}}{\text{Notional amount outstanding at time of default}}$$

The main benchmarking tables present the 'gross recovery rate' and 'net recovery rate' variables without detailed desegregation for simplification purposes.[30] The EU benchmarks for the 'gross recovery rate' and 'net recovery rate' are presented for each asset class, namely: corporate, SMEs, CRE, RRE, retail-credit cards and retail-other consumer loans (Tables 7 – 30). Some benchmarks are based on very low number of observations and, therefore, making generalisations about the whole banking sector can be misleading.

Table 7: EU benchmark, gross recovery rate (%), for each EU Member State – SMEs

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	4,460	6	53	54.4	43.8	2.4	55.4	100
BE	50	5	55	72.2	45.3	0	49.1	100
BG	2,861	3	38.8	37.3	37.3	5.7	23.7	73.7
CY	1,137	3	25.6	33.3	32.5	0	10.8	42.4
CZ	8,444	4	28.1	12.6	39.1	0	1.7	56.4
DE	898	7	49.1	72	44.8	0	43.3	100
DK	63	6	47.4	79.1	38.5	0.2	51.4	73.4
EE	14	1	29.5	21.3	37.9	0	5.4	38.7
ES	19,670	9	66.3	66.1	41.2	19.8	100	100
FI	42	3	39.8	32.9	37.9	2.1	23.5	74.4
FR	9,954	6	34.4	35.4	41.9	0	5.7	82.3
EL	24,086	3	5	11.6	20.4	0	0	0
HR	851	2	20.8	6	34.6	0	0	28.7
HU	20,587	4	21.2	2.8	39.3	0	0	3.9
IE[31]	456	2	6.7	8.5	19.4	0	0	0.8
IT	14,707	14	25.8	20.8	35.3	0	4.4	46.2
LT	365	3	54.7	48	42.8	0	68.4	100
LU	151	3	74.9	79.9	36.8	46.6	100	100
LV	225	2	53.3	66.4	42.7	2	56.7	100
MT	36	2	33.7	22.8	40.5	0	2.9	60.1
NL	14,607	6	64	65.5	36.5	41.9	63.4	100
PL	14,653	10	10.9	6.9	24.5	0	0	4.7
PT	19,089	6	42.9	42	43	0.7	21.1	100
RO	8,021	4	25.9	26.9	35.4	2.2	6.8	38.1
SE	1,307	7	68.5	45	44.2	4.8	100	100

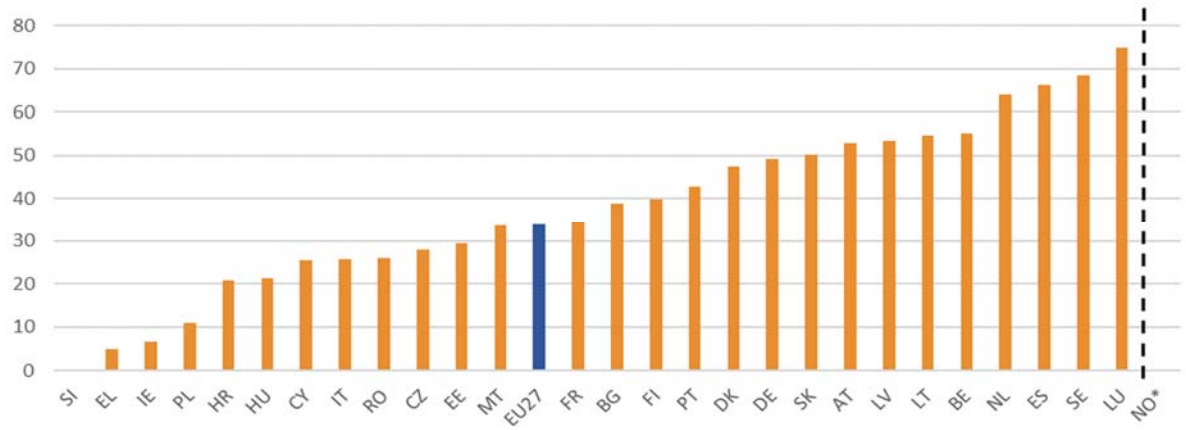
[30] All types of loans are incorporated in this table. Annex 1 provides the EU27 benchmarks by loan category (simple average by loan as well as by country). Annex 3 provides a summary of country benchmarks, per asset class for category 1, i.e. loans that concluded the enforcement process between end-2015 and end-2018 (simple EU27 average by loan and by country) for Net Recovery Rate. The loans not written off are also incorporated. This may create a bias since the recovery may improve as long as they are not written off. Par 158 of EBA GLs on PD and LGD provides some information: (…) *158. Institutions should obtain the long-run average LGD by adjusting the observed average LGD taking into account the information related to processes that were not closed ('incomplete recovery processes') and where the time from the moment of default until the moment of estimation is shorter than the maximum period of the recovery process specified for this type of exposures.* (…).

[31] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
SI[32]	–	–	–	–	–	–	–	–
SK	312	2	50.1	47.7	37.9	13.5	40.1	100
EU27	**168,876**	**104**	**33.8**	**35.1**	**42.1**	**0**	**4.9**	**86**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 1: EU benchmark, gross recovery rate (%), simple average for each EU Member State – SMEs



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 8: EU benchmark, gross recovery rate (%), for each EU Member State – corporate

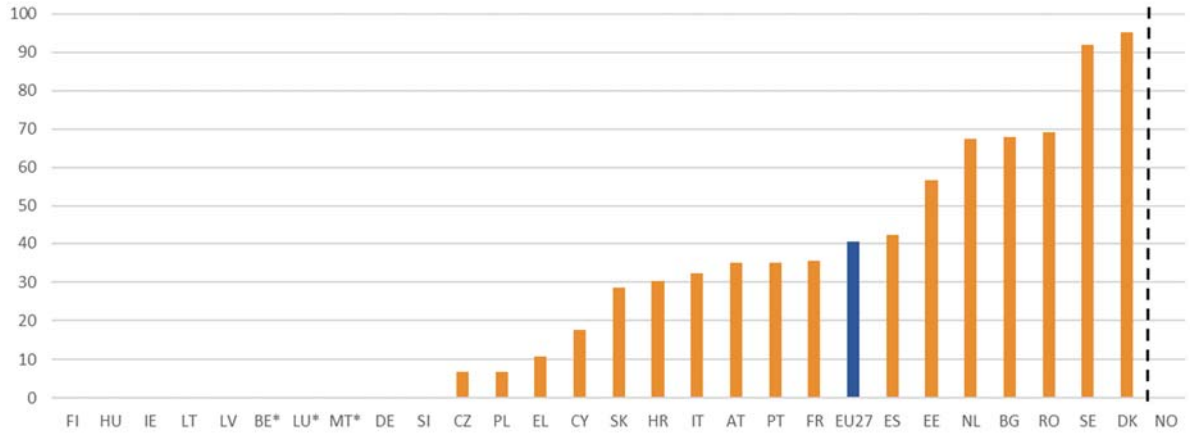
Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	38	3	34.9	41.3	40	1.7	16	76.3
BE*	*Not shown	–	–	–	–	–	–	–
BG	252	3	67.9	53.6	39.3	23.6	97.1	100
CY	57	2	17.6	18	28.1	0	2	18.5
CZ[33]	38	2	6.9	5	11.5	0	0	17.5
DE[33]	–	–	–	–	–	–	–	–
DK	17	3	95.2	97.7	11.3	99.1	100	100
EE	27	1	56.6	54.7	33.4	46.3	57.3	80.6
ES	332	6	42.2	54.6	43.8	0	25	100
FI	NA	–	–	–	–	–	–	–
FR	85	3	35.6	48.6	36.6	2.9	16.2	60.6
EL	353	2	10.9	10.7	28	0	0	0
HR	726	1	30.2	60	41.2	0	2.3	74.9
HU	NA	–	–	–	–	–	–	–
IE[34]	NA	–	–	–	–	–	–	–
IT	878	11	32.3	29.4	37.5	0	14.3	60.1
LT	NA	–	–	–	–	–	–	–

[32] For SMEs, the number of loans with negative net recovery amounts represents 66% of the total number of loans in the sample for the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 31% and 31.7%, respectively.
[33] Based on a very low number of observed data and, therefore, making generalisations about the whole banking sector can be misleading.
[34] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
LU*	*Not shown	–	–	–	–	–	–	–
LV	NA	–	–	–	–	–	–	–
MT*	*Not shown	–	–	–	–	–	–	–
NL	180	2	67.5	42.9	35	49.5	70	100
PL	321	4	6.9	5	21.2	0	0	0
PT	403	5	35	21.1	41.2	0	8.4	82.3
RO	68	3	69.3	55.7	37.1	35.8	91.5	100
SE	14	3	92	100	20.5	100	100	100
SI[35]	–	–	–	–	–	–	–	–
SK	14	2	28.6	24.8	40	0	3.1	28.2
EU27	**4,277**	**55**	**40.4**	**26.2**	**43.4**	**0**	**16.2**	**100**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 2: EU benchmark, gross recovery rate (%), simple average for each EU Member State – corporate



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 9: EU benchmark, net recovery rate (%), for each EU Member State – SMEs

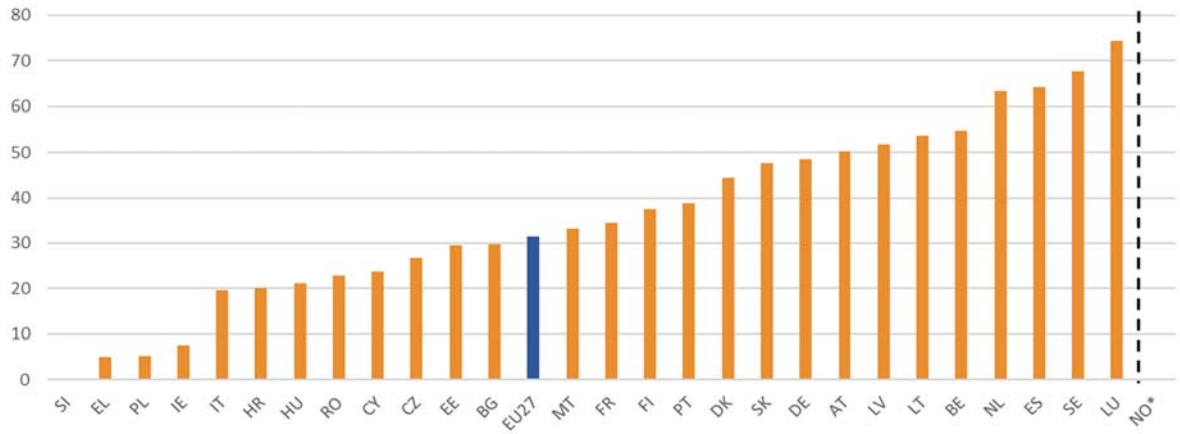
Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	4,460	6	50.2	52.9	44.3	0	47.9	100
BE	50	5	54.7	71.3	45.2	0	49.1	100
BG	2,861	3	29.6	32.5	38.2	0	6	60.3
CY	1,137	3	23.7	31.6	31.3	0	9.6	36.4
CZ	8,444	4	26.7	12.2	38.1	0	0.6	51.8
DE	898	7	48.5	71.9	44.9	0	43.3	100
DK	63	6	44.6	70.9	37.7	0.1	42.9	69.8
EE	14	1	29.5	21.3	37.9	0	5.4	38.7
ES	19,670	9	64.2	64.9	41.5	16.2	93.9	100
FI	42	3	37.7	29.1	37.7	1.7	21.6	74.4
FR	9,954	6	34.3	35.1	41.8	0	5.5	81.8
EL	24,086	3	5	11.4	20.3	0	0	0
HR	851	2	20	6	34.2	0	0	23.4
HU	20,587	4	21	2.6	39.3	0	0	2.5

[35] For corporate, the number of loans with negative net recovery amounts represent 47% of the total number of loans for the sample in the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 50.1% and 50.8%, respectively.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
IE[36]	456	2	7.6	8.3	20.8	0	0	1.2
IT	14,707	14	19.6	16.9	29.7	0	0.6	29.4
LT	365	3	53.7	47.7	42.5	0	67.4	100
LU	151	3	74.3	78.9	37.3	45.4	100	100
LV	225	2	51.9	64.5	42.3	1.6	53.8	100
MT	36	2	33.1	22.7	40.7	0	2.9	60.1
NL	14,607	6	63.3	64.5	36.7	40.7	61.3	100
PL	14,653	10	5.3	4.1	17.9	0	0	0
PT	19,089	6	39	36.8	42.4	0	13.7	93.7
RO	8,021	4	22.9	19.9	32.2	1.3	5.8	32.9
SE	1,307	7	67.7	44.6	44.4	3	100	100
SI[37]	–	–	–	–	–	–	–	–
SK	312	2	47.8	45.6	38.6	9.7	37.2	97.8
EU27	**168,876**	**104**	**31.5**	**33.3**	**41.3**	**0**	**2**	**75.2**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 3: EU benchmark, net recovery rate (%), simple average for each EU Member State – SMEs



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 10: EU benchmark, net recovery rate (%), for each EU Member State – corporate

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	38	3	34.6	40.8	39.9	1.6	16	76.3
BE*	*Not shown	–	–	–	–	–	–	–
BG	252	3	65.2	50.8	40.2	17.8	87	100
CY	57	2	15.9	17.3	27.9	0	0.1	17.6
CZ[38]	38	2	6.6	4.7	10.9	0	0	16.7

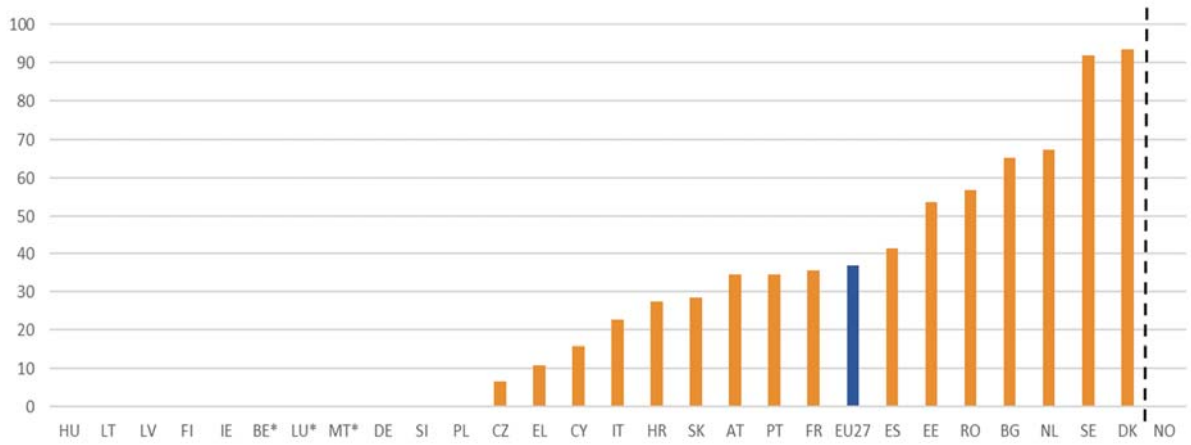
[36] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

[37] For SMEs, the number of loans with negative net recovery amounts represent 66% of the total number of loans in the sample for the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 31% and 31.7%, respectively.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
DE[38]	–	–	–	–	–	–	–	–
DK	17	3	93.4	96.9	14.3	94	100	100
EE	27	1	53.8	52	31.7	44	54.4	76.6
ES	332	6	41.3	54.4	43.7	0	19.4	99.6
FI	NA	–	–	–	–	–	–	–
FR	85	3	35.6	48.5	36.5	2.9	16.2	60.6
EL	353	2	10.8	10.6	27.8	0	0	0
HR	726	1	27.4	60	39.9	0	1.1	54.8
HU	NA	–	–	–	–	–	–	–
IE[39]	NA	–	–	–	–	–	–	–
IT	878	11	22.7	18.6	31.2	0	8.7	33.5
LT	NA	–	–	–	–	–	–	–
LU*	*Not shown	–	–	–	–	–	–	–
LV	–	–	–	–	–	–	–	–
MT*	*Not shown	–	–	–	–	–	–	–
NL	180	2	67.5	42.7	35.1	49.5	70	100
PL	321	4	0.3	0.4	2.5	0	0	0
PT	403	5	34.6	21.1	41.2	0	7.3	82.2
RO	68	3	56.8	48.6	35.7	23.8	78.6	85
SE	14	3	91.8	100	20.5	100	100	100
SI[40]	–	–	–	–	–	–	–	–
SK	14	2	28.5	24.7	40	0	3.1	27.9
EU27	**4,277**	**55**	**36.8**	**23.7**	**42.5**	**0**	**10.7**	**93.4**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 4: EU benchmark, net recovery rate (%), simple average for each EU Member State – corporate



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Regarding banks' representativeness, the sizes of each participating bank (large, medium or small) and its main business model and their main business models (corporate-oriented, cross-border

[38] Based on a very low number of observed data; therefore, making generalisations about the whole banking sector can be misleading.
[39] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.
[40] For Corporate, the number of loans with negative net recovery amounts represent 46% of the total number of loans for the sample in the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 50.1% and 50.8%, respectively.

universal, retail-oriented, and other)[41] were taken into consideration. In addition, the percentage of total assets of the participating banks in comparison with the percentage of total assets in the banking systems across the EU was also taken into account (see Annex 6 for details for each EU Member State).

For firms (corporate and SMEs), the comparison between the expected and the observed participating banks shows the following:

- 23 EU Member States have a coverage of greater than or equal to 20% of expected domestic banks and are well diversified: Six EU Member States do not show large and medium-sized banks; however in five of these Member States, the sample of expected participating banks also does not include large and medium-sized banks. Six EU Member States do not show large banks (although for these EU Member States, it was not expected of them); however the participating medium-sized and small banks observed are diversified (cross-border universal, retail-oriented and other specialised), covering at least 67% of the expected medium-sized banks and at least 25% of the expected small banks.

- Two EU Member States do not show small banks, however the observed participating large and medium banks cover at least 14% of the expected medium-sized banks and 60% of large banks.

In terms of banks' representativeness, the vast majority of EU Member States show a sufficient coverage when comparing the expected and the observed participating banks' sizes and main business models. Six EU Member States show a potential misrepresentation (only one small bank for each), without considering potential foreign loans.

Table 11: EU benchmark, gross recovery rate (%), for each EU Member State – RRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	1,343	4	66.6	65.5	39.5	24.1	92.4	100
BE	483	3	69.7	69.4	40.5	34.8	100	100
BG	3,066	3	55.5	47.9	36.9	22.6	54.6	100
CY	2,370	4	30.1	24.5	37.8	0	4.6	58.9
CZ	4,938	6	56.5	55.5	42.2	9.1	64.1	100
DE	387	9	72.8	69.8	39.4	40.2	100	100
DK	1,064	6	82.5	78.9	29.1	70.3	100	100
EE	10	1	59.7	68	42.4	11.9	38.6	100
ES	20,329	11	66.1	64.8	42	12.8	97.6	100
FI	241	4	53.9	49.6	40.5	12.3	47.2	100
FR	3,328	6	48.7	51.5	45	2.9	29.6	100
EL	26,091	2	0.2	0.4	4.5	0	0	0
HR	663	2	50.6	53.2	34.5	16.1	55.3	79.9
HU	20,072	5	35.4	41.6	38.1	0	20.4	66.8

[41] For details, see Cernov, M. and Urbano, T., 'Identification of EU bank business models: A novel approach to classifying banks in the EU regulatory framework', EBA Staff Paper Series No. 2, 2018, available at: https://eba.europa.eu/documents/10180/2259345/Identification+of+EU+bank+business+models+-+Marina+Cernov%2C%20Teresa+Urbano+-+June+2018.pdf/8a69aed9-3e58-4f81-bc4c-80a48e4c3779.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
IE[42]	4,872	8	11.7	11.8	23.4	0	0	11
IT	14,087	11	40.2	37.7	38.1	0	38	73.2
LT	1,266	5	60.2	61.3	38.2	20.6	68.7	99
LU	126	4	88.8	91	25.8	96.3	100	100
LV	1,378	3	57	49.9	39	17.6	58.2	99.8
MT	49	2	38.1	24.7	44.4	0.6	7.7	100
NL	9,235	6	89.2	82.9	14.1	88.8	92.8	98.2
PL	6,951	7	17.3	12.7	32.2	0	0	16.2
PT	37,964	5	67.1	63.8	38.5	28.5	89.5	100
RO	3,259	6	39.2	33.4	36.1	2.9	31.4	69.8
SE	1,686	6	70.9	68.1	44.1	1.9	100	100
SI[43]	194	2	37.7	18.6	37.1	9.1	20.6	72.7
SK	2,124	3	79.3	76.3	31	64	100	100
EU27	**167,576**	**112**	**46.1**	**44.4**	**43.4**	**0**	**38.4**	**99.7**
NO	1,437	4	34	19.4	44.1	1.6	4	100

Figure 5: EU benchmark, gross recovery rate (%), simple average for each EU Member State – RRE

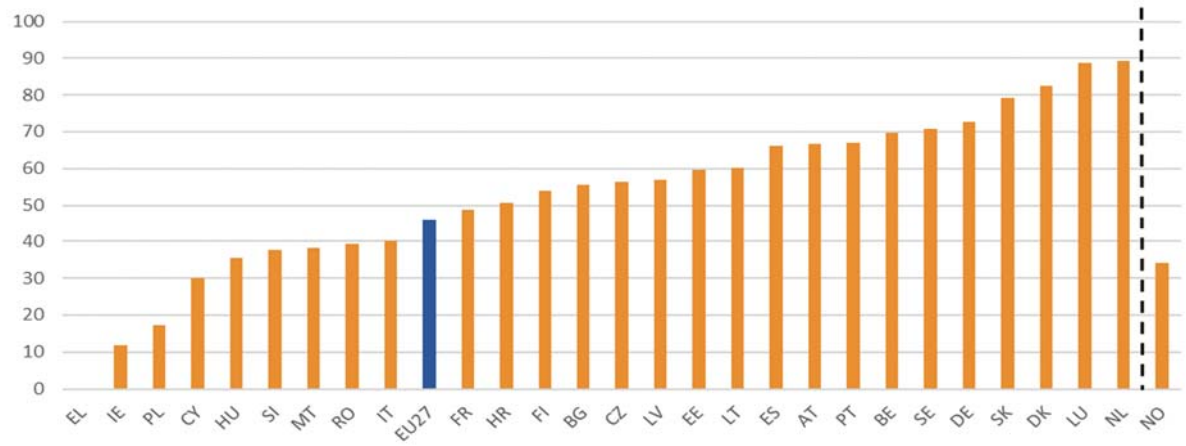


Table 12: EU benchmark, gross recovery rate (%), for each EU Member State – CRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	336	3	65.2	70.9	41	20	93.3	100
BE	NA	–	–	–	–	–	–	–
BG	223	3	54.9	53.4	34.8	21.9	60.1	89
CY	2,264	3	24.5	31.4	29.5	0	14.6	39.5
CZ	34	4	64.6	85.2	38.5	30.1	75.6	98.6
DE	54	6	77.9	84	36.6	64.4	100	100
DK	423	4	80.6	82.4	29.4	64.8	100	100
EE	NA	–	–	–	–	–	–	–
ES	3,446	7	68.5	76.7	38.8	37.6	94.8	100
FI	NA	–	–	–	–	–	–	–
FR	26	6	27.6	32.2	39.8	0	0	46

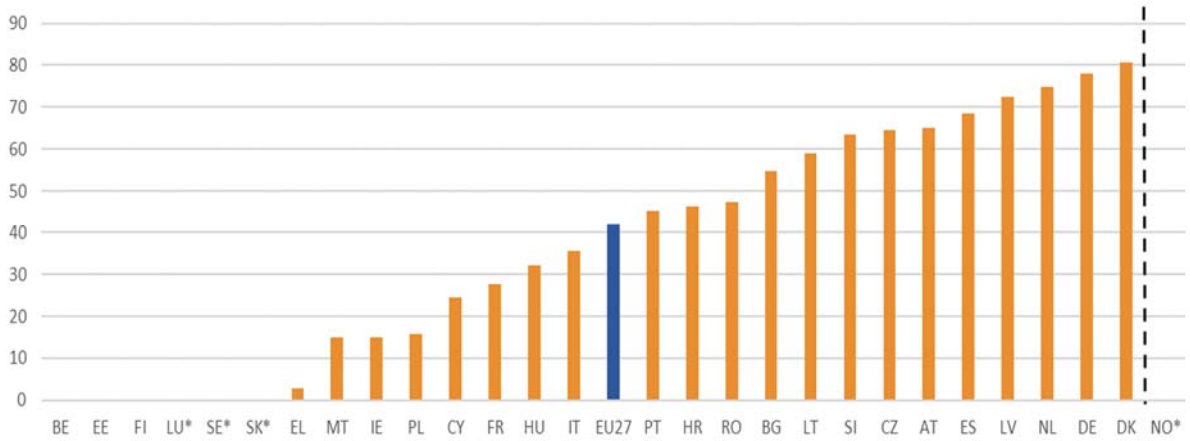
[42] Where non-judicial debt settlement (i.e. voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

[43] For RRE, the number of loans with negative net recovery amounts represent 7.7% of the total number of loans for the sample in the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 34% and 34.7%, respectively.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
EL	351	2	2.9	12.9	14.8	0	0	0
HR	228	2	46.4	30.6	35.2	14.6	45.3	76.7
HU	244	3	32.2	14.7	36.4	0	18.6	50
IE[44]	348	3	15.1	21.8	28.2	0	0	19.4
IT	9,556	9	35.6	31.1	37.1	0	27.4	66.3
LT	63	3	59.1	61.2	41.3	8.9	76.1	100
LU*	*Not shown	–	–	–	–	–	–	–
LV	24	3	72.6	85.8	33	45.1	84	99.2
MT	10	2	15	33.5	25.3	0	1.6	22.2
NL	929	4	74.8	44.1	37.1	54.3	99.4	100
PL	1,417	7	15.9	17.6	32.5	0	0	6
PT	2,761	5	45.3	50	41.2	2.7	36.1	97.1
RO	30	3	47.5	48.4	44.2	0	33.1	100
SE*	*Not shown	–	–	–	–	–	–	–
SI	244	2	63.4	62.8	36.6	32.3	75.8	96.3
SK*	*Not shown	–	–	–	–	–	–	–
EU27	**23,020**	**83**	**42.2**	**39.4**	**40.6**	**0**	**33.7**	**88.8**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 6: EU benchmark, gross recovery rate (%), simple average for each EU Member State – CRE



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 13: EU Benchmark, net recovery rate (%), for each EU Member State – RRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	1,343	4	64.1	63.5	40.1	19.4	86.6	100
BE	483	3	68.8	68.2	40.7	32.1	98.2	100
BG	3,066	3	50.8	44.3	37.9	15.9	46.6	96.2
CY	2,370	4	28.2	23.6	36.7	0	3.9	52.5
CZ	4,938	6	57.1	55.4	40.2	13.6	68.7	96.4
DE	387	9	71.7	68.7	39.7	36.7	100	100
DK	1,064	6	79.6	76.1	31.3	59.9	100	100
EE	10	1	54.8	65.1	44.2	9.9	29	100
ES	20,329	11	65.8	64.5	41.8	14.5	94.9	100

[44] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
FI	241	4	52.2	47.7	41	9	46.6	99.2
FR	3,328	6	48.6	51.2	45	2.9	29.2	100
EL	26,091	2	0.2	0.4	4.5	0	0	0
HR	663	2	44.6	51.6	35.7	1	48.1	75.6
HU	20,072	5	33.2	39	37.7	0	16.1	61.3
IE[45]	4,872	8	11	11.1	22.8	0	0	9.6
IT	14,087	11	32.8	33.7	34.1	0	26.3	60.2
LT	1,266	5	59.1	60.2	38.2	19.4	67	97.5
LU	126	4	88.6	90.8	26.1	96.2	100	100
LV	1,378	3	55.4	48.7	39.4	14.6	55	99.1
MT	49	2	37.3	24.1	44.1	0	7.7	98
NL	9,235	6	88.9	82.5	14.1	88.5	92.4	97.8
PL	6,951	7	7.2	5.2	22.9	0	0	0
PT	37,964	5	64.6	61.4	38.9	24.1	83.1	100
RO	3,259	6	36.3	31	33.5	2.7	29.3	63.8
SE	1,686	6	70.4	68	44.1	1	99.7	99.9
SI[46]	194	2	37	18	37.1	8.5	19.5	72.1
SK	2,124	3	78.2	75.1	31.7	61.6	100	100
EU27	**167,576**	**112**	**43.9**	**42.6**	**43**	**0**	**32.7**	**95.8**
NO	1,437	4	32.1	17.6	43.5	1.2	2.7	99

Figure 7: EU Benchmark, net recovery rate (%), simple average for each EU Member State – RRE

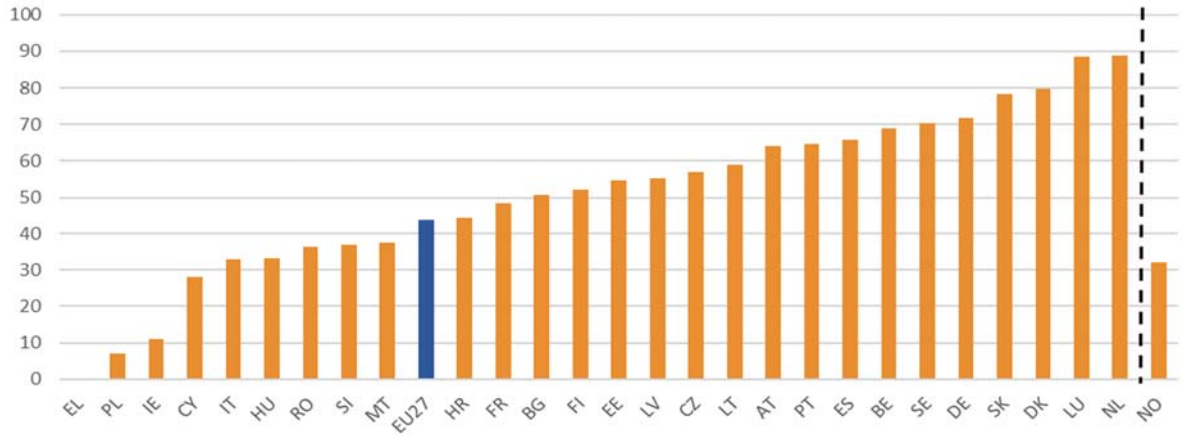


Table 14: EU benchmark, net recovery rate (%), for each EU Member State – CRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	336	3	63.5	69.7	41.5	15.8	89.4	100
BE	NA	–	–	–	–	–	–	–
BG	223	3	51.5	50.8	35.3	19.5	50.1	85
CY	2,264	3	23.3	30.2	28.7	0	13.3	36.3
CZ	34	4	62.9	82.3	37.3	28.6	75.6	93.7

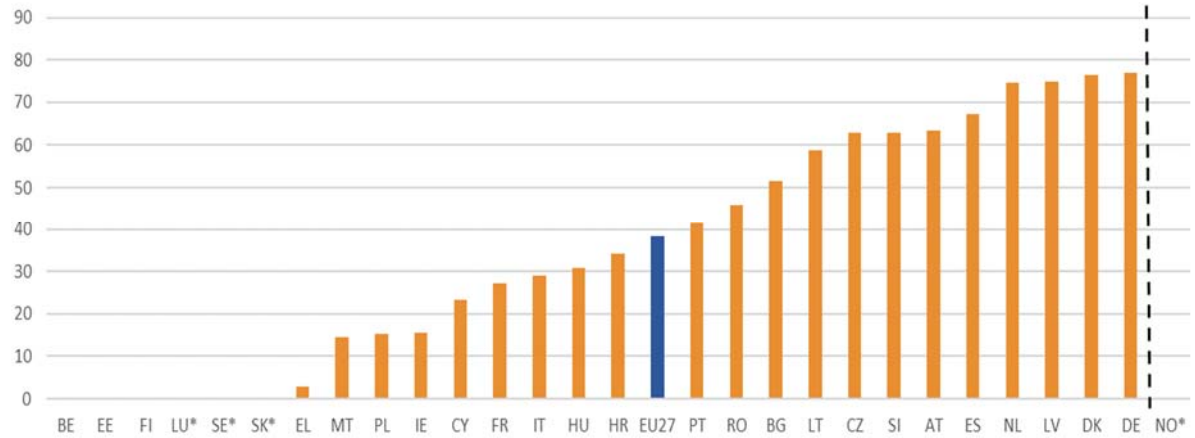
[45] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

[46] For Residential Real Estate, the number of loans with negative net recovery amounts represent 7.7% of the total number of loans for the sample in the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 34% and 34.7%, respectively.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
DE	54	6	77	82.3	37.4	62.1	100	100
DK	423	4	76.5	77.2	33	53.6	100	100
EE	NA	–	–	–	–	–	–	–
ES	3,446	7	67.3	76.3	38.9	35.4	90.2	100
FI	NA	–	–	–	–	–	–	–
FR	26	6	27.1	30.7	39.5	0	0	46
EL	351	2	2.9	12.7	14.7	0	0	0
HR	228	2	34.1	29.9	35.7	0	21.8	62.2
HU	244	3	30.8	14.4	36.2	0	16	49.5
IE[47]	348	3	15.5	21.5	28.8	0	0	17.7
IT	9,556	9	29	26.6	33.6	0	12.1	53.4
LT	63	3	58.7	61	41.6	8.9	75.5	100
LU*	*Not shown	–	–	–	–	–	–	–
LV	24	3	74.8	88	30.4	47.5	83.3	99.2
MT	10	2	14.5	31.7	24.1	0	1.6	22.2
NL	929	4	74.5	43	37.1	53.5	99	100
PL	1,417	7	15.2	14.9	32.2	0	0	3.3
PT	2,761	5	41.5	49.4	40.7	0.5	27.7	90.4
RO	30	3	45.9	44.1	43	0	31.3	90
SE*	*Not shown	–	–	–	–	–	–	–
SI	244	2	62.9	62.2	36.5	31.6	75.2	95.7
SK*	*Not shown	–	–	–	–	–	–	–
EU27	**23,020**	**83**	**38.4**	**37.6**	**39.6**	**0**	**25.9**	**78**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 8: EU benchmark, net recovery rate (%), simple average for each EU Member State – CRE



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Regarding banks' representativeness, the size of the participating banks (large, medium, and small) and respective main business models (Corporate-oriented, Cross-border Universal, Retail-Oriented, and Other)[48] were taken into consideration. In addition, the percentage of total assets of the

[47] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

[48] For details, see Cernov, M. and Urbano, T., 'Identification of EU bank business models: A novel approach to classifying banks in the EU regulatory framework', EBA Staff Paper Series No. 2, 2018, available at: https://eba.europa.eu/documents/10180/2259345/Identification+of+EU+bank+business+models+-+Marina+Cernov%2C%20Teresa+Urbano+-+June+2018.pdf/8a69aed9-3e58-4f81-bc4c-80a48e4c3779.

participating banks in comparison with the percentage of total assets in the banking systems across the EU was also taken into account (see Annex 6 for details for each EU Member State).

For RRE, the comparison between the expected and the observed participating banks shows the following:

- 24 EU Member States have a coverage equal or above 20% of expected domestic banks and well diversified: Seven EU Member States do not show large and medium banks, however for six of them, the sample of expected participating banks does not include large and medium banks in the first place. Ten EU Member States do not show large banks (although for seven of these EU countries, it was not expected), however the observed participating medium and small banks are diversified, covering at least 50% of the expected medium banks and at least 9% of the expected small banks (with five countries with a proportion at least of 50%). One country displays no medium banks.

For CRE, the comparison between the expected and the observed participating banks shows the following:

- 20 EU Member States show a coverage equal or above 20% of expected domestic banks and well diversified: Five EU Member States do not show large and medium banks, however the sample of expected participating banks does not include large and medium banks for four of these countries in the first place. Six EU Member States do not show large banks (although for five of these EU countries, it was not expected), however the observed participating medium and small banks are diversified (Cross-Border Universal and Retail-Oriented) and cover at least 67% of the expected sample for medium and 9% of small banks. Three EU Member States do not show small banks, however the observed participating large and medium cover at least 50% of the expected large and 25% of medium banks. One EU country does not show medium banks.

- Outside these 20 EU countries with a sufficient coverage, three EU Member State do not show any information and the benchmarks are not available.

In terms of banks' representativeness, the vast majority of EU Member States show a sufficient coverage when comparing the expected and the observed participating banks regarding their size and main business models.

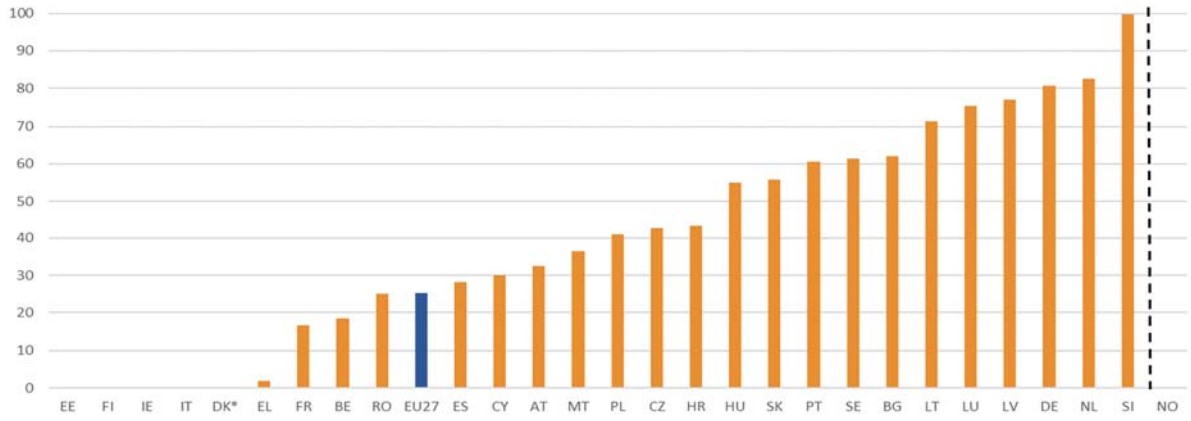
Table 15: EU benchmark, gross recovery rate (%), for each EU Member State – credit cards

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	1,894	1	32.4	31.7	40.1	0	8.2	70
BE	267	2	18.4	25.1	34.9	0	0	11.4
BG	3,094	3	62.1	50.9	40.1	22.4	75.3	100
CY	226	3	30	21.5	40.9	0	5.3	73.6
CZ	31,653	2	42.7	36.9	37.3	6.7	33.4	77.7
DE	51	1	80.6	80.4	31.3	68.8	100	100

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
DK*	*Not shown	–	–	–	–	–	–	–
EE	NA	–	–	–	–	–	–	–
ES	31,311	6	28.2	23.3	40.3	0	2.3	63.1
FI	NA	–	–	–	–	–	–	–
FR	39,742	4	16.7	13.4	32.2	0	0	12.3
EL	123,322	1	1.8	2.9	4.8	0	0	0
HR	2,913	1	43.3	41.2	38.5	8.4	31.5	90
HU	10,762	2	55	52.1	44.1	1.4	62.2	100
IE	NA	–	–	–	–	–	–	–
IT	NA	–	–	–	–	–	–	–
LT	3,222	2	71.4	67.8	25.4	68.9	75.4	79.8
LU	739	2	75.3	67.8	34.3	44.5	100	100
LV	1,829	3	76.9	73.6	35.4	46.3	100	100
MT	57	1	36.3	28.5	44.7	0	5.6	99.3
NL	5	1	82.6	82.6	26.7	37.9	77.5	100
PL	55,296	6	40.9	32.2	41.7	0	22.5	97
PT	6,169	6	60.6	55.6	37	24.2	74.1	94
RO	7,477	1	25	23.2	35	0	2.7	32.6
SE	16,874	7	61.5	58.4	31.7	49	49	100
SI[49]	656	2	99.8	99.9	3.9	100	100	100
SK	983	2	55.8	46.2	39.8	19.8	40.9	100
EU27	**338,544**	**54**	**25.2**	**14.6**	**37.1**	**0**	**0**	**46.9**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 9: EU benchmark, gross recovery rate (%), simple average for each EU Member State – credit cards



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

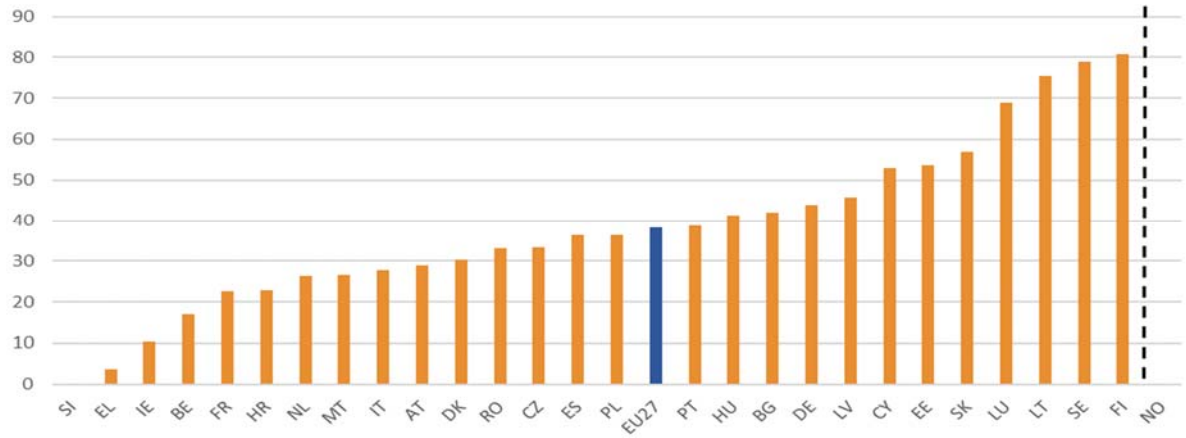
Table 16: EU benchmark, gross recovery rate (%), for each EU Member State – Retail - other consumer loans

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	17,941	7	28.9	30.9	38.7	0	5.8	53.8
BE	1,109	5	17.1	23.6	33.8	0	0	9.3
BG	21,803	4	42.1	26.9	40.6	1.4	26.7	100
CY	2,360	3	52.9	53	38.7	12.8	54.5	100

[49] For Retail - credit cards, the number of loans with negative net recovery amounts represent 1.6% of the total number of loans for the sample in the country.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
CZ	54,148	5	33.4	33.3	33.5	3.9	22.5	55.6
DE	43,663	9	43.9	40	47.9	0	0	100
DK	398	3	30.4	27.4	36.1	0	13.1	54
EE	10	1	53.7	52	30.1	33.1	44.7	64.9
ES	88,609	12	36.5	45.3	36.3	7.7	25.2	63.3
FI	9,410	5	80.8	62.6	35.5	90.4	100	100
FR	33,769	10	22.6	17.9	35.7	0	0.3	35
EL	67,187	4	3.7	4.3	6.6	0	0	12.5
HR	13,525	5	22.8	13.2	34.5	0	4.5	32.8
HU	76,853	5	41.2	27.2	43.6	0	20.7	100
IE[50]	309	5	10.4	17.3	24.7	0	0	5.2
IT	20,490	10	27.8	27.9	30.8	0	24.3	42.7
LT	2,946	3	75.5	69	28.3	72	78.8	100
LU	534	4	68.9	64.1	36.1	34.5	85.5	100
LV	3,171	2	45.8	40.3	40.6	0.1	44.2	100
MT	123	3	26.5	47.1	38.4	0	2.2	42.7
NL	277	6	26.4	46	37.3	0	2	46.5
PL	286,355	11	36.5	19.9	39.4	0	17.5	77.6
PT	21,884	8	38.7	40.4	37.5	11.5	19.1	78.9
RO	33,826	6	33.2	39.1	26.8	17.9	26	40
SE	70,309	9	79	50.4	35.6	61.8	100	100
SI[51]	–	–	–	–	–	–	–	–
SK	8,446	5	57	39.2	41.5	17.1	51.9	100
EU27	**885,349**	**104**	**38.2**	**29.6**	**40.6**	**0**	**19.3**	**91.5**
NO	NA	–	–	–	–	–	–	–

Figure 10: EU benchmark, gross recovery rate (%), simple average for each EU Member State – other consumer loans



[50] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

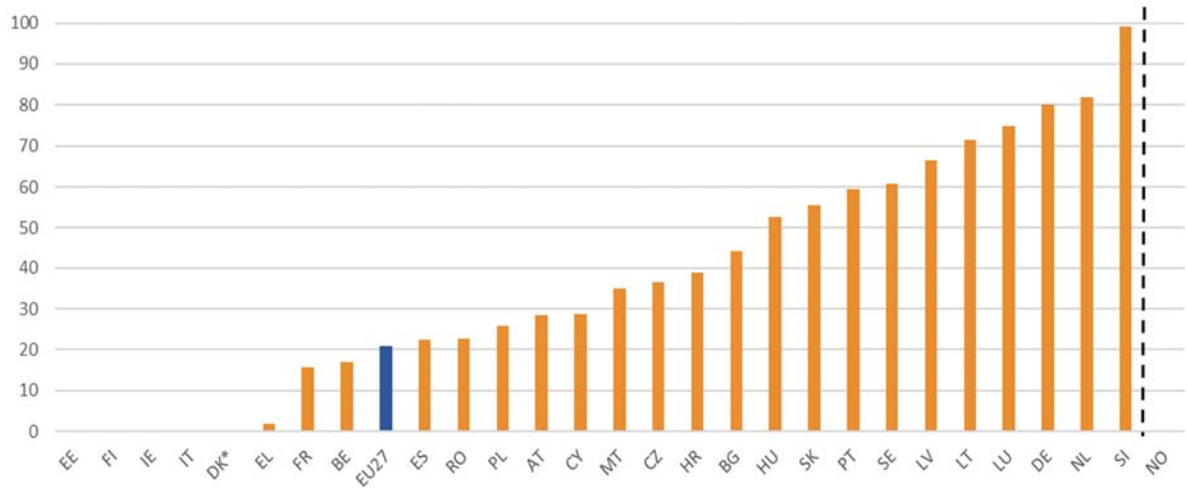
[51] For Retail-Other Consumer loans, the number of loans with negative recovery amounts represent 40% of the total number of loans. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 54.3% and 55%, respectively.

Table 17: EU benchmark, net recovery rate (%) for each EU Member State – credit cards

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	1,894	1	28.5	28	37.9	0	5.9	52.2
BE	267	2	17.1	24	34.4	0	0	2.5
BG	3,094	3	44.3	39.1	40.2	0	37.2	91.5
CY	226	3	28.6	20.4	40	0	5.3	68
CZ	31,653	2	36.6	32	35.5	4.1	24.1	65.9
DE	51	1	80.1	79.8	31.7	68.7	100	100
DK*	*Not shown	–	–	–	–	–	–	–
EE	NA	–	–	–	–	–	–	–
ES	31,311	6	22.4	18.6	32.9	0	1.2	47.2
FI	NA	–	–	–	–	–	–	–
FR	39,742	4	15.6	12.5	30.6	0	0	11
EL	123,322	1	1.8	2.8	4.7	0	0	0
HR	2,913	1	38.8	38	39.2	0.6	24.7	83.4
HU	10,762	2	52.7	49.9	44.6	0	55.2	100
IE	NA	–	–	–	–	–	–	–
IT	NA	–	–	–	–	–	–	–
LT	3,222	2	71.4	67.8	25.4	68.9	75.4	79.8
LU	739	2	74.8	66.8	34.6	43.8	100	100
LV	1,829	3	66.6	62.5	36.5	39.5	95	95
MT	57	1	35	27.9	45	0	0	98.4
NL	5	1	81.9	81.9	27.4	36.2	76	100
PL	55,296	6	25.8	21.1	39.6	0	0	49
PT	6,169	6	59.5	53.6	37.1	21.7	73.1	93.1
RO	7,477	1	22.7	21	31.8	0	2.5	29.8
SE	16,874	7	60.7	57.9	32.3	49	49	100
SI[52]	656	2	99.2	99.3	3.9	99.4	99.4	99.4
SK	983	2	55.5	45.9	39.8	19.7	39.8	100
EU27	**338,544**	**54**	**21**	**12.9**	**34.4**	**0**	**0**	**28.1**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 11: EU benchmark, net recovery rate (%), simple average for each EU Member State – credit cards



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

[52] For retail-credit cards, the number of loans with negative net recovery amounts represent 1.6% of the total number of loans for the sample in the country. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 97.6% and 98.2%, respectively.

Table 18: EU benchmark, net recovery rate (%) for each EU Member State – other consumer loans

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	17,941	7	25.4	28.8	37.1	0	3.3	41.1
BE	1,109	5	16.4	22.7	33.6	0	0	6.1
BG	21,803	4	34.5	23.2	41.2	0	11	85.6
CY	2,360	3	50	52.3	38.6	9.2	48	94.1
CZ	54,148	5	31.9	32.1	32.4	4	21.1	52
DE[53]	–	–	–	–	–	–	–	–
DK	398	3	28.9	26.2	35.6	0	11.3	47.7
EE	10	1	45.4	43.1	33	19.8	38.9	56.4
ES	88,609	12	32.9	42.2	34.6	5.3	22.8	53.9
FI	9,410	5	80	61.6	36.2	81.6	100	100
FR	33,769	10	20.7	13.9	34.3	0	0	29.8
EL	67,187	4	3.6	4.3	6.5	0	0	12.3
HR	13,525	5	18.5	5.7	33	0	0	22.4
HU	76,853	5	38.6	26.4	43.6	0	12.7	100
IE[54]	309	5	10.3	16.8	24.6	0	0	4.8
IT	20,490	10	24.6	25.1	28.8	0	20.8	35.9
LT	2,946	3	74.6	68	28.8	71.8	78.6	100
LU	534	4	67.5	62.5	36.5	33.1	82.1	100
LV	3,171	2	43.9	38.8	38.9	0	42.2	95
MT	123	3	25.2	45.5	38.2	0	0	42.7
NL	277	6	24.6	42.8	35.9	0	0.9	42.8
PL	286,355	11	28.7	14	39.2	0	2.4	55.7
PT	21,884	8	36.2	38.1	37.2	9.3	16.8	72.6
RO	33,826	6	30.9	35.6	25.3	16.5	24	37.3
SE	70,309	9	78	49.9	36.4	61.7	100	100
SI[55]	–	–	–	–	–	–	–	–
SK	8,446	5	56.3	38.5	41.6	16.7	49.2	100
EU27	**885,349**	**104**	**32.9**	**27.2**	**39.5**	**0**	**13.5**	**67.5**
NO	NA	–	–	–	–	–	–	–

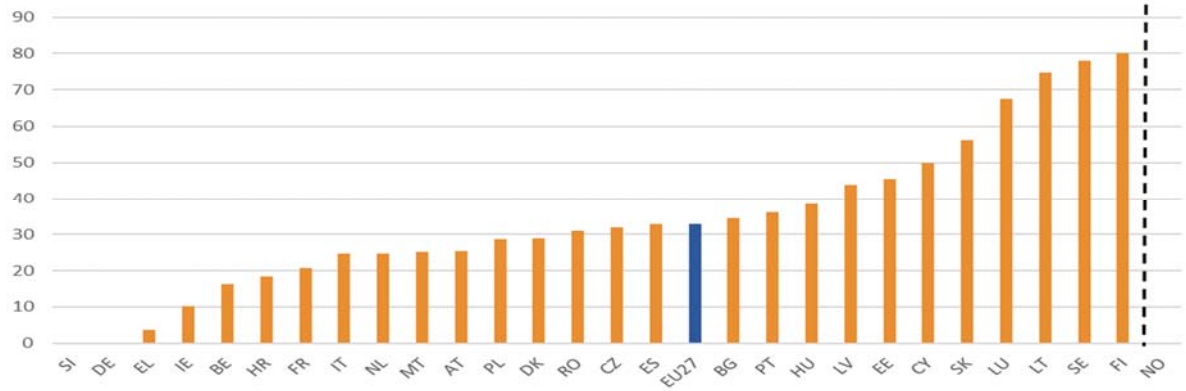
Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

[53] Of the 43,663 observations, fewer than 1,000 were provided by domestic banks. Based on a high volume of observed data provided by one participating bank and, therefore, making generalisations about the whole banking sector can be misleading.

[54] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

[55] For retail - other consumer loans, the number of loans with negative recovery amounts represent 40% of the total number of loans. If these loans were considered, the simple average of the net recovery rate and gross recovery rate would be 54.3% and 55%, respectively.

Figure 12: EU benchmark, net recovery rate (%), simple average for each EU Member State – other consumer loans



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Regarding banks' representativeness, the sizes of the participating banks (large, medium, or small) and their main business models (corporate-oriented, cross-border universal, retail-oriented, and other) [56] were taken into consideration. In addition, the percentage of total assets of the participating banks in comparison with the percentage of total assets in the banking systems across the EU was also taken into account (see Annex 6 for details for each EU Member State).

For retail – credit cards, the comparison between the expected and the observed participating banks shows the following:

- 13 EU Member States have a coverage of greater than or equal to 20% of expected domestic banks and are well diversified (four EU Member States show only small banks, but this is also the case for their respective expected participating banks). Three EU Member States do not show large banks (although it was not expected of them). However, the medium-sized and small banks cover at least 67% of the total medium-sized and 13% of the small banks.

- In addition to the 13 EU Member States for which the coverage is sufficient, five EU Member States did not show any information, although benchmarks including foreign loans[57] (where the insolvency process takes place in a different EU Member State from the domicile of the domestic bank) are included in the recovery rate benchmarks of one EU Member State.

For retail – other consumer loans:

- 23 EU Member States show a coverage of greater than or equal to 20% of expected domestic banks and are well diversified. Among them, nine EU Member States do not show

[56] For details, see Cernov, M. and Urbano, T., 'Identification of EU bank business models: A novel approach to classifying banks in the EU regulatory framework', EBA Staff Paper Series No. 2, 2018, available at: https://eba.europa.eu/documents/10180/2259345/Identification+of+EU+bank+business+models+-+Marina+Cernov%2C%20Teresa+Urbano+-+June+2018.pdf/8a69aed9-3e58-4f81-bc4c-80a48e4c3779.
[57] See Annex 4.

large banks (although this was not expected for six of these EU Member States). However, the medium-sized and small banks are sufficiently diversified in terms of business models (Cross-border Universal, Retail-oriented and other specialised) and cover at least 33% of medium-sized banks and 20% of small banks. Seven EU Member States have only small banks (corresponding to what was expected for five of them). Only one country has no medium-sized banks in the recovery sample with sufficient coverage.

In terms of banks' representativeness, the vast majority of EU Member States show a sufficient coverage when comparing the expected and the observed participating banks' size and main business models.

5.2 Time to recovery

The 'time to recovery' variable was defined as the length (in days) of the recovery period (as part of the recovery rate process, from the start of the formal enforcement status to the date of ultimate recovery from the formal enforcement procedures). The specific from which the number of days was counted was the date of the bank's decision to enter into a formal legal enforcement procedure. It contains the days until full recovery. The date of the initiation by a court may not be the date of the initiation of the formal enforcement process (normally, before the initiation by a possible court there are several days of formal enforcement procedure). If the length of the recovery period was not available before the initiation by the court for each formal enforcement process, banks estimated such initial period (based on experience from similar processes) and added the respective estimates (i.e. number of days) to the known remaining days to report the 'time to recovery'. Therefore, a common definition was used for all loans under enforcement procedures. Some benchmarks are based on very low number of observations and, therefore, making generalisations about the whole banking sector can be misleading.

The EU benchmarks for the 'time to recovery' are presented per asset classes for firms (corporate and SMEs), real estate (CRE and RRE) and retail (credit cards and other consumer loans), as follows:

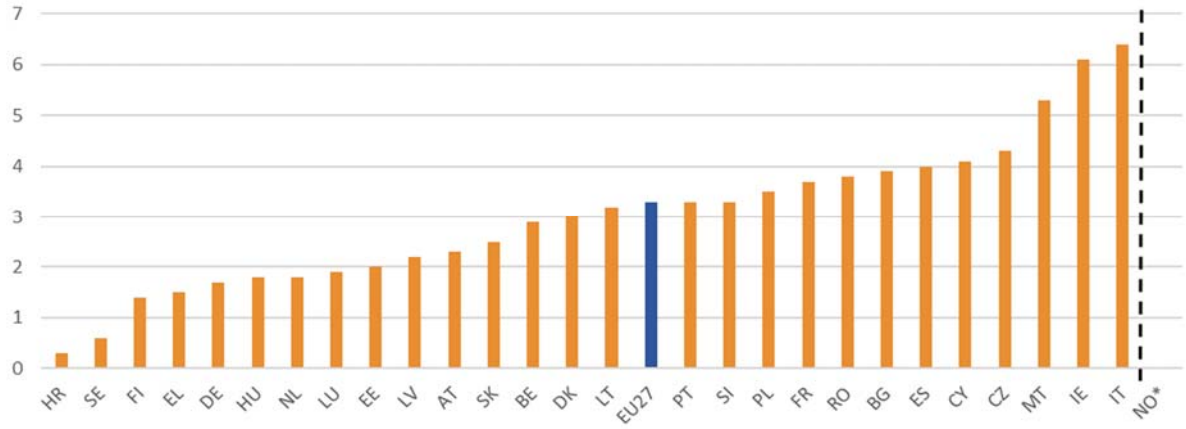
Table 19: EU benchmark, time to recovery (years), for each EU Member State – SMEs

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	3,253	6	2.3	3.6	2.8	0.3	1.3	3.4
BE	55	5	2.9	3.5	2.2	0.9	2.9	4.7
BG	2,842	3	3.9	4.1	2.4	2	3.8	5.7
CY	962	3	4.1	2.5	4.5	1.2	2.5	5.5
CZ	8,823	4	4.3	3.9	4	1	3	7.9
DE	900	7	1.7	2.6	2.5	0	0.7	2.2
DK	300	8	3	3.5	2.4	0.8	2.8	5.1
EE	13	1	2	2	1.3	0.8	1.8	2.7
ES	11,206	9	4	4.2	3.5	1.3	3	6
FI	427	4	1.4	1.7	1.5	0.2	0.9	1.9
FR	6,793	7	3.7	4.8	3.2	1.5	2.8	4.8

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
EL	1,325	3	1.5	1.7	0.8	0.8	1.3	2.2
HR	973	2	0.3	0.2	0.9	0	0	0
HU	17,351	4	1.8	2.7	1.8	0.5	1.3	2.5
IE[58]	41	3	6.1	6.6	2.8	4.3	6.5	8
IT	14,960	13	6.4	6.1	3.6	4	6.8	8.3
LT	301	3	3.2	5.3	3.2	0.6	1.8	6.2
LU	1,019	4	1.9	3.1	2.9	0.2	0.6	2.6
LV	117	2	2.2	2.8	2.3	0.5	1.2	3.2
MT	60	4	5.3	5.3	2.2	4.5	5.2	6.5
NL	15,810	6	1.8	2.5	1.6	0.6	1.4	2.7
PL	5,578	8	3.5	3.1	3.3	1.2	1.8	5.8
PT	22,572	6	3.3	3.3	4.1	0	1.3	5.6
RO	6,090	5	3.8	3.6	1.9	2.3	5.2	5.2
SE	1,362	9	0.6	1.8	0.9	0	0.2	0.8
SI	5,379	2	3.3	3.2	2.2	1.3	3	5.1
SK	2,205	3	2.5	3.1	2	1.1	1.8	3.2
EU27	**130,717**	**107**	**3.3**	**3.5**	**3.4**	**0.8**	**2.2**	**5.2**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 13: EU Benchmark, time to recovery (years), simple average for each EU Member State – SMEs



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 20: EU Benchmark, time to recovery (years), for each EU Member State – corporate

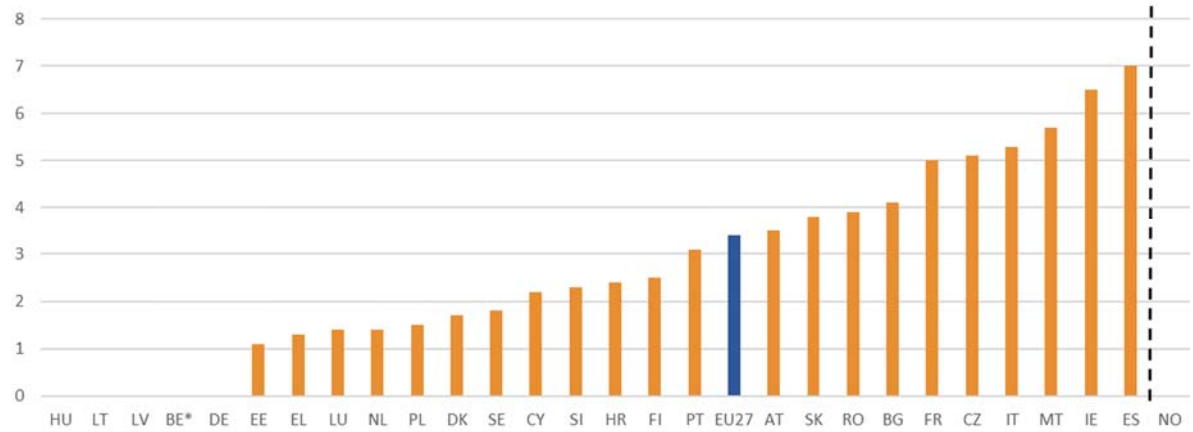
Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	32	3	3.5	3.2	2.1	1.8	3.8	4.3
BE*	*Not shown	–	–	–	–	–	–	–
BG	234	2	4.1	4.3	2.6	2	4.1	5.8
CY	47	2	2.2	2	2.7	1	1.5	2.6
CZ[59]	38	2	5.1	8.4	4.9	1.7	1.7	8.9

[58] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
DE[59]	–	–	–	–	–	–	–	–
DK	30	4	1.7	1.8	2.3	0.1	0.9	1.6
EE	27	1	1.1	1.4	0.9	0.4	0.9	1.4
ES	190	5	7	2.5	4.5	3	6.3	10.2
FI	12	2	2.5	2	1.7	1.6	2.2	2.2
FR	48	4	5	4.9	1.8	3.4	6	6.1
EL	70	2	1.3	1.2	0.8	0.5	1.3	1.7
HR	896	1	2.4	1	2.6	0	1.6	5.4
HU	NA	–	–	–	–	–	–	–
IE[60]	6	1	6.5	7	2.9	2.9	7	7.8
IT	943	9	5.3	5.5	3.6	2.8	5	7.2
LT	NA	–	–	–	–	–	–	–
LU	15	2	1.4	1.4	0.3	1.5	1.5	1.5
LV	NA	–	–	–	–	–	–	–
MT	7	1	5.7	5.2	2.7	4	4.7	4.8
NL	218	2	1.4	2.5	1.2	0.2	1.4	2.5
PL	61	2	1.5	2.6	1	0.9	1.3	2
PT	309	4	3.1	2.8	1.9	1.8	2.5	4.6
RO	46	3	3.9	3	0.9	4.2	4.2	4.2
SE	32	5	1.8	10	2.4	0.1	0.9	2.3
SI	859	1	2.3	2.1	1.8	1	2	3
SK	12	2	3.8	3.7	3	0.9	2.8	5.8
EU27	**4,145**	**53**	**3.4**	**3.9**	**3.1**	**1**	**2.7**	**5.3**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 14: EU Benchmark, time to recovery (years), simple average for each EU Member State – corporate



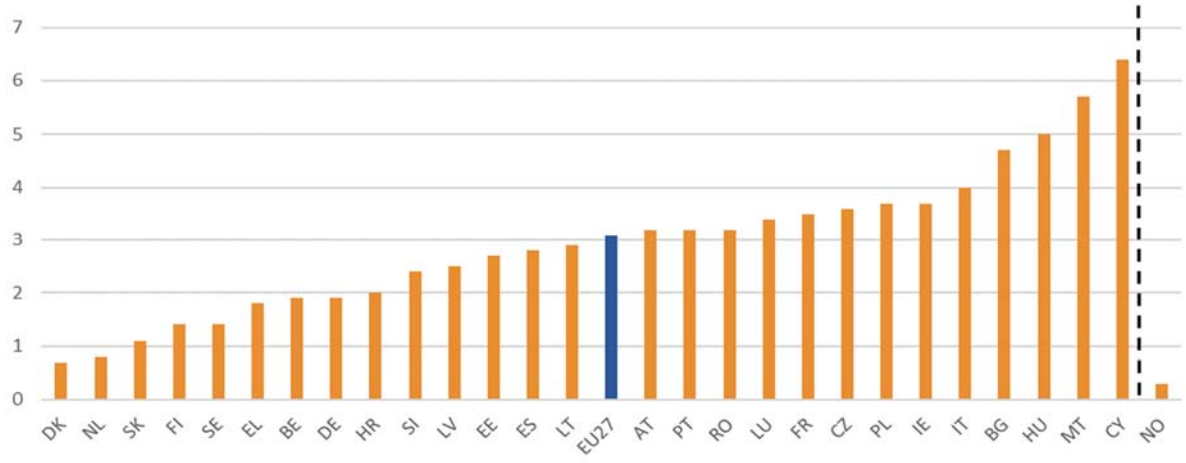
Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

[59] Based on a very low number of observed data; therefore, making generalisations about the whole banking sector can be misleading.
[60] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration

Table 21: EU Benchmark, time to recovery (years), for each EU Member State – RRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	974	4	3.2	2.9	2.7	0.9	2.2	5.7
BE	336	3	1.9	1.4	2.6	0.5	1.1	2
BG	2,529	3	4.7	5.1	2.5	2.8	4.8	6.8
CY	2,080	4	6.4	3.7	4.7	2.7	5.9	7.9
CZ	3,953	6	3.6	4.1	2.9	1.5	2.8	4.7
DE	397	9	1.9	2.1	1.9	0.6	1.3	2.5
DK	1,127	8	0.7	0.8	1	0.1	0.4	0.8
EE	8	1	2.7	3.1	2.1	0.9	1.5	4.9
ES	16,286	10	2.8	3	2.5	0.9	2.3	4.2
FI	1,664	6	1.4	1.4	1.5	0.4	1.1	1.9
FR	2,127	7	3.5	3.8	3.2	1.2	2.6	4.3
EL	67	1	1.8	1.6	1	1	2	2.7
HR	619	2	2	1.9	2	0.4	1.3	3.2
HU	9,864	4	5	4.1	3.1	2.9	4.6	6.9
IE[61]	1,332	9	3.7	3.7	1.5	2.8	3.7	4.7
IT	10,577	10	4	2.5	3.4	1	4	5.9
LT	807	4	2.9	3.2	2.3	0.9	2.4	4.6
LU	276	5	3.4	3.2	3.8	0.8	2.5	4.6
LV	913	3	2.5	3.3	2.4	0.7	1.6	3.6
MT	52	2	5.7	5.5	2	4.5	5.2	7.1
NL	11,323	8	0.8	1.2	1.1	0.1	0.4	1
PL	1,966	6	3.7	3.7	3.3	1	2.3	6.5
PT	30,112	5	3.2	3.2	2.5	1.3	2.5	4.6
RO	2,843	6	3.2	3.6	2.1	1.5	3	4.6
SE	2,044	9	1.4	1.4	1.8	0.3	0.9	1.8
SI	202	2	2.4	2.2	1.5	1	2.1	3
SK	2,026	3	1.1	1.1	1.3	0.4	0.7	1.5
EU27	**106,504**	**114**	**3.1**	**2.7**	**2.9**	**0.9**	**2.3**	**4.8**
NO	1,491	3	0.3	0.3	0.5	0	0	0.5

Figure 15: EU Benchmark, time to recovery (years), simple average for each EU Member State – RRE



[61] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems' distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Table 22: EU benchmark, time to recovery (years), for each EU Member State – CRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	248	3	3	2.9	2.3	1	2.3	4.5
BE	NA	–	–	–	–	–	–	–
BG	231	3	4.3	5	2.2	2.8	4.5	5.8
CY	1,672	3	2.1	1.7	2.2	0.9	1.5	2.4
CZ[62]	35	4	2.8	3.9	3	0	2.2	3.2
DE	55	6	1.9	4.3	2.4	0.6	1.5	2.1
DK	468	6	1.8	1.7	1.7	0.4	1.2	2.6
EE*	*Not shown	–	–	–	–	–	–	–
ES	2,279	7	3.4	3.4	2.5	1.4	3	5
FI	269	3	1.3	1.8	1.3	0.3	0.9	1.7
FR	22	5	3.6	3.5	3.1	0.8	2.2	5.9
EL	18	1	2.1	2.1	0.8	1.2	2.3	2.7
HR	224	2	1.9	0.5	2	0.4	1.1	3
HU	118	2	4	4.7	3.6	1.5	2.9	5.6
IE[63]	32	2	6	5.3	3.6	2.5	6.7	9.1
IT	7,643	8	5.6	4.9	3.7	2.5	6.1	8.1
LT	35	3	2.9	3.2	1.9	1.8	2.1	4.2
LU	12	3	3.5	4.3	2.1	2.3	2.8	3.4
LV	16	2	3.1	2.9	2.3	1.7	2.5	3.1
MT	12	3	4.4	4	1.4	4	4.1	4.1
NL	998	4	2	3.1	1.6	0.7	1.8	2.9
PL	590	6	3.6	1.5	3.1	1.4	2.3	5.3
PT	1,618	5	3.4	2.1	2.8	1.2	2.6	5.4
RO	29	3	3.3	2.7	2.4	1.7	2.7	4.3
SE	53	4	1.3	1.8	1.2	0.3	0.7	2.3
SI	228	2	2	2	1.9	1	2	2.5
SK*	*Not shown	–	–	–	–	–	–	–
EU27	**16,909**	**82**	**4.1**	**3.6**	**3.4**	**1.3**	**3.1**	**6.5**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 16: EU benchmark, time to recovery (years), simple average for each EU Member State – CRE

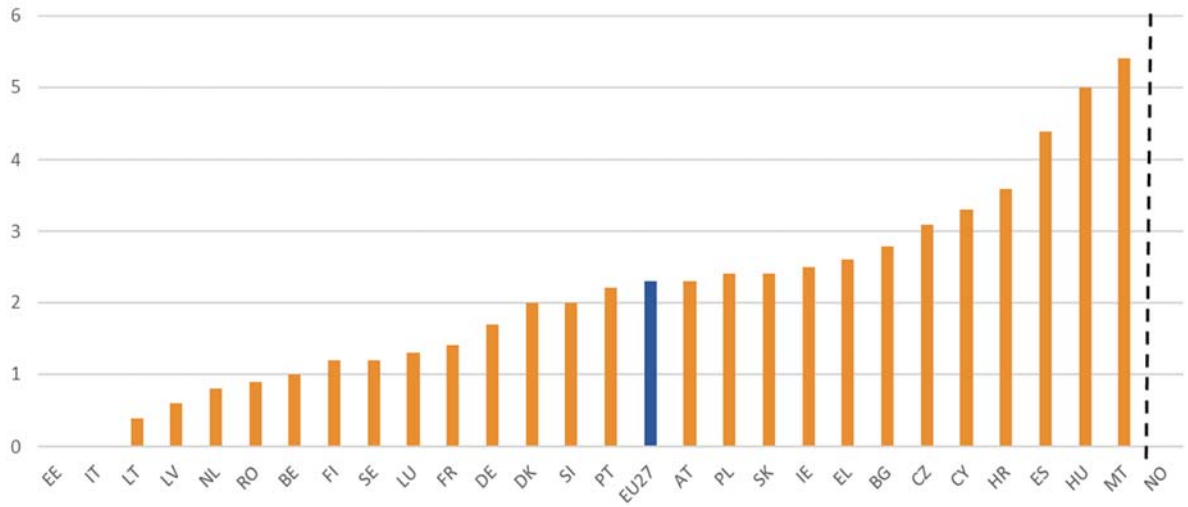
Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

[62] Based on a very low number of observed data; therefore, making generalisations about the whole banking sector can be misleading.
[63] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Table 23: EU benchmark, time to recovery (years), for each EU Member State – credit cards

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	3,170	2	2.3	2.6	2.1	1.3	1.8	2.8
BE	491	2	1	1.4	1.9	0.1	0.2	0.5
BG	3,404	3	2.8	6.5	4.6	0.6	1.8	3.3
CY	228	3	3.3	3.7	2.4	1.5	2.7	4
CZ	47,757	2	3.1	2.9	3.2	0	2.1	5.2
DE	107	1	1.7	2.2	1.7	0.4	1.3	2.3
DK	14	3	2	6.8	2.7	0.2	0.5	1.8
EE	NA	–	–	–	–	–	–	–
ES	13,277	6	4.4	4.3	2.7	2.3	4.9	5.7
FI	195	3	1.2	1.6	1	0.4	0.9	1.7
FR	62,765	4	1.4	1.5	0.9	0.8	1.3	2.1
EL	16,667	1	2.6	2.6	0.2	2.5	2.5	2.7
HR	2,914	1	3.6	3.2	3.1	0.3	3.3	6.8
HU	805	1	5	4.6	2.1	3.5	5	6.7
IE[64]	5	1	2.5	2.6	1.1	1	2	3.1
IT	NA	–	–	–	–	–	–	–
LT	3,252	2	0.4	0.5	0.7	0.2	0.2	0.4
LU	1,280	2	1.3	1.6	1.6	0.3	0.7	1.6
LV	1,216	3	0.6	0.7	0.6	0	0.2	1.1
MT	68	2	5.4	5.5	0.6	5.2	5.2	5.2
NL	954	2	0.8	0.9	0.7	0	0.8	1.4
PL	50,421	6	2.4	2	2	1.1	1.7	3.2
PT	6,234	6	2.2	2.8	1.9	0.8	1.9	3.2
RO	2,507	1	0.9	1	0.5	0.6	0.9	1.3
SE	7,467	9	1.2	1.4	1.6	0.1	0.2	1.8
SI	666	1	2	2	1.7	0.5	1.6	3
SK	1,002	2	2.4	2.2	1.8	1.2	1.7	3.2
EU27	**226,866**	**56**	**2.3**	**2.3**	**2.3**	**0.8**	**1.7**	**2.8**
NO	NA	–	–	–	–	–	–	–

Figure 17: EU Benchmark, time to recovery (years), simple average for each EU Member State – credit cards



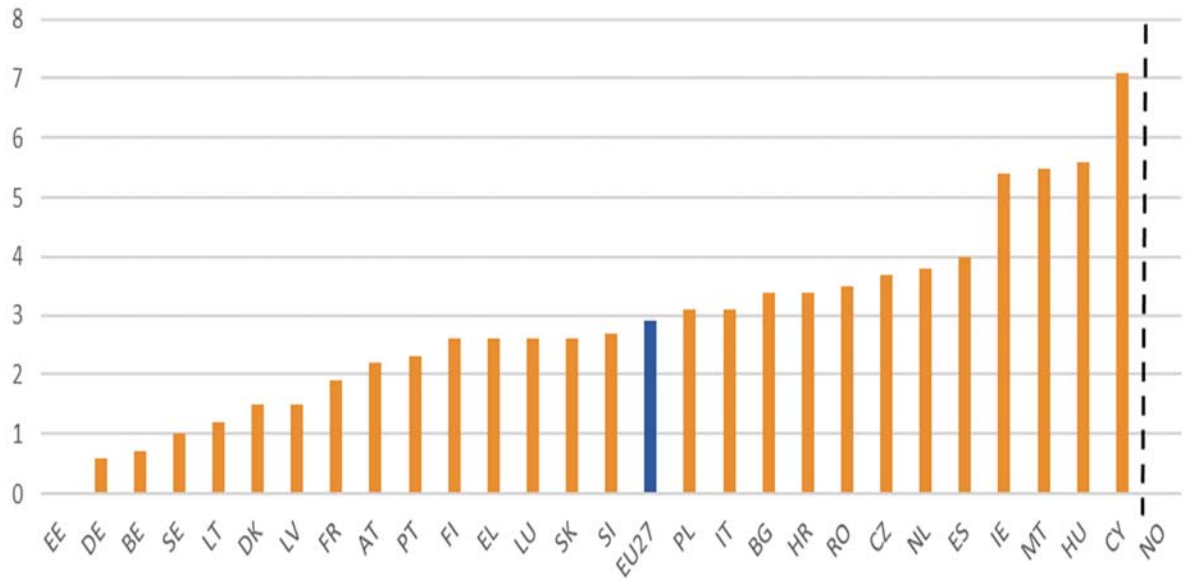
[64] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Table 24: EU benchmark, time to recovery (years), for each EU Member State – other consumer loans

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	23,049	6	2.2	3.2	3.2	0.7	1.5	2.8
BE	1,111	6	0.7	0.6	2	0.1	0.2	0.3
BG	20,447	4	3.4	3.2	5.1	0.3	1.3	4.3
CY	6,364	3	7.1	4	5.7	2.9	5.7	9.2
CZ	58,107	5	3.7	4.5	3.3	1	3	5.4
DE	29,761	10	0.6	1.3	0.8	0.2	0.4	0.8
DK	488	5	1.5	0.5	2	0.2	0.8	1.6
EE	NA	–	–	–	–	–	–	–
ES	46,318	13	4	5.2	3.5	1.5	3.1	5.9
FI	7,439	8	2.6	2.8	2.4	0.4	2	4.5
FR	59,253	10	1.9	2.7	2.2	0.7	1.5	2.5
EL	17,466	3	2.6	2.6	0.4	2.7	2.7	2.7
HR	16,923	5	3.4	1	3.5	0	2.1	6.9
HU	24,289	5	5.6	5	3.1	3.3	5.2	7.6
IE[65]	39	5	5.4	4.9	3.5	1.8	5.7	8.6
IT	26,679	11	3.1	3.8	3.1	0.6	2.1	5.2
LT	2,704	3	1.2	1.7	2.2	0.2	0.4	1.1
LU	1,999	5	2.6	3.4	3.7	0.5	1.4	3.4
LV	1,922	2	1.5	4.3	1.7	0.5	1.2	1.7
MT	164	4	5.5	6.3	2.5	5.2	5.2	5.2
NL	32,286	7	3.8	4.4	3.3	1.4	3.3	5.3
PL	335,894	11	3.1	2.3	2.7	1.4	2.2	3.4
PT	20,102	9	2.3	2.8	2.8	0.3	1.1	3.3
RO	19,072	7	3.5	4.1	1.9	2.1	3.7	4.5
SE	59,862	11	1	2.4	2.5	0	0.1	0.9
SI	9,551	4	2.7	2.7	2.4	0.7	2	4.1
SK	7,295	5	2.6	2.8	2	1.1	1.9	3.7
EU27	**828,584**	**108**	**2.9**	**3.7**	**3**	**0.9**	**2**	**3.9**
NO	NA	–	–	–	–	–	–	–

[65] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Figure 18: EU benchmark, time to recovery (years), simple average for each EU Member State – other consumer loans



5.3 Judicial Cost to recovery

The 'judicial cost to recovery' variable was defined using the judicial costs as a share of the notional amounts at time of default, as follows:

$$\text{Judicial cost to recovery} = \frac{\text{Judicial costs}}{\text{Notional amount outstanding at time of default}}$$

The 'judicial costs' variable includes only direct costs from the judicial system. Judicial costs managed at asset class level may be calculated and reported by the participating bank based on the share of costs relating to the particular loan. Staffing costs of the units/departments dedicated to the formal enforcement processes within the respective bank are not considered judicial costs.

The 'notional amount outstanding at time of default' variable was defined as the notional amount of the loan outstanding at the time of default, i.e. where the loan has a status of defaulted as defined by Article 178 of the CRR: a) the institution considers that the obligor is unlikely to pay its credit obligations to the institution, the parent undertaking or any of its subsidiaries in full, without recourse by the institution to actions such as realising security; b) more than 90 days past due.

Other possible variables and respective ratios were considered, for instance, the judicial costs as a share of the recovered amounts and the judicial costs as a share of the 'notional amount outstanding at the formal beginning of enforcement'. Some benchmarks are based on very low

number of observations and, therefore, making generalisations about the whole banking sector can be misleading.

The EU benchmarks for the 'judicial cost to Recovery' are presented for each asset classes for firms (corporate and SMEs), real estate (CRE and RRE) and retail (credit cards and other consumer loans), as follows:

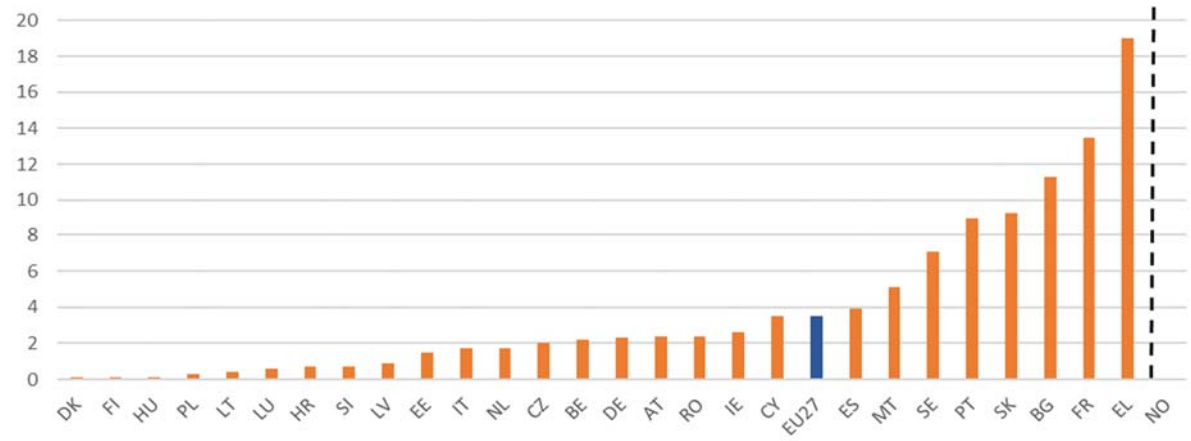
Table 25: EU benchmark, judicial cost to recovery (%), for each EU Member State – SMEs

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	4,462	6	2.4	1	8.5	0	0	1.8
BE	61	5	2.2	2.1	5.5	0	0	2.6
BG	2,617	3	11.3	5.9	11.8	3	7.4	14.8
CY	893	3	3.5	0.9	5.4	0	1.2	4.7
CZ	8,696	4	2	0.2	3.5	0	0	3.5
DE	925	7	2.3	1.3	8.5	0	0	1.1
DK	61	6	0.1	0.1	0.5	0	0	0
EE	14	1	1.5	0.7	2.1	0	0	1.8
ES	10,054	8	3.9	2	8.5	0	0.7	4.2
FI	66	3	0.1	0	0.4	0	0	0
FR	1,480	5	13.5	2	33	0	0	6.8
EL	387	2	19	7.1	27.9	3.9	9.3	21
HR	850	2	0.7	0	9.2	0	0	0
HU	20,224	4	0.1	0.3	0.6	0	0	0
IE[66]	684	3	2.6	0.1	12.8	0	0	0.4
IT	18,863	13	1.7	0.7	7.7	0	0	0.5
LT	371	3	0.4	0.1	1.1	0	0	0
LU	550	3	0.6	0.2	3	0	0	0
LV	218	2	0.9	0.8	2.3	0	0	0.3
MT	60	5	5.1	2.1	9.1	0	0.7	4.8
NL	16,395	6	1.7	1.4	9.8	0	0	1.2
PL	14,938	9	0.3	0.1	1.2	0	0	0
PT	30,710	6	9	1.1	24.6	0.3	1	4.5
RO	7,701	3	2.4	5	3.7	0.1	0.6	2.6
SE	1,693	7	7.1	0.6	14	0.1	1.9	7.1
SI[67]	5,381	2	0.7	0.6	0.3	0.6	0.6	0.6
SK	589	2	9.3	4.6	12.3	5.6	6.8	9.3
EU27	**148,943**	**104**	**3.5**	**1.2**	**13.6**	**0**	**0**	**1.3**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 19: EU Benchmark, judicial cost to recovery (%), simple average for each EU Member State – SMEs

[66] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.
[67] The benchmark should be considered with caution. One of the participating banks provided data for the entire portfolio of loans and not for separate asset classes as an estimate of judicial cost to recovery.



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

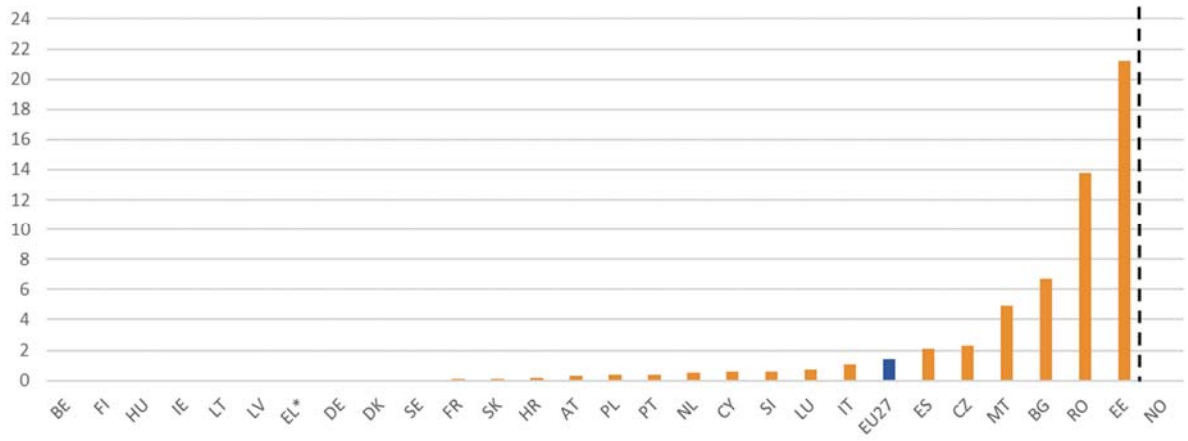
Table 26: EU benchmark, judicial cost to recovery (%), for each EU Member State – corporate

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	37	3	0.3	0.6	0.7	0	0	0.1
BE	NA	–	–	–	–	–	–	–
BG	245	3	6.7	4.6	6.4	1.5	5.4	9.3
CY	61	2	0.6	0.3	1.3	0	0	0.6
CZ[68]	38	2	2.3	0.1	5.2	0	0	0.2
DE[68]	–	–	–	–	–	–	–	–
DK	16	3	0	0	0.1	0	0	0
EE	24	1	21.2	0.5	24.7	0.5	9	40
ES	339	3	2.1	0.7	4.9	0	0	1.5
FI	NA	–	–	–	–	–	–	–
FR	11	2	0.1	0.1	0.2	0	0	0
EL*	*Not shown	–	–	–	–	–	–	–
HR	703	1	0.2	0	2.4	0	0	0
HU	NA	–	–	–	–	–	–	–
IE	NA	–	–	–	–	–	–	–
IT	1,088	10	1.1	0.2	4.9	0	0	0.1
LT	NA	–	–	–	–	–	–	–
LU	16	2	0.7	0.5	0.9	0	0	1.7
LV	NA	–	–	–	–	–	–	–
MT	35	2	4.9	2.3	2.9	3	5.4	6.3
NL	118	1	0.5	0	4.2	0	0	0
PL	331	4	0.4	0	3.6	0	0	0
PT	457	5	0.4	0.1	0.7	0	0.2	0.6
RO	61	1	13.8	13	1.5	12	15	15
SE	14	3	0	0	0	0	0	0
SI[69]	830	1	0.6	0.6	0	0.6	0.6	0.6
SK	10	2	0.1	0.1	0.1	0	0	0.3
EU27	**4,448**	**51**	**1.4**	**0.5**	**4.7**	**0**	**0**	**0.6**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

[68] Based on a very low number of observed data; therefore, making generalisations about the whole banking sector can be misleading.
[69] The benchmark should be considered with caution. One of the participating banks provided data for the entire portfolio of loans and not for separate asset classes as an estimate of judicial cost to recovery.

Figure 20: EU benchmark, judicial cost to recovery (%), simple average for each EU Member State – corporate



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 27: EU benchmark, judicial cost to recovery (%), for each EU Member State – RRE

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	1,306	4	1.6	1.2	2.9	0	0	2
BE	486	3	0.9	0.9	0.1	0.9	0.9	0.9
BG	2,789	3	7.1	5.8	3.5	4.7	6.9	9.4
CY	2,821	3	2.2	1.3	3.3	0	1	2.7
CZ	4,900	6	1.5	1.3	2.6	0	0	2.9
DE	379	9	1.9	1.7	3.2	0	0.1	3.2
DK	1,091	6	0.3	0.5	0.8	0	0	0
EE	NA	–	–	–	–	–	–	–
ES	9,555	9	2.1	1.9	3.5	0.2	0.7	2
FI	330	4	0.4	0.2	0.8	0	0.1	0.5
FR	310	6	1.3	1.2	2.8	0	0	0.9
EL	304	1	5.1	2.2	4.3	1.4	4.2	8.1
HR	647	2	0.9	0.6	1.3	0	0.2	1.4
HU	18,896	4	2.4	2.4	3.4	0	1	3.8
IE[70]	3,930	6	0.4	0.2	0.8	0	0.2	0.5
IT	16,171	12	1.3	0.9	2.7	0	0	1.2
LT	1,305	5	0.4	0.3	0.9	0	0.1	0.3
LU	160	3	0.1	0.2	0.5	0	0	0
LV	1,335	3	1.8	1.3	2.3	0	0.7	2.8
MT	48	2	1.5	1.1	1.9	0	0	3.3
NL	9,181	5	0.3	0.3	0.1	0.3	0.3	0.3
PL	6,971	7	0.2	0.2	0.7	0	0	0
PT	40,655	5	2.7	1.8	2.7	0.9	1.9	3.5
RO	3,175	6	2.5	2	2.8	0.2	1.6	3.8
SE	1,633	6	1	0.2	2.5	0.1	0.2	0.4
SI[71]	209	2	0.7	0.7	0.6	0.6	0.6	0.6

[70] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.
[71] The benchmark should be considered with caution. One of the participating banks provided data for the entire portfolio of loans and not for separate asset classes as an estimate of judicial cost to recovery.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
SK	1,020	2	1.7	1.6	3.2	0	0	2.2
EU27	**129,607**	**103**	**2**	**1.3**	**2.9**	**0**	**0.7**	**2.7**
NO	1,504	4	9.2	4	30.4	0.1	0.7	4.3

Figure 21: EU benchmark, judicial cost to recovery (%), simple average for each EU Member State – RRE

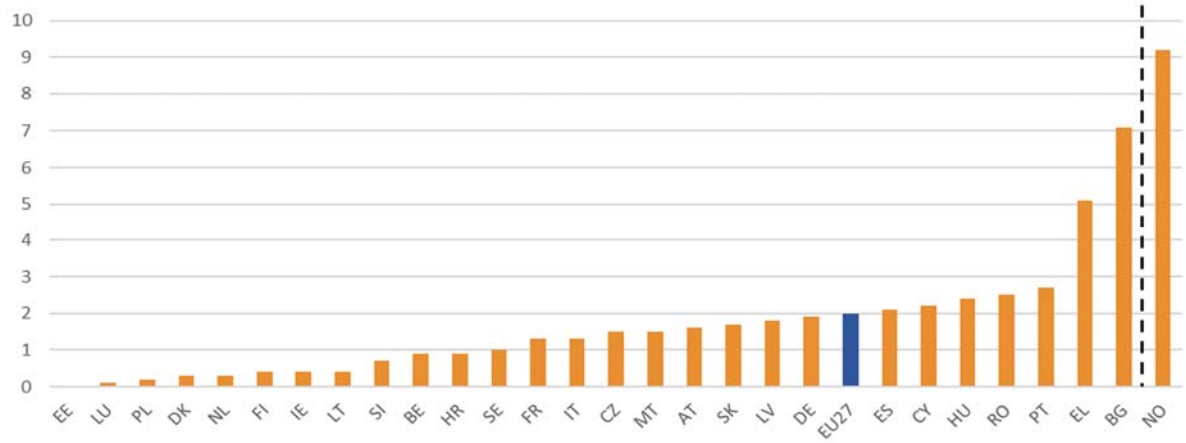


Table 28: EU benchmark, judicial cost to recovery (%), for each EU Member State – CRE

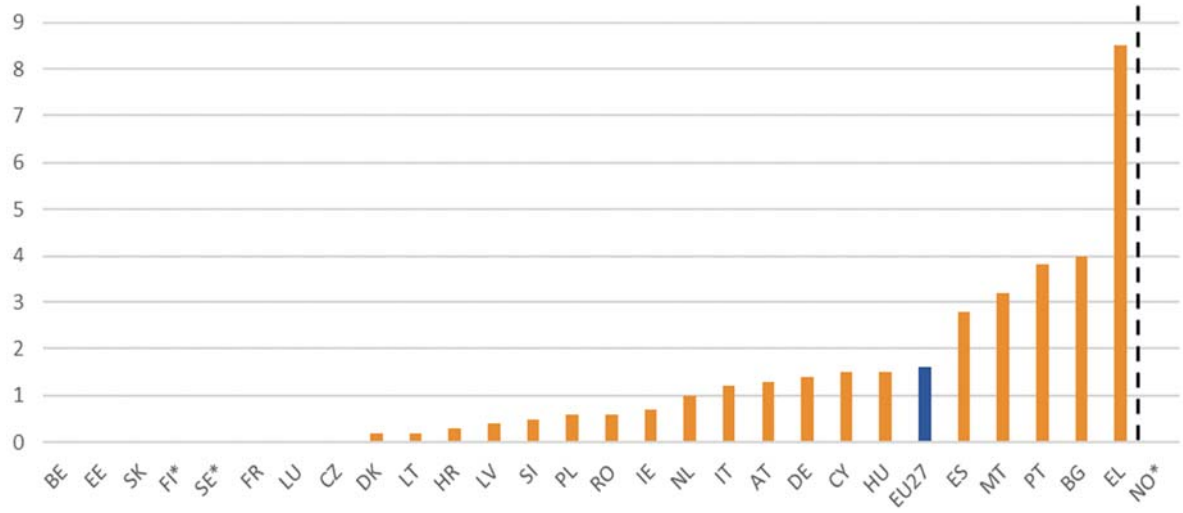
Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	334	3	1.3	0.6	2.9	0	0	1.1
BE	NA	–	–	–	–	–	–	–
BG	201	3	4	2.4	3.8	1	2.8	5.5
CY	1,132	3	1.5	0.4	3.5	0	0.4	1.4
CZ	33	3	0	0	0.1	0	0	0
DE	54	6	1.4	1.7	2.7	0	0	1.2
DK	559	4	0.2	0.2	0.4	0	0.1	0.2
EE	NA	–	–	–	–	–	–	–
ES	1,435	6	2.8	0.9	5.5	0	0.5	2.4
FI*	*Not shown	–	–	–	–	–	–	–
FR	24	5	0	0	0.1	0	0	0
EL	273	1	8.5	2.5	8.8	1.4	6.1	12.3
HR	223	2	0.3	0	0.8	0	0	0
HU	238	3	1.5	0.3	2.5	0	0.1	1.9
IE[72]	495	3	0.7	0.1	2.6	0	0	0.1
IT	12,648	9	1.2	0.4	3.1	0	0	0.8
LT	62	3	0.2	0.2	0.4	0	0	0
LU	10	2	0	0	0	0	0	0
LV	23	3	0.4	0.2	0.7	0	0.1	0.5
MT	19	3	3.2	2.3	3.9	0	2	5
NL	776	3	1	1.3	4	0	0	0
PL	1,478	7	0.6	0.3	1.7	0	0	0
PT	2,913	5	3.8	0.4	5.8	0.5	1.4	4.1
RO	28	3	0.6	0.2	1.4	0	0	0.1
SE*	*Not shown	–	–	–	–	–	–	–

[72] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
SI[73]	236	2	0.5	0.6	0.2	0.5	0.6	0.6
SK	NA	–	–	–	–	–	–	–
EU27	**23,199**	**80**	**1.6**	**0.5**	**4**	**0**	**0.1**	**1.3**
NO*	*Not shown	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 22: EU benchmark, judicial cost to recovery (%), simple average for each EU Member State – CRE



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 29: EU benchmark, judicial cost to recovery (%), for each EU Member State – credit cards

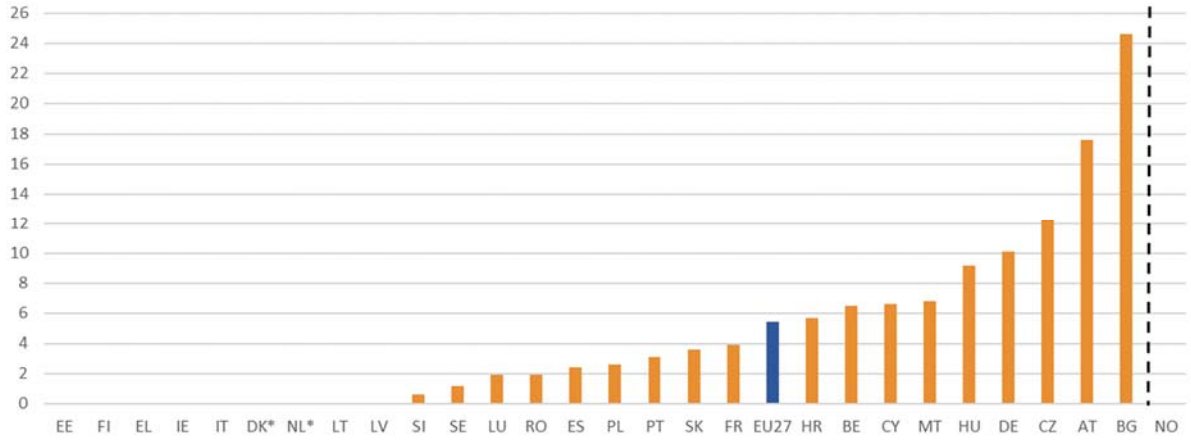
Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT[74]	3,131	1	17.6	15.5	17.5	0	17	31.1
BE	302	2	6.5	8.9	8.4	3.9	3.9	3.9
BG	2,279	3	24.6	17.1	21.1	8.1	20	34.5
CY	268	3	6.6	3.4	9.9	0	1.2	10.2
CZ[75]	44,794	2	12.2	10.2	17.4	0	5.8	17.1
DE	107	1	10.1	9.5	10.4	0.4	4.8	18.2
DK*	*Not shown	–	–	–	–	–	–	–
EE	NA	–	–	–	–	–	–	–
ES	8,105	4	2.4	2.9	4	0	0	3.6
FI	NA	–	–	–	–	–	–	–
FR	38,160	3	3.9	4	12.7	0	0	0.2
EL	NA	–	–	–	–	–	–	–
HR	2,904	1	5.7	4.1	4.3	4.1	5.4	6.9
HU	10,539	2	9.2	7.2	7.6	2.6	8.6	13.5
IE	NA	–	–	–	–	–	–	–
IT	NA	–	–	–	–	–	–	–
LT	3,213	2	0	0	0	0	0	0
LU	1,242	2	1.9	2.1	5.2	0	0	0
LV	1,829	3	0	0	0	0	0	0
MT	56	2	6.8	5.9	10.5	0	2.3	8.3
NL*	*Not shown	–	–	–	–	–	–	–

[73] The benchmark should be considered with caution. One of the participating banks provided data for the entire portfolio of loans and not for separate asset classes as an estimate of judicial cost to recovery.
[74] Participating banks include foreign subsidiaries, therefore the countries' benchmarks are influenced not only by domestic but also by foreign banks' enforcement practices in the country of the enforcement procedures. Therefore, making generalisations about the whole banking sector can be misleading.
[75] Making generalisations about the whole banking sector can be misleading.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
PL	65,693	6	2.6	1.9	3.5	0	0.6	4.4
PT	6,631	6	3.1	4.7	9.6	0	0	1.9
RO	7,254	1	1.9	1.8	2.8	0	0.1	2.4
SE	19,577	6	1.2	1	2.1	0	0	1.9
SI[76]	666	2	0.6	0.6	0	0.6	0.6	0.6
SK	1,002	1	3.6	2.7	8.4	0	0	1.7
EU27	**217,758**	**48**	**5.4**	**3.8**	**11.6**	**0**	**0**	**5.7**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Figure 23: EU benchmark, judicial cost to recovery (%), simple average for each EU Member State – credit cards



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 30: EU benchmark, judicial cost to recovery (%), for each EU Member State – other consumer loans

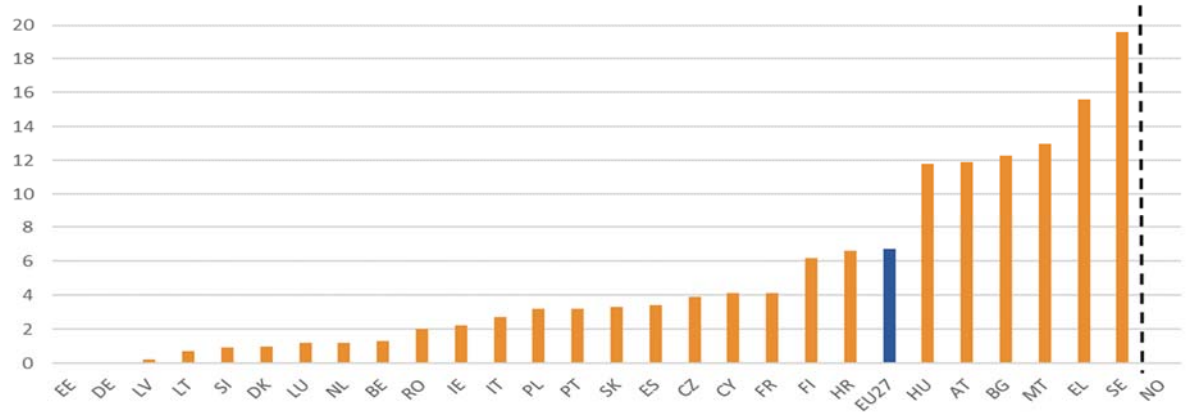
Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
AT	24,063	7	11.9	4.6	19.4	0	0	16.8
BE	1,121	4	1.3	1.4	1.2	1	1	1.4
BG	11,175	3	12.3	6.6	13.6	3.5	8	14.5
CY	3,676	3	4.1	0.5	9.1	0	0	3.8
CZ	58,017	5	3.9	3	10.2	0	0	0
DE[77]	–	–	–	–	–	–	–	–
DK	403	4	1	0.3	2.4	0	0.2	0.9
EE	NA	–	–	–	–	–	–	–
ES	66,283	10	3.4	3.8	4.3	2	2	2.7
FI	9,687	5	6.2	2.1	13.8	0	0	4.1
FR	20,849	7	4.1	4.2	11.3	0	0	0.7
EL	226	3	15.6	9.2	14.5	6.4	11.1	20.5
HR	15,492	5	6.6	1.5	8	0	5.9	9.1
HU	74,745	5	11.8	2.4	11	3	9.2	16.5
IE[78]	446	5	2.2	0.3	7.8	0	0	0.6
IT	24,821	10	2.7	2.7	5.8	0	1	2.5
LT	3,100	3	0.7	0.8	1.5	0	0	0
LU	675	3	1.2	1.1	3	0	0	0.2

[76] The benchmark should be considered with caution. One of the participating banks provided data for the entire portfolio of loans and not for separate asset classes as an estimate of Judicial Cost to Recovery.
[77] Out of the 17,388 observations, around 1,000 observations were provided by domestic banks. Therefore, making generalisations about the whole banking sector can be misleading. In addition, of 17,388 observations, 15,852 were provided by one foreign bank that reported consistently high judicial costs.
[78] Where non-judicial debt settlement (i.e., voluntary sale/surrender of property) is a prominent feature of workout in national financial systems distressed debt workout, judicial enforcement benchmarks will not reflect work out recovery rates, costs, or duration.

Country of formal enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	1st quartile	Median	3rd quartile
LV	3,082	2	0.2	1	0.7	0	0	0
MT	127	4	13	4.7	16.9	0	5	18.1
NL	286	6	1.2	2.8	2.5	0	0	0
PL	378,156	11	3.2	1.4	4.7	0	1.6	4.3
PT	28,484	6	3.2	2.1	6.4	0.6	1.3	3.1
RO	32,367	6	2	2.2	1.3	1.2	2	2.2
SE	77,584	8	19.6	1.6	21.3	0.6	11.4	33.7
SI[79]	9,630	4	0.9	1	1.6	0.6	0.6	0.6
SK	7,537	4	3.3	2.3	6.7	0	0	6
EU27	**869,420**	**95**	**6.7**	**2.3**	**12.6**	**0**	**2**	**6.3**
NO	NA	–	–	–	–	–	–	–

Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations

Figure 24: EU benchmark, judicial cost to recovery (%), simple average for each EU Member State – other consumer loans



Note: * Not shown when the number of observations is below five. The EU27 figures include not shown observations

6. Main determinants from enforcement frameworks across the EU explaining the recovery outcomes

The main factors that explain the differences in recovery outcomes were compared against the EU benchmarks. National loan enforcement regimes vary significantly across EU Member States in terms of the range of enforcement processes available to creditors, the scope and consistency of rule application, and the efficiency of court systems. It was important to study[80] the potential impacts on the banking systems by considering, *inter alia*, the following:

[79] The benchmark should be considered with caution. One of the participating banks provided data for the entire portfolio of loans and not for separate asset classes as an estimate of judicial cost to recovery.

[80] In future, it will also be important to study the potential impacts on the banking systems by considering, *inter alia*, the following: a) the potential to impede on the credit supply and contribute to suboptimal resource allocation of funds to the real economy; and b) the potential to discourage both national and cross-border lending and investment.

- the possible limits to recovery values that may drive delays in resolution and/or cause undue cost burdens;
- the factors that may impair banks' ability to recover collateral and cause a build-up of NPLs on the banks' balance sheets.

The investigation of the key features of the national loan enforcement regimes and the links to efficient debt enforcement outcomes from a creditor perspective, i.e. via higher recovery rates and shorter time to recoveries, shed some light on the significant differences in recovery outcomes across the EU.

The potential explanatory indicators for the key characteristics that define the national loan enforcement regimes could be collected by using questionnaires and publicly available information.

In 2018, the Commission started the qualitative analysis on the basis of a survey sent to Member States through the Financial Services Committee. The Commission services collected this qualitative information and provided the EBA with a translation of it into quantitative information. The translation into quantitative indicators produced either ordinal[81] or binary variables. The collection of comparative qualitative information of enforcement regimes within a Member State took into account the idiosyncratic aspects of an enforcement regime such as national institutional characteristics (e.g. individual and collective enforcement methods, the existence of specialised courts, court capacity, and court clearance rates of a Member State).

The data analysis assumes that the national institutional characteristics have a direct impact on the efficiency of the enforcement regime, influencing the main indicators/EU benchmarks, i.e. recovery rates and time to recoveries.

Cross-sectional data

The characteristics of the enforcement frameworks for the EU Member States based on a survey collected during 2019 provides cross-sectional data. The survey was collected from selected countries (EU Member States) in a single time period and the reference date of 31 December 2018.

In addition, the loan-by-loan level data on the main variables (i.e. recovery rate, time to recovery, judicial costs to recovery, etc…) used in the analysis were collected with reference to a certain point in time, namely 31 December 2018. Each loan was observed under formal enforcement in the sample only once. Thus, the behaviour of each loan under enforcement is observed only once (not across time, despite different information collected at different moments, for instance at the time of default and at the time of enforcement).

The participating banks, as in a cross-sectional study, were selected based only the inclusion and exclusion criteria set for the study.

[81] See for details regarding the questionnaire and respective variables: European Commission - Analysis of the individual and collective loan enforcement laws in the EU Member States, 2019. Translating qualitative information into quantitative indicators is subject to ambiguity, so the use of dummy variables to avoid having to give arbitrary values where a clear effectiveness ranking is not present is also a possibility. That is, in the event of a natural order in a factor (e.g. an indicator for 'no rules', 'informal rules', and 'formal rules'), the factor will be split into three dummy variables, of which one will function as the reference category. For details, see treatment effect literature.

There is no time dimension involved in cross-sectional studies. The data collection lasted several months for both, the EU survey and the loan-by-loan data; however the point in time data is similar to both rather than the calendar time to collect the data. The main data in this study were collected with reference to 31 December 2018.

Since this is a one-time measurement of exposure and outcome, it is difficult to derive causal relationships from cross-sectional analysis. However, under certain circumstances a cross-sectional design may be valid when studying potentially causal associations. For example, if the association is assumed to be stable over time, a cross-sectional design may be valid. In this case, it is assumed that the main characteristics of the enforcement frameworks (even if a few changes have happened between 2015 and 2018) and the characteristics of the loans, individuals, banks and countries (as part of the sample) are stable over time.

Some control variables are time series data collected at different points in time (e.g. annual gross domestic product-GDP; banks efficiency). In these cases, each variable is observed once per time period for a number of periods. The business cycle has an impact on these relationships; however, due to data constraints, this was not entirely taken into account in the study.

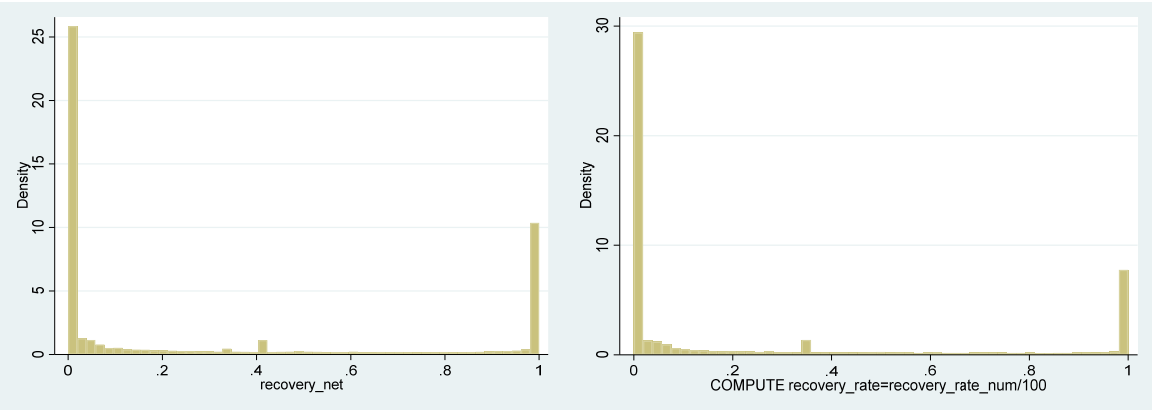
Some variables were transformed and converted into natural logs (ln). The purpose was to bring all values to a similar scale and also to reduce the effect of any outliers.

Recovery rate variables

Figure 25 shows the distributions of the cumulative of both variables, recovery net and recovery rate for corporate and SMEs (as an example). The distributions are bimodal with many observations with low recovery and many with complete recovery. Bimodal distributions of bank loan recoveries are also found in Asarnow and Edwards (1995)[82], Felsovalyi and Hurt (1998)[83], Franks et al. (2004)[84], Araten et al. (2004)[85] and Caselli et al. (2008)[86]. The histogram of enforced loans' recovery rates demonstrates two peaks, with a bimodal characteristic demonstrating that the probabilities of full recovery rates ranging from 0.9 to 1 and the probabilities of low rates ranging from 0.1 to 0.2 are both very high.

[82] Asarnow, E. and Edwards, D., 'Measuring loss on defaulted bank loans: A 24-year study', Journal of Commercial Lending, Vol. 77, No. 7, 1995, pp. 11-23.
[83] Felsovalyi, A. and Hurt, L., 'Measuring loss on Latin American defaulted bank loans: A 27-year study of 27 countries', *Journal of Lending & Credit Risk Management*, Vol. 81, No. 2, 1998, pp. 41-46.
[84] Franks, J., de Servigny, A. and Davydenko, D., 'A comparative analysis of the recovery process and recovery rates for private companies in the UK, France and Germany', Standard and Poor's Risk Solutions, 2004.
[85] Araten, M., Jacobs, M. and Varshney, P., 'Measuring LGD on commercial loans: An 18-year internal study', *The RMA Journal*, Vol. 4., 2004, pp. 96-103.
[86] Caselli, S., Gatti, S. and Querci, F., 'The sensitivity of the loss given default rate to systematic risk: new empirical evidence on bank loans', *Journal of Financial Services Research*, Vol. 34, 2008, pp. 1-34.

Figure 25: Firms (corporate and SMEs) – histogram – recovery net and recovery rate



A common method to estimate the distribution of recovery rates is Beta distribution, which forms a smooth curve compared with the histogram. The Beta distribution estimation cannot fit the bimodal distribution of defaulted loans' recovery rates. Beta distribution estimation can partly describe the distribution of recovery rates but cannot fit its multiple peaks characteristic.[87]

Logistic function

As Figure 25 shows, the recovery rate is restricted to the interval between 0 and 1. Owing to the bounded nature of the dependent variable one cannot implement an ordinary least squares (OLS) regression because the predicted values from the OLS regression can never be guaranteed to lie in the unit interval. In addition, least squares estimates for regression models are highly sensitive to observations that do not follow the pattern of the other observations (i.e. outliers).

The logit–normal model is preferable on the grounds that it has the desirable property to restrict recovery rates to the interval between 0% and 100%. This additional structural element may make parameter estimation more efficient.[88]

Cross-sectional regressions

After collecting the information on the key characteristics of the enforcement regimes on a country-by-country basis, the analysis takes a cross-sectional view of all EU Member States for each indicator/factor. The objective is to obtain explanatory factors relating to enforcement procedures (including corporate insolvency and personal insolvency).

It was possible to develop a statistical identification of the effects on a loan level basis through cross-sectional regressions for each of the recovery outcomes (rates, times) with the data obtained on borrower characteristics, (extra) judicial timings, and qualitative enforcement regime factors, among other things. For instance, it was possible to test the effect of enforcement regime indicators on observed recovery rates directly. The impact of loan enforcement regimes and institutional factors was estimated on the loan recovery rates, while controlling for unobservable differences in

[87] Düllmann and Gehde-Trapp (2004) utilize a logit-normal distribution and empirically analyse the recovery rates.
[88] See Annex 7 for details.

countries beyond enforcement regimes and loan characteristics. The recovery rates were collected for all loans under formal enforcement procedures observed in all EU Member States.

The enforcement indicators are the qualitative characteristics, transformed into binary information, observed at the EU Member State level. A series of controls were used, such as macroeconomic factors (e.g. GDP per capita), banks' characteristics (size, business models)[89] and legal origin of the enforcement.[90] The approach allows to quantify the impact of various enforcement indicators captured by the variety of loans (e.g. loans going through foreclosure, as an example).

The influence of the economic situation of the EU Member States during the formal enforcement of the loans was taken into account for controls. Several EU Members States data show the situation after a severe crisis, and this affects every single variable: recovery rates plunge because of lower collateral values and deterioration of the debtor's situation, and time to recovery increases as a result of to overloaded judicial systems. Furthermore, where the crisis has been long, samples collected may be overpopulated by the most difficult to recover assets. Creditors with better solvency or better collateral may be recovered in the first stages of the process, while the most difficult cases tend to take longer to recover. Therefore, these types of cases may be overrepresented in the sample of certain EU Member States. Macroeconomic factors, despite not capturing completely the potential business cycle impact given some data restrictions, helped to explain some of the differences observed among EU Member States, and were also relevant for studying the differences among enforcement frameworks.[91] The quality of the final model specifications was validated through statistical testing.

Clustered standard errors

Some observations in the data set are related to each other and this correlation exists because some loan characteristics (e.g. a bank's debtor or country of enforcement) are identical or similar for groups of observations within clusters (the observations within each cluster are not independently and identically distributed). For instance, some banks may be more efficient in the enforcement process than other banks.[92] The cluster-adjusted standard error will account for within-cluster correlation or heteroscedasticity.

Data was sampled from a population of EU Member States using clustered sampling for the participating banks and the intention of the study is to infer something about the broader population of banks. When using clustered standard errors it is important for clustering to take into account how the sample was selected and whether there are clusters in the population of interest that are not represented in the sample. Given the sampling design, we clustered standard errors by both countries of enforcement and banks.

[89] The level of capital (measured against the capital requirements) and the level of NPL (or NPL ratio) were also considered and provided similar results to control variables.
[90] See Annex 4 for details.
[91] A future possibility is the collection of data for different reference dates (i.e. not only 31 December 2018). The analysis could study different timeframes in which the loans entered into enforcement procedures (e.g. well before 2015 or after) as this would have an expected impact on the variables (given the judicial/legal reforms that were implemented in some Member States over time).
[92] The existence of clusters will lead to: standard errors that are smaller than regular OLS standard errors, narrow confidence intervals, t-statistics that are too large and misleadingly small p-values (see Cameron, A. & Miller, Douglas. (2015). A Practitioner's Guide to Cluster-Robust Inference. Journal of Human Resources. University of Wisconsin Press, vol. 50(2), pages 317-372)

The research questions and hypotheses clearly support this model.

The analysis begins with the univariate relationships between recovery rates and the explanatory variables (dichotomic variables showing the characteristics of the enforcement frameworks). The aim is to find a mathematical relationship between the explanatory and response variables. The simple relationship between loan recovery rates and each of the dichotomic variables was examined. Successive models were built on the entire sample by enforcement/insolvency qualitative characteristics. Each enforcement/insolvency qualitative characteristics is a dummy variable that is entered into the regression equation.

Control for the presence of potential endogeneity

Several control variables are entered into the model to test the recovery rate. It is important to control for loan characteristics (time to recovery), bank characteristics (efficiency, size and business model), country characteristics (GDP per capita, legal system).[93] Macroeconomic variables did not explain as much of the variation in recovery rates as the banks' variables did.[94]

Endogeneity can occur in a variety of cases. There are two common cases: first, when important variables are omitted from the model, also called omitted variable bias, and second, when the outcome variable is a predictor of 'x' and not simply a response to 'x', also called simultaneity bias or selection bias. The second case, i.e. when the outcome variable of interest is, in fact, a predictor of the 'x' variable(s) in a model, is more difficult to control. This simultaneity (reciprocal effects) produces biased coefficients that generally lead to overestimation of the effect size of 'x' in regression models.

The possibility that in EU Member States with lower levels of recovery rates this may induce a higher public pressure to improve the efficiency of the judicial system, with recovery rates being the cause of changes (independent variable) rather than the consequence (dependent variable) was studied. To control for the presence of potential endogeneity, among other control variables, the legal origin of the EU Member State (i.e. a country legal origin) was used as an instrument variable for the proxy for the efficiency of the judicial system.

To account for unobserved cultural and institutional effects, country fixed effects were used.[95] This accounts for unobserved, time-invariant country heterogeneity. Not accounting for unobservable country heterogeneity in cross-country analyses causes a serious omitted variable bias on estimates of institutional effects – if such omitted country characteristics are correlated with these institutions. However, when controlling for country fixed effects (country dummies), many of the

[93] Other control *variables* such as additional borrower characteristics (total assets), loan characteristics (discount rate, LTV), industry sector fixed effects and time-period effects could be also useful if more observations were available.

[94] Univariate results using macro-economic variables show the correct sign for each coefficient, but not all of the relationships are significant. Averages of the period 2013-2018 (and sub-periods) were used. The countries' average of GDP growth, as expected, are positively correlated with recovery rates but are not significant. The countries' average of GDP per capita are also positively correlated with recovery rates and significant at 10% level. The countries' average of unemployment, as expected, are negatively correlated with recovery rates and are significant at 5% level. Regarding GDP per capita, it is necessary to avoid the occurrence of serial correlation (a situation where the error term is autocorrelated, i.e. where the error term of an observation, at time t, is influenced by the error term of any observation, at time t-j) due to the inertia of the economic time series (i.e. a positive correlation between successive residuals). When using cross-sectional data, autocorrelated error terms (i.e. special autocorrelation) are much less likely, however in this cross-sectional analysis, the average of GDP per capita was used for the period between 2013 and 2018.

[95] Such unobservable time-invariant country characteristics include, for example, culture, history, response behaviour, and formal institutions that are not captured by available measures.

country dummies are omitted because of collinearity (a situation where there is either an exact or approximately exact linear relationship among the explanatory variables). A wide number of predictors being omitted because of collinearity is because most of them are redundant. Nevertheless, the use of country dummies increases the adjusted[96] R^2 and improves the likelihood ratio (LR) statistic.[97] In this way, the effects of de facto time-invariant institutions will be identified in models with country fixed effects. The variables are defined in Table 31.

Table 31 Variables description

Variables	Description
Time to recovery (years) of the participating bank	The length of the recovery period (as part of the recovery rate process, from the start of the formal enforcement status to the date of ultimate recovery from the formal enforcement procedures).
Efficiency 2018 (ratio) of the participating bank	Noninterest expense before foreclosed property expense, amortisation of intangibles, and goodwill impairments as a percentage of net interest income (fully taxable equivalent, if available) and noninterest revenues, excluding only gains from securities transactions and nonrecurring items. For European banks, expenses include foreclosed property and amortization of intangibles and income includes security transactions. Source: SNL Financial Fundamentals.
Average GDP growth between 2013 and 2018: avgGDP_growth_13_18	Average GDP growth between 2013 and 2018, for each EU Member State. Source: Eurostat.
Log of the average real GDP per capita between 2013 and 2018: lnaGDPpercap13_18	Log of the average real GDP per capita between 2013 and 2018, for each EU Member State. Source: Eurostat.
Legal origin: d_Legalorigin	Legal origin based on four groups corresponding to the type of legal system in each EU Member State: 1 = Germanic; 2 = French; 3 = Anglo-Saxon[98]; or 4 = Nordic. French Law: BE, ES, FR, GR, IT, LT, LU, MT, NL, PT, RO Germanic Law: AT, BG, HR, CZ, EE, DE, HU, LV, PL, SK, SI Anglo-Saxon Law: CY, IE Nordic Law: DK, FI, SE, NO Source : La Porta et al. (1997, 1998, 2008).[99]
Size category of the participating bank: d_bsize_cat2	Size category of the bank: 1=Small; 2=Medium; or 3=Large. Small banks - total assets below EUR 10 billion); medium-sized banks - total assets between EUR billion 10 and EUR 50 billion; large banks - total assets above EUR 50 billion.
Business model of the participating bank: d_b_BM	Business model of the participating bank: 1 = cross-border universal; 2 = retail-oriented; 3 = Corporate-oriented; or 4 = other specialised. Source: EBA Staff Paper on Business Models.[100]

The estimated parameters of the significant explanatory enforcement regime indicators show the impact of such explanatory indicators on the recovery outcomes. The resulting impact for individual

[96] The standard R^2 is not very useful for qualitative response models. Various alternative statistics can be used to estimate the quality of the fit (called pseudo-R^2s): R^2 of McFadden, Count R^2, etc.
[97] To test the null hypothesis that all the slope coefficients are simultaneously equal to zero, we rely on the LR statistic (under the null it follows a Chi-squared distribution with degrees of freedom equal to the number of explanatory variables). It is equivalent to the F–test used for the standard linear regression model.
[98] Anglo-Saxon legal origin relates largely to CY data (IE contributes with few observations). The analysis were also tested by including MT and the results did not change. The results should be used with caution.
[99] La Porta, R., López-de-Silanes, F., Shleifer, 'The Economic Consequences of Legal Origins', Journal of Economic Literature, Vol.46, No. 2, 2008, pp. 285-332; La Porta, R., López-de-Silanes, F., Shleifer, A. and Vishny, R.W., 'Legal determinants of external finance', *Journal of Finance*, Vol. 52, No. 3, 1997, pp. 1131-1150, and La Porta, R., López-de-Silanes, F., Shleifer, A. and Vishny, R.W., 'Law and finance', *Journal of Political Economy*, Vol. 106, 1998, pp. 1113-1155.
[100] For details, see Cernov, M. and Urbano, T., 'Identification of EU bank business models: A novel approach to classifying banks in the EU regulatory framework', EBA Staff Paper Series No. 2, 2018, available at: https://eba.europa.eu/documents/10180/2259345/Identification+of+EU+bank+business+models++Marina+Cernov%2C%20Teresa+Urbano+-+June+2018.pdf/8a69aed9-3e58-4f81-bc4c-80a48e4c3779.

EU Member States could be used to evaluate the estimated parameters, including scenario analysis of the impact on recovery outcomes of a Member State moving to a more efficient regime (all else equal).

Hence, the basic thesis that some factors (characteristics) of the enforcement frameworks are significant indicators of the likely average recovery rate amongst bank loans appears to be substantiated. In addition, the univariate results using banks and macro-economic variables show the expected behaviours and assures the quality of the data collection regarding the dependent variable. These univariate regressions,[101] and the multivariate regressions discussed in the following sections, were calculated using the recovery rate as the dependent variable.

Robustness checks

Some robustness checks were carried out to verify how the results would change when taking into account several important modifications to the approach.

The models shown in the tables are based on the recovery rates directly reported by the banks. One might argue that this variable is conceptually different from an indirect calculation of recovery rates using the amounts reported by the banks. Both specifications are important. The results are based on the indirect calculation of recovery rates using the amounts reported by the banks demonstrate similar results.

In addition, the regional legal origin (as a supra-national regional categorical variable) in a country-random effects model provides also a sufficient robustness check and substitution for omitted country fixed effects. The reason for the neglect of the time dimension is that most political institutions and governance structures regarding judicial systems and enforcement frameworks tend to be rather stable over time, causing their available measures to be correlated too highly with any vector of country dummies. This high correlation implies that in most empirical models the effects of country characteristics of the enforcement frameworks have some difficulties to be (statistically) identified when country fixed effects are added.

Moreover, different methodologies were also used, namely Tobit and Ordinal Logit models. Tobit is a model developed for censored samples, i.e. samples in which information on the dependent variable (e.g. recovery rate) is available for only some observations. Recovery rates equal to zero must be treated differently. In addition, for all the loans under enforcement that have not finished, it is possible to consider recovery rates higher than the recovery rates obtained by 31 December 2018 (the reference date for data collection), instead of assuming the same level of recovery rates for more recent years. Given the lack of information for different moments in time the analysis in this case did not use the information for a recovery rate equal to zero. Future data collections, for different dates, will allow these robustness checks to be developed further. Ordinal logit is a model to be used when the dependent variable (e.g. recovery rate) is qualitative and contains more than two ordinal (i.e. ranked or ordered) outcomes. The recovery rate was transformed into four ordinal categories, as follows: 1 (for recovery rates = 0); 2 (for recovery rates > 0% and < 50%); 3 (for recovery rates ≥ 50% and < 100%; and 4 for recovery rates = 100%. There is a clear ranking among

[101] Cramér's V as a statistical measure of association between two variables was used. As expected, the correlations among some of the qualitative characteristics of the enforcement frameworks tend to be high and well above 0.5 (1=perfect association). That is, when a specific characteristic exists it is reasonable to also find similar characteristics in the same framework. For example, one characteristic such as the absence of privileges (prior rank) for wages, pension schemes (D28) are frequently seen together with another similar characteristic such as the absence of other general privileges for specific types of creditors/debt (D29) in the MS and respective enforcement framework (Cramér's V=0.83).

the categories (i.e. logical order). The results of using either Tobit or Ordinal logit models to explain the recovery rates were similar.

Finally, regarding the categories of loans, a robustness check was also developed by restricting the sample to only loans that concluded the enforcement process between end-2015 and end-2018 (i.e. Category 1). Whenever the reduction of the sample was possible, given the sampling design, the regressions provide similar results, i.e. the positive characteristics of the enforcement frameworks are the same. The number of observations decrease significantly in some asset classes (such as corporate or CRE) when using only loans that concluded the enforcement process between end-2015 and end-2018; this creates several missing values across different countries of enforcement, and the sizes and business models of banks do not allow sample design and country of enforcement to be taken into account. For firms (as well as for SMEs), all the positive and significant variables show the same results. For RRE the characteristics maintain the positive signal and one of the characteristics continues to be significant. For CRE, the characteristics maintain the positive signal. For retail – other consumer loans, all the characteristics maintain the positive signal and continue to be significant. Finally, for retail – credit cards, all characteristics maintain the positive signal and one continues to be significant.

6.1 Corporate and SMEs

Recovery rate

The analysis is developed by grouping corporate and SMEs (called firms). The characteristics of the enforcement frameworks that contribute to higher recovery rates are similar for corporate and SMEs.

The characteristics (factors) that are associated with higher recovery rates[102] for both (corporate and SMEs) and are therefore key variables of interest in the data analysis are the following:

- legal techniques to enable out-of-court enforcement of collateral available;
- out-of-court enforcement of collateral available – tangible moveable assets;
- absence of long moratoria that suspend enforcement of collateral;
- creditors' chances to impact on the proceedings through creditor committees;
- absence of privileges (prior rank) for debt towards government, social security etc. (‘clearance of arrears to public sector’);
- absence of privileges (prior rank) for wages, pension schemes, etc.;
- absence of other general privileges for specific types of creditors/debt;
- 'pre-pack' insolvency (or restructuring) available for SMEs.

In a multivariate analysis, more complex models to explain recovery rates were developed, by adding several variables to the enforcement/insolvency qualitative characteristic. Table 33 shows, in addition to the enforcement/insolvency qualitative characteristic, the estimations with the inclusion of other variables such as time to recovery, banks’ characteristics (efficiency, size and

[102] That is, if the country enforcement framework confirms the existence of such qualitative characteristic the recovery rate is, on average, higher than in countries without such qualitative characteristics. Other qualitative characteristics of the same questionnaire were used and were not significant.

business models), a macroeconomic variable (average of the GDP per capita between 2013 and 2018), and the legal origin of the enforcement framework (i.e. Germanic, French, Anglo-Saxon, or Nordic).

A positive and significant coefficient indicates that the enforcement/insolvency qualitative characteristic being considered increases the total recovery rate. The basic structure of the most successful models is the following: logit models for each of the key variables of interest together with several control variables were developed. The result shows that the dummy variables are consistently positive and statistically significant across all specifications. Regressions in columns 1–7 build the 'basic models' with all enforcement/insolvency qualitative characteristic (factors) significant (based on their *t*-ratios).

Time to recovery is expected to be an inverse measure of enforcement/insolvency efficiency. Higher time to recovery results in a lower recovery rate, reflecting poor enforcement/insolvency procedures. It was expected that this variable would have a negative coefficient in the recovery rate regression. The results show that, indeed, a longer enforcement time reduces recovery rates. In addition, as expected, higher efficiency (i.e. a negative signal of the variable) and higher GDP per capita increases the recovery rates; however, the coefficients are not significant. The results include, in addition to banks' efficiency, other bank-level variables to control for the potential effects of banks' characteristics, namely size and business models. The banks' characteristics help to control more effectively for the effect of business model, size, and operating efficiency on recovery rates. The results are generally robust to the use of control variables.

Regarding macroeconomic variables, the results are as expected (positive for GDP per capita). However, the macro-variable shows no significance. This is similar to previous findings. Altman et al. (2005)[103] regressed average recovery rates on default rates and macroeconomic variables, and found that recovery rates and default rates are closely linked, and that macroeconomic variables become insignificant and redundant once default rates (as banks' NPLs) are included as explanatory variables. Macroeconomic variables in general are significant determinants of default probabilities but not of recovery rate distributions (Bruche and González-Aguado, 2008[104]). In addition, Asarnow and Edwards (1995)[105] carried out a long-term empirical study on recovery rates which covers a time period of 24 years from 1970 to 1993 and found a time-stable non-linear uptrend of the recovery rate variable that seems to be independent of macroeconomic factors. Moreover, the results confirm the legal origin of the EU Member State as a valid control variable.[106]

Table 32 shows for corporate and SMEs the characteristics (factors) that are associated with higher recovery rates. To recover value from the collateral of a secured loan, when a creditor has the possibility of receiving either the collateral itself or the proceeds therefrom without a court proceeding it seems to increase the recovery rates. The fact that out-of-court enforcement could be available just so, or only upon prior agreement with the borrower, is a positive and significant factor for firms in the enforcement frameworks. Across the EU, out-of-court enforcement is not available in all Member States or is available only for some specific asset classes. Tangible movable assets seem to be one of the types of asset classes that benefit from better recovery rates when

[103] Altman, E., Brady, B. Resti, A. and Sironi, A., 'The link between default and recovery rates: Theory, empirical evidence and implications', *Journal of Business*, Vol. 78, 2005, pp. 2203-2228. 10.1086/497044.
[104] Bruche, M. and González-Aguado, C., 'Recovery rates, default probabilities and the credit cycle', *Journal of Banking and Finance*, Vol. 34, No. 4, pp. 754-764.
[105] Asarnow, E. and Edwards, D., 'Measuring loss on defaulted bank loans: A 24-year study', *Journal of Commercial Lending*, Vol. 77, No. 7, 1995, pp. 11-23.
[106] See Annex 8 for descriptive statistics and correlations.

the out-of-court enforcement is available. With regard to moratoria, enforcement often comes with a moratorium or stay, meaning that the borrower is given additional time during which a creditor cannot enforce. The absence of the possibility of a long moratorium improves recovery rates. Moreover, the existence in the enforcement frameworks of the possibility of creditors' chances to impact on the proceedings seems to be an important factor for higher recovery rates. Generally, creditors' chances to impact on the proceedings means that the proceedings are geared more towards recovery of value by the creditors. Finally, the existence of privileges for debt towards government, wages, pensions and other general privileges by taking precedence over other creditors results in lower recovery rates to banks. In the absence of such rules, banks are able to recover more.

Table 32: Firms (corporate and SMEs) – characteristics (factors) that are associated with higher recovery rates

	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate
D1 Out-of-court enforcement of collateral	1.847 ***								
	(3.020)								
D2 Out-of-court enforcement of collateral, real estate collateral		1.704 **							
		(2.500)							
D3 Out-of-court enforcement of collateral, tangible moveable assets			1.704 **						
			(2.500)						
D10 Absence of long moratoria that suspend enforcement of collateral				1.848 ***					
				(3.020)					
D25 Creditors' chances to impact on the proceedings through creditor committees					6.150 ***				
					(3.020)				
D27 Absence of privileges (prior rank) for debt towards government, social security						1.845 *			
						(3.020)			
D28 Absence of privileges (prior rank) for wages, pension schemes							1.845 ***		
							(3.020)		
D29 Absence of other general privileges for specific types of creditors/debt								6.860 ***	
								(3.020)	
D30 Pre-pack' insolvency (or restructuring) available for SMEs									6.860 ***
									(3.010)
Time to recovery (years)	-0.105 **	-0.109 *	-0.109 *	-0.105 **	-0.105 **	-0.105 **	-0.105 **	-0.105 **	-0.105 **
	(-2.120)	(-1.920)	(-1.920)	(-2.120)	(-2.120)	(-2.120)	(-2.120)	(-2.120)	(-2.120)
Efficiency Ratio 2018	0.022	0.034	0.034	0.022	0.022	0.022	0.022	0.022	0.022
	(1.080)	(1.510)	(1.510)	(1.090)	(1.080)	(1.080)	(1.080)	(1.080)	(1.080)
lnaGDPpercap13_18	-0.046	-0.223	-0.223	-0.047	-0.045	-0.045	-0.045	-7.379 ***	-7.379 ***
	(-0.100)	(-0.400)	(-0.400)	(-0.100)	(-0.100)	(-0.100)	(-0.100)	(-2.880)	(-2.880)
d_legalorigin (reference =2)									
Germanic Law	-4.063 ***	-3.829 ***	-3.829 ***	-4.065 ***	-4.062 ***	-2.218	-2.218 *	9.271 **	2.411
	(-2.800)	(-2.610)	(-2.610)	(-2.800)	(-2.800)	(-1.890)	(-1.890)	(2.500)	(1.420)
Anglo-Saxon Law	-6.279 ***	-5.716 ***	-5.716 ***	-6.284 ***	-6.277 ***	-2.587	-2.587 *	9.071 **	2.211
	(-3.100)	(-2.740)	(-2.740)	(-3.100)	(-3.100)	(-1.690)	(-1.690)	(2.230)	(1.040)
Nordic Law	-1.663	-1.259	-1.259	-3.511 **	2.642	-1.663	0.182 ***	17.745 ***	10.885 ***
	(-1.160)	(-0.850)	(-0.850)	(-2.060)	(1.540)	(-1.160)	(0.130)	(2.860)	(2.710)
d_bsize_categ2 (reference =2)									
Small Bank	0.341	0.088	0.088	0.343	0.340	0.340	0.340	0.340	0.340
	(0.590)	(0.150)	(0.150)	(0.590)	(0.590)	(0.590)	(0.590)	(0.590)	(0.590)
Large Bank	1.148 *	0.892	0.892	1.153 *	1.147 *	1.147 **	1.147 *	1.147 *	1.147 *
	(1.710)	(1.180)	(1.180)	(1.710)	(1.710)	(1.710)	(1.710)	(1.710)	(1.700)
d_b_BM (reference =2)									
Cross-border Universal (Bank Business Model)	-0.755	-0.625	-0.625	-0.754	-0.751	-0.751 **	-0.751	-0.751	-0.751
	(-1.550)	(-1.240)	(-1.240)	(-1.550)	(-1.550)	(-1.550)	(-1.550)	(-1.550)	(-1.540)
Corporate-oriented (Bank Business Model)	1.332	2.053	2.053	-0.399	1.334	1.334	1.334	1.334	1.334
	(0.810)	(1.200)	(1.200)	(-0.280)	(0.820)	(0.820)	(0.820)	(0.820)	(0.810)
Other specialised (Bank Business Model)	2.271 ***	2.113 ***	2.113 ***	2.274 ***	2.271 ***	2.271 ***	2.271 ***	2.271 ***	2.271 ***
	(3.230)	(2.600)	(2.600)	(3.230)	(3.230)	(3.230)	(3.230)	(3.230)	(3.220)
Constant	3.244	4.083	4.083	3.245	-1.071	1.389	1.389	61.948 ***	68.809 ***
	(0.860)	(0.910)	(0.910)	(0.860)	(-0.290)	(0.380)	(0.380)	(3.010)	(3.000)
Bank (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. Banks	94	88	88	89	94	94	94	94	94
No. Clusters	119	111	111	119	126	126	126	126	126
Observations	111,318	101,779	101,779	111,301	111,380	111,380	111,380	111,380	111,380
Log likelihood	-63,301	-57,542	-57,542	-63,297	-63,334	-63,334	-63,334	-63,334	-63,334
Adjusted R-squared	0.1495	0.1591	0.1591	0.1494	0.1495	0.1495	0.1495	0.1495	0.1495

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For detailed analysis regarding the positive characteristics of the enforcement frameworks and the interactions and differences between unsecured and secured loans as well as between non-physical secured loans and physical secured loans, see Annex 9.

Do corporate firms have higher or lower recovery rates than SMEs?

Table 33 shows additional data analysis maintaining the positive characteristics (factors) of the enforcement frameworks and also comparing both types of asset classes (corporate or SMEs). A dichotomic variable 'type of portfolio' (SME=0; corporate=1) is used in the analysis.[107]

[107] For simplification purposes, only the positive characteristics (factors) are used in the analysis together with the dichotomous variable 'type of portfolio' (SME =0 ; corporate = 1).

Table 33: Corporate and SMEs – characteristics (factors) associated with higher recovery rates and comparison between asset classes

	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate
Type of portfolio (Corporate=1; SMEs=0)	0.370 *	0.334 *	0.334 *	0.465 ***	0.328 *	0.334 *	0.334 *	0.334 *	0.334 *	0.334 *
	(1.930)	(1.900)	(1.900)	(2.720)	(1.860)	(1.900)	(1.900)	(1.900)	(1.900)	(1.900)
D1 Out-of-court enforcement of collateral			1.478 ***							
			(14.050)							
D3 Out-of-court enforcement of collateral, tangible moveable assets				1.496 ***						
				(14.230)						
D10 Absence of long moratoria that suspend enforcement of collateral					1.477 ***					
					(14.040)					
D25 Creditors' chances to impact on the proceedings through creditor committees						4.925 ***				
						(14.060)				
D27 Absence of privileges (prior rank) for debt towards government, social security							1.478 *			
							(14.060)			
D28 Absence of privileges (prior rank) for wages, pension schemes								1.478 ***		
								(14.060)		
D29 Absence of other general privileges for specific types of creditors/debt									1.569 ***	
									(15.400)	
D30 Pre-pack' insolvency (or restructuring) available for SMEs										1.569 ***
										(15.400)
Constant	-0.059	0.853 ***	-0.624 ***	-0.644 ***	-0.624 ***	-4.072 ***	-0.624 ***	-0.624 ***	-0.716 ***	-0.716 ***
	(-0.230)	(8.690)	(-16.290)	(-16.920)	(-16.210)	(-15.580)	(-16.290)	(-16.290)	(-26.450)	(-26.450)
Bank (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country fixed effects	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. Banks	115	114	114	106	109	114	114	114	114	114
No. Clusters	156	155	147	136	148	155	155	155	155	155
Observations	187,173	187,172	187,081	152,768	187,044	187,172	187,172	187,172	187,172	187,172
Log likelihood	-129,600	-109,477	-109,434	-85,619	-109,409	-109,477	-109,477	-109,477	-109,477	-109,477
Adjusted R-squared	0.0006	0.1558	0.1557	0.1909	0.1557	0.1558	0.1558	0.1558	0.1558	0.1558

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A similar analysis was developed with the size of the firms (total assets) and the results are identical.[108] The dichotomic variable for the type of portfolios shows that, controlling for the dichotomic variables showing the characteristics of the enforcement frameworks, corporate firms have a higher recovery rate than SMEs, presenting a positive coefficient, but this is statistically significant only at the 10% level. Moreover, the interaction terms of those characteristics with the type of portfolio (i.e. SME or corporate) are significant.[109] The significant interactions suggest that the effect of those characteristics on recovery rate depends on the type of portfolio. The test of simple main effects suggests that regarding recovery rates, when those characteristics do not exist (i.e. absence of such characteristics in the national enforcement frameworks), SMEs are negative and significantly different (with significantly lower recovery rates) from corporate. However, when those characteristics exist in the national enforcement frameworks (with the exception of D3: Out-of-court enforcement of collateral for tangible moveable assets), SMEs are not significantly different (despite continuation of lower recovery rates) from corporate. That is, the existence of such characteristics increases the recovery rates in general (for SMEs and corporate) and reduces the difference (not significant anymore) between SMEs and corporate. Regarding D3: Out-of-court enforcement of collateral for tangible moveable assets, when this characteristic exists in the national enforcement frameworks, SMEs continue to be negative and significantly different (lower recovery rates) from corporate. That is, the existence of D3 increases the recovery rates in general and, reduces the difference between SMEs and corporate; however, the differences continue to be significant.

[108] The regression without country-fixed effects (column 1) is presented just for control and comparison purposes with the remaining regressions with country-fixed effects.
[109] Not presented owing to space constraints.

Time to recovery

In this section, the analysis focuses on the observed and expected duration of time until the end of the formal process of enforcement (the event of interest). The statistical method is named survival analysis and the survival time (of the formal process of enforcement) is measured in years using the variable 'time to recovery' (predicting the duration of the event).

To find reasonable explanations to the final estimate, this study used information concerning enforcement characteristics provided by the Commission. These enforcements' characteristics are the covariates that were investigated as possible explanatory variables to the survival time (of the formal process of enforcement), i.e. Time to Recovery. Given the study of factors that characterize the countries' enforcement frameworks and influence the recovery outcomes, the selection of such respective covariates via univariate analysis is therefore the focus of this investigation.

These covariates were set to the information available at default and at the beginning of the formal enforcement process and did not vary over time.

The study implements a survival analysis method on recovery data to estimate the survival time (of the formal process of enforcement), investigates what drives the estimate and to compare the estimate between different asset classes among the covariates of interest.

There are several survival analysis methods. This study uses the Cox proportional hazards model (a semi-parametric method), and to validate the model's predictive ability it uses both Kaplan – Meier survival curves and the log-rank test for equality of survivor functions. The Cox model is not restricted to any assumptions on an underlying distribution of the survival times and the method to investigate predictive ability (Kaplan–Meier survival curves) is easy to interpret. Kaplan–Meier survival curves and logrank tests are useful only when the predictor variable is categorical. Cox proportional hazards regression analysis works for both quantitative predictor variables and categorical variables. Furthermore, the Cox regression model extends survival analysis methods to assess simultaneously the effect of several risk factors on survival time.

Some of the loans did not complete the formal enforcement process and are, therefore, in need of censoring owing to the end of the period of study (31 December 2018), whereas the enforcement process did not finish (no date of event), which is a right-censoring issue.

The outcome variable is a time variable measuring time to the event. This time variable and the event status variable (indicating for each loan if the enforcement process finished or not) are the two dependent variables in survival analysis. These two variables provide two key concepts: the survival function and the hazard function (for details, see Cox, 1972; and Allison, 2010).[110]

In a formal enforcement process, a low survival rate means that banks will get a larger recovery rate (amounts of debt paid back) and a short predicted survival means that the debt will be paid off earlier.

Figure 26 shows the estimated survival curves for some of the characteristics of the enforcement frameworks (and respective levels for the dichotomic variables). The Kaplan–Meier survival

[110] Cox, D., 'Regression models and life-tables', Journal of the Royal Statistical Society. Series B (Methodological), Vol. 34, No. 2, 1972, pp. 187-220; Allison, P.D., Survival Analysis Using SAS@: A Practical Guide, Second Edition, SAS Institute Inc., Cary, North Carolina, USA, 2010.

estimates show the probability of the event (i.e. close of the enforcement process) at a certain time interval. In comparison, for the same level of probability, a curve to the left and below shows a shorter time to achieve the same event. As examples, characteristics such as the absence of privileges (prior rank) for debt towards government, social security (D27) and the absence of other general privileges for specific types of creditors/debt (D29) show that their existence in the enforcement frameworks (i.e. D27 = 1 and D29 = 1) reduce the time to recovery (i.e. curve D27=1 on the left and below). The absence of privileges (prior rank) for debt towards government, social security (D27) shows a late emerging difference behaviour when the enforcement process reaches 5 years. The absence of other general privileges for wages and pension schemes (D28) shows a transient difference behaviour from the beginning in addition to a late-emerging difference behaviour when the enforcement process reaches 5 years.

Figure 26: Estimated survival curves for the characteristics of the enforcement frameworks D27 and D28

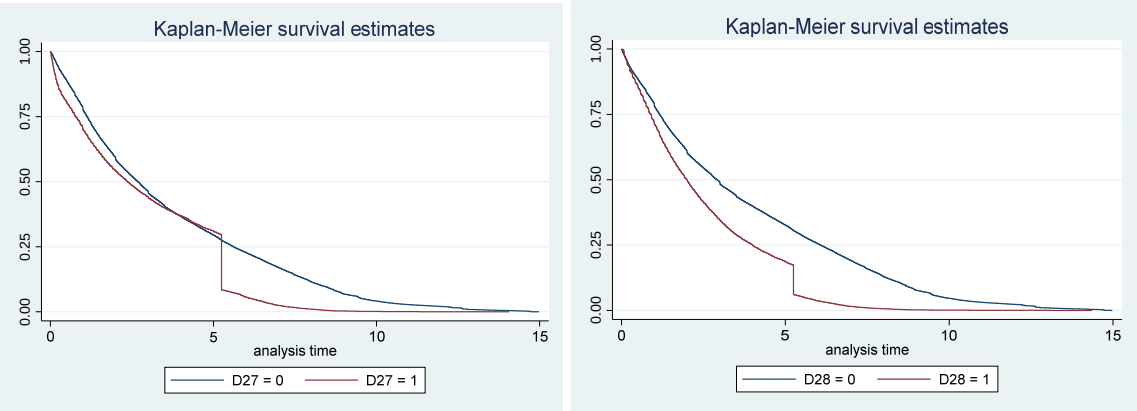


Table 34 shows the parameter estimates for the hazard ratios using variables associated with shorter time to recovery. The exponentiated coefficients are known as hazard ratios and give the effect size of covariates. For example, the existence of out-of-court enforcement of collateral (D1) in an enforcement framework (i.e. D1 = 1) increases the hazard by a factor of 1.31, or 31%. That is, the existence of D1 is associated, not only with a higher recovery rate but also with a shorter time to recovery. Regarding both the absence of other general privileges for specific types of creditors/debt and 'pre-pack' insolvency -or restructuring available for SMEs (D29 and D30, respectively), the coefficients are not significant. That is, despite both D29 and D30 being associated with higher recovery rates they are not associated with shorter time to recovery. The existence of creditors' chances to impact on the proceedings through creditor committees (D25) in an enforcement framework (i.e. D25 = 1) provides the strongest hazard ratio, increasing the hazard by a factor of 2.46, or 146%; therefore, this characteristic of the enforcement framework is associated with a much shorter time to recovery than if this characteristic does not exist.

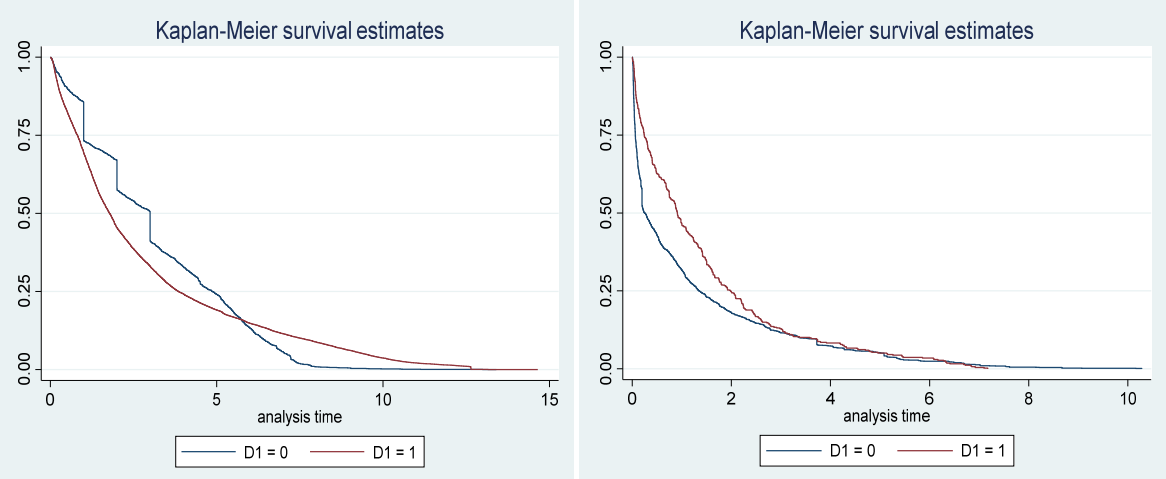
Table 34: Parameter estimates for the hazard ratios – variables associated with shorter time to recovery

	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS	FIRMS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Time to Recovery	Time to Recovery	Time to Recovery	Time to Recovery	Time to Recovery	Time to Recovery	Time to Recovery
D1 Out-of-court enforcement of collateral	1.310 **						
	(2.010)						
D2 Out-of-court enforcement of collateral, for real estate collateral		1.304 **					
		(1.980)					
D3 Out-of-court enforcement of collateral, for tangible moveable assets			1.304 **				
			(1.980)				
D10 Absence of long moratoria that suspend enforcement of collateral				1.310 **			
				(2.010)			
D25 Creditors' chances to impact on the proceedings through creditor committees					2.457 **		
					(2.010)		
D27 Absence of privileges (prior rank) for debt towards government, social security						1.310 **	
						(2.010)	
D28 Absence of privileges (prior rank) for wages, pension schemes							1.310 **
							(2.010)
Bank (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y
Country fixed effects	Y	Y	Y	Y	Y	Y	Y
No. Banks	113	105	105	109	114	114	114
No. Clusters	144	134	134	144	152	152	152
Observations	130,208	118,827	118,827	129,954	130,279	130,279	130,279
Log likelihood	-1,388,022	-1,254,410	-1,254,410	-1,385,031	-1,388,840	-1,388,840	-1,388,840
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The legal origin of the enforcement framework is an important variable to explain the time to recovery. For example, the existence of the out-of-court enforcement of collateral (D1) as a characteristic in the enforcement frameworks is associated, not only with a higher recovery rate but also with a shorter time to recovery if the legal origin is Germanic or Nordic. Although D1 is associated with a higher time to recovery in the first 3 years of the enforcement procedure If the legal origin is Nordic, this effect is dissipated given the existence of several loans under enforcement for several years If the enforcement framework does not allow the existence of D1 (Figure 27, on the right-hand panel – for D1 = 0 there is a longer curve to the right, whereas for D1 = 1 the survival curve ceases before 8 years of recovery). As expected, for variables D2 and D3 (same type of characteristic to D1) the behaviour is very similar to D1.[111]

Figure 27: Estimated survival curves for the characteristics of the enforcement frameworks D1, by legal origin (left panel: Germanic; right panel: Nordic)

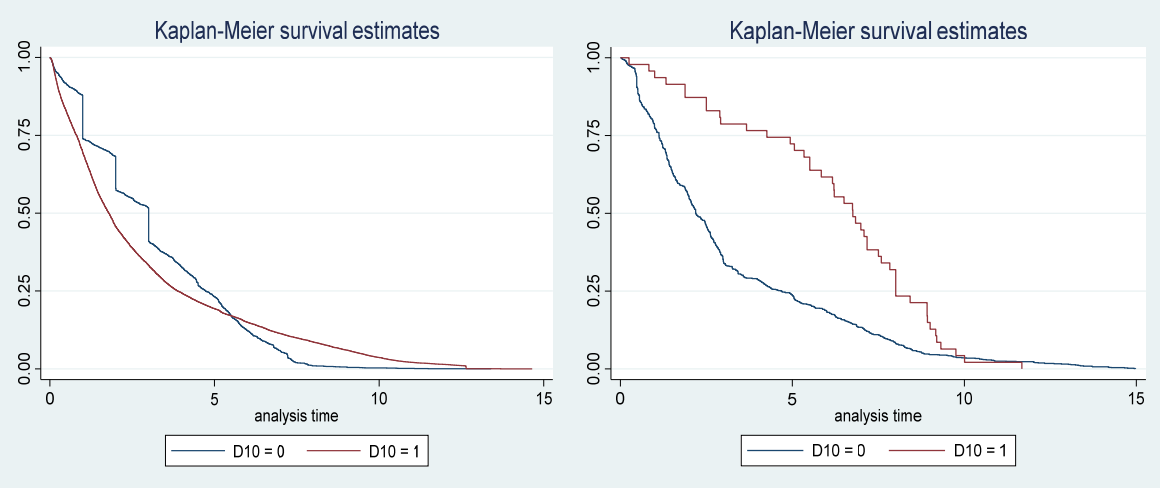


Regarding the absence of long moratoria that suspend the enforcement of collateral (D10), the existence of this characteristic in the enforcement frameworks is associated, not only with a higher

[111] Given the lack of observations for French and Anglo-Saxon legal origins it is not possible to provide such an analysis.

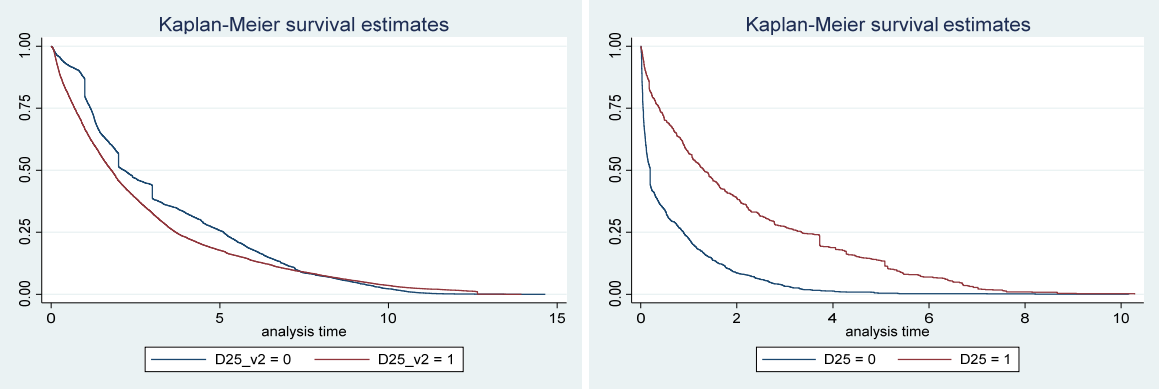
recovery rate but also, and as expected, with a shorter time to recovery If the legal origin is Germanic, French or Nordic. However, the existence of this characteristic in the enforcement frameworks is associated with a higher time to recovery If the legal origin is Anglo-Saxon. Figure 28 shows, in the left-hand panel, the effect of a longer time to recovery (curve to the right) in the first 10 years of the formal enforcement process If D10 is available in the enforcement framework (i.e. D10 = 1).

Figure 28: Estimated survival curves for the characteristics of the enforcement frameworks D10, by legal origin (left panel: Germanic; right panel: Anglo-Saxon)



As regards creditors' chances to impact on the proceedings through creditor committees (D25), the existence of this characteristic in the enforcement frameworks is associated, not only with a higher recovery rate but also with a shorter time to recovery If the legal origin is Germanic. However, the existence of this characteristic in the enforcement frameworks is associated with a higher time to recovery if the legal origin is French (but only for enforcement processes longer than 5 years), Anglo-Saxon or Nordic. Figure 29 shows, in the left-hand panel, the effect of a longer time to recovery (curve to the right) in the first 8 years of the formal enforcement process In the case of Nordic legal origin and D25 is being available in the enforcement framework (i.e. D25 = 1).

Figure 29: Estimated survival curves for the characteristics of the enforcement frameworks D25, by legal origin (left panel: Germanic; right panel: Nordic)



With reference to both absence of privileges (prior rank) for debt towards government, social security as well as for wages and pension schemes (D27 and D28), the absence of these characteristics in the enforcement frameworks is associated, not only with a higher recovery rate

but also to with shorter time to recovery If the legal origins are Germanic, Anglo-Saxon or Nordic. However, the absence of these characteristics in the enforcement frameworks is associated with a higher time to recovery if the legal origin is French.

Regarding enforcement frameworks with a Germanic legal origin, the existence of variables D1, D2, D3, D10, D25, D27 and D28 in the frameworks seems important (and statistically significant) in reducing the time to recovery. With regard to enforcement frameworks with French legal origins, D2, D3 and D10 seem important to reducing the time to recovery. For enforcement frameworks with an Anglo-Saxon legal origin, D27 seems an important variable in reducing the time to recovery. Finally, with reference to enforcement frameworks with Nordic legal origins, the existence of variables D1, D3, D10, D27 and D28 seem important in contributing to reducing the time to recovery.

6.2 Residential real estate and Commercial real estate

The analysis is developed for each asset class separately, RRE and CRE, since the number of loans is sufficient to carry out such analysis and the characteristics of the national enforcement frameworks that influence the recovery outcomes are different.

The analysis begins with the univariate relationships between recovery rates and the explanatory variables (dichotomic variables showing the characteristics of the enforcement frameworks). The simple relationship between loan recovery rates and each of the dichotomic variables was examined.

Residential real estate

Recovery rate

For RRE, the characteristics (factors) that are associated with higher recovery rates[112] and are therefore key variables of interest in the data analysis are the following:

- courts/judges specialised in insolvency cases (secured loans – specific rules);
- triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow; and
- courts specialised in insolvency cases (unsecured loans – general rules).

Table 35 shows the estimation with the inclusion of the survey qualitative data as well as the variables: time to recovery, banks' characteristics (efficiency, size and business models), a macro-economic variable (average of GDP growth between 2013 and 2018), and the legal origin of the enforcement framework (i.e. Germanic, French, Anglo-Saxon, or Nordic).

[112] That is, if the country enforcement framework confirms the existence of such qualitative characteristic the recovery rate is, on average, higher than in countries without such qualitative characteristics. Other qualitative characteristics of the same questionnaire were used and were not significant.

A positive and significant coefficient indicates that the enforcement/insolvency qualitative characteristic being considered increases the total recovery rate. The basic structure of the most successful models is the following: logit models for each of the key variables of interest together with several control variables were developed. The standard errors were clustered by both countries of enforcement and banks.

Time to recovery is expected to be an inverse measure of enforcement/insolvency efficiency. Longer time to recovery results in lower Recovery Rates, reflecting poor enforcement/insolvency procedures. It was expected that this variable would have a negative coefficient in the recovery rate regression. The results show that, indeed, a longer enforcement time reduces recovery rates, although the coefficient is not always significant. In addition, as expected higher efficiency (i.e. a negative signal of the variable) increases the recovery rates. Regarding the macro-economic variable, the results are as expected (positive for average of GDP growth) but the coefficients are not significant. Moreover, the results confirm the legal origin of the EU Member State as a valid control variable.

Table *35: RRE – characteristics (factors) that are associated with higher recovery rates*

	Residential Real Estate		
	(1)	(2)	(3)
VARIABLES	Recovery Rate	Recovery Rate	Recovery Rate
D89 Courts/judges specialised in insolvency cases - secured loans	2.395 ***		
	(5.530)		
D96 Triggers for collective insolvency proceeding consideration		2.025 *	
		(1.760)	
D102 Courts specialised in insolvency cases - unsecured loans			2.092 ***
			(4.540)
Time to recovery (Years)	-0.041	-0.041	-0.100 ***
	(-0.980)	(-0.960)	(-2.630)
Efficiency Ratio 2018	-0.009	-0.010	-0.020
	(-0.560)	(-0.600)	(-0.950)
avGDP_growth_13_18	0.383	0.390	0.240
	(0.980)	(0.980)	(0.600)
d_legalorigin (reference =2)			
Germanic Law	0.149	0.167	-0.266
	(0.090)	(0.110)	(-0.160)
Anglo-Saxon Law	-5.754 ***	-3.750 **	-5.573 ***
	(-2.730)	(-2.380)	(-2.680)
Nordic Law	2.023	5.423 *	0.548
	(1.350)	(1.780)	(0.360)
d_bsize_categ2 (reference =2)			
Small Bank	-1.520 ***	-1.545 ***	-1.376 ***
	(-2.770)	(-2.810)	(-2.820)
Large Bank	-0.771	-0.846	0.876
	(-1.490)	(-1.620)	(1.100)
d_b_BM (reference =2)			
Cross-border Universal (Bank Business model)	-0.902	-0.898	-1.549 ***
	(-1.290)	(-1.280)	(-2.330)
Corporate-oriented (Bank Business Model)	-0.427	-0.422	-0.630
	(-0.410)	(-0.400)	(-0.620)
Other specialised (Bank Business Model)	3.005 ***	3.032 ***	3.017 ***
	(6.570)	(6.530)	(6.960)
Constant	2.111	2.506	4.423 *
	(0.990)	(0.820)	(1.930)
Bank (clustered standard errors)	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y
Country fixed effects (clustered standard errors)	Y	Y	Y
No. Banks	93	84	101
No. Clusters	113	99	122
Observations	78,636	68,362	94,812
Log likelihood	-18,140	-17,704	-26,512
Adjusted R-squared	0.205	0.183	0.231

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For RRE, courts and judges specialised in insolvency cases for secured and unsecured loans seems to be an important factor in increasing recovery rates. The results show that specialised courts and judges would render recovery speedier and recovery rates higher. Finally, the existence of triggers

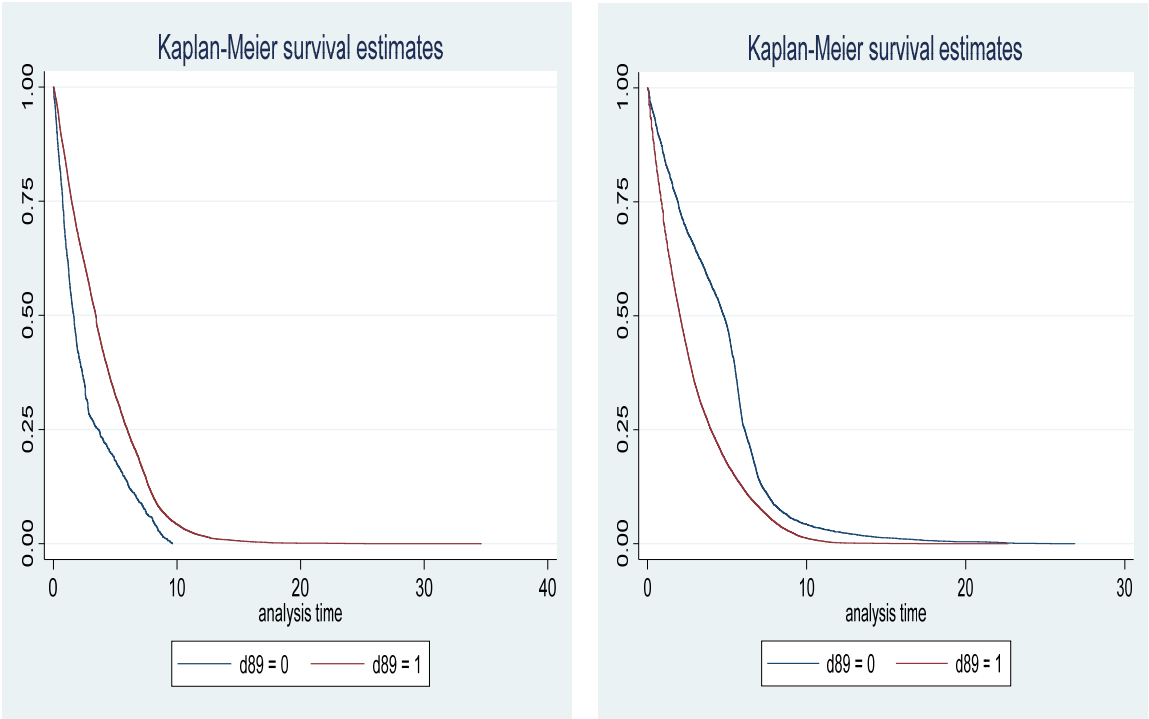
for collective insolvency proceedings taking into consideration debtor's future positive/negative cash flow also results in higher recovery rates.

Time to recovery

Legal origin is also an important variable and the same characteristic can result in different outcomes on the recovery rates depending on the legal origin of the framework.

Figure 30 shows the differences for estimated survival curves, as example, for one characteristic of the enforcement framework (and respective levels for the dichotomic variables). The existence of specialised courts/judges specialised in insolvency cases (D89) results not only in higher recovery rates but also in shorter times to recovery. However, the shorter time to recovery does not necessarily apply for all legal origins. For instance, this is not the case for the enforcement frameworks with Germanic legal origins, where the existence of D89 increases the respective time to recovery (left-hand panel, with the red curve on the right). On the contrary, for the enforcement frameworks with French legal origin, D89 is associated with shorter recovery proceedings (right-hand panel, with the red curve on the bottom left).

Figure 30: Estimated survival curves for the characteristics of the enforcement frameworks D89, by legal origin (left panel: Germanic legal origin; right panel: French legal origin)



Commercial real estate

Recovery rate

For CRE, the characteristics (factors) that are associated with higher recovery rates[113] and therefore key variables of interest in the data analysis are the following:

- absence of long moratoria that suspend enforcement of collateral;
- electronic communication with courts and insolvency administrators[114];
- triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow;
- debtor obliged to file for insolvency within short time limit;
- creditors' chances to impact on the proceedings through creditor committees (existence, voting rights, right to ask to switch to out-of-court proceedings);[115]
- absence of privileges (prior rank) for debt towards government, social security, etc.;

Table 36 shows the estimation with the inclusion of the survey qualitative data as well as the variables: time to recovery, banks' characteristics (efficiency, size and business models), a macro-economic variable (average GDP growth between 2013 and 2018), and the legal origin of the enforcement framework (i.e. Germanic, French, Anglo-Saxon, or Nordic).

A positive and significant coefficient indicates that the enforcement/insolvency qualitative characteristic being considered increases the total recovery rate. The basic structure of the most successful models is the following: logit models for each of the key variables of interest together with several control variables were developed. The standard errors we clustered by both countries of enforcement and banks.

Time to recovery is expected to be an inverse measure of enforcement/insolvency efficiency. Longer time to recovery results in a lower recovery rate, reflecting poor enforcement/insolvency procedures. It was expected that this variable would have a negative coefficient in the recovery rate regression. The results show that, indeed, a longer enforcement time reduce recovery rates. The results are significant at the 1% level.

The results include bank level variables to control for the potential effects of banks' characteristics, namely banks' efficiency, size and business models. Regarding the macro-economic variable, the results were as expected (positive for GDP average growth) at a 10% significance level (except for three qualitative survey questions, namely D10, D21 and D22). Moreover, the results confirm the legal origin of the EU Member State as a valid control variable.

[113] That is, if the country enforcement framework confirms the existence of such qualitative characteristic the recovery rate is, on average, than in countries without such qualitative characteristics. Other qualitative characteristics of the same questionnaire were used and were not significant.
[114] It is assumed that, if an EU Member State answers 'Yes' to a minimum of 75% of the criteria in response to the following question, then the qualitative characteristic can be applied to that country (meaning the dummy is equal to 1).
[115] It is assumed that, if an EU Member State answers 'Yes' to a minimum of 75% of the criteria in response to the following question, then the qualitative characteristic can be applied to that country (meaning the dummy is equal to 1).

Table *36*: *CRE – characteristics (factors) that are associated with higher recovery rates*

	Commerical Real Estate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate	Recovery Rate
D10 Absence of long moratoria that suspend enforcement of collateral	2.517 **						
	(2.400)						
D17 Electronic communication with courts and insolvency administrators (secured loas)		12.240 **					
		(2.400)					
D21 Triggers for collective insolvency proceeding			2.514 **				
			(2.400)				
D22 Debtor obliged to file for insolvency within short time limit				2.514 **			
				(2.400)			
D25 Creditors' chances to impact on the proceedings					40.8 **		
					(2.400)		
D27 Absence of privileges (prior rank) for debt towards government, etc.						12.240 **	
						(2.400)	
D37 Electronic communication with courts and insolvency administrators (Unsecured loans)							12.240 **
							(2.400)
Time to recovery (Years)	-0.149 ***	-0.150 ***	-0.15 ***	-0.150 ***	-0.150 ***	-0.150 ***	-0.150 ***
	(-5.090)	(-5.130)	(-5.13)	(-5.13)	(-5.13)	(-5.130)	(-5.130)
Efficiency Ratio 2018	0.030	0.029	0.029	0.029	0.029	0.029	0.029
	(1.270)	(1.270)	(1.270)	(1.270)	(1.270)	(1.270)	(1.270)
avGDP_growth_13_18	-0.664 ***	3.305 **	-0.665 ***	-0.665 ***	3.305 **	3.305 **	3.305 **
	(-0.319)	(1.990)	(-0.320)	(-0.320)	(-2.020)	(-2.020)	(2.570)
d_legalorigin (reference =2)							
Germanic Law	-0.371	5.049 **	-0.376	-0.376	5.049 **	-7.190 **	5.049 **
	(-0.310)	(2.570)	(-0.32)	(-0.320)	(2.570)	(-2.020)	(2.570)
Anglo-Saxon Law	0.996	-11.229 *	3.525 **	3.525 **	-23.469 **	-23.469 **	-11.229 *
	(0.510)	(-1.830)	(1.960)	(1.960)	(-2.110)	(-2.110)	(-1.830)
Nordic Law	0.000	13.989 ***	11.94 ***	14.452 ***	13.989 ***	13.989 ***	13.989 ***
	(0.000)	(15.350)	(10.19)	(15.150)	(15.350)	(15.350)	(15.350)
d_bsize_categ2 (reference =2)							
Small Bank	-1.291	-0.289	-0.289	-0.289	-0.289	-0.289	-0.289
	(-1.270)	(-0.270)	(-0.27)	(-0.270)	(-0.270)	(-0.270)	(-0.270)
Large Bank	0.929	0.922	0.922	0.922	0.922	0.922	0.922
	(0.940)	(0.950)	(0.950)	(0.950)	(0.950)	(0.950)	(0.950)
d_b_BM (reference =2)							
Cross-border Universal (Bank Business model)	-1.516	-1.512	-1.512	-1.512	-1.512	-1.512	-1.512
	(-1.240)	(-1.250)	(-1.250)	(-1.250)	(-1.250)	(-1.250)	(-1.250)
Corporate-oriented (Bank Business Model)		-11.852 ***	-11.852 ***	-11.852 ***	-11.852 ***	-11.852 ***	-11.852 ***
		(-8.240)	(-8.240)	(-8.240)	(-8.240)	(-8.240)	(-8.240)
Constant	1.089	-16.545 **	1.120	1.120	-45.10 **	-4.305	-16.545 **
	(0.520)	(-2.030)	(0.540)	(0.540)	(-2.270)	(-1.250)	(-2.030)
Bank (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y
Country fixed effects (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y
No. Banks	58	63	63	63	63	63	63
No. Clusters	62	67	67	67	67	67	67
Observations	14,927	15, 252	15,252	15,252	15,252	15,252	15,252
Log likelihood	-7,497	-7,536	-7,536	-7,536	-7,536	-7,536	-7,536
Adjusted R-squared	0.085	0.091	0.091	0.091	0.091	0.091	0.091

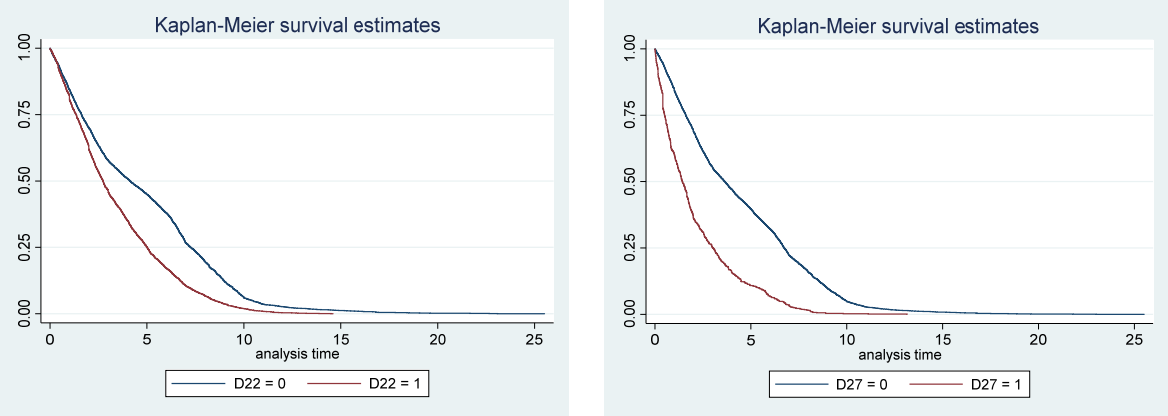
Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For CRE, with regard to moratoria, enforcement often comes with a moratorium or stay, meaning that the borrower is given additional time during which a creditor cannot enforce. The absence of the possibility of a long moratorium improves the recovery rates. 'Long' meaning moratoria designed to give 'breathing space' to a debtor to continue operations without paying debt, as opposed to short-term moratoria of a few weeks that may be needed to convene meetings for a round of negotiations on restructuring or on organisational matters regarding the insolvency. The existence of electronic communication with courts and insolvency administrators seems to be a significant characteristic (factor) for both secured and unsecured loans. This means swifter proceedings, because electronic communication can be assumed to save time over physical mail. The absence of privileges for debt towards government, social security etc. results in higher recovery rates to banks. Furthermore, when the debtor is obliged to file for insolvency proceeding within a short time limit, as well as when creditors can have an impact on the proceedings through creditor committees (existence, voting rights, right to ask to switch to out-of-court proceedings the recovery process) and when there are triggers for collective insolvency proceeding taking into consideration a debtor's future positive/negative cash flow, the recovery rates for banks improve.

Time to recovery

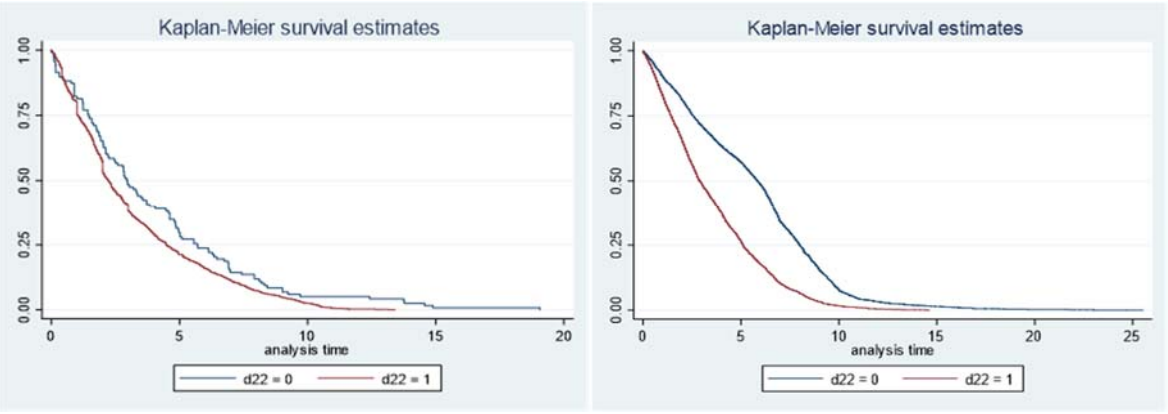
Figure 31 shows the estimated survival curves for some of the characteristics of the enforcement frameworks (and respective levels for the dichotomic variables). The Kaplan-Meier survival estimates show the probability of the event (i.e. close of the enforcement process) at a certain time interval. In comparison, for the same level of probability, a curve to the left and below shows a shorter time to achieve the same event. As examples, If the enforcement frameworks oblige the debtor to file for insolvency proceeding within a short time limit or if there are absences of privileges for debt towards government, social security (D22=1; D27=1), this reduces the time to recovery (i.e. curves D22=1 and D27=1, with red curves to the left and below).

Figure 31: Estimated survival curves for the characteristics of the enforcement frameworks D22 and D27



The time to recovery can vary depending on the legal origin of the enforcement framework. If the enforcement framework obliges the debtor to file for insolvency processing within a short time (D22 = 1), this in general it results in higher recovery rates, as well as shorter time to recovery. Figure 31 below presents the cases of different legal origins (Germanic and French, left- and right-hand panels respectively). For the same level of probability, the French legal origin shows a shorter time to achieve the same event than the Germanic legal origin (left-hand panel). Indeed, the presence of the D22 characteristic in the framework affects the length of the recovery process from the beginning of the enforcement in the French legal origin whereas in the case of the Germanic legal origin, the presence of D22 seems to have an impact on the time to recovery later on and in smaller proportions.

Figure 32: Estimated survival curves for the characteristics of the enforcement frameworks D22, by legal origin (left panel: Germanic; right panel: French)



6.3 Retail – credit cards and retail – other consumer loans

The analysis is developed for each asset class separately, retail – credit cards and retail – other consumer loans, because the number of loans is sufficient to carry out such an analysis and the characteristics of the national enforcement frameworks that influence the recovery outcomes are different.

The analysis begins with the univariate relationships between recovery rates and the explanatory variables (dichotomic variables showing the characteristics of the enforcement frameworks). The simple relationship between loan recovery rates and each of the dichotomic variables was examined.

Retail – credit cards

For retail – credit cards, the characteristics (factors) that are associated with higher recovery rates[116] and therefore key variables of interest in the data analysis are the following:

- triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow;
- creditors entitled to request insolvency proceedings to be commenced;
- availability of avoidance actions;[117]
- electronic communication with courts and insolvency administrators (unsecured loans).

Table 37 shows the estimation with the inclusion of the survey qualitative data as well as the variables: time to recovery, banks' characteristics (size and business models), a macro-economic variable (average GDP growth between 2015 and 2018) and the legal origin of the enforcement framework (i.e. Germanic, French, Anglo-Saxon, or Nordic). A positive and significant coefficient indicates that the enforcement/insolvency qualitative characteristic being considered increases the total recovery rate. The basic structure of the most successful models is as follow: logit models for each of the key variables of interest together with several control variables were developed. The standard errors we clustered by both countries of enforcement and banks. Time to recovery is expected to be an inverse measure of enforcement/insolvency efficiency. Longer time to recovery in general results in lower recovery rates, reflecting poor enforcement/insolvency procedures. However, for retail – credit cards the results show a positive but not significant coefficient. The results include bank level variables to control for the potential effects of banks' characteristics, namely size and business models. Regarding the macro-economic variable, the results are as expected (positive average GDP growth) and are significant at the 1% level. Moreover, the results confirm the legal origin of the EU Member State as a valid control variable.

[116] That is, if the country enforcement framework confirms the existence of such qualitative characteristic the recovery rate is, on average, higher than in countries without such qualitative characteristics. Other qualitative characteristics of the same questionnaire were used and were not significant.
[117] The characteristic 'Availability of avoidance actions' (D99) and its sub-characteristics 'Maximum timeframe/sensitive retrospective period for voidable transactions' (D100) and 'Broad range of reasons and recipients for avoidance actions' (D101) show similar results.

Table 37: Retail – credit cards – characteristics (factors) that are associated with higher recovery rates

		Retail: Credit cards			
		(1)	(2)	(3)	(4)
		Recovery rate	Recovery rate	Recovery rate	Recovery rate
D96	Triggers for collective insolvency proceeding	1.299 ***			
		(4.090)			
D98	Creditors entitled to request insolvency proceedings to be commenced		2.774 ***		
			(21.890)		
D99	Availability of avoidance actions			1.029 **	
				(2.550)	
D105	Electronic communication with courts and insolvency administrators				1.029 **
					(2.550)
Time to recovery (Years)		0.022	0.008	0.008	0.008
		(0.120)	(0.110)	(0.110)	(0.110)
avGDP_growth_13_18		0.866 ***	2.195 ***	0.895 ***	0.895 ***
		(7.520)	(16.880)	(7.280)	(7.280)
d_legalorigin (reference =2)					
	Germanic Law	0.226	3.231 ***	-0.766	-0.766
		(0.580)	(9.000)	(-1.470)	(-1.470)
	Anglo-Saxon Law	-7.766 ***	-15.810 ***	-10.020 ***	-10.020 ***
		(-20.630)	(-21.020)	(-12.920)	(-12.920)
	Nordic Law	2.154 ***	4.654 ***	1.632 *	1.632 *
		(3.100)	(6.030)	(1.890)	(1.890)
d_bsize_categ2 (reference =2)					
	Small Bank	0.082	0.136	0.136	0.136
		(0.590)	(1.130)	(1.130)	(1.130)
	Large Bank	1.52 ***	1.375 ***	1.375 ***	1.375 ***
		(5.990)	(4.070)	(4.070)	(4.070)
d_b_BM (reference =2)					
	Cross-border Universal (Bank Business model)	0.307	0.247	0.247	0.247
		(1.040)	(1.040)	(1.040)	(1.040)
Constant		-2.575 ***	-7.916 ***	-1.35 ***	-1.35 ***
		(-3.460)	(-17.400)	(-3.060)	(-3.060)
Bank (clustered standard errors)		Y	Y	Y	Y
Country (clustered standard errors)		Y	Y	Y	Y
Country fixed effects (clustered standard errors)		Y	Y	Y	Y
No. Banks		36	49	49	49
No. Clusters		44	58	58	58
No. Observations		159,178	179,506	179,506	179,506
logLikelihood		-91,426	-98,399	-98,399	-98,399
Adjusted R-squared		0.122	0.138	0.138	0.138

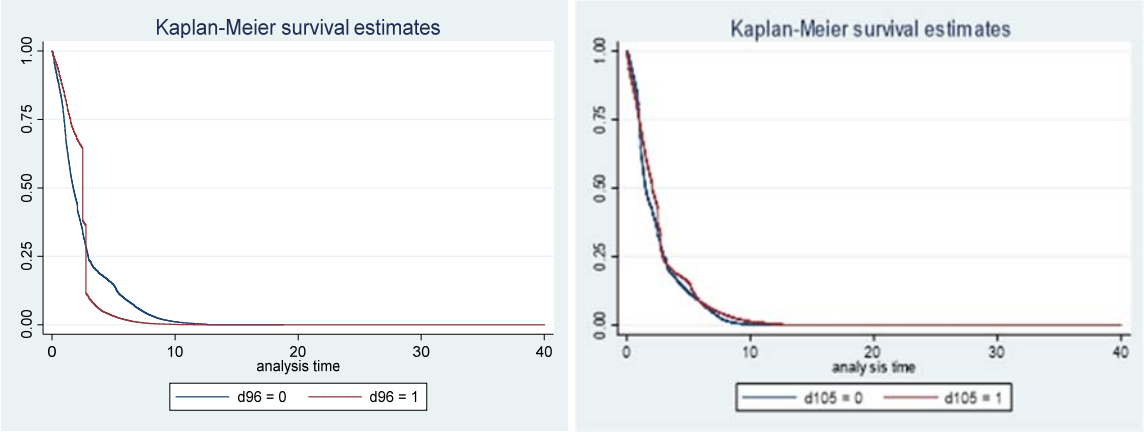
Robust t-statistics in parentheses
*** p<0.01,** p<0.05, * p<0.1

For retail – credit cards, when the creditors are allowed to request the opening of the insolvency procedure, the recovery rates are improved. Moreover, electronic communication with courts and administrators lead to a more efficient insolvency procedure and results in better recovery rates. Finally, the existence of triggers for collective insolvency proceedings taking into consideration a debtor's future positive/negative cash flow as well as the availability of avoidance actions (maximum timeframe/sensitive retrospective period for voidable transactions and broad range of reasons and recipients for avoidance actions) seems to contribute to better recovery rates.

Time to recovery

Figure 33 shows the estimated survival curves for some of the characteristics of the enforcement frameworks (and corresponding levels for the dichotomic variables). The Kaplan–Meier survival estimates show the probability of the event (i.e. close of the enforcement process) at a certain time interval. In comparison, for the same level of probability, a curve to the left and below shows a shorter time to achieve the same event. The existence of triggers for collective insolvency proceedings, taking into consideration a debtor's future positive/negative cash flow as a characteristic in the enforcement framework reduces the time to recovery (i.e. curve for D96 = 1 below), even if it emerges later in the process (5 years after beginning). However, the duration of the recovery process does not seem to be affected by electronic communication with courts and administrators (D105).

Figure 33: Estimated survival curves for the characteristic of the enforcement frameworks D96 and D105



Retail – other consumer loans

For retail – other consumer loans, the characteristics (factors) that are associated with higher recovery rates[118] and are therefore key variables of interest in the data analysis are the following:

- legal techniques to enable out-of-court enforcement of collateral available (movable collateral);
- out-of-court foreclosure proceedings such as asset seizure without preceding court order/judgement;
- time limit for filing of claims (to speed up proceedings generally);
- triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow;
- debtor obliged to file for insolvency within short time limit;
- courts specialised in insolvency cases (unsecured loans – general rule).

[118] That is, if the country enforcement framework confirms the existence of such qualitative characteristic the recovery rate is, on average, higher than in countries without such qualitative characteristics. Other qualitative characteristics of the same questionnaire were used and were not significant.

Table 38 shows the estimation with the inclusion of the survey qualitative data as well as the variables: time to recovery, banks' characteristics (size and business models) and the legal origin of the enforcement framework (i.e. Germanic, French, Anglo-Saxon, or Nordic).

A positive and significant coefficient indicates that the enforcement/insolvency qualitative characteristic under consideration increases the total recovery rate. The basic structure of the most successful models is as follows: logit models for each of the key variables of interest together with several control variables were developed. The standard errors were clustered by both countries of enforcement and banks. All six characteristic of the legal framework for the retail other consumer loans are robust, positive and significant at the 1% level (except for D92, which is significant at the 5% level). Time to recovery is expected to be an inverse measure of enforcement/insolvency efficiency. Longer time to recovery results in lower Recovery Rate, reflecting poor enforcement/insolvency procedures. For retail – other consumer loans, the results for time to recovery show negative but not significant coefficients for the majority of the qualitative factors. The coefficient associated with average GDP growth is, as expected, positive and significant at the 1% level for all characteristics. The results include other bank level variables to control for the potential effects of banks' characteristics, namely size and business models. Moreover, the results confirm the legal origin of the EU Member State as a valid control variable.

Table 38: Retail – other consumer loans – characteristics (factors) that are associated with higher recovery rates

	Retail : Other consumer loans					
	(1)	(2)	(3)	(4)	(5)	(6)
	Recovery rate	Recovery rate	Recovery rate	Recovery rate	Recovery rate	Recovery rate
D77 Legal techniques to enable out-of-court enforcement of collateral	1.912 ***					
	(7.320)					
D92 Out-of-court foreclosure proceedings		2.063 **				
		(2.520)				
D94 Time limit for filing of claims (to speed up proceedings)			1.505 ***			
			(3.770)			
D96 Triggers for collective insolvency proceeding				2.345 ***		
				(5.650)		
D97 Debtor obliged to file for insolvency within short time limit					1.957 ***	
					(7.340)	
D102 Courts specialised in insolvency cases						3.642 ***
						(4.580)
Time to recovery (Years)	0.005	0.005	-0.028	-0.014	-0.026	-0.026
	(0.110)	(0.110)	(-0.560)	(-0.260)	(-0.570)	(-0.570)
avGDP_growth_13_18	1.092 ***	1.092 ***	1.101 ***	1.098 ***	1.114 ***	1.114 ***
	(7.720)	(7.730)	(7.590)	(7.730)	(7.000)	(7.000)
d_legalorigin (reference =2)						
Germanic Law	-0.327	1.585 *	1.585 *	1.600 *	-0.465	1.492
	(-0.440)	(1.900)	(1.880)	(1.930)	(-0.570)	(1.620)
Anglo-Saxon Law	0.803	-10.470 ***	-8.335 ***	-6.018 ***	-10.430 ***	-8.475 ***
	(1.020)	(-6.160)	(-5.480)	(-4.140)	(-6.130)	(-5.230)
Nordic Law	3.786 ***	3.786 ***	5.251 ***	7.338 ***	3.547 ***	7.189 ***
	(4.290)	(4.290)	(4.560)	(6.360)	(3.630)	(9.630)
d_bsize_categ2 (reference =2)						
Small Bank	0.201	0.200	0.180	0.153	0.478	0.478
	(0.550)	(0.550)	(0.490)	(0.410)	(1.360)	(1.360)
Large Bank	1.414 ***	1.412 ***	1.359 ***	1.358 ***	1.594 ***	1.594 ***
	(3.380)	(3.380)	(3.230)	(3.230)	(3.340)	(3.340)
d_b_BM (reference =2)						
Cross-border Universal (Bank Business model)	0.377 ***	0.377 ***	0.376 ***	0.375 ***	0.293 **	0.293 **
	(2.630)	(2.630)	(2.730)	(2.700)	(1.980)	(1.980)
Corporate-oriented (Bank Business Model)	-0.108	3.323 **	3.309 **	3.291 **	3.441 **	3.441 **
	(-0.240)	(2.420)	(2.470)	(2.440)	(2.510)	(2.510)
Other specialised (Bank Business Model)		-0.107	-0.160	-0.104	-0.448	-0.448
		(-0.240)	(-0.350)	(-0.220)	(-0.980)	(-0.980)
Constant	-2.771 ***	-2.771 ***	-4.193 ***	-5.058 ***	-2.803 ***	-6.445 ***
	(-3.000)	(-3.000)	(-3.600)	(-4.060)	(-2.640)	(-6.960)
Bank (clustered standard errors)	Y	Y	Y	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y	Y	Y	Y
Country fixed effects (clustered standard errors)	Y	Y	Y	Y	Y	Y
No. Banks	93	96	89	83	102	102
No. Clusters	137	142	134	121	151	151
No. Observations	667,404	667,442	650,269	564,357	695,339	695,339
logLikelihood	-331,339	-331,372	-319,775	-305,852	-335,987	-335,987
Adjusted R-squared	0.117	0.117	0.119	0.083	0.121	0.121

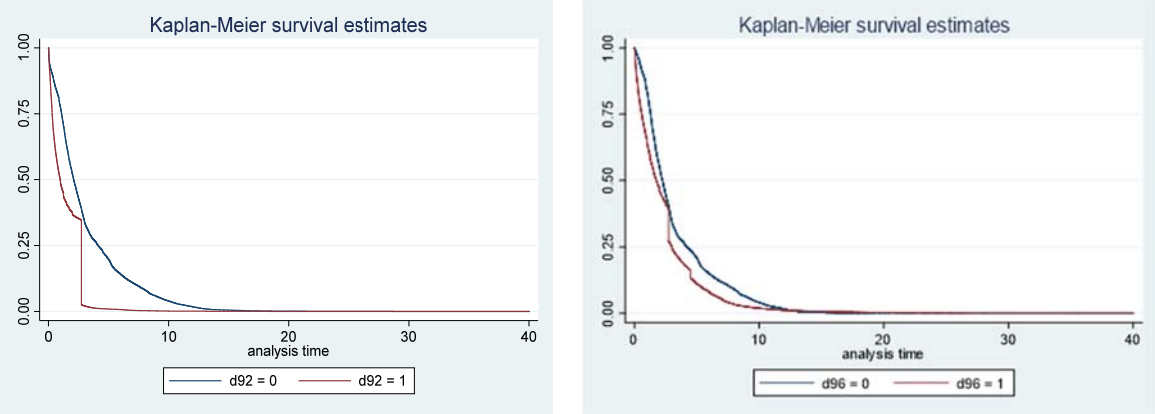
Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For retail – other consumer loans, the existence in the enforcement framework of out-of-court foreclosure proceedings such as asset seizure without preceding court order/judgement, as well as legal techniques to enable the out-of-court enforcement of collateral available (meaning no judgement on the underlying claim needed, not even a court order needed) seem to result in higher recovery rates for the banks. Moreover, when the debtor is obliged to file for insolvency proceedings within a short time limit and when there is a time limit for filling of claims, the process is more efficient in terms of recovered amounts. In addition, it is assumed that specialised courts and judges would render recovery speedier and recovery rates higher. Finally, the existence of triggers for collective insolvency proceedings taking into consideration a debtor's future positive/negative cash flow, also increases the recovery rates.

Time to recovery

Figure 34 shows the estimated survival curves for some of the characteristics of the enforcement frameworks (and respective levels for the dichotomic variables). The Kaplan–Meier survival estimates show the probability of the event (i.e. close of the enforcement process) at a certain time interval. In comparison, for the same level of probability, a curve to the left and below shows a shorter time to achieve the same event. The existence of out-of-court foreclosure proceedings such as asset seizure without a preceding court order/judgement in the framework (D92 = 1) reduces the time to recovery (i.e. curve equal to 1 are on the left and below), especially around 3 years after the beginning of the enforcement process. In the same way, the existence of triggers for collective insolvency proceedings taking into consideration a debtor's future positive/negative cash flow (D96 = 1), seems also to shorten the insolvency process.

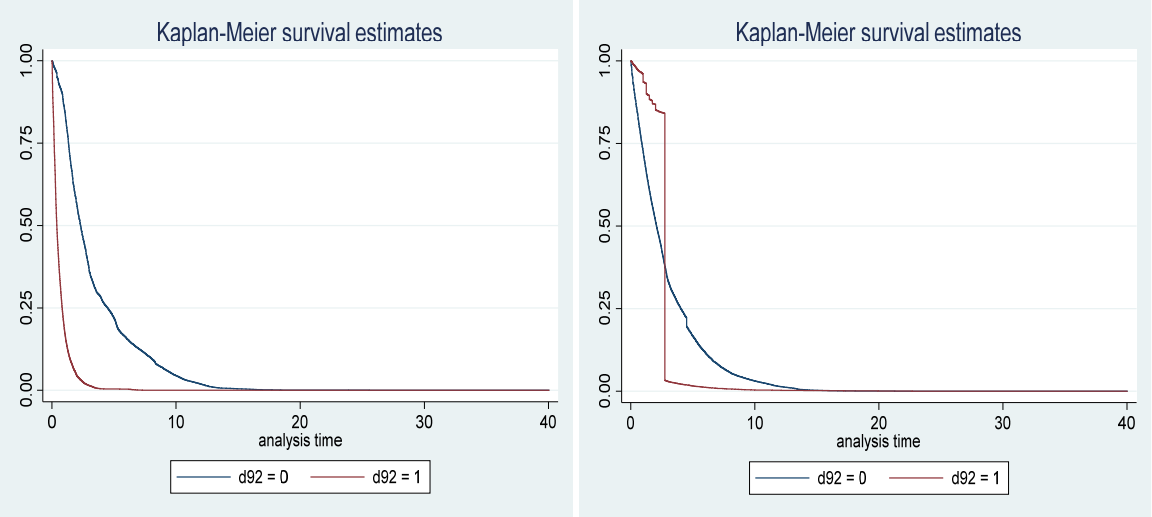
Figure 34: Estimated survival curves for the characteristics of the enforcement frameworks D92 and D96



The time to recovery can vary depending on the legal origin of the enforcement framework. For instance, the presence in the enforcement frameworks of the characteristic 'out-of-court foreclosure proceedings such as asset seizure without preceding court order/judgement' (D92) results in higher recovery rates and also a shorter time to recovery in the case of Germanic legal origins, but not immediately for French legal origins. Figure 35 illustrates Germanic and French legal origins (left- and right-hand panels, respectively). For the same level of probability, the Germanic legal origin shows a shorter time to achieve the event (red curve to the left and below) when D92

is a characteristic in the enforcement framework, whereas the same effect is observed only after 3 years from the beginning of the recovery process for countries with a French legal origin.

Figure 35: Estimated survival curves for the characteristics of the enforcement frameworks D92 by legal origin (left panel : Germanic legal origin; right panel: French legal origin)



6.4 Conclusion

The main determinants that explain the recovery outcomes were analysed. For both corporates and SMEs, the determinants (factors) of higher recovery rates are similar, namely: the existence of legal instruments to enable the out-of-court enforcement of collateral posted, the absence of long moratoria that suspend the enforcement of collateral, the possibility for creditors to influence the proceedings through creditor committees, absence of privileges (prior rank) for debt towards specific types of creditors/debt (such as government, social security, wages, pension schemes), and the existence of 'pre-pack' insolvency (or restructuring) regimes available for SMEs. Corporate firms generally show higher recovery rates than SMEs, although the positive coefficients are statistically significant only at the 10% level. The level of recovery rates for loans that are under enforcement frameworks are independent of whether the enforcing banks are of domestic or foreign origin. It also turns out that the effect on recovery rates of the positive characteristics of the national enforcement frameworks depend on the type of portfolio. When such characteristics are absent from the national enforcement frameworks, the coefficients for SMEs are negative and significantly different from corporates with significantly lower recovery rates. However, when those characteristics are present in the national enforcement frameworks, in general SMEs are not significantly different from corporates despite still showing lower recovery rates. In other words, the presence of such characteristics increases the recovery rates in general for both SMEs and corporates and reduces the difference in outcomes between SMEs and Corporates. Regarding the analysis of time to recovery, although both the absence of other general privileges for specific types of creditors/debt and the presence of 'pre-pack' insolvency procedures for SMEs are associated

with higher recovery rates, these characteristics are not associated with a shorter time to recovery. In contrast, the legal origin of the enforcement framework is an important factor in the time to recovery. That said, in certain legal origins some of the characteristics that are associated with higher recovery rates do not contribute to shorter times to recovery. It should be stressed that this is the first time that individual loan level information has been collected by the EBA across the EU, and some remaining data quality issues suggest that the results should be interpreted with appropriate caution.

For RRE, higher recovery rates are associated with the following characteristics: courts/judges who are specialised in insolvency cases for secured and unsecured loans, and the existence of triggers for collective insolvency proceeding which take into consideration debtor's future positive/negative cash flow. The existence of specialised courts/judges in insolvency proceedings results not only in higher recovery rates but also in shorter times to recovery. Regarding CRE, the characteristics (factors) that are associated with higher recovery rates are the following: absence of long moratoria that suspend enforcement of collateral, triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow; electronic communication with courts and insolvency administrators, debtor being obliged to file for insolvency within short time limit, creditors' chances to impact on the proceedings through creditor committees (existence, voting rights, right to ask to switch to out-of-court proceedings), and absence of privileges (prior rank) for debt towards government and social security. The presence in the enforcement frameworks of the obligation for the debtor to file for insolvency proceeding within a short time frame and the absence of privileges for debt towards government and social security also seem to contribute to reduced recovery times.

For retail – credit cards, the characteristics (factors) that are associated with higher recovery rates are the following: triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow, creditors entitled to request insolvency proceedings to be commenced; availability of avoidance action, and electronic communication with courts and insolvency (unsecured loans). For retail – other consumer loans, the characteristics (factors) that are associated with higher recovery rates are the following: out-of-court foreclosure proceedings such as asset seizure without preceding court order/judgement, legal techniques to enable the out-of-court enforcement of collateral available (no judgement on the underlying claim needed; not even a court order needed), time limit for filling claims; triggers for collective insolvency proceeding , the debtor obligation to file for insolvency within short time frame, and courts specialised in insolvency cases. Out-of-court foreclosure proceedings such as asset seizure without a preceding court order/judgement results not only in higher recovery rates but also in shorter times to recovery.

Table 39 summarises the positive characteristics of the enforcement frameworks among the asset classes considered. The positive characteristics in the enforcement frameworks tend to improve the averages of the recovery rates.

Table 39: Summary of the positive characteristics of the enforcement frameworks for each class

FIRMS (Corporate and SMEs)	CRE	RRE	Retail – credit cards	Retail – other consumer loans
Legal instruments to enable out-of-court enforcement of collateral posted; the absence of long	Absence of long moratoria that suspend enforcement of collateral; electronic communication between the courts and	Courts/judges who are specialised in insolvency cases (secured and unsecured); and	Triggers for collective insolvency proceeding taking into consideration debtor's future	Out-of-court foreclosure proceedings such as asset seizure without preceding court order/judgement; legal

moratoria that suspend enforcement of collateral; the possibility for creditors to influence the proceedings through creditor committees; absence of privileges (prior rank) for debt towards specific types of creditors/debt (such as government, social security, wages, pension schemes); and the existence of 'pre-pack' insolvency (or restructuring) regimes available for SMEs.	the insolvency administrators (secured and unsecured loans); triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow; debtor obliged to file for insolvency within short time frame; creditors' chances to impact on the proceedings through creditor committees; and the absence of privileges (prior rank) for debt towards government and social security.	triggers for collective insolvency proceeding which take into consideration debtor's future positive/negative cash flow.	positive/negative cash flow; electronic communication with courts and insolvency administrators (secured loans); availability of avoidance actions and creditors entitled to request insolvency proceedings to be commenced.	techniques to enable out-of-court enforcement of collateral available; time limit for filing of claims; triggers for collective insolvency proceeding taking into consideration debtor's future positive/negative cash flow; debtor obliged to file for insolvency within short time limit; and courts specialised in insolvency cases.

Finally, and as also seen in other published studies on recovery rates, the legal system that forms the basis of the enforcement framework seems to be an important factor in explaining recovery rates and time to recovery.

Annex 1 – Data and variables

To address the technical concerns regarding the potentially large number of loans to be collected, the EBA suggested that the data collection follow a two-step process. First, the EBA sought a reliable overview of the relevant loans' population. The NCAs therefore asked the participating banks to provide the distribution of this sub-sample of loans for each relevant asset class. This provided the EBA/CAs information about the maximum number of loans to be considered. Second, after receiving the distribution of loans for each jurisdiction from participating banks (obtaining information about the potential universe of loans within the scope of the exercise), the EBA requested all loans, limiting the total number of loans collected to 100,000 per asset class. In the end, this limit was never achieved by any participating bank, so it was not necessary to apply a criterion for the sampling of loans. That is, all loans under a formal enforcement process from the participating banks were collected, improving the representativeness of the data at loan level.

For borrower identification the following information was collected (Table 40): LEI (only for legal entities, where available; NA-not applicable for natural individuals) to connect to key reference information and enabling the clear and unique identification of companies; a country identifier (for legal entities, an unique national identifier code); and the bank's unique internal loan code (bank's internal code or a unique code created for the CfA Benchmarking of National Loan Enforcement exercise).

Table 40: Borrower identification

LEI	Identifier	Loan Number
For legal entities; NA for natural individuals	For legal entities: unique national identifier code. For natural persons: unique borrower code at bank's level	Bank's unique internal loan code

Table 41 shows the sources of detailed information on recovery details including factors such as: the recovery rate, the discount rate; the notional amounts; the judicial costs, and the accumulated write-off.

Table 41: Recovery details

Recovery Rate	Discount Rate	Notional amount outstanding at the time of default	Notional amount outstanding at the formal beginning of the enforcement	Gross recovery amount without deducting costs from the recovery process	Net recovery amount after costs from the recovery process	Judicial costs	Accumulated write-off

Annex 2 – EU27 benchmarks for each asset class (two indicators), for each category

Table 42: Category 1 – recovery rate (gross and net), time to recovery and judicial cost to recovery for each asset class (EU27 simple average – two indicators: simple average at loan level and simple average by country)[119]

Asset class	Gross recovery rate (%)		Net recovery rate (%)		Time to recovery (years)		Judicial cost to recovery (%)	
	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country
Corporate	51.1	49.9	48.6	47.5	4.1	3.6	1.5	2.4
SMEs	56.0	59.4	52.7	56.8	4.2	3.7	4.2	4.8
RRE	73.9	70.3	70.9	67.5	3.3	3.1	2.3	2.0
CRE	57.0	64.2	54.2	61.8	4.1	3.7	2.1	1.4
Retail – credit cards	50.0	74.1	41.2	70.0	2.8	2.5	6.3	8.6
Retail – other consumer loans	57.2	59.8	49.8	55.7	3.5	3.4	8.0	7.0

Table 43: Category 2 – recovery rate (gross and net), time to recovery and judicial cost to recovery for each asset class (EU27 simple average – two indicators: simple average at loan level and simple average by country)

Asset class	Gross Recovery Rate (%)		Net Recovery Rate (%)		Time to Recovery (years)		Judicial cost to recovery (%)	
	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country
Corporate	37.9	30.6	35.8	28.1	2.5	2.8	0.9	1.1
SMEs	25.3	34.8	24.0	33.4	2.4	1.8	3.4	3.3
RRE	23.6	35.4	22.7	34.2	2.8	2.9	1.8	1.5
CRE	29.0	36.0	26.1	34.7	5.7	2.1	1.6	1.4
Retail – credit cards	10.1	46.6	9.0	42.7	1.4	1.8	5.2	6.5
Retail – other consumer loans	28.4	29.0	25.1	26.0	2.1	1.9	7.4	7.1

[119] The concluded enforcement cases in which the collateral goes to the participating banks are included in Category 1; therefore, such cases are included in the calculation of the recovery outcomes. It is not possible from the data collected to separate further the concluded enforcement cases in which a collateral has been auctioned but effectively bought by the bank itself. In future exercises, additional information on these enforcement cases would be welcome, as this has been a prevalent feature in some countries and a clear indication of impediments in the process of liquidation of collateral.

Table 44: Category 3 – recovery rate (gross and net), time to recovery and judicial cost to recovery for each asset class (EU27 simple average – two indicators: simple average at loan level and simple average by country)

Asset class	Gross recovery rate (%)		Net recovery rate (%)		Time to recovery (years)		Judicial cost to recovery (%)	
	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country
Corporate	31.7	32.1	28.5	29.0	3.3	3.3	1.7	2.0
SMEs	20.9	37.1	17.7	33.9	2.9	2.2	2.1	3.4
RRE	45.2	44.1	40.7	42.4	2.9	2.3	1.7	1.8
CRE	38.9	51.3	33.7	49.7	2.3	2.0	1.1	0.8
Retail – credit cards	25.1	31.3	21.8	27.1	2.1	1.9	5.3	6.4
Retail – other consumer loans	23.3	35.3	18.1	32.5	2.4	2.2	3.4	4.6

Table 45: Category 4 – recovery rate (gross and net), time to recovery and judicial cost to recovery for each asset class (EU27 simple average - two indicators: simple average at loan level and simple average by country)

Asset class	Gross Recovery Rate (%)		Net Recovery Rate (%)		Time to Recovery (years)		Judicial cost to recovery (%)	
	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country	Simple average at loan level	Simple average by country
Corporate	21.2	25.0	8.2	15.8	2.4	2.5	1.1	1.4
SMEs	15.9	33.4	13.7	28.5	1.6	2.0	2.1	2.6
RRE	14.1	32.7	12.2	26.9	2.1	2.3	0.9	1.2
CRE	42.3	40.9	29.9	33.6	2.5	1.7	2.8	1.0
Retail – credit cards	7.3	31.1	4.1	29.6	1.4	2.0	0.7	2.3
Retail – other consumer loans	7.1	24.4	4.5	17.7	1.7	1.7	0.8	2.4

Table 46: Category 5 – recovery rate (gross and net), time to recovery and judicial cost to recovery for each asset class (EU27 simple average – two indicators: simple average at loan level and simple average by country)

Asset class	Gross Recovery Rate (%)		Net Recovery Rate (%)		Time to Recovery (years)		Judicial cost to recovery (%)	
	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country	Simple Average at loan level	Simple Average by country
Corporate	56.4	37.9	54.2	36.4	4.3	5.8	14.4	5.6
SMEs	56.8	57.4	53.8	55.4	3.5	4.3	6.0	2.6
RRE	67.8	55.5	65.4	51.3	3.1	3.4	3.1	2.2
CRE	52.6	51.5	48.3	41.4	3.4	2.7	3.8	1.9
Retail – credit cards	88.4	79.6	87.1	78.8	4.3	3.3	2.9	3.6
Retail – other consumer loans	31.4	46.0	28.3	38.6	3.6	3.3	6.8	4.2

Annex 3 – Net recovery rate benchmarks for each asset class – Category 1[120]

Firms

Table 47: Recovery rate net benchmark, SMEs – Category 1

Country of enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	5th percentile	1st quartile	Median	3rd quartile	95th percentile
AT	3,023	5	44.9	48	43.6	0	0	31.8	100	100
BE	37	4	58.6	53.4	46.5	0	0	92.5	100	100
BG	2,179	3	31.4	35.4	39.4	0	0	6.5	67.6	100
CY	261	3	49.8	47.2	38.5	0	11.7	47.1	94.8	100
CZ	3,914	3	31.7	21.2	42.8	0	0	0	89.4	100
DE	481	7	70.2	83.2	42	0	21	100	100	100
DK	27	5	57.6	73.7	34.1	0	24.1	66.9	69.8	100
EE	NA	–	–	–	–	–	–	–	–	–
ES	6,337	9	75.2	62.4	36	0	53	100	100	100
FI	5	2	61	5	53.5	0	0	4.9	100	100
FR	5,114	6	46.1	56.7	44	0	0	38.4	100	100
EL	913	2	90.4	71.8	25.1	22.3	100	100	100	100
HR	128	2	51.6	40.2	39.7	0	6.3	46.7	98.6	100
HU	793	3	37.7	13.4	38.8	0	0	27.1	68.5	100
IE	50	2	14.4	15.5	28.8	0	0	0	9.2	98.8
IT	4,719	13	31.1	27.6	36	0	0	13.6	57.5	100
LT	268	3	56.7	60.5	43.5	0	0	73.8	100	100
LU	129	3	75.5	79.6	36.7	0	47.1	100	100	100
LV	110	2	76.4	79.7	34.1	1.6	54.1	100	100	100
MT*	*Not shown	–	–	–	–	–	–	–	–	–
NL	11,550	6	64.9	70.8	37	0	40.7	76.7	100	100
PL	4,316	9	12.3	5.7	25.5	0	0	0	6.5	76.4
PT	8,205	6	58.8	52.6	42.6	0	4.8	77.8	100	100
RO	914	4	68.4	42.2	33.3	0	52.8	85.2	90.7	98.4
SE	999	7	75.3	41.2	41.8	0	47	100	100	100
SI[121]	-	–	–	–	–	–	–	–	–	–
SK	129	2	67.4	68.4	40.4	1	23.6	100	100	100
EU27	**55,913**	**96**	**52.7**	**59.1**	**43.1**	**0**	**0**	**52.1**	**100**	**100**
NO*	*Not shown	–	–	–	–	–	–	–	–	–

Note: *Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 48: Recovery rate net benchmark, corporate – Category 1

Country of enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	5th percentile	1st quartile	Median	3rd quartile	95th percentile
AT	27	3	39	43	40.2	0	3.6	16.8	76.3	100
BE*	*Not shown	–	–	–	–	–	–	–	–	–
BG	226	2	71.7	62.7	36.6	1.6	39.2	97.5	100	100
CY	26	2	20.4	31.7	35.4	0	0	0	41.3	100
CZ	33	1	7.5	6.6	11.4	0	0	0	16.7	32
DE*	*Not shown	–	–	–	–	–	–	–	–	–
DK	14	1	94.8	94.4	12.7	56.2	100	100	100	100
EE	NA	–	–	–	–	–	–	–	–	–
ES	155	4	38.3	48.5	45.8	0	0	0	99.9	100

[120] SI shows a high number of loans with negative recovery amounts. If these loans were considered, the net recovery rate and gross recovery rate would be lower (see Section 5 for details).
[121] For SMEs, If the negative recovery amounts loans were considered, the simple average would be 33.4%.

FI	NA	-	-	-	-	-	-	-	-	-
FR	45	3	34.5	56	43	0	0.5	5.5	89.5	100
EL	24	1	71.3	69.3	36.8	1.1	25.9	100	100	100
HR	453	1	34.5	29.2	42.3	0	0	5.5	87.7	100
HU	NA	–	–	–	–	–	–	–	–	–
IE	NA	–	–	–	–	–	–	–	–	–
IT	170	8	34.6	38.7	38.6	0	0	18	65.5	100
LT	NA	–	–	–	–	–	–	–	–	–
LU*	*Not shown	–	–	–	–	–	–	–	–	–
LV	NA	–	–	–	–	–	–	–	–	–
MT	*Not shown	–	–	–	–	–	–	–	–	–
NL	112	2	68.6	86.2	33	0	49.8	62.6	100	100
PL	34	2	1.5	3.6	5	0	0	0	0	9
PT	158	5	57.5	66.3	41.8	0	6.9	72.2	100	100
RO*	*Not shown	–	–	–	–	–	–	–	–	–
SE	13	3	95.1	100	17	38.6	100	100	100	100
SI[122]	-	–	–	–	–	–	–	–	–	–
SK	5	1	22.8	12.3	43.4	0	0	0	11.2	100
EU27	**1,595**	**45**	**48.6**	**58.5**	**44**	**0**	**0**	**45.1**	**99.9**	**100**
NO	NA	–	–	–	–	–	–	–	–	–

Note: *Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Real estate

Table 49: Recovery rate net benchmark, RRE – Category 1

Country of enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	5th percentile	1st quartile	Median	3rd quartile	95th percentile
AT	958	3	71.5	36.1	36.1	0.6	42.7	93.1	100	100
BE	316	3	70.7	40.8	40.8	0	36.1	99.2	100	100
BG	2,113	3	61.8	34.5	34.5	3.5	30.8	62.9	100	100
CY	985	3	58.4	34.9	34.9	0	29.7	58.4	100	100
CZ	2,917	6	73.5	33.2	33.2	2.2	48.8	93.4	98	100
DE	253	9	88.9	25.8	25.8	20.8	100	100	100	100
DK	971	5	78.8	31.7	31.7	9.4	56.5	100	100	100
EE	10	1	54.8	44.2	44.2	5.6	9.9	29	100	100
ES	7,170	9	80	31.5	31.5	3.3	70.6	99.8	100	100
FI	101	4	83.8	31.3	31.3	2.2	91.5	99.3	100	100
FR	1,451	5	83.7	33.5	33.5	0	97.9	100	100	100
EL	58	1	85.8	32.3	32.3	0	100	100	100	100
HR	385	2	60.7	32.6	32.6	0	40.7	67.9	89.5	100
HU	8,236	4	53.8	38.3	38.3	0	17.7	50.9	100	100
IE	862	8	30.9	33.3	33.3	0	1	16.7	55	100
IT	3,474	10	50.4	37.4	37.4	0	13.6	50	87.9	100
LT	743	3	66.7	37.7	37.7	0	34.2	87.6	100	100
LU	113	4	92.4	20.3	20.3	38.4	99.7	100	100	100
LV	680	3	60.8	37.6	37.6	0	27	63.2	100	100
MT*	*Not shown	–	–	–	–	–	–	–	–	–
NL	8,705	6	88.9	14.1	14.1	57	88.5	92.4	97.7	100
PL	2,474	7	15.3	32	32	0	0	0	4.1	100
PT	23,388	5	78.4	32.4	32.4	5.4	64.2	98.6	100	100
RO	1,086	6	48.7	36	36	0	14.9	43.9	87.7	100
SE	621	5	50.8	47.5	47.5	0	0	62	100	100
SI[123]	75	2	42	38	12	21.9	95.9	21.5	75	2
SK	1,344	3	91.8	22.2	22.2	29.9	100	100	100	100

[122] For Corporate, If the negative recovery amounts loans were considered, the average net recovery rate would be 40.1%.
[123] For Residential Real Estate, If the negative recovery amounts loans were considered, the simple average would be 39%.

EU27	**69,490**	**103**	**70.9**	**36.3**	**36.3**	**0**	**42.2**	**92.1**	**100**	**100**
NO	59	4	77.4	36.5	36.5	4.7	65.3	100	100	100

Note: *Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 50: Recovery rate net benchmark, CRE – Category 1

Country of enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	5th percentile	1st quartile	Median	3rd quartile	95th percentile
AT	241	3	72.2	72.6	36.8	0	44.1	96.2	100	100
BE	NA	–	–	–	–	–	–	–	–	–
BG	181	3	52	53.9	35.2	0	19.5	49.6	87.8	100
CY	324	3	48	60.1	40.6	0	0.6	45.4	96.7	100
CZ	13	4	84	79.2	23.1	28.6	75.7	93.7	98	99.2
DE	39	4	93.2	88.5	20	28	100	100	100	100
DK	380	4	78	78.9	32.1	6.3	58.7	100	100	100
EE	NA	–	–	–	–	–	–	–	–	–
ES	1,348	7	74.3	73.9	33.7	0	50.4	98.7	100	100
FI	NA	–	–	–	–	–	–	–	–	–
FR	20	5	27.7	33.4	40.2	0	0	0	43.2	100
EL	9	2	72.6	72	34.4	20.2	30.9	63.7	100	100
HR	106	2	49.8	53.8	37.9	0	0	50.4	87.6	100
HU	74	2	36.6	20.5	28	0	15.5	31.8	49.5	100
IE	45	2	18.3	14.1	28.6	0	0	3.6	20.9	100
IT	2,171	7	51.8	51.6	37.2	0	13.2	53.9	89.4	100
LT	23	2	89.1	85.9	25.7	0	92.8	100	100	100
LU*	*Not shown	–	–	–	–	–	–	–	–	–
LV	14	2	81.6	85.9	25.1	32.7	62.6	97.8	99.2	100
MT	NA	–	–	–	–	–	–	–	–	–
NL	760	3	75	53	37	0	56	100	100	100
PL	1,189	7	16.8	28.8	33.3	0	0	0	8.3	100
PT	1,336	5	50.9	54.1	42.9	0	2	51.6	99.1	100
RO	16	2	79.4	73.4	29.6	8.7	68.8	90	100	100
SE	*Not shown	–	–	–	–	–	–	–	–	–
SI	45	2	53.9	59.7	35.8	17.1	58.8	82	45	2
SK	NA	–	–	–	–	–	–	–	–	–
EU27	**8,340**	**70**	**54.2**	**48.2**	**41.4**	**0**	**3.3**	**59.4**	**100**	**100**
NO*	*Not shown	–	–	–	–	–	–	–	–	–

Note: *Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Retail

Table 51: Recovery rate net benchmark, retail – credit cards – Category 1

Country of enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	5th percentile	1st quartile	Median	3rd quartile	95th percentile
AT	621	1	52.2	48.8	44.5	0	0	60.3	100	100
BE	60	2	59.8	66.1	42.1	0	6.2	75.8	100	100
BG	1,963	3	53.2	55.1	40.9	0	4.5	55.5	100	100
CY	76	2	72.8	73.3	37.1	0	44.3	93	100	100
CZ	18,106	2	44.6	40.5	36.1	0	12.9	36.2	80.3	100
DE	37	1	86.2	83.8	25.3	21.1	74.7	100	100	100
DK*	*Not shown	–	–	–	–	–	–	–	–	–
EE	NA	–	–	–	–	–	–	–	–	–
ES	6,683	6	67.6	63.8	27.3	0	66.2	73	80.5	100
FI	NA	–	–	–	–	–	–	–	–	–
FR	36,967	4	15.9	12.6	31	0	0	0	11	100
EL	16	1	100	100	0	100	100	100	100	100
HR	2,201	1	48.9	51.1	38.7	0	9.1	42.4	92.6	100

HU	3,697	2	86	85.4	31.3	0	100	100	100	100
IE	NA	–	–	–	–	–	–	–	–	–
IT	NA	–	–	–	–	–	–	–	–	–
LT	931	2	71.9	60.5	42.9	0	14.5	100	100	100
LU	587	2	78.8	70.9	32.4	8.5	59.1	100	100	100
LV	862	3	91	88.5	18.7	95	95	95	95	95
MT	NA	–	–	–	–	–	–	–	–	–
NL*	*Not shown	–	–	–	–	–	–	–	–	–
PL	27,869	6	38.8	32.7	44.9	0	0	5	100	100
PT	3,752	6	70.8	63.2	30	0	60.2	81.1	94	100
RO*	*Not shown	–	–	–	–	–	–	–	–	–
SE	5,840	7	91.6	93.8	26.8	0	100	100	100	100
SI[124]	436	1	99.4	99.4	0	99.4	99.4	99.4	436	1
SK	543	2	72.9	70.2	41.4	0	27.8	100	100	100
EU27	**111,252**	**50**	**41.2**	**28.9**	**42.8**	**0**	**0**	**22.5**	**95**	**100**
NO	NA	–	–	–	–	–	–	–	–	–

Note: *Not shown when the number of observations is below five. The EU27 figures include not shown observations.

Table 52: Recovery rate net benchmark, retail – other consumer loans – Category 1

Country of enforcement	Number of observations	Number of banks	Simple average	Weighted average	Standard deviation	5th percentile	1st quartile	Median	3rd quartile	95th percentile
AT	8,965	6	29.2	30.8	40.9	0	0	0	67.7	100
BE	196	5	62.9	67.5	44.5	0	0	95.4	100	100
BG	10,505	4	59.6	58.2	42.2	0	14.3	79.1	100	100
CY	1,926	3	60	54	35	0.9	29.7	62.1	100	100
CZ	29,153	5	43.6	44	32.8	0	18.4	36.8	67.4	100
DE	21,649	8	24.1	41.5	23	0	0	21.4	37.8	69.2
DK	310	3	30.6	33.9	37.9	0	0	9.5	58.6	100
EE	NA	–	–	–	–	–	–	–	–	–
ES	28,525	11	54.7	61.7	38.6	3.5	20.8	59.2	100	100
FI	6980	5	95.1	90.5	19.3	49.8	100	100	100	100
FR	26,774	9	20.1	13.3	34.4	0	0	0	26.8	100
EL	44	3	90.3	48.8	27.9	6.1	100	100	100	100
HR	6,935	5	31.2	20.2	38.7	0	0	6.7	66.3	100
HU	22,193	5	68.1	29.4	42.5	0	21.3	100	100	100
IE	43	4	17.2	13.4	33.2	0	0	0	7.2	100
IT	9,570	9	24.9	27.9	32.7	0	0	13.9	34.7	100
LT	878	3	75.1	66.5	39.5	0	58.4	100	100	100
LU	432	4	74.4	70.3	34	2.6	51.8	97.3	100	100
LV	1,339	2	67.1	45.5	39.8	0	22.1	95	95	95.6
MT	17	2	68	72	39	0	28	83	100	100
NL	152	4	34.3	50.3	39.6	0	0	12.3	78.6	100
PL	139,453	9	39.4	22.1	43.7	0	0	14	100	100
PT	9,073	8	54.5	56.3	41.5	0	9.9	64	100	100
RO	5,593	5	54.9	47.3	38.4	0	11.6	65.2	90	98.8
SE	47,692	9	94.4	86.7	21.4	32.9	100	100	100	100
SI[125]	–	–	–	–	–	–	–	–	–	–
SK	4,457	4	82	80.4	35.7	0	96.1	100	100	100
EU27	**386,936**	**99**	**49.8**	**42.6**	**43.8**	**0**	**0**	**41.6**	**100**	**100**
NO	NA	–	–	–	–	–	–	–	–	–

[124] For retail – credit cards, If the negative recovery amounts loans were considered (1.6% of the total number of loans), the simple average would be 98.2%,
[125] For retail – other consumer loans, If the negative recovery amounts loans were considered, the simple average would be 57.5%.

Annex 4 – Benchmarks by legal origin and assets class[126]

Table 53: Benchmarks by legal origin – firms

CORPORATE

Legal origin	Recovery rate gross (%)	Recovery rate Net (%)	Number of observations	Time to recovery (years)	Number of observations	Judicial cost to recovery (%)	Number of observations
Germanic	46.9	44.2	1,884	2.6	2,171	1.4	2,231
French	34.9	30.6	2,305	4.4	1,847	1.5	2,126
Anglo-Saxon	17.6	15.9	57	2.7	53	0.6	61
Nordic	93.7	92.7	31	1.9	74	0.0	30

SME

Legal origin	Recovery rate gross (%)	Recovery rate net (%)	Number of observations	Time to recovery (years)	Number of observations	Judicial cost to recovery (%)	Number of observations
Germanic	26.1	23.6	55,135	2.8	47,434	1.3	58,914
French	37.4	35.2	110,736	3.7	80,191	4.9	86,632
Anglo-Saxon	20.2	19.1	1,593	4.1	1,003	3.1	1,577
Nordic	66.8	65.8	1,413	1.1	2,090	6.6	1,821

Table 54: Benchmarks by legal origin – real estate

RRE

Legal origin	Recovery rate gross (%)	Recovery rate net (%)	Number of observations	Time to recovery (years)	Number of observations	Judicial cost to recovery (%)	Number of observations
Germanic	41.0	37.6	41,126	4.0	23,451	2.1	38,452
French	49.0	47.1	116,217	2.9	74,806	2.0	81,350
Anglo-Saxon	17.8	16.6	7,242	5.4	3,412	1.2	6,751
Nordic	60.8	59.2	4,428	1.0	6,326	1.0	4,349

[126] The averages include loans from the EU27 Member States and Norway. The legal origin classification was based on La Porta, R., López-de-Silanes, F., Shleifer, 'The Economic Consequences of Legal Origins', Journal of Economic Literature, Vol.46, No. 2, 2008, pp. 285-332; La Porta, R., López-de-Silanes, F., Shleifer, A. and Vishny, R.W., 'Legal determinants of external finance', *Journal of Finance*, Vol. 52, No. 3, 1997, pp. 1131-1150, and La Porta, R., López-de-Silanes, F., Shleifer, A. and Vishny, R.W., 'Law and finance', *Journal of Political Economy*, Vol. 106, 1998, pp. 1113-1155

	CRE						
Legal origin	Recovery rate gross (%)	Recovery rate net (&)	Number of observations	Time to recovery (years)	Number of observations	Judicial cost to recovery (%)	Number of observations
Germanic	35.2	33.3	2,807	3.1	1,749	1.0	2,820
French	45.3	40.8	17,176	4.6	12,666	1.8	18,188
Anglo-Saxon	23.3	22.3	2,612	2.1	1,704	1.3	1,627
Nordic	80.8	76.8	429	1.6	794	0.2	568

Table 55: Benchmarks by legal origin – retail

	Retail — other consumer loans						
Legal origin	Recovery rate gross (%)	Recovery rate net (%)	Number of observations	Time to recovery (years)	Number of observation	Judicial cost to recovery (%)	Number of observations
Germanic	38.1	30.6	531,809	3.1	527,238	6.1	599,285
French	26.2	23.9	270,754	3.0	227,154	3.0	178,339
Anglo-Saxon	47.9	45.4	2,669	7.1	6,403	3.9	4,122
Nordic	78.9	78.0	80,117	1.2	67,789	18.1	87,674

	Retail — credit cards						
Legal origin	Recovery rate gross (%)	Recovery rate net (%)	Number of observations	Time to recovery (years)	Number of observation	Judicial cost to recovery (%)	Number of observations
Germanic	44.4	33.9	109,131	2.7	111,462	7.1	132,944
French	12.4	11.2	212,311	2.0	107,495	3.2	64,967
Anglo-Saxon	30.0	28.6	226	3.3	233	6.6	268
Nordic	61.5	60.8	16,876	1.2	7,676	1.2	19,579

Annex 5 - Number of loans included in the benchmarks and percentage of total reported loans included in the benchmarks

Table 56: Sample for each Member state – SMEs

		Number of loans included in the benchmarks				% of total reported loans included in the benchmarks			
Country of enforcement	Number of reported loans	Number of reported domestic loans	Recovery rate	Time to recovery	Judicial cost to recovery	% loans – reported domestic	% loans – recovery rate	% loans – time to recovery	% loans – judicial cost to recovery
AT	4,644	4,638	4,460	3,253	4,462	99.9	96.0	70.0	96.1
BE	71	1	50	55	61	1.4	70.4	77.5	85.9
BG	3,059	3,059	2,861	2,842	2,617	100	93.5	92.9	85.6
CY	1,788	1,788	1,137	962	893	100	63.6	53.8	49.9
CZ	8,854	8,841	8,444	8,823	8,696	99.9	95.4	99.6	98.2
DE	940	840	898	900	925	89.4	95.5	95.7	98.4
DK	463	97	63	300	61	21.0	13.6	64.8	13.2
EE	57	–	14	13	14	–	24.6	22.8	24.6
ES	33,967	33,884	19,670	11,206	10,054	99.8	57.9	33.0	29.6
FI	681	658	42	427	66	96.6	6.2	62.7	9.7
FR	11,213	11,149	9,954	6,793	1,480	99.4	88.8	60.6	13.2
EL	24,389	24,388	24,086	1,325	387	100	98.8	5.4	1.6
HR	975	975	851	973	850	100	87.3	99.8	87.2
HU	20,667	20,625	20,587	17,351	20,224	99.8	99.6	84.0	97.9
IE	2,850	2,845	456	41	684	99.8	16.0	1.4	24.0
IT	19,280	19,272	14,707	14,960	18,863	100	76.3	77.6	97.8
LT	387	387	365	301	371	100	94.3	77.8	95.9
LU	1,381	1,381	151	1,019	550	100	10.9	73.8	39.8
LV	240	240	225	117	218	100	93.8	48.8	90.8
MT	90	89	36	60	60	98.9	40.0	66.7	66.7
NL	17,270	17,257	14,607	15,810	16,395	99.9	84.6	91.5	94.9
PL	17,078	17,078	14653	5578	14,938	100	85.8	32.7	87.5
PT	32,792	32,790	19,089	22,572	30,710	100	58.2	68.8	93.7
RO	8,022	7,904	8,021	6,090	7,701	98.5	100.0	75.9	96.0
SE	2,282	1,990	1,307	1,362	1,693	87.2	57.3	59.7	74.2
SI	5,402	5,402	1,830	5,379	5,381	100	33.9	99.6	99.6
SK	3,313	3,313	312	2,205	589	100	9.4	66.6	17.8
EU27	**222,155**	**220,891**	**168,876**	**130,717**	**148,943**	**99.4**	**76.0**	**58.8**	**67.0**
NO	1	1	1	1	1	100	100	100	100

Table 57: Sample for each Member state – corporate

		Number of loans included in the benchmarks				% of total reported loans included in the benchmarks			
Country of enforcement	Number of reported loans	Number of reported domestic loans	Recovery rate	Time to recovery	Judicial cost to recovery	% loans – reported domestic	% loans – recovery rate	% loans – time to recovery	% loans – judicial cost to recovery
AT	39	39	38	32	37	100	97.4	82.1	94.9
BE	1	–	1	1	–	–	100	100	–
BG	255	254	252	234	245	100	98.8	91.8	96.1
CY	78	78	57	47	61	100	73.1	60.3	78.2
CZ	38	36	38	38	38	94.7	100.0	100.0	100.0
DE	19	9	10	12	13	47.4	52.6	63.2	68.4
DK	41	35	17	30	16	85.4	41.5	73.2	39.0
EE	27	27	27	27	24	100	100.0	100.0	88.9
ES	509	503	332	190	339	98.8	65.2	37.3	66.6
FI	23	19	–	12	–	82.6	–	52.2	–
FR	100	98	85	48	11	98.0	85.0	48.0	11.0
EL	377	377	353	70	1	100	93.6	18.6	0.3
HR	896	896	726	896	703	100	81.0	100.0	78.5
HU	NA	–	–	–	–	–	–	–	–
IE	12	6	–	6	–	50.0	–	50.0	–
IT	1,171	1,166	878	943	1,088	100	75.0	80.5	92.9
LT	NA	–	–	–	–	–	–	–	–
LU	39	39	1	15	16	0	2.6	38.5	41.0
LV	NA	–	–	–	–	–	–	–	–
MT	36	36	4	7	35	100	11.1	19.4	97.2
NL	250	250	180	218	118	100	72.0	87.2	47.2
PL	486	486	321	61	331	100	66.0	12.6	68.1
PT	466	466	403	309	457	100	86.5	66.3	98.1
RO	68	67	68	46	61	98.5	100.0	67.6	89.7
SE	102	79	14	32	14	77.5	13.7	31.4	13.7
SI	859	859	458	859	830	100	53.3	100	96.6
SK	16	13	14	12	10	81	87.5	75.0	62.5
EU27	**5,908**	**5,838**	**4,277**	**4,145**	**4,448**	**98.8**	**72.4**	**70.2**	**75.3**
NO	NA	–	–	–	–	–	–	–	–

Table 58: Sample for each Member state – RRE

		Number of loans included in the benchmarks				% of total reported loans included in the benchmarks			
Country of enforcement	Number of reported loans	Number of reported domestic loans	Recovery rate	Time to recovery	Judicial cost to recovery	% loans – reported domestic	% loans – recovery rate	% loans – time to recovery	% loans – judicial cost to recovery
AT	1,350	1,349	1,343	974	1,306	99.9	99.5	72.1	96.7
BE	610	597	483	336	486	97.9	79.2	55.1	79.7
BG	3,098	3,098	3,066	2,529	2,789	100	99.0	81.6	90.0
CY	4,740	4,740	2,370	2,080	2,821	100	50.0	43.9	59.5
CZ	4,964	4,939	4,938	3,953	4,900	99.5	99.5	79.6	98.7
DE	409	386	387	397	379	94.4	94.6	97.1	92.7
DK	1,329	1,304	1,064	1,127	1,091	98.1	80.1	84.8	82.1
EE	98	85	10	8	0	86.7	10.2	8.2	0
ES	27,277	26,732	20,329	16,286	9,555	98.0	74.5	59.7	35.0
FI	2,606	2,529	241	1,664	330	97.0	9.2	63.9	12.7
FR	3,400	3,382	3,328	2,127	310	99.5	97.9	62.6	9.1

EL	26,798	26,796	26,091	67	304	100	97.4	0.3	1.1
HR	702	702	663	619	647	100.0	94.4	88.2	92.2
HU	20,320	20,318	20,072	9,864	18,896	100.0	98.8	48.5	93.0
IE	10,749	10,724	4,872	1,332	3,930	99.8	45.3	12.4	36.6
IT	16,931	16,786	14,087	10,577	16,171	99.1	83.2	62.5	95.5
LT	1,341	1,313	1,266	807	1,305	97.9	94.4	60.2	97.3
LU	350	350	126	276	160	100.0	36.0	78.9	45.7
LV	1,711	1,698	1,378	913	1,335	99.2	80.5	53.4	78.0
MT	52	52	49	52	48	100.0	94.2	100.0	92.3
NL	13,389	13,386	9,235	11,323	9,181	100.0	69.0	84.6	68.6
PL	7,438	7,438	6,951	1966	6,971	100.0	93.5	26.4	93.7
PT	42,479	42,479	37,964	30,112	40,655	100.0	89.4	70.9	95.7
RO	3,262	3,015	3,259	2,843	3,175	92.4	99.9	87.2	97.3
SE	2,745	2,603	1,686	2,044	1,633	94.8	61.4	74.5	59.5
SI	220	220	194	202	209	100.0	88.2	91.8	95.0
SK	2,239	2,239	2,124	2,026	1,020	100.0	94.9	90.5	45.6
EU27	**200,607**	**199,260**	**167,576**	**106,504**	**129,607**	**99.3**	**83.5**	**53.1**	**64.6**
NO	1,542	1,396	1,437	1,491	1,504	90.5	93.2	96.7	97.5

Table 59: Sample for each Member state – CRE

		Number of loans included in the benchmarks				% of total reported loans included in the benchmarks			
Country of enforcement	**Number of reported loans**	**Number of reported domestic loans**	**Recovery rate**	**Time to recovery**	**Judicial cost to recovery**	**% loans – reported domestic**	**% loans – recovery rate**	**% loans – time to recovery**	**% loans – judicial cost to recovery**
AT	340	340	336	248	334	100	98.8	72.9	98.2
BE	NA	–	–	–	–	–	–	–	–
BG	245	245	223	231	201	100	91.0	94.3	82.0
CY	2,834	2,834	2,264	1,672	1,132	100	79.9	59.0	39.9
CZ	35	33	34	35	33	94.3	97.1	100.0	94.3
DE	57	56	54	55	54	98.2	94.7	96.5	94.7
DK	865	601	423	468	559	69.5	48.9	54.1	64.6
EE	14	9	–	2	0	64.3	–	14.3	0
ES	4,339	4,339	3,446	2,279	1,435	100	79.4	52.5	33.1
FI	464	458	–	269	3	98.7	–	58.0	0.6
FR	33	23	26	22	24	69.7	78.8	66.7	72.7
EL	997	997	351	18	273	100	35.2	1.8	27.4
HR	267	267	228	224	223	100	85.4	83.9	83.5
HU	244	244	244	118	238	100	100	48.4	97.5
IE	757	757	348	32	495	100	46.0	4.2	65.4
IT	12,759	12,759	9,556	7,643	12,648	100	74.9	59.9	99.1
LT	64	48	63	35	62	75.0	98.4	54.7	96.9
LU	26	26	4	12	10	100	15.4	46.2	38.5
LV	104	104	24	16	23	100	23.1	15.4	22.1
MT	22	22	10	12	19	100	45.5	54.5	86.4
NL	1,072	1,072	929	998	776	100	86.7	93.1	72.4
PL	1,567	1,567	1,417	590	1,478	100	90.4	37.7	94.3
PT	3,026	3,026	2,761	1,618	2,913	100	91.2	53.5	96.3
RO	30	30	30	29	28	100	100	96.7	93.3
SE	84	21	2	53	2	25.0	2.4	63.1	2.4
SI	244	244	244	228	236	100	100	93.4	96.7
SK	6	6	3	2	0	100	50.0	33.3	0
EU27	**30,495**	**30,128**	**23,020**	**16,909**	**23,199**	**98.8**	**75.5**	**55.4**	**76.1**
NO	4	4	4	4	4	100	100	100	100

Table 60: Sample for each Member state – retail – credit cards

		Number of loans included in the benchmarks				% of total reported loans included in the benchmarks			
Country of enforcement	Number of reported loans	Number of reported domestic loans	Recovery rate	Time to recovery	Judicial cost to recovery	% loans – reported domestic	% loans – recovery rate	% loans – time to recovery	% loans – judicial cost to recovery
AT	3,170	3,169	1,894	3,170	3,131	100	59.7	100	98.8
BE	570	466	267	491	302	81.8	46.8	86.1	53.0
BG	4,546	4,546	3,094	3,404	2,279	100	68.1	74.9	50.1
CY	421	420	226	228	268	99.8	53.7	54.2	63.7
CZ	47,797	47,797	31,653	47,757	44,794	100	66.2	99.9	93.7
DE	125	–	51	107	107	0	40.8	85.6	85.6
DK	23	17	2	14	2	73.9	8.7	60.9	8.7
EE	1	–	–	–	–	–	–	–	–
ES	34,555	34,555	31,311	13,277	8,105	100	90.6	38.4	23.5
FI	561	496	.	195	0	88.4	0.0	34.8	0.0
FR	62,865	62,552	39,742	62,765	38,160	99.5	63.2	99.8	60.7
EL	124,142	124,142	123,322	16,667	0	100	99.3	13.4	0.0
HR	2,914	2,914	2,913	2,914	2,904	100	100	100	99.7
HU	10,763	10,763	10,762	805	10,539	100	100	7.5	97.9
IE	15	–	–	5	0	–	–	33.3	0.0
IT	NA	–	–	–	–	–	–	–	–
LT	3,280	3,280	3,222	3,252	3,213	100	98.2	99.1	98.0
LU	1,618	1,618	739	1,280	1,242	100	45.7	79.1	76.8
LV	5,989	5,987	1,829	1,216	1,829	100	30.5	20.3	30.5
MT	69	69	57	68	56	100	82.6	98.6	81.2
NL	2,669	2,664	5	954	4	99.8	0.2	35.7	0.1
PL	73,466	73,466	55,296	50421	65,693	100.0	75.3	68.6	89.4
PT	7,037	7,037	6,169	6,234	6,631	100	87.7	88.6	94.2
RO	7,477	7,477	7,477	2,507	7,254	100	100	33.5	97.0
SE	20,391	20,202	16,874	7,467	19,577	99.1	82.8	36.6	96.0
SI	668	668	656	666	666	100	98.2	99.7	99.7
SK	1,117	1,117	983	1,002	1,002	100	88.0	89.7	89.7
EU27	**416,249**	**415,422**	**338,544**	**226,866**	**217,758**	**99.8**	**81.3**	**54.5**	**52.3**
NO	NA	–	–	–	–	–	–	–	–

Table 61: Sample for each Member state – retail – other consumer loans

		Number of loans included in the benchmarks				% of total reported loans included in the benchmarks			
Country of enforcement	Number of reported loans	Number of reported domestic loans	Recovery rate	Time to recovery	Judicial cost to recovery	% loans – reported domestic	% loans – recovery rate	% loans – time to recovery	% loans – judicial cost to recovery
AT	25,352	25,276	17,941	23,049	24,063	99.7	70.8	90.9	94.9
BE	1,287	1,186	1,109	1,111	1,121	92.2	86.2	86.3	87.1
BG	23,398	23,397	21,803	20,447	11,175	100	93.2	87.4	47.8
CY	7,212	7,212	2,360	6,364	3,676	100	32.7	88.2	51.0
CZ	59,710	59,598	54,148	58,107	58,017	99.8	90.7	97.3	97.2
DE	43,706	1,017	43,663	29,761	17,388	2.3	99.9	68.1	39.8
DK	814	809	398	488	403	99.4	48.9	60.0	49.5
EE	1,279	1,278	10	–	0	99.9	0.8	–	0.0
ES	112,644	77,000	88,609	46,318	66,283	68.4	78.7	41.1	58.8
FI	12,091	1,199	9,410	7,439	9,687	9.9	77.8	61.5	80.1
FR	63,105	56,151	33,769	59,253	20,849	89.0	53.5	93.9	33.0

EL	68,066	68,064	67,187	17,466	226	100	98.7	25.7	0.3
HR	17,056	17,044	13,525	16,923	15,492	99.9	79.3	99.2	90.8
HU	76,855	76,715	76,853	24,289	74,745	99.8	100.0	31.6	97.3
IE	555	547	309	39	446	98.6	55.7	7.0	80.4
IT	27,627	24,199	20,490	26,679	24,821	87.6	74.2	96.6	89.8
LT	8,179	3,134	2,946	2,704	3,100	38.3	36.0	33.1	37.9
LU	2,554	2,553	534	1,999	675	100	20.9	78.3	26.4
LV	4,995	4,974	3,171	1,922	3,082	99.6	63.5	38.5	61.7
MT	184	183	123	164	127	99.5	66.8	89.1	69.0
NL	36,815	36,758	277	32,286	286	99.8	0.8	87.7	0.8
PL	427,717	427,712	286,355	335894	378,156	100	66.9	78.5	88.4
PT	29,809	29,784	21,884	20,102	28,484	99.9	73.4	67.4	95.6
RO	34,000	21,174	33,826	19,072	32,367	62.3	99.5	56.1	95.2
SE	90,190	87,866	70,309	59,862	77,584	97.4	78.0	66.4	86.0
SI	9,836	9,716	5,894	9,551	9,630	98.8	59.9	97.1	97.9
SK	9,034	9,010	8,446	7,295	7,537	99.7	93.5	80.8	83.4
EU27	**1,194,070**	**1,073,556**	**885,349**	**828,584**	**869,420**	**89.9**	**74.1**	**69.4**	**72.8**
NO	NA	–	–	–	–	–	–	–	–

Annex 6 – Ratio of total assets of the participating banks over the total assets of the banking sector

Table *62*: Ratio of total assets of the participating banks over the total assets of the banking sector (reference date: 31 December 2018)[127]

	Group of asset classes (%)		
Country of the bank	**FIRMS**	**Real estate**	**Retail**
AT	19.2	4.6	5.0
BE	0.8	25.1	25.1
BG	31.4	31.4	31.4
CY	67.0	68.8	67.0
CZ	23.2	21.1	25.2
DE	0.4	0.5	0.4
DK	90.8	93.3	68.2
EE	6.2	2.0	2.0
ES	25.7	25.8	26.0
FI	53.8	53.6	54.8
FR	3.7	3.7	2.9
EL	25.0	24.9	24.9
HR	43.4	43.4	43.8
HU	42.9	46.2	42.9
IE	29.3	41.6	27.6
IT	27.5	24.9	4.1
LT	68.0	68.0	68.0
LU	20.7	17.7	14.6
LV	55.8	55.8	42.3
MT	74.9	71.5	69.7
NL	63.4	64.5	39.2
PL	30.9	22.3	22.8
PT	60.8	60.3	60.3
RO	30.7	31.1	29,3
SE	29.9	11.4	31.2
SI	10.7	10.7	10.7
SK	34.0	37.0	37.0
EU27[128]	**35.9**	**35.6**	**32.6**

[127] The ratios are calculated as an approximation, as the total assets information is not available to the EBA at the level of individual credit institutions, for which the loan enforcement data were collected. The coverage is calculated taking into account the sample of domestic banks participating in a given asset class (firms, real estate and retail), for which all or part of their loans have been included in the calculation of the benchmarks. The sum of consolidated total assets of the participating banks is used for each asset class as the numerator. As the denominator, the total assets of the jurisdiction (source: ECB's Consolidated Banking Data) are used. For some Member States it was not possible to obtain the amount of total assets of some participating banks with a reference date of 31 December 2018. In those cases, the ratios may be under-estimated. In some Member States, the coverage may be over-estimated due to use of consolidated data, while loan enforcement information was collected on individual basis.
[128] EU27 average at country level.

Annex 7 – Methodology to study recovery rates

Dullmann & Trapp, 2004[129], utilize a logit-normal distribution and empirically analyse the recovery rates. Following a proposal by Schonbucher, 2003, the recovery rate is modelled as a logit transformation of a normally distributed random variable Yj. The recovery rate R (Yj (X)) follows a logit–normal distribution defined as follows:

$$Y_j(X) = \mu + \sigma\sqrt{\omega}\,X + \sigma\sqrt{1-\omega}\,Z_j$$

$$R(Y_j(X)) = \frac{\exp(Y_j(X))}{1+\exp(Y_j(X))},$$

where X and Zj are independent standard normally distributed. The parameter ω is restricted to the interval [0, 1]. The study that utilize a logit-normal distribution demand that PD, μ, σ and ω, like ρ, are constant for all observations and across all time periods. The same study further assume that the Zj are pairwise uncorrelated cross–sectionally.

Logistic function

As Figure 25 shows, the recovery rate is restricted to the interval between 0 and 1. Due to the bounded nature of the dependent variable one cannot implement an ordinary least squares (OLS) regression since the predicted values from the OLS regression can never be guaranteed to lie in the unit interval. In addition, least squares estimates for regression models are highly sensitive to observations which do not follow the pattern of the other observations (i.e. outliers).

$$E(r|\mathbf{x}) = \beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k = \mathbf{x}\beta, \qquad (1)$$

If OLS or WLS cannot be used, non-linear estimation procedures are required (i.e. the maximum likelihood estimator). An alternative specification to equation (1) is

$$E(r|\mathbf{x}) = G(\mathbf{x}\beta), \qquad (2)$$

where G(.) satisfies 0 < G(z) < 1 for all z. This condition guarantees that the predicted recovery rates lie in the unit interval. The most common functional forms for G(.) are the cumulative normal distribution, the logistic function,

$$G(\mathbf{x}\beta) = \frac{1}{1+\exp(-\mathbf{x}\beta)}, \qquad (3)$$

The model creates a relationship in the form of a logistic line that best approximates all the individual data points.

The logit–normal model is preferable on the grounds that it has the desirable property to restrict recovery rates to the interval between 0% and 100%. This additional structural element may make parameter estimation more efficient.

[129] Düllmann, Klaus and Gehde-Trapp, Monika, Systematic Risk in Recovery Rates - an Empirical Analysis of U.S. Corporate Credit Exposures (June 2004).

Annex 8 – Descriptive statistics and correlations

FIRMS

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Recovery Rate	187,173	0.25	0.38	0.0	1.0
Net Recovery Rate	157,724	0.34	0.42	0.0	1.0
D1	213,394	0.92	0.28	0.0	1.0
D2	178,933	0.71	0.45	0.0	1.0
D3	178,933	0.90	0.30	0.0	1.0
D10	213,010	0.84	0.37	0.0	1.0
D25	213,509	0.84	0.37	0.0	1.0
D27	213,509	0.10	0.29	0.0	1.0
D28	213,509	0.16	0.37	0.0	1.0
D29	213,509	0.17	0.38	0.0	1.0
D30	213,509	0.65	0.48	0.0	1.0
Time to Recovery	130,280	3.67	3.45	0.0	118.6
Bank Efficiency 2018	209,679	57.91	10.00	10.9	133.1
Ln Average GDP per capita 2013-18	213,510	9.89	0.46	8.7	11.3
Legal Origin					
Germanic	213,510	0.25	0.44	0.0	1.0
French	213,510	0.71	0.46	0.0	1.0
Anglo-Saxon	213,510	0.02	0.15	0.0	1.0
Nordic	213,510	0.02	0.13	0.0	1.0
Bank Size					
Small	213,510	0.14	0.35	0.0	1.0
Medium	213,510	0.25	0.44	0.0	1.0
Large	213,510	0.60	0.49	0.0	1.0
Bank Business Model					
Cross-border	213,510	0.88	0.33	0.0	1.0
Retail-oriented	213,510	0.12	0.33	0.0	1.0
Corporate-oriented	213,510	0.00	0.01	0.0	1.0
Other specialised banks	213,510	0.00	0.05	0.0	1.0
Type of Portfolio (SME0=; Corporate=1)	213,510	0.02	0.15	0.0	1.0
Firm Ln Total Assets 2018	95,817	13.11	2.99	-4.6	23.1

Correlations

	Recovery Rate	Net Recovery Rate	Time to Recovery	Bank Efficiency 2018	Ln Average GDP per capita 2013-18	Firm Ln Total Assets 2018
Recovery Rate	1					
Net Recovery Rate	0.85	1				
Time to Recovery	-0.14	-0.09	1			
Bank Efficiency 2018	0.07	0.04	-0.07	1		
Ln Average GDP per capita 2013-18	0.15	0.25	0.00	0.38	1	
Firm Ln Total Assets 2018	-0.04	0.07	-0.13	-0.02	-0.01	1

RRE

Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Recovery Rate	178,856	0.40	0.42	0.0	1.0
Net Recovery Rate	166,882	0.44	0.43	0.0	1.0
D89	165,785	0.83	0.37	0.0	1.0
D96	151,990	0.56	0.50	0.0	1.0
D102	192,977	0.74	0.44	0.0	1.0
Time to recovery	102,722	3.24	2.88	0.0	38.4
Bank Efficiency 2018	196,570	56.92	11.70	10.9	123.7
Average GDP growth 2013-18	196,876	2.29	1.82	0.4	8.2
Legal origin					
Germanic	196,876	0.21	0.41	0.0	1.0
French	196,876	0.67	0.47	0.0	1.0
Anglo-Saxon	196,876	0.08	0.27	0.0	1.0
Nordic	196,876	0.04	0.19	0.0	1.0
Bank Size					
Small	196,876	0.13	0.34	0.0	1.0
Medium	196,876	0.25	0.43	0.0	1.0
Large	196,876	0.63	0.48	0.0	1.0
Bank Business model					
Cross-border	196,876	0.85	0.35	0.0	1.0
Retail-oriented	196,876	0.12	0.33	0.0	1.0
Corporate-oriented	196,876	0.02	0.15	0.0	1.0
Other specialised banks	196,876	0.00	0.04	0.0	1.0

Correlations

	Recovery Rate	Net Recovery Rate	Time to Recovery	Bank Efficiency Ratio 2018	Average GDP growth 2013-18
Recovery Rate	1				
Net Recovery Rate	0.86	1			
Time to Recovery	-0.16	-0.13	1		
Bank Efficiency Ratio 2018	-0.23	-0.25	0.14	1	
Average GDP growth 2013-18	-0.13	-0.17	0.14	-0.06	1

CRE

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Recovery Rate	27,401	0.31	0.37	0.0	1.0
Net Recovery Rate	22,517	0.38	0.40	0.0	1.0
D10	28,864	0.84	0.37	0.0	1.0
D17	29,726	0.82	0.38	0.0	1.0
D21	29,643	0.34	0.47	0.0	1.0
D25	29,726	0.98	0.09	0.0	1.0
D22	29,726	0.38	0.49	0.0	1.0
D27	29,726	0.04	0.20	0.0	1.0
D37	29,726	0.82	0.38	0.0	1.0
Time to recovery	16,144	4.29	3.36	0.0	25.5
Bank Efficiency 2018	29,605	62.01	13.83	10.9	94.8
Average GDP growth 2013-18	29,730	1.49	1.46	0.4	8.2
Legal origin					
Germanic	29,730	0.10	0.31	0.0	1.0
French	29,730	0.73	0.45	0.0	1.0
Anglo-Saxon	29,730	0.12	0.33	0.0	1.0
Nordic	29,730	0.05	0.21	0.0	1.0
Bank Size					
Small	29,730	0.10	0.30	0.0	1.0
Medium	29,730	0.25	0.43	0.0	1.0
Large	29,730	0.65	0.48	0.0	1.0
Business model					
Cross-border	29,730	0.89	0.31	0.0	1.0
Retail-oriented	29,730	0.09	0.29	0.0	1.0
Corporate-oriented	29,730	0.02	0.14	0.0	1.0
Other specialised banks	29,730	0.00	0.02	0.0	1.0

Correlations

	Recovery Rate	Net Recovery Rate	Time to Recovery	Bank Efficiency ratio 2018	Average GDP growth 2013-18
Recovery Rate	1				
Net Recovery Rate	0.84	1			
Time to Recovery	-0.14	-0.17	1		
Bank Efficiency Ratio 2018	-0.10	-0.14	0.04	1	
Average GDP growth 2013-18	-0.01	0.04	-0.25	-0.46	1

Retail – other consumer loans

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Recovery Rate	1,047,993	0.34	0.39	0.0	1.0
Net Recovery Rate	878,558	0.33	0.39	0.0	1.0
D77	1,054,605	0.30	0.46	0.0	1.0
D92	1,055,159	0.11	0.31	0.0	1.0
D94	1,035,000	0.90	0.30	0.0	1.0
D96	911,738	0.26	0.44	0.0	1.0
D97	1,146,429	0.20	0.40	0.0	1.0
D102	1,146,429	0.80	0.40	0.0	1.0
Time to recovery	800,918	3.03	3.05	0.0	40.0
Average GDP growth 2013-18	1,166,404	2.62	1.31	0.4	8.2
Legal origin					
Germanic	1,166,404	0.58	0.49	0.0	1.0
French	1,166,404	0.32	0.47	0.0	1.0
Anglo-Saxon	1,166,404	0.01	0.08	0.0	1.0
Nordic	1,166,404	0.09	0.28	0.0	1.0
Size					
Small	1,166,404	0.54	0.50	0.0	1.0
Medium	1,166,404	0.16	0.37	0.0	1.0
Large	1,166,404	0.30	0.46	0.0	1.0
Business model					
Cross-border Universal	1,166,404	0.60	0.49	0.0	1.0
Retail-oriented	1,166,404	0.37	0.48	0.0	1.0
Corporate-oriented	1,166,404	0.00	0.01	0.0	1.0
Other specialised	1,166,404	0.04	0.19	0.0	1.0

Correlations

	Recovery Rate	Net Recovery Rate	Time to Recovery	Average GDP growth 2013-18
Recovery Rate	1.00			
Net Recovery Rate	0.94	1.00		
Time to Recovery	0.00	0.01	1.00	
Average GDP growth 2013-18	0.10	0.03	0.12	1.00

Retail – credit cards

Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Recovery Rate	371,098	0.23	0.35	0.0	1.0
Net Recovery Rate	333,290	0.21	0.34	0.0	1.0
D96	337,853	0.45	0.50	0.0	1.0
D98	395,207	0.57	0.49	0.0	1.0
D99	395,207	0.98	0.14	0.0	1.0
D105	392,538	0.79	0.41	0.0	1.0
Time to recovery	209,870	2.52	2.27	0.0	40.0
Average GDP growth 2013-18	399,253	1.86	1.37	0.5	8.2
Legal origin					
Germanic	399,253	0.34	0.47	0.0	1.0
French	399,253	0.61	0.49	0.0	1.0
Anglo-Saxon	399,253	0.00	0.03	0.0	1.0
Nordic	399,253	0.05	0.22	0.0	1.0
Bank Size					
Small	379,655	0.50	0.50	0.0	1.0
Medium	379,655	0.12	0.33	0.0	1.0
Large	379,655	0.38	0.49	0.0	1.0
Business model					
Cross-border	399,253	0.63	0.48	0.0	1.0
Retail-oriented	399,253	0.37	0.48	0.0	1.0

Correlations

	Recovery Rate	Net Recovery Rate	Time to Recovery	Average GDP growth 2013-18
Recovery Rate	1			
Net Recovery Rate	0.87	1		
Time to Recovery	0.03	0.08	1	
Average GDP growth 2013-18	0.38	0.28	0.07	1

Annex 9 – Interactions between positive characteristics of the enforcement frameworks and security status (unsecured and secured loans)

Are the positive characteristics of the enforcement frameworks influenced by the difference between unsecured and secured loans?

The interaction terms of different positive characteristics of the enforcement frameworks with the security status (i.e. unsecured or secured loans) are significant. The significant interactions suggest that the effect of different positive characteristics of the enforcement frameworks on recovery rate depends on the security status. As expected, the positive characteristics produce impacts on recovery rates in different ways.

First, the test of simple main effects suggests that regarding recovery rates, when some characteristics such as the out-of-court enforcement of collateral, absence of long moratoria that suspend enforcement of collateral, creditors' chances to impact on the proceedings through creditor committees and 'pre-pack' insolvency (or restructuring) available for SMEs (i.e. D1, D10, D25, D30=0) do not exist in the enforcement frameworks, unsecured loans are not significantly different (despite lower recovery rates) from secured loans. However, when those characteristics exist in the enforcement frameworks, unsecured loans are significantly different (maintaining, however, lower recovery rates) from secured loans. That is, the existence of such characteristics increases the recovery rates in general and increases the difference (significant) between unsecured and secured loans. As expected, those characteristics improve the recovery rates with a higher impact on secured loans.

Second, the test of simple main effects suggests that regarding recovery rates, when out-of-court enforcement of collateral for real estate collateral, absence of privileges (prior rank) for debt towards government, social security and for wages, pension schemes, as well as for specific types of creditors/debt (D2, D27, D28, D29 = 0) do not exist in the enforcement frameworks, unsecured loans are significantly different (lower recovery rates) from secured loans. However, when those characteristics exist in the enforcement framework, unsecured loans are not significantly different (despite the continuation of lower recovery rates) from secured loans. That is, the existence of such characteristics increases the recovery rates in general and reduces the difference (not significant anymore) between unsecured and secured loans.

Finally, the test of simple main effects suggests that regarding recovery rates, when the out-of-court enforcement of collateral for tangible moveable assets (D3 = 0) does not exist in the enforcement framework, unsecured loans are not significantly different (despite lower recovery rates) from secured loans. When D3 exist in the enforcement framework, unsecured loans are not significantly different (despite lower recovery rates) from secured loans as well. That is, the existence of D3 in the enforcement frameworks increases the recovery rates in general but does not change the difference (not significant) between unsecured and secured loans.

VARIABLES	FIRMS (1) Recovery Rate	FIRMS (2) Recovery Rate	FIRMS (3) Recovery Rate	FIRMS (4) Recovery Rate	FIRMS (5) Recovery Rate	FIRMS (6) Recovery Rate	FIRMS (7) Recovery Rate	FIRMS (8) Recovery Rate	FIRMS (9) Recovery Rate
D1 Out-of-court enforcement of collateral	1.331 **								
	(2.480)								
D2 Out-of-court enforcement of collateral, for real estate collateral		0.892 **							
		(2.030)							
D3 Out-of-court enforcement of collateral, for tangible moveable assets			1.216 **						
			(2.250)						
D10 Absence of long moratoria that suspend enforcement of collateral				2.745 ***					
				(4.360)					
D25 Creditors' chances to impact on the proceedings through creditor committees					2.006 ***				
					(4.440)				
D27 Absence of privileges (prior rank) for debt towards government, social security						1.468 ***			
						(3.350)			
D28 Absence of privileges (prior rank) for wages, pension schemes							0.340		
							(0.680)		
D29 Absence of other general privileges for specific types of creditors/debt								0.606	
								(1.270)	
D30 Pre-pack' insolvency (or restructuring) available for SMEs									2.610 ***
									(4.680)
D[1,2,.30]#d_security_status									
0#Unsecured-0#Secured	-0.537	-0.749 **	-0.537	0.729	0.120	-0.506 **	-0.704 ***	-0.697 ***	0.451
	(-1.080)	(-2.110)	(-1.080)	(1.200)	(0.300)	(-2.000)	(-3.290)	(-3.190)	(0.860)
1#Unsecured-1#Secured	-0.514 **	-0.233	-0.376	-0.723 ***	-0.555 **	-0.641	0.517	0.353	-0.723 ***
	(-2.080)	(-0.740)	(-1.440)	(-3.410)	(-2.270)	(-1.540)	(0.880)	(0.650)	(-3.320)
Constant	-0.053	0.153	-0.053	-1.290 **	-0.694	-0.083	0.109	-0.030	-1.156 **
	(-0.110)	(0.440)	(-0.110)	(-2.170)	(-1.780)	(-0.340)	(0.520)	(-0.140)	(-2.240)
Bank (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country (clustered standard errors)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. Banks	112	104	104	107	112	112	112	112	112
No. Clusters	145	134	134	146	153	153	153	153	153
Observations	184,912	150,599	150,599	184,875	185,003	185,003	185,003	185,003	185,003
Log likelihood	-107,974	-84,571	-84,689	-107,172	-107,934	-108,013	-107,419	-107,528	-107,403
Prob > chi2	0.157	0.189	0.188	0.163	0.158	0.157	0.162	0.161	0.162

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Are the positive characteristics of the enforcement frameworks influenced by the difference between physical secured loans and non-physical secured loans?

The interaction terms of different positive characteristics of the enforcement frameworks with the security type (i.e. non-physical secured loans or physical secured loans) are not significant. The significant interactions suggest that the effect of different positive characteristics of the enforcement frameworks on recovery rate do not depend on the security type being non-physical secured loans or physical secured loans.

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