WINTER RESEARCH UPDATE

14 DECEMBER 2023
ON TODAY’S CALL

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AGENDA

• WELCOME AND INTRODUCTION
  DR. CHRISTIAN THUN, EUROPEAN DATAWAREHOUSE

• EFFECTS OF CLIMATE RISK ON ABS VALUATION AND LIQUIDITY RISK
  YANIS BOUZIDI, BANQUE DE FRANCE

• EPC DISCLOSURE IN EUROPEAN MORTGAGE LOANS
  USMAN JAMIL, EUROPEAN DATAWAREHOUSE

• EPC DISCLOSURE IN EUROPEAN AUTO LOANS
  USMAN JAMIL, EUROPEAN DATAWAREHOUSE

• RMBS LOANS PERFORMANCE UPDATE
  USMAN JAMIL, EUROPEAN DATAWAREHOUSE

• USING EDW DATA FOR ACADEMIC RESEARCH
  LUDOVIC THEBAULT, PHD, EUROPEAN DATAWAREHOUSE

• Q & A
EFFECTS OF CLIMATE RISK ON ABS VALUATION AND LIQUIDITY RISK
Effect of climate risk on ABS valuation and liquidation risk

Yanis Bouzidi
Risk management Directorate
Risk Analysis and Eurosystem Pricing Division

14 December 2023
A CENTRALISED PRICING HUB FOR COLLATERAL VALUATION

The Common Eurosystem Pricing Hub (CEPH), developed and operated by the Eurosystem, provides the Eurosystem with a unique price per asset per business day that is used by all Eurosystem central banks to value eligible marketable assets submitted as collateral in Eurosystem credit operations.

To define these unique Eurosystem prices, the CEPH collects market prices and defines the most reliable one on a given business day. In the absence of a reliable market price for a particular marketable asset on the business day preceding the valuation date, the CEPH calculates a theoretical price.

The value of a marketable asset is calculated on the basis of this unique Eurosystem price on the business day preceding the valuation date.

The CEPH started its marketable assets operations on 24 September 2012.

Banque de France CEPH team has a more specific focus on ABS valuation.

CEPH is a reliable, integrated, resilient, proprietary system ensuring daily prices for collateral marketable assets.
As of Q3 2023, ABS represent 30% of market securities used as collateral, for a total of EUR 364 bn.
CEPH uses market data and Credit Agency estimates to predict pricing parameters such as Discount factor, Prepayment rate, and Default rate.

The Loan Level Data are collected and used for cash flows projections.

We are also using EDW Data on new projects such as the application of Artificial intelligence models for Prepayment rates modelling and the assessment of climate risks by using microloans information.
The European Union has a target of **climate neutrality** by 2050

To achieve this objective, different directives have been set out on different sectors such as building and automobile activities

A trajectory on building **Energy Performance Certificates** (EPC) has been set, including the following measures:

- All new buildings have to be zero-emission by 2028
- “Residential buildings need to achieve at least energy performance class E by 2030, and D by 2033”

For automobile sector, all new cars registered in Europe have to be zero-emission from 2035

This new European regulation may have a significant impact on the involved sectors. Additionally, it may have an effect on **the perception of ABS by investors through increased transition risk**. We thus investigate whether the market takes into account the EPC of the underlying loans when dealing with ABS.

Since ABS are accepted as collateral for the ECB monetary policy, this is a key issue for the measure of **risk to the Eurosystem**.

Specifically, this study measures the effect of EPCs on **ABS (RMBS and AUTOLOANS) liquidation risk and valuation**.

Please note that this study is a theoretical, exploratory analysis which does not necessarily reflect Eurosystem or Banque de France views.
DATA DESCRIPTION

• An ABS is an asset backed by thousands of loans (pool of loans)
• Asset cash flows are directly linked to the characteristics of the underlying loans
• European ABS issuers report loan characteristics through ESMA reporting templates, which are made available online to investors. Since the beginning of 2022, those templates make it possible (but not mandatory) to report the EPC of the purchased property for all loans.
• 58 RMBS active deals in our scope are using the ESMA reporting template and only 32 of them are more or less well-filling the EPC field
• Almost 100% of active Autoloans ABS deals in our scope are using ESMA template and 24 of them are more or less well-filling the EPC field
• For example, a well documented RMBS (BRERA SEC S.R.L.) has the following EPC split:

<table>
<thead>
<tr>
<th>Pool</th>
<th>Total_All</th>
<th>Total_EPC</th>
<th>EPC_A</th>
<th>EPC_B</th>
<th>EPC_C</th>
<th>EPC_D</th>
<th>EPC_E</th>
<th>EPC_F</th>
<th>EPC_G</th>
<th>EPC_OTHR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRERA4</td>
<td>61466</td>
<td>48553</td>
<td>4880</td>
<td>2394</td>
<td>3724</td>
<td>5556</td>
<td>5974</td>
<td>7901</td>
<td>18035</td>
<td>89</td>
</tr>
</tbody>
</table>

• For this study, we removed pools where the EPC information is not available for more than 50% of loans
• For the purpose of harmonizing our sample, we keep only assets with weighted average life under five years
• The perimeters are then limited to 24 RMBS and 17 AUTOLOANS ABS
EPC: A PROXY FOR ENERGY EFFICIENCY

- The EPC classification ranges from class A to class G. The following ratio is set to reflect the energy efficiency of an ABS tranche:

\[
EPC\_RATIO = \frac{EPC\_A + EPC\_B + EPC\_C}{TOTAL\_ALL}
\]

- The distribution of that ratio in our dataset is shown in Graph 1

**Graph 1**: Distribution of the EPC ratio (left for RMBS and right for Autoloans ABS). “Brown” RMBS are shown on the left of the brown line, while “Green” RMBS are those on the right of the green line
LIQUIDATION RISK : RMBS

• We compare the performance of the “Green” portfolio with the “Brown” portfolio, which are composed respectively by the “Green” ABS and “Brown” ABS

• We computed the daily returns of each portfolio and the average time required to liquidate the positions between 4/12/2022 and 4/12/2023

• We found the interesting below results:

<table>
<thead>
<tr>
<th></th>
<th>ES_5% weekly</th>
<th>Average Liquidation time (weeks)</th>
<th>Final liquidation risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>BROWN</td>
<td>-2,61%</td>
<td>16</td>
<td>-10,44%</td>
</tr>
<tr>
<td>GREEN</td>
<td>-1,88%</td>
<td>17</td>
<td>-7,75%</td>
</tr>
</tbody>
</table>

Table 1 : “Green” portfolio vs “Brown” portfolio Expected Shortfall (ES) and liquidity risk

• Table 1 shows that the volatility of the “Green” portfolio is lower compared to the “Brown” portfolio

• The “Green” Portfolio appears to be less affected when conditions are adverse on the RMBS market (Graph 2)
LIQUIDATION RISK : AUTOLOANS

• As for RMBS, we use the same methodology and analysis period for AUTOLOANS ABS
• We found the interesting below results for the AUTOLOANS ABS:

<table>
<thead>
<tr>
<th></th>
<th>ES_5% weekly</th>
<th>Average Liquidation time (weeks)</th>
<th>Final liquidation risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>BROWN</td>
<td>-0.42%</td>
<td>2.3</td>
<td>-0.64%</td>
</tr>
<tr>
<td>GREEN</td>
<td>-0.21%</td>
<td>1.6</td>
<td>-0.27%</td>
</tr>
</tbody>
</table>

*Table 2 : “Green” portfolio vs “Brown” portfolio Expected Shortfall (ES) and liquidity risk*

*Graph 3 : “Green” portfolio vs “Brown” portfolio performance. Value = 100 at 04/12/2022*

• Table 2 shows that the volatility of the “Green” portfolio is lower compared to the “Brown” portfolio
• The difference is smaller compared to the RMBS result
• The “Green” Autoloans Portfolio appears to have better performance compared to the “Brown” Autoloans Portfolio when conditions are adverse (Graph 3)
VALUATION: AN ENERGY PERFORMANCE PREMIUM?

- For each ABS, we calculate an implied discount margin (IDM), which is the discount rate (risk free rate + IDM) at which the observed market price is equal to the NPV of cash flows.

- We estimate the effect of Energy performance (measured by EPC) on IDM using the following linear regression model:

  \[ IDM = \alpha_1 WAL + \alpha_2 \text{Spread} + \alpha_3 \text{EPC}_\text{RATIO} + \alpha_4 \text{Issued amount} + \alpha_5 \text{income} + \beta_c \]

- The result below shows that a higher \text{EPC}_\text{RATIO} for an RMBS implies a lower IDM

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAL</td>
<td>8,7</td>
<td>***</td>
</tr>
<tr>
<td>\text{Sprerad}</td>
<td>-0,28</td>
<td>.</td>
</tr>
<tr>
<td>\beta_{FR}</td>
<td>46</td>
<td>.</td>
</tr>
<tr>
<td>\beta_{NL}</td>
<td>-16</td>
<td>.</td>
</tr>
<tr>
<td>\text{EPC}_\text{RATIO}</td>
<td>-86</td>
<td>***</td>
</tr>
<tr>
<td>Issued Amount</td>
<td>-2,70E-08</td>
<td>*</td>
</tr>
<tr>
<td>income</td>
<td>2,00E-03</td>
<td>***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Significance</th>
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</thead>
<tbody>
<tr>
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<td>-4,8</td>
<td>***</td>
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<tr>
<td>\text{Sprerad}</td>
<td>-0,39</td>
<td>***</td>
</tr>
<tr>
<td>\beta_{DE}</td>
<td>54</td>
<td>***</td>
</tr>
<tr>
<td>\beta_{FR}</td>
<td>82</td>
<td>***</td>
</tr>
<tr>
<td>\text{EPC}_\text{RATIO}</td>
<td>6,9</td>
<td>.</td>
</tr>
<tr>
<td>Issued Amount</td>
<td>-1,80E-08</td>
<td>***</td>
</tr>
<tr>
<td>income</td>
<td>8,30E-08</td>
<td>.</td>
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</tbody>
</table>

*Table 3: IDM regression results. The left table for RMBS and the right table for AUTOLOANS ABS

<table>
<thead>
<tr>
<th>Significance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>(p_value &lt; 0,001)</td>
</tr>
<tr>
<td>**</td>
<td>(p_value &lt; 0,01)</td>
</tr>
<tr>
<td>*</td>
<td>(p_value &lt; 0,05)</td>
</tr>
<tr>
<td>.</td>
<td>(p_value &lt; 0,1)</td>
</tr>
<tr>
<td>`'</td>
<td>(p_value &gt; 0,1)</td>
</tr>
</tbody>
</table>

- All else being equal, it appears that the market is asking a higher yield for “Brown” RMBS

- We do not find a premium in the case of AUTOLOANS ABS
CONCLUSION

• This preliminary investigation on the effect of climate risk on ABS market shows that:
  ▪ The “Green” deals tend to have smaller volatility compared to the “Brown” deals
  ▪ The “Green” RMBS deals premium appears to be lower than the “Brown” RMBS deals premium

• One explanation for these results could be the disparity between the demand and the supply of the “Green” deals

• Due to the lack of data availability and the recent introduction of the EPC in the ESMA template, this study will be repeated in the near future in order to have larger datasets

• Some bias on the assets (option, swap, rates.. Effect) or on the pools (waterfall, revolving effect) may subsist. We are working on neutralizing them
EPC DISCLOSURE IN EUROPEAN MORTGAGE LOANS
EPC DATA AVAILABILITY

Residential Mortgages

Source: European DataWarehouse

DECEMBER 2023
EPC DISTRIBUTION IN EDW DATA

Residential Mortgages

EPC distribution by Country using EDW data (based on number of loans)

Source: European DataWarehouse
EPC DISTRIBUTION FROM PUBLIC SOURCES

Residential Buildings

Source: Buildings Performance Institute Europe (2017), Factsheet: 97% of buildings need to be upgraded; Statista (2021)

Distribution of the building stock in the EU per EPC class

Source: Buildings Performance Institute Europe (2017), Factsheet: 97% of buildings need to be upgraded; Statista (2021)
**LINKEDIN POLL**

Most participants voted that houses in Portugal consume the least energy!

Which country has the lowest average yearly energy consumption in kWh/m² for Mortgaged Residential Properties?

You can see how people vote. [Learn more](#)

<table>
<thead>
<tr>
<th>Country</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portugal</td>
<td>57%</td>
</tr>
<tr>
<td>Germany</td>
<td>4%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>39%</td>
</tr>
<tr>
<td>France</td>
<td>0%</td>
</tr>
</tbody>
</table>

23 votes • 6d left • Hide results
EPC_THRESHOLDS_BY_COUNTRY

Residential Buildings

Sources: BPIE, ING, national and EU sources;
Final energy for DE, CZ, RO, NO, UK; Primary Energy for FR, DK, FI, AU, NL, PT, IE, BE, S, IT

kWh/m²/year

<0

0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-110
110-120
120-130
130-140
140-150
150-160
160-170
170-180
180-190
190-200
200-210
210-220
220-230
230-240
240-250
250-260
260-270
270-280
280-290
290-300
300-310
310-320
320-330
330-340
340-350
350-360
360-370
370-380
380-390
400-425
425-450
>450

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ESTIMATED AVERAGE PRIMARY ENERGY CONSUMPTION PER COUNTRY

Residential Buildings

ESTIMATED AVERAGE ENERGY EFFICIENCY OF RESIDENTIAL PROPERTIES (KWH/M2/YEAR)

Source: European DataWarehouse
EPC DISCLOSURE IN EUROPEAN AUTO LOANS
EPC DATA AVAILABILITY
Auto loans

AUTO LOANS
Number of Loans Reporting a Valid EPC in ESMA

Source: European DataWarehouse

DECEMBER 2023
ENERGY PERFORMANCE CERTIFICATES – AUTO LOANS
Different EPCs for the same car models in different countries

EPC DISTRIBUTION OF NEW CARS GROUPED BY YEAR OF LOAN ORIGINATION

VW TIGUAN (FRANCE)

VW TIGUAN (GERMANY)

Source: European DataWarehouse
ENERGY PERFORMANCE CERTIFICATES – AUTO LOANS

Different EPCs for the same car models in different countries

EPC DISTRIBUTION OF NEW CARS GROUPED BY YEAR OF LOAN ORIGINATION

Source: European DataWarehouse
EDW DATA - MINING CAR MODEL DATA TO IMPLY FUEL TYPE

Car Manufacturer and Model is reported to EDW for each Auto loan/lease

- Need to standardise these 3 characteristics:
  - Manufacturer
  - Model
  - Imply Fuel Type (not Available in the templates)

- A large text mining exercise:
  - **14,310** unique combinations for Volkswagen Golf alone!!

- Hints for implying fuel type, example:
  - TDI implies Diesel
  - TSI implies Petrol and so on
EPCS ASSIGNED TO CARS BY ENGINE TYPE – GERMANY VS FRANCE

- Diesel cars have better EPCs in Germany
- Petrol cars have better EPCs in France

Source: European DataWarehouse
GERMAN AUTO ABS - 30 TO 60 DAY DELINQUENCIES (% OF BALANCE)

Electric cars seem to have the lowest delinquency levels when compared with cars of other fuel types

Source: European DataWarehouse
Borrowers that get a loan/lease for electric cars have the highest incomes.

Source: European DataWarehouse
ESTIMATING CO₂ EMISSIONS FOR CAR LOANS/LEASES IN EDW DATA

Matching EDW data with European Environment Agency (EEA) data

Assumptions

• If fuel cannot be implied using available info, the average CO₂ emissions of Petrol + Diesel cars for the manufacturer, model, year, and country are used.

• For cases where only NEDC standard emissions are available, a factor of 1.2 is used to convert NEDC emissions to estimated WLTP emissions.
CO2 EMISSIONS MATCHING

83% of German Auto loans/leases were matched with a CO$_2$ Emissions estimate

Source: European DataWarehouse
GERMAN AUTO ABS – 30 TO 60 DAY DELINQUENCY LEVELS (% OF BALANCE)

Low emission vehicles seem to have lower delinquency levels

Source: European DataWarehouse
**CO₂ EMISSIONS ESTIMATES**

Germany has highest estimated average CO₂ emissions for cars in ABS portfolios

- German consumers appear to have a preference for heavier cars

---

Source: European DataWarehouse

Source: European Environment Agency
**CO₂ EMISSION TRENDS**

German consumers are buying more low emission vehicles every year.

Avg CO₂ emissions (g/km) of New Passenger Cars in Germany has fallen each year.

Source: European Environment Agency

Avg CO₂ emissions (g/km) of New Passenger Cars in 2022

Source: European Environment Agency
RMBS LOANS PERFORMANCE UPDATE
RMBS

Are Floating Rate Mortgages driving delinquencies??

% Balance by Interest Rate Type as of 2023 Q2

30 to 60 Days delinquencies (% of Current Balance)

Source: European DataWarehouse

DECEMBER 2023
USING EDW DATA FOR ACADEMIC RESEARCH
CONSULT EXISTING PUBLICATIONS
RESEARCH SECTION

Our own publications, plus third-party research https://eurodw.eu/knowledge/research/

https://eurodw.eu/knowledge/magazine//

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BLOG
Short articles on current topics https://eurodw.eu/knowledge/magazine//
WEBINARS

The slides and recordings of our webinars https://eurodw.eu/news-events-and-multimedia/events/
LIST OF RESEARCH PUBLICATIONS

Our own publications, plus third-party research Media Library - European DataWarehouse (eurodw.eu)

https://eurodw.eu/about-us/media-library/

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Excel Available in our Media Library Section
Using mortgage (RMBS) data

The Impact of Lending Standards on Default Rates of Residential Real Estate Loans

“This paper analyses the impact of lending standards for residential real estate (RRE) loans on default rates...” (J. Gaudêncio, A. Mazany, C. Schwarz), ECB occasional paper 220, March 2019

Navigating the Housing Channel of Monetary Policy Across Euro Area Regions

“This paper assesses the role of the housing market in the transmission of conventional and unconventional monetary policy across euro area regions...” (N. Battistini, M. Falagiarda, A. Hackmann, M. Roma), ECB working paper 2752, November 2022

Forecasting Loan Default in Europe with Machine Learning

“We compare the performance of a set of machine learning algorithms relative to the logistic regression, finding that they perform significantly better in providing predictions.” (L. Barbaglia, S. Manzan, E. Tosetti), July 2021

Building’s Energy Efficiency and the Probability of Mortgage Default: The Dutch Case

“We investigate the relationship between building energy efficiency and the probability of mortgage default” (M. Billio, M. Costola, L. Pelizzon, M. Riedel), May 2021, The Journal of Real Estate Finance and Econometrics
THIRD-PARTY RESEARCH PUBLICATIONS (2)

Using auto data

**Credit Fire Sales: Captive Lending as Liquidity in Distress**

“We study the role of captive finance in the car loan market when manufacturers’ liquidity demand increases” (M. Benetton, S. Mayordomo, D. Paravisini), Banco de Espana, April 2021

**Do Lenders Price the Brown Factor in Car Loans? Evidence from Diesel Cars**

“Using car loan-level data we study whether banks adjust their lending terms and conditions in response to different shocks to the perceived environmental quality of diesel vehicles” (W. Beyene, M. Falagiarda, S. Ongena, A. Scopelliti), Swiss Finance Institute, Oct 2022

**Climate Risk Measurement of Assets Eligible as Collateral for Refinancing Operations – Focus on Asset Backed Securities**

“This report describes an exploratory study regarding exposure to climate risk of ABS, an asset class frequently pledged as collateral in the ECB refinancing operations” (L. Andre, A. Grept, N. Laut, G. Plantier, Z. Sapey-Triomphe, P.F. Weber), Banque de France, January 2022
Using Credit Cards Data

Social traits and Credit Card Default: A Two-Stage Prediction Framework

“Over the past years, studies shed light on how social norms and perceptions potentially affect loan repayments, with overtones for strategic default. Motivated by this strand of the literature, we incorporate collective social traits in predictive frameworks on credit card delinquencies” (C. Gaganis, P. Papadimitri, F. Pasiouras, M. Tasiou), Annals of Operations Research, July 2022

Using SME Data

Better be Careful: The Replenishment of ABS Backed by SME Loans

“The purpose of this paper is to reveal whether banks select loans of lower quality for portfolio replenishment than for initial securitization” (A. Fenner, P. Klein, C. Mössinger) Deutsche Bundesbank, 2021

Using multiple asset classes

Textual Disclosure in Prospectuses and Investors’ Security Pricing

“We explore the impact of textual disclosures’ quality and quantity, measured as the share of boilerplate language, the linguistic complexity, and the disclosure length, on investors’ security pricing at issuance.” (J. Debener, A. Fenner, P. Klein, S. Ongena)
VERIFY YOUR ACCESS RIGHTS...
CHECK ACCESS RIGHTS

Data access types

• Due to EDW market share, tariffs for access to EDW data is determined by user type:
  • Rating agency vs data vendor vs active market participant vs universities
  • Data access for universities is now €3000 per year, automatically renewable

University access allows

• Conduct and publish academic research using EDW data, nevertheless, please let us know once a publication using EDW data is about to be published.

University access DOES NOT ALLOW

• Re-distribution (sale) of EDW raw data to third parties (this requires a different contract)
• Using the data for consulting work (this also requires a different contract)
• Publicly displaying individual data

PLEASE READ THE CONTRACT CAREFULLY,
WHEN IN DOUBT, PLEASE CONSULT US!
VERIFY DATA AVAILABILITY
DATA AVAILABILITY REPORT (AS OF Q4 2022)

A list of available deals and key metrics

Data Availability Report Q4 2022 – European DataWarehouse (eurodw.eu)
Not all lenders securitise loans to the same extent in all countries

- RMBS segment is one of the most representative and diversified otherwise
- 50% of the auto segment is concentrated in Germany
- 50% of consumer loans are from Italy
- 57% of leases are from Italy
- Not all lenders are banks...

Samples dominated by 1 large securitisation

- May reflect actual market share
- In any case, large securitisations deserve specific attention...

REFER TO THE DATA AVAILABILITY REPORT
CONSULT EXISTING FIELDS
KEY COLLECTED DATA

Borrower specific data
- Anonymised info (no name or address, loan identifiers are encrypted)
- Employment type, income...

Loan characteristics
- Original amount, outstanding amount, start date, maturity date
- Repayment type (annuity, bullet etc...)
- Interest rate %, index, margin, reset frequency/dates etc...

Collateral details
- Valuation amount, date, method
- Collateral type, location
- Energy efficiency characteristics NEW - ESMA FIELD

Performance information
- Loan performance status (performing, arrear, default, redeemed, repurchased, liquidated)
- Days in arrears, default date, default amount, recovery, loss
OPTIONAL VS MANDATORY FIELDS

IN ECB reporting

• Some fields are mandatory and some fields are optional
• Optional fields are often not populated
• Optional fields are fields which may be required under a rating agency methodology

Report on optional fields More is better: optional loan-level data fields provide valuable complementary information

IN ESMA reporting

• Mandatory fields only
• Some new fields some ECB fields
• Optional fields are fields which may be required under a rating agency methodology

REFER TO THE DATA AVAILABILITY REPORT
REPORTING FORMATS
ECB VS ESMA VS FCA DATA AVAILABILITY

Mortgages
Sum of all Outstanding Mortgages (in Euro Billion)
REPORTING FORMATS

ECB format (historical reporting format)
The historical reporting format, one template per asset class, dozens of fields, some mandatory some optional
50+ mandatory fields for mortgages

ESMA format (since 2020, will eventually replace the ECB format)
The new reporting format following the implementation of the 2017 securitisation regulation
ESMA reporting also includes a list of investor report fields

Report comparing ECB vs ESMA reporting formats GAP ANALYSIS Version 3.0 AND 3.1
VERIFY REPRESENTATIVITY/BIAS
# REPRESENTATIVITY

## Amount of Mortgages in EDW as % of Total Loans
(Data as of Q4 2019)

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Ireland</th>
<th>Netherlands</th>
<th>Spain</th>
<th>Italy</th>
<th>Belgium</th>
<th>Portugal</th>
<th>France</th>
<th>UK</th>
<th>Germany</th>
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<tbody>
<tr>
<td>0%</td>
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<td>20%</td>
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Source: European DataWarehouse
DATA BIAS

Selection bias

• Securitisations typically have eligibility criteria
• Portfolios sometimes reflect the activity of specialised lenders/specific loans
• See Italy and “Cessione del Quinto” consumer loans

Survivor bias

• Loans in arrears/default typically excluded from original securitised pool
• Expect to find near 0% arrears on the first reporting date
• Is loan performance “too good to be true”? Some data providers repurchase defaulted loans
• Repaid loans are dropped from the subsequent reporting

To check

• Is income stratification consistent with country average?
• Do LTV levels, income levels, interest rate levels match market averages?
• Geographic origin of the loans should mirror economic importance of the various regions
• Are there any unusual concentrations in the sample?
  • For SME, check industry, and loan term. If all are similar, the sample is probably not representative!
    (e.g. In floorplan deals, all the SMEs are actually car dealers, all the same NACE code 45)
  • In „Geldilux“ SME deals, all the loans are all very short-term bullet loans with a low default rate

NOT ALL SECURITISATIONS ARE A REPRESENTATIVE DATA SAMPLE
CHECK PLAUSIBILITY
DATA QUALITY DESERVES ATTENTION

Data quality at EDW

- EDW has a team liaising with data providers to improve data quality
- Corrections affect subsequent data uploads; past uploads are often not corrected by data providers
- In ECB data, errors affect mostly 2013, 2014, 2015 data
- Early (recent) ESMA data also have data quality issues

Recommended verification work

- Check sum, minimal, maximal, mean values, order them by edcode and „as of“ date, errors stand out
- Check consistency (a defaulted loan should have a default amount and default date)
- When relying on a limited number of edcodes, compare key statistics to investor reports
ADJUSTED DATABASE REPORT

BEWARE OF DATA REPORTING PECULIARITIES

Reporting frequency

- Data is uploaded quarterly at least, but some data providers report monthly
- For auto, data is often reported monthly, whereas for mortgages, it is typically quarterly
- Do not triple count data reported monthly when doing statistics!

Reporting lag

- The pool cut-off date is the "as of" date of the data
- The submission date is the upload date, when the data is actually uploaded
- There was an average lag of ca. 40 days between as of and upload date with the ECB data
- The maximum lag with the ESMA data is at most 60 days

Cf. some of our explanatory reports

- Data Timing and Timeliness
- EDW Commentary on Spanish RMBS Loan-Level Data
- EDW Commentary on Italian Loan Level Data
- COVID-19 Survey of Payment Holiday Reporting Practices in Europe
- Standardising Geographic Information for European Loan Level Data
LOAN PERFORMANCE-RELATED WORK
WHEN DOING WORK INVOLVING LOAN PERFORMANCE

Performance data

• Default definition is often specific to a securitisation (in Spain 12 or 18 months)
• It may be preferable to have your own default definition to make comparisons, for instance:
  • Count as defaulted a loan that goes 3 months in arrears or is flagged as defaulted
  • Use amount outstanding at time of default as default amount,
  • Use first PCD in which the loan appears defaulted as a default date
• Losses can take a long time to materialise (particularly in Italy), some originators repurchase defaults
• Focusing on recoveries instead of losses may be a better choice
  • Compare amount of loan at time of default vs now
• Loan ID consistency should be verified when doing default/recovery/loss rates
• See report on loan ID consistency [Link to Loan ID consistency]

COMPARE YOUR FINDINGS TO OTHER SOURCES
PERFORMANCE RELATED EDW PUBLICATIONS

Some performance indices are also available online

- The PDF versions with methodologies are also available online
  - May 2016: Spanish SME Index (PDF)
  - August 2018: ED Spanish RMBS Index (PDF)
  - November 2019: Italian SME Index (PDF)

- We recently published the EXCEL version which can now be freely downloaded
  - October 2019: Italian SME Index Q2 2019
  - June 2019: Spanish RMBS Index Q1 2019
  - March 2018: Spanish SME Index 2018 Q4
Please also refer to:

- Our report on [CDR calculation](#)
- Our various COVID-related publications
  - [Monitoring Moratoria through COVID-19](#)
  - [Monitoring the Impact of COVID-19 Q1 2021 RMBS Report](#)
  - [Monitoring the Impact of COVID-19: Q4 2020 AUTO TRACKER](#)
  - [Monitoring the Current LTV](#)
  - [Explanatory report on calculated LTVs](#)
  - [The V in LTV and why it matters](#)
BEFORE SUBMITTING YOUR RESEARCH
PLEASE CONSULT US BEFORE PUBLISHING

To avoid missing something important...

• We have unique knowledge regarding the data and the securitisation sector
• It could be that you missed something important!
• We can help to check that the results make sense
• We are happy to discuss!

PLEASE LET US KNOW WHEN YOU PUBLISH A NEW PAPER
Q&A
AND NOW...
... DO YOUR OWN RESEARCH!
WE WISH YOU A WONDERFUL HOLIDAY SEASON AND A FANTASTIC 2024!
THANK YOU // CONTACT

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