

LONDON WORKSHOP

5 FEBRUARY 2020



AGENDA

15:00 WELCOME AND INTRODUCTION

- Dr. Christian Thun, European DataWarehouse
- Andrew Mulley, Citibank

15:10 STATUS OF THE IMPLEMENTATION OF THE SECURITISATION REGULATION

- Christian Moor, European Banking Authority

15:40 EUROPEAN DATAWAREHOUSE SOLUTIONS AND UPDATES

- Joel Penn, European DataWarehouse
- Gopala Sankaran, European DataWarehouse
- Eirini Kanoni, European DataWarehouse

16:10 DOES ENERGY EFFICIENCY PREDICT MORTGAGE PERFORMANCE?

- Benjamin Guin, Bank of England

16:30 MACHINE LEARNING IN CREDIT DATA ANALYTICS

- Alexander Baranski, Carlton Hill Partners

16:50 REGULATORY AND ENERGY EFFICIENCY ROUND TABLE DISCUSSION AND Q&A

- Marco Angheben, European DataWarehouse [Moderator]
- Christian Moor, European Banking Authority
- Alessandro Pighi, Fitch Ratings
- Tom Quoroll, Linklaters
- Steve Gandy, Santander
- Ian Stewart, UK Covered Bond Council

17:35 CLOSING REMARKS

17:40 NETWORKING RECEPTION

STATUS OF THE IMPLEMENTATION OF THE SECURITISATION REGULATION

CHRISTIAN MOOR, EUROPEAN BANKING AUTHORITY

Status of the Implementation of the Securitisation Regulation

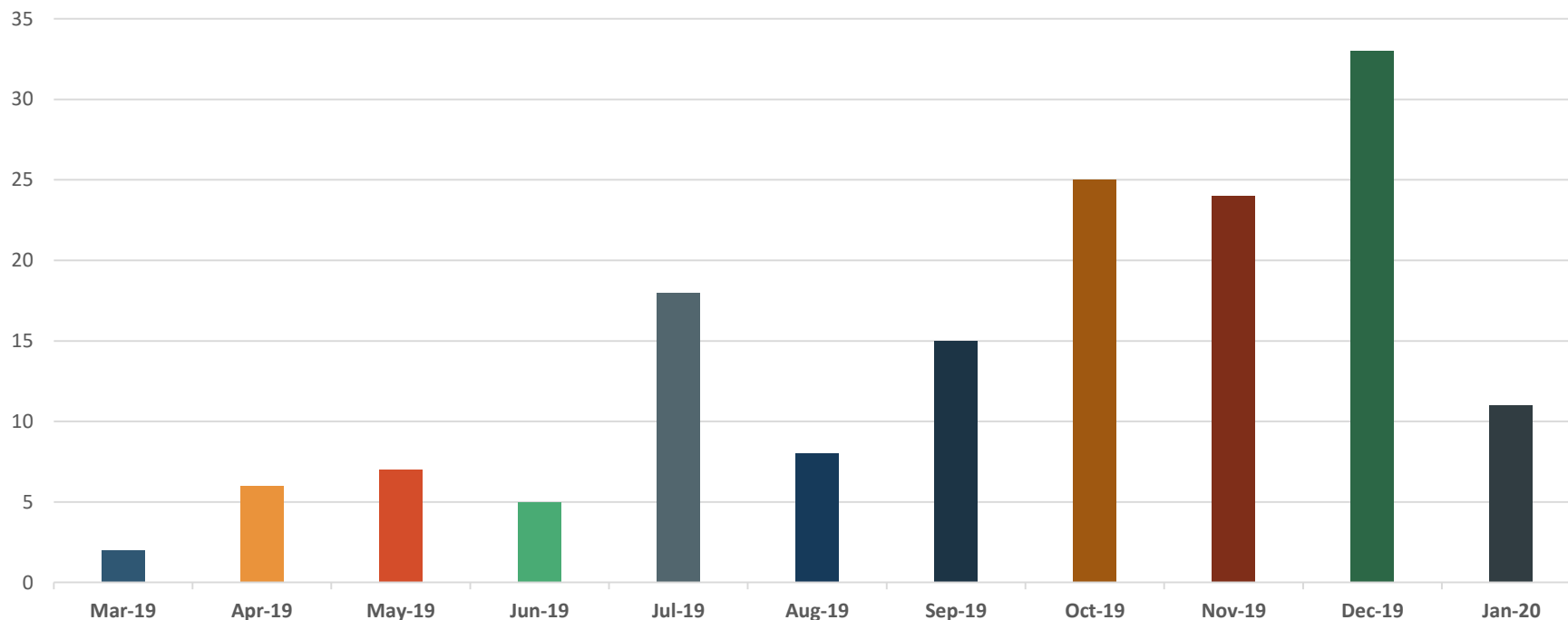
Implementation, co-ordination and new developments

Christian Moor, European Banking Authority

European DataWarehouse Workshop, London, 5 February 2020

STS Notifications

STS Notifications (March 2019 - 29 Jan 2020)

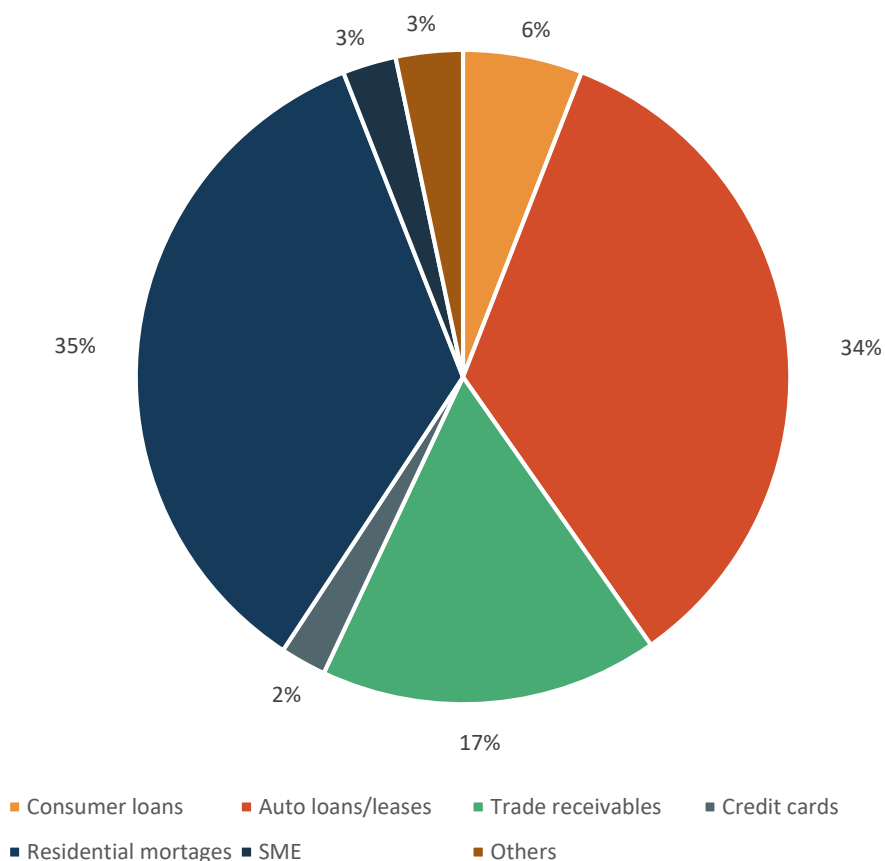


Source: ESMA

- 154 STS transaction notified to ESMA
 - started with private RMBS transaction on 22 March 2019
- 116 traditional securitisations, 38 ABCP transactions, no ABCP programme

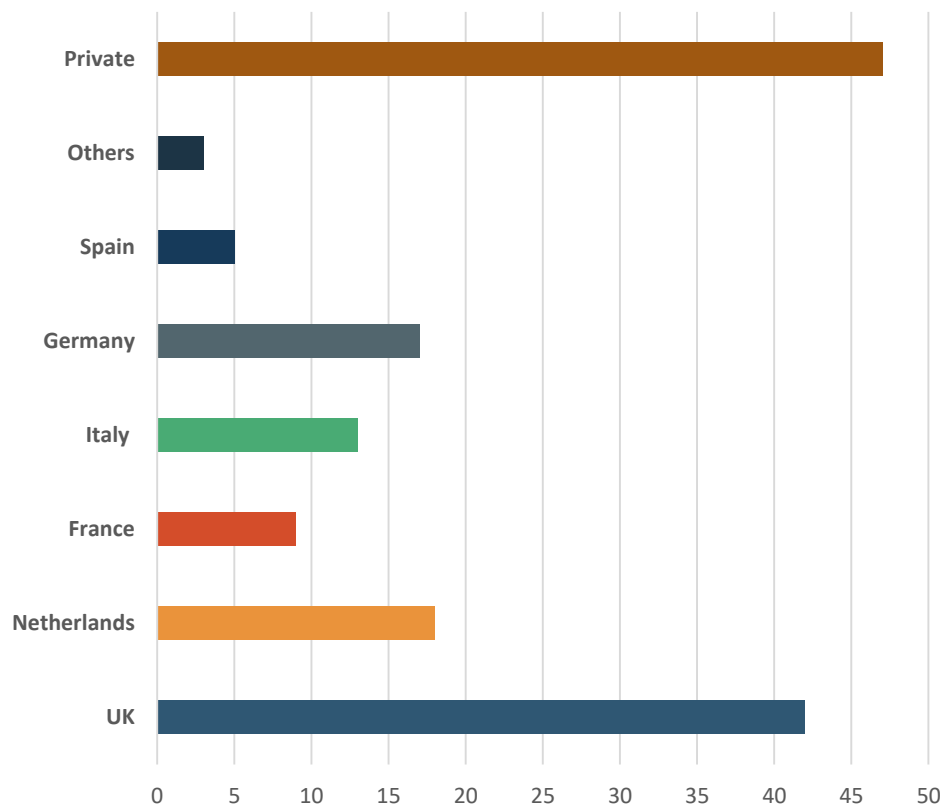
STS transactions and trends

Underlying Exposures (as of 29 Jan 2020)



Source: ESMA

Country of Originator (as of 29 Jan 2020)



Source: ESMA

- Mainly RMBS and Auto transactions, significant use of Master-trusts
- UK most active country followed by Netherlands and Germany

New EU securitisation framework

Objectives:

- Building block of the Capital Markets Union
- Promote an active and sound securitisation market & rebuild the trust in the securitisation market

Securitisation Regulation:

- Scope of application: cross-sectoral
- General requirements for securitisation:
 - transparency, due diligence, risk retention, third party certifiers, sanctions, prohibition of re-securitisation, credit granting, etc
- Criteria for 'STS' securitisation:
 - Criteria for simplicity, standardisation, and transparency

Amendments to CRR:

- New hierarchy of approaches for the calculation of capital (SEC-IRBA, SEC-SA, SEC-ERBA)
- Capital treatment of securitisation for credit institutions and investment firms
- Preferential capital treatment for STS securitisation

Scope and timeline:

- Only for traditional (true-sale) securitisation and short-term (ABCP) securitisation
- Synthetic securitisation is outside of the scope (currently favourable treatment for senior positions in SME securitisation only)
- Entered into force on 1 January 2018, application date 1 January 2019

Level 2 technical standards and guidelines

General Requirements

- RTS on Risk Retention – legal review by COM
- RTS on Disclosure requirements – adopted by COM
- 2 RTS on Securitisation Repository – adopted by COM
- Guidelines on Securitisation Reporting Data (ESMA) (Final GL expected in Q2/Q3 2020)
- RTS on cooperation, exchange of information and notification between CAs and ESAs (ESMA) – legal review by COM

Standards for 'STS'

- GLs on interpretation of STS Criteria – in force
- RTS on homogeneous assets – in force
- RTS on STS notification templates – adopted by COM
- RTS on authorisation of third party assessing STS compliance – in force
- RTS on risk mitigation techniques on uncleared OTC derivatives for STS securitisations – adopted by COM

CRR

- RTS on the calculation of Kirb in accordance with the purchased receivables approach – legal review by COM
- Guidelines for the determination of weighted average maturity of the tranche (Final GL expected in Q2 2020)
- ITS on the mapping of ECAs Credit Assessments for securitisation positions (postponed)

OBJECTIVE:

To ensure **cross-sectoral consistency**

- To assess **practical issues** which may arise with the implementation of STS securitisation in the EU
- **ORGANISATIONAL ASPECTS:**
 - Composed of ESAs and NSAs, COM and ECB
 - Established as of **January 2019**
 - 3 meetings in 2019

WORK:

- **Cross-sectoral reports:**
 - 2 comprehensive reports on the functioning of the new securitisation framework and securitisation contribution to funding real economy
- **Open cross-sectoral issues:**
 - Interpretation of rules of securitisation framework
 - Due diligence of EU institutional investor
 - Clarification of scope of application with respect to third countries
- **Binding mediation:**
 - In case of disagreement on STS-compliance between the competent authorities, executed by ESMA/Joint-Committee

EU STS Securitisation Regime post Brexit

- UK left the EU on 31 January 2020
 - Withdrawal Agreement include a **transition period**, which is meant to bridge the period between the date of the UK's exit from the EU and the entry into force of the new, yet to be negotiated, UK-EU partnership arrangements.
 - The transition will run until the end of December 2020, with the possibility of extension. A decision on extending the transition period must be taken by 1 July 2020.
 - The UK will continue to apply EU law during the transition period, with a few exceptions, as if it were a Member State.
- Art 46 STS Securitisation Regulation (Regulation 2017/2401)
 - By 1 January 2022, the Commission shall present a report to the European Parliament and the Council on the functioning of this Regulation, accompanied, if appropriate, by a legislative proposal.

(e) whether in the area of STS securitisations an equivalence regime could be introduced for third-country originators, sponsors and SSPEs, taking into consideration international developments in the area of securitisation, in particular initiatives on simple, transparent and comparable securitisations.

Main priorities and topics 2020

A light green circle is positioned to the left of the first priority item.

A. Finalisation of implementation of the new EU securitisation framework

A teal circle is positioned to the left of the second priority item.

B. Cross sectoral consistency, clarification of scope of application & due diligence

A teal circle is positioned to the left of the third priority item.

C. Development of STS framework for synthetic securitisation

A teal circle is positioned to the left of the fourth priority item.

D. Harmonisation of supervisory assessment of the significant risk transfer

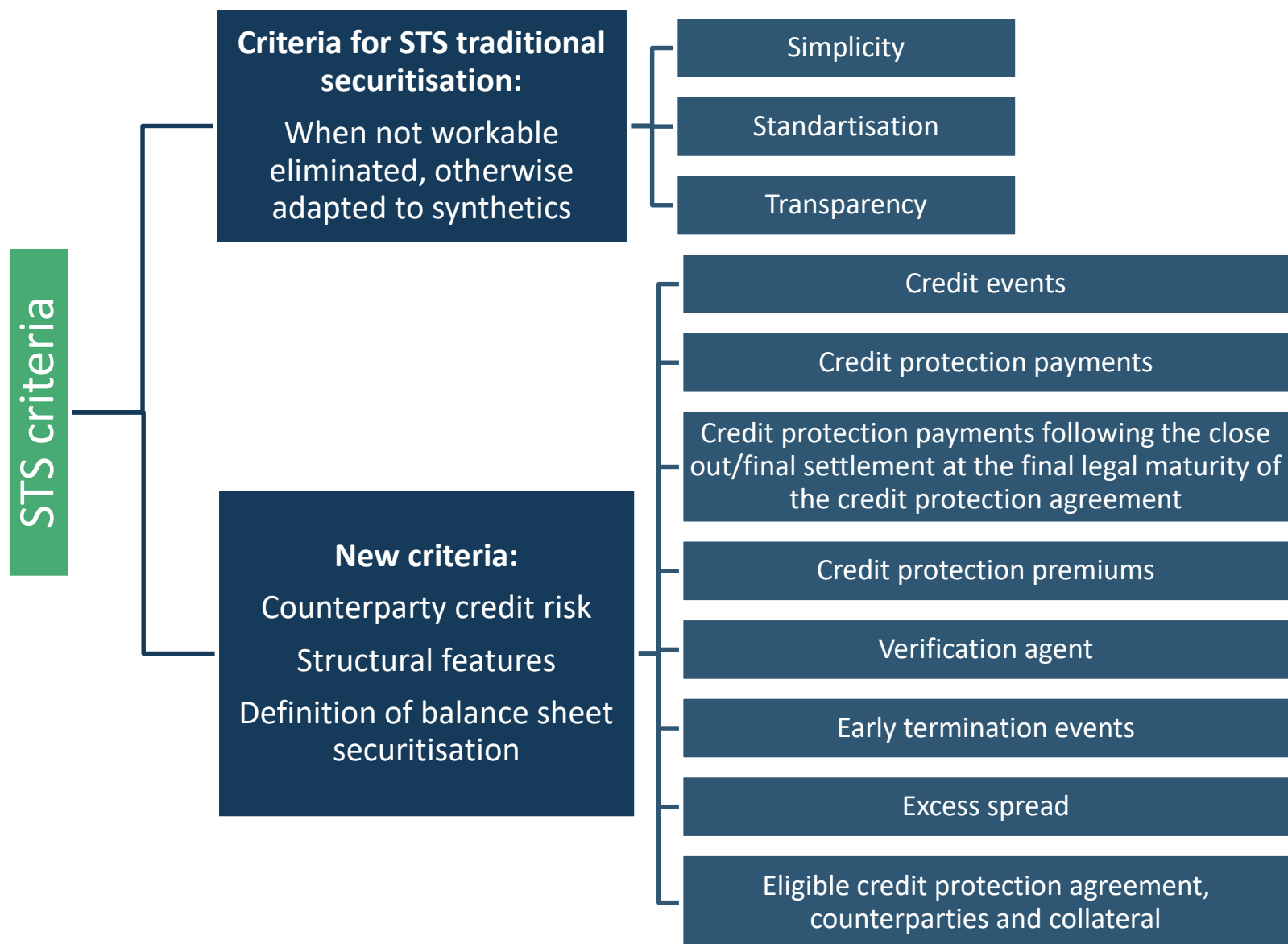
A grey-blue circle is positioned to the left of the fifth priority item.

E. Recalibration of capital requirements for NPL securitisation

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F. Increase of use of internal models by banks investing in securitisation

Development of STS Synthetic criteria



Harmonisation of supervisory assessment of SRT

- Heterogeneity of supervisory practices
 - Increased regulatory uncertainty and impairment of level playing field
- Reflecting limitations/lack of regulatory treatment
 - Goal to enhance and harmonise regulatory and supervisory treatment

Harmonisation of the process of SRT assessment
(deadlines and templates for SRT notification by originator to CA, and supervisory feedback)

Harmonisation of complex structural features
(excess spread, pro-rata amortisation, call options, early termination events, cost of credit protection, etc)

Harmonisation of quantitative SRT tests
(including assessment of 'commensurateness' of risk transfer)

Opinion on Regulatory Treatment NPL Securitisations

Publicly acknowledged at EU level that the capital requirements for NPL securitisations have been mis-calibrated



EBA opinion published end October 2019

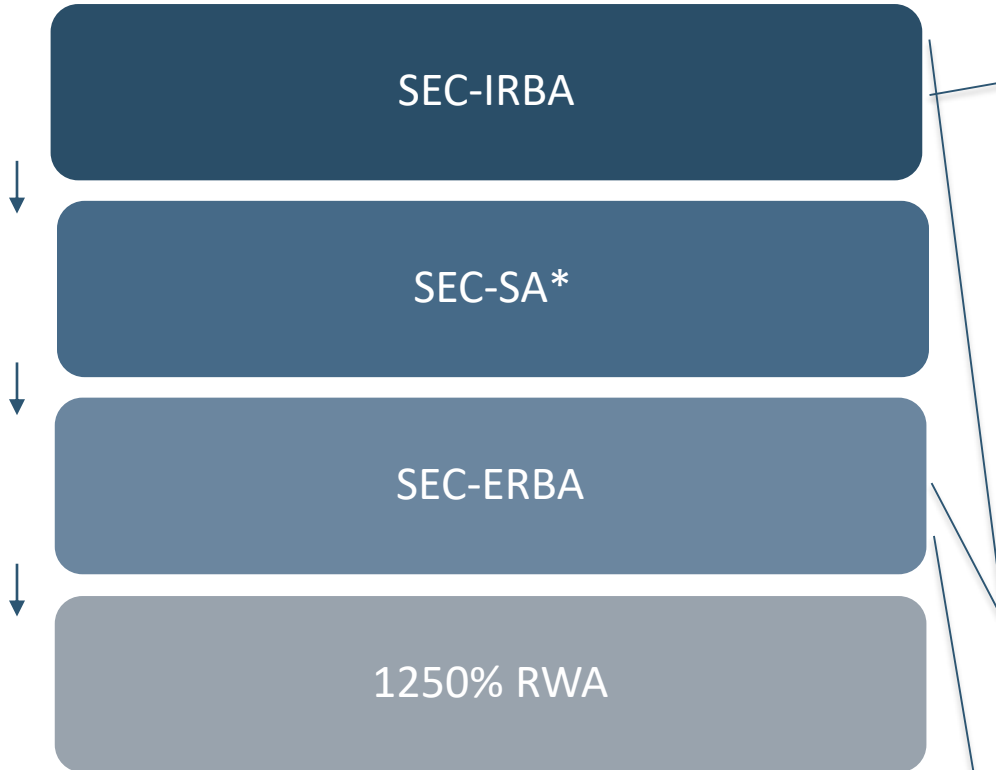
- The opinion examines the role of securitisations for NPL disposal
 - It sets out the EBA's view on certain constraints in the EU law securitisation framework that prevent or hinder that role
 - It is addressed to the European Commission with a set of recommendations for change of Level 1: CRR and Securitisation Regulation
- 

Q&A on Art. 9(3) of Securitisation Regulation on credit granting criteria



EBA participation in the discussions at both EU and international level

CRR - Hierarchy and Internal Models



* **SEC-ERBA instead of SEC-SA, for rated positions, if:**

- ✓ STS: RW SEC-SA > 25%, Non STS: RW SEC-SA > 25% or RW SEC-ERBA > 75%
- ✓ Pools of auto loans, auto leases and equipment leases
- ✓ Optional use for Institutions to all of its rated securitisation positions on a yearly basis
- ABCP exposures using IAA (Art 265)

RTS on the calculation of Kirb using PuRa Approach

- Facilitation to use internal models under IRB
 - ✓ Knowledge of underwriting and credit standards
 - ✓ Credit Policy and Due Diligence
 - ✓ Use of (Proxy) Data & Definition of default
 - ✓ Eligibility of retail treatment of securitised exposures (Corporate Waiver)

Guidelines for the determination of weighted average maturity of the tranche

- Weighted average maturity of the contractual payments due under the tranche
 - Cash and synthetics
 - Use of data and external providers
 - Asset and Liability side of cashflows

ITS on the mapping of ECAIs Credit Assessments for securitisation positions

- Mapping of SEC-ERBA Credit Quality Steps to external ratings
- Quick fix via Q&A 2018_4274

Supervisory reporting on securitisation

Changes to securitisation COREP templates with the supervisory reporting on securitisation aimed at aligning with the new STS securitisation framework

Final Draft ITS on securitisation COREP templates: May 2019
Implementation date March 2020

Supervisory disclosure on securitisation

Changes to securitisation Pillar III templates to incorporate the new STS securitisation framework

Consultation Paper in October 2019 and Final Report Q2 2020

ANNEX

- EBA DELIVERABLES ON SECURITISATION

Regulatory technical standards (RTS):

- RTS on risk retention (STS Art 6(7))
- RTS on homogeneous underlying exposures (STS Art 20(14) / STS Art 24(21))
- RTS on method for calculating nominal amount for undrawn part of a liquidity facility (CRR Art 248(1))
- RTS on calculation of K_{IRB} in accordance with the PuRa approach (CRR Art 255(9))
- Two RTS on SPPE criteria for mitigation of counterparty credit risk for OTC derivatives under EMIR (STS Art 42)

Implementing technical standards (ITS):

- ITS on convergence of practices on risk retention (CRR Art 270a(2))
- ITS on the mapping of ECAs credit assessment for securitisation positions (CRR Art 27e)

Guidelines:

- Guidelines on the harmonised interpretation and application of STS criteria (STS Art 19(2) / STS Art 23 (3))
- Guidelines on implicit support (CRR Art 250(4))
- Guidelines on practices on hierarchy of approaches for calculation of risk weights (CRR Art 254(8))
- Guidelines on computation of K_{IRB} for dilution risk (CRR Art 255(8))
- Guidelines on the determination of tranche maturity and WAL (CRR Art 257(5))
- Guidelines on estimates of probability of PD and LGD using IRC (CRR Art 377(3))

Reports:

- ESRB Report on the financial stability of securitisation markets together with EBA, at least every 3 years (STS Art 31(2))
- EBA Report on eligibility of synthetic securitisation as STS securitisation (STS Art 45(1))
- EBA Report on SRT (CRR Art 244(6) / CRR Art 245(6))
- EBA annual Report on practices on hierarchy of approaches for calculation of risk weights (CRR Art 254(8))

Recommendations:

- Recommendation on STS criteria (STS Art 19(2) / STS Art 23 (3))

Others:

Notification on derogation of use of hierarchy (CRR Art 254 (8))
New COREP securitisation templates
New Pillar 3 securitisation disclosure templates

EUROPEAN BANKING AUTHORITY

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<http://www.eba.europa.eu>

EUROPEAN DATAWAREHOUSE SOLUTIONS AND UPDATES

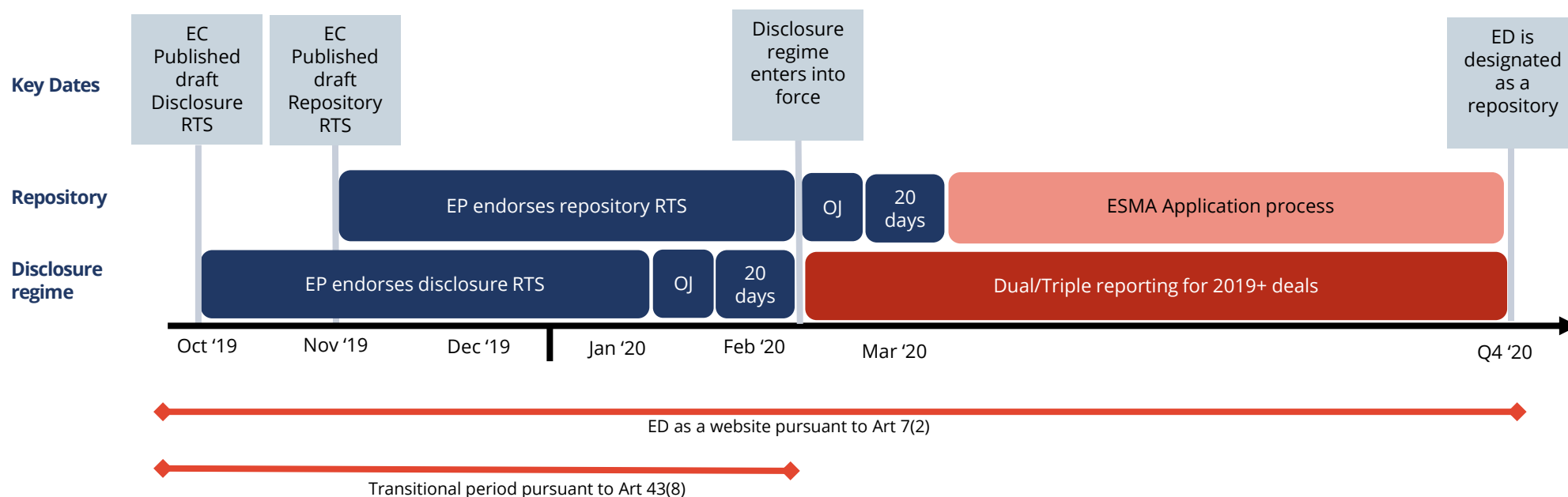
REPORTING AND REGULATION IN THE UK

JOEL PENN, EUROPEAN DATAWAREHOUSE

REGULATORY TIMELINE IN 2019/2020

Last updated to reflect regulatory developments as of 2 December 2019

Repository & disclosure regime



EC: European Commission

EP: European Parliament

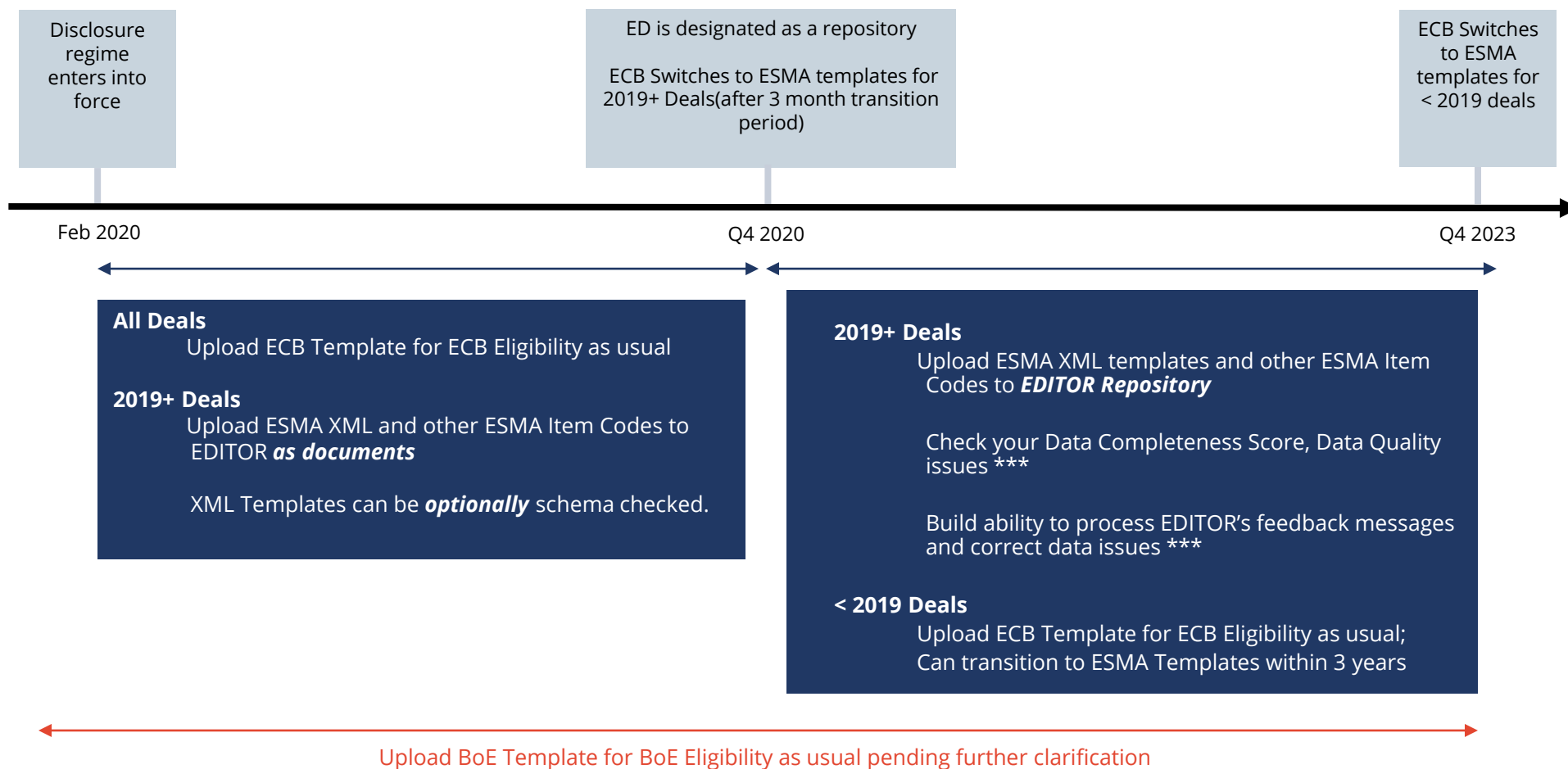
ESMA: European Securities and Markets Authority

OJ: Official Journal of the European Union –publication of the Level 2 of the RTS following the translation into the national languages of the European Union

RTS: Regulatory Technical Standards

REPORTING REQUIREMENTS TIMELINE

ECB & ESMA Templates



*** ED will make these features available in Sandbox at least 1-2 months before becoming a repository to help issuers with the transition

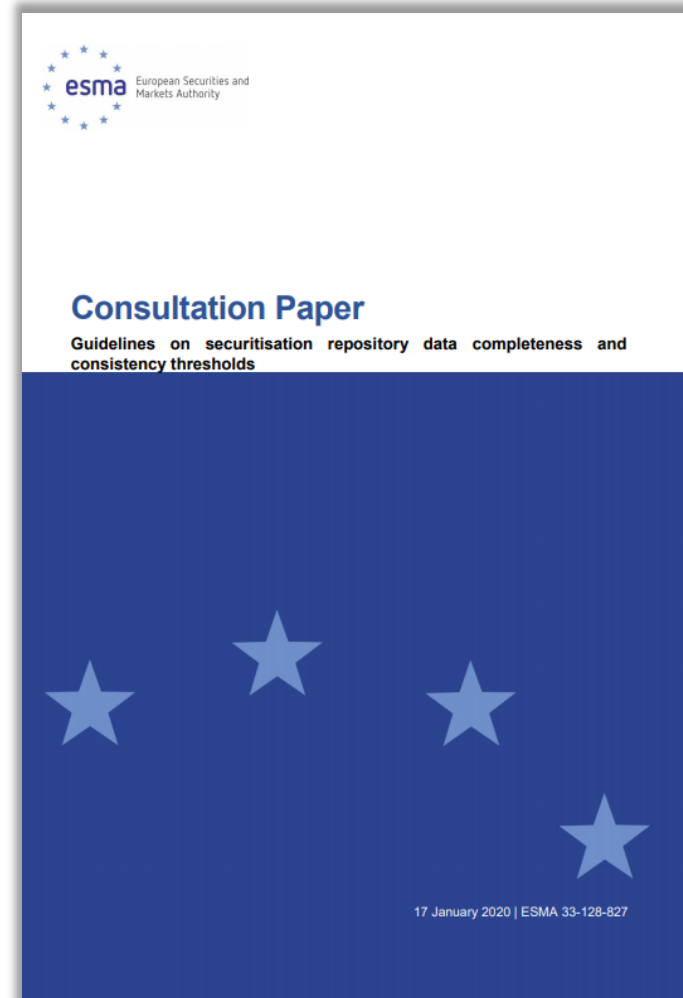
ESMA CONSULTATION PAPER ON 'NO DATA' THRESHOLDS

On 17th January 2020, ESMA published a Consultation Paper (CP) with guidelines on securitisation repository data completeness and consistency thresholds. The deadline is 16th March 2020.

This CP sets out an initial calibration of 'No Data' (ND) thresholds to be applied by repositories when verifying the completeness and consistency of disclosure templates submitted to them by reporting entities in accordance with the final RTS and ITS on disclosure requirements.

Summary of ESMA proposed thresholds

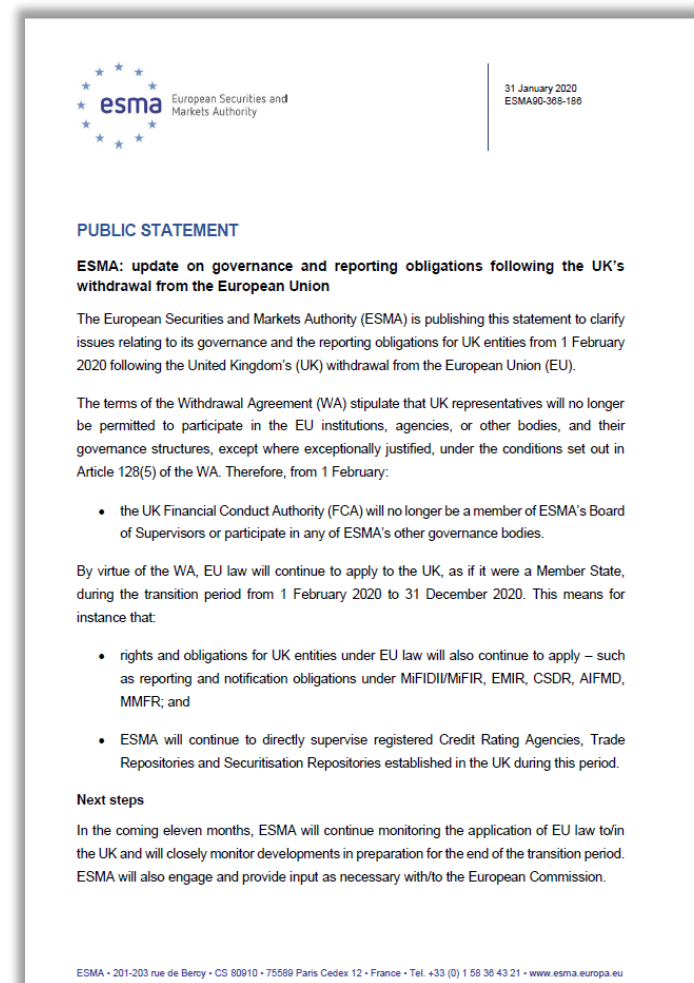
(1) Template category	(2) Total ESMA fields	(3) Total ESMA fields where ND1-4 options are allowed	(4) Proposed acceptable number of fields threshold: <u>legacy assets</u> (i.e. greater than 0% and up to 10% use of ND options in each field)	(5) Proposed acceptable number of fields threshold: <u>legacy IT systems</u> (i.e. greater 10% use of ND options in each field)
All	1018	618	N/A	N/A
Auto	78	41	15	15
Commercial Mtg.	227	75	50	50
Consumer	63	30	15	15
Credit cards	41	18	10	10
Leasing	78	42	15	15
Residential Mtg.	97	56	30	30
Corporate/SME	111	53	20	20
ABCP	44	39	39	39
NPE	203	203	203	203
Esoteric	76	61	61	61



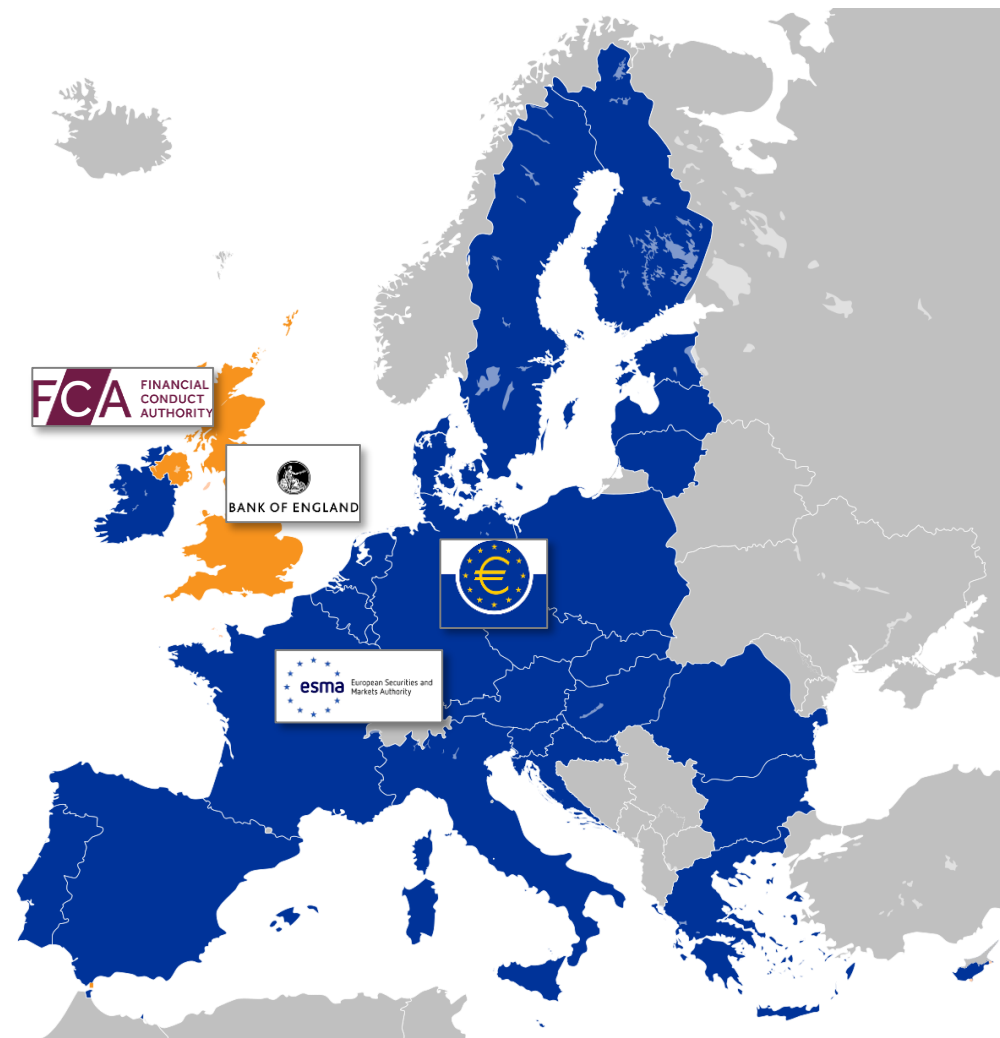
https://www.esma.europa.eu/sites/default/files/library/esma33-128-827_cp-guidelines_on_securitisation_repository_data_completeness_and_consistency_thresholds.pdf

ESMA: UPDATE FOLLOWING UK'S WITHDRAWAL FROM THE EU

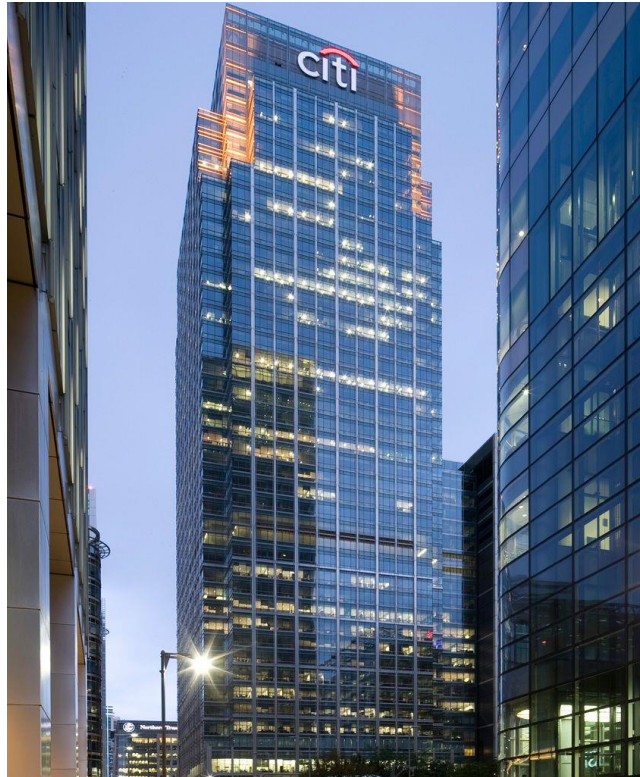
- The UK Financial Conduct Authority (FCA) will no longer be a member of ESMA's Board of Supervisors or participate in any of ESMA's other governance bodies
- By virtue of the Withdrawal Agreement, EU law will continue to apply to the UK, as if it were a Member State, during the transition period from 1 February 2020 to 31 December 2020
- ESMA will continue to directly supervise registered Credit Rating Agencies, Trade Repositories and Securitisation Repositories established in the UK during this period



REPOSITORY SOLUTIONS FOR THE UK AND EUROPE



WE ARE LIVE !



CHANGES FOR UK ISSUERS

WHAT WILL CHANGE:

- New UK website: editor.eurodw.co.uk
- Database and data will be hosted in UK
- European DataWarehouse Ltd. (not GmbH)

WHAT WON'T CHANGE:

- All functionality of EDITOR will be the same
- Entire upload process stays the same

PLEASE NOTE:

According to our understanding you are not yet required to use European DataWarehouse Ltd in order to comply with Article 7 of the Securitisation Regulation.

You may continue to use European DataWarehouse GmbH as your dedicated website until we receive further clarification.

EDITOR

EDITOR

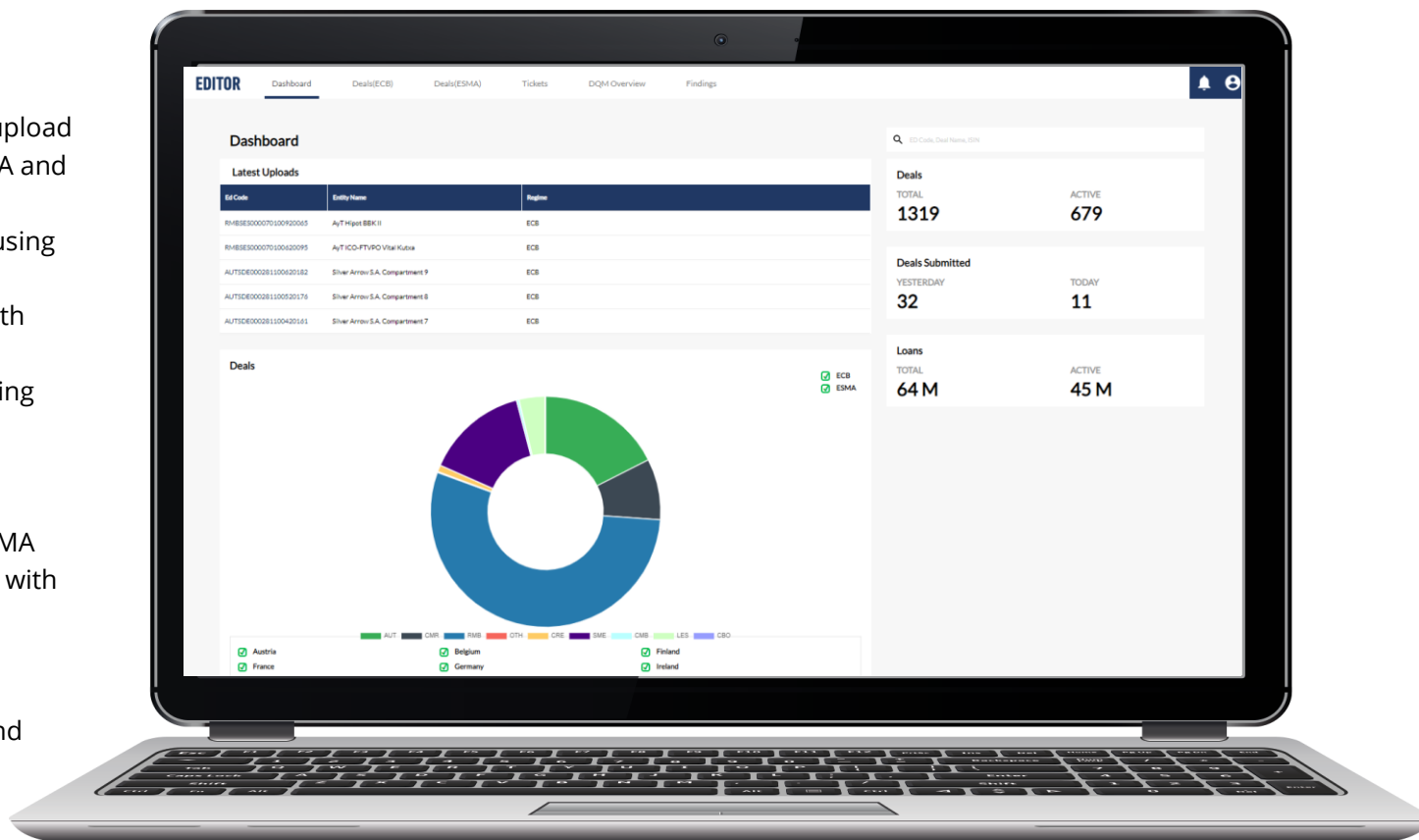
An integrated web application for the analysis and upload of loan level data (LLD) and documentation

Key Features:

- Allows Data Providers to pre-screen and analyse LLD and upload it in compliance with the ESMA and ECB reporting requirements
- In-depth data quality checks using over 2,500 rules
- Centralised rule repository with automatic updates
- Integrated Data Quality Tracking System (DQTS)

Latest Enhancements:

- Ability to upload the latest ESMA XML template as a Document with optional schema checks
- A web-based CSV to XML Converter for Underlying Exposures, Investor Report and Significant Event data
- Supported Templates (Non-ABCP) include Underlying Exposures for RMB, AUT, CMR, LES, COR, CRE, Investor Report, and Inside Information/Significant Events



REPORTING REGIMES

Fulfil regulatory and eligibility reporting requirements under different regimes



- ECB repository for issuers to fulfil their Eurosystem eligibility requirements for ABS and private whole loan portfolios



- Dedicated website fulfilling the ESMA reporting criteria during the interim period under the CRA III/ESMA XML reporting regime
- Plan to be an ESMA securitisation repository once the application process begins later in 2020



- Issuers are now able to fulfil their Bank of England (BoE) eligibility requirements by reporting their loan-level data, cashflow models and documentation to European DataWarehouse
- ED intends to become a securitisation repository in the UK

FREE SANDBOX ENVIRONMENT

Users can test their new ESMA templates and processes in a dedicated testing facility

Key Features:

- Upload unlimited test files and create test deals
- Frequently updated to reflect regulatory developments

Testing Includes:

- Free Access to Editor for a limited period
- Free Access to our web-based CSV to XML converter
- Supported Templates (Non-ABCP):
 - I. Underlying Exposures for RMB, AUT, CMR, LES, COR, CRE
 - II. Investor Report
 - III. Inside Information/Significant Events
- All remaining disclosure templates will be added to the converter in our upcoming February release.



Please send an email to enquiries@eurodw.eu for any requests

REGULATORY REPORTING IN EDITOR

GOPALA SANKARAN, EUROPEAN DATAWAREHOUSE

WHY EDITOR?

- Secure, integrated platform for all regulatory reporting requirements
- Meets all ESMA requirements around security, encryption, data quality and completeness
- Secure FTP and Website interfaces for data upload and data download
- Data made available to investors and other relevant stakeholders as per regulatory requirements
- Technical and data preparation support
- **Dedicated private area**
 - Issuers (Data Owners) have full control of who can see their data
 - Grant and revoke access to specific people or organisations
 - Private area can also be used for public deals (e.g. pre-marketing phase)

DISCLOSURE REQUIREMENTS – DOCUMENTS TO REPORT

Everything you need to know about the Reporting Requirements of the EU Securitisation Regulation

Disclosure Requirements - Documents to Report



Before Pricing

Documentation



Item Code	Document
[3]	Final offering document; prospectus; closing transaction documents, excluding legal opinions
[4]	Asset sale agreement; assignment; novation or transfer agreement; any relevant declaration of trust
[5]	Derivatives and guarantees agreements; any relevant documents on collateralisation arrangements where the exposures being securitised remain exposures of the originator
[6]	Servicing; back-up servicing; administration and cash management agreements
[7]	Trust deed; security deed; agency agreement; account bank agreement; guaranteed investment contract; incorporated terms or master trust framework or master definitions agreement or such legal documentation with equivalent legal value
[8]	Inter-creditor agreements; derivatives documentation; subordinated loan agreements; start-up loan agreements and liquidity facility agreements
[9]	Any other underlying documentation that is essential for the understanding of the transaction
[10]	STS Notification



Quarterly (Non-ABCP); Monthly (ABCP)

XML Data Templates



[1]	Underlying exposures or underlying receivables or credit claims XML	
[2] [11] or [12]	Investor report Inside Information or Significant Event	Common XML file to report [2] and [11]/[12] in a single XML file XML

XML DATA FORMAT

Data for ESMA eligibility will need to be uploaded as an XML File

- The ESMA XML Templates (latest version published on 20 December 2019) follow the ISO 20022 standard
- 4 Item codes covered by XML templates (1, 2, 11 & 12)
 - Underlying Exposures
 - Investor Report
 - *Inside information*
 - *Significant Event templates*
- Submitting data in XML is mandatory as per the regulation
- The XML data will be accepted by repositories only after they pass
 - Schema checks
 - Content checks
- ED offers a CSV to XML converter to help issuers avoid the complexities of XML generation








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CSV TO XML CONVERTER

- **What is it?** An online portal (<https://csv2xml.eurodw.eu>) to convert ESMA Templates from ED defined CSV to ESMA XML Format
- **Which documents does the converter support?**
 - 4 Item codes supported (1, 2, 11 & 12)
 - Underlying Exposures, [Investor Report](#), [Inside Information](#) & [Significant Event](#)
- **What does it include?** CSV to ESMA XML file conversion for
 - Underlying Exposure - XML #97 for ABCP and #99 for Non-ABCP
 - Other 3 - XML #96 for ABCP and #98 for Non-ABCP
- **When can the converted XML be uploaded to EDITOR?**
 - When the templates enter into force the XML files can be uploaded to EDITOR as documents
 - When ED becomes a repository the XML files can be uploaded to EDITOR in a structured way which includes data completeness score calculations, quality checks, etc.

	BusinessApplicationHeaderV01_head.001.001.01
	FinancialInstrumentReportingStatusAdv
	DRAFT1auth.096.001.02
	DRAFT1auth.097.001.02
	DRAFT1auth.098.001.02
	DRAFT1auth.099.001.02
	head.003.001.01

For more information on the ED converter please see our webinar replay at www.eurodw.eu

CSV TO XML CONVERTER –COMMON ERRORS & SOLUTIONS

- Naming Convention / Format Errors
 - Zip file names
 - CSV File Names
 - CSV File Headers
 - Incorrectly separated fields
 - Extra blank rows at the bottom
- Content Errors in CSV that hinders XML conversion
 - Text in a date or number field
 - Incorrect CSV Y/N representations (e.g. Yes, No)
 - Incorrect representations of complex fields like SESS6, Ratings
- Schema errors after XML Conversion
 - Incorrect LEI Format
 - Incorrect list field value (e.g. PERG instead of PERF)



Refer to the sample files provided in the converter website and follow the same formatting



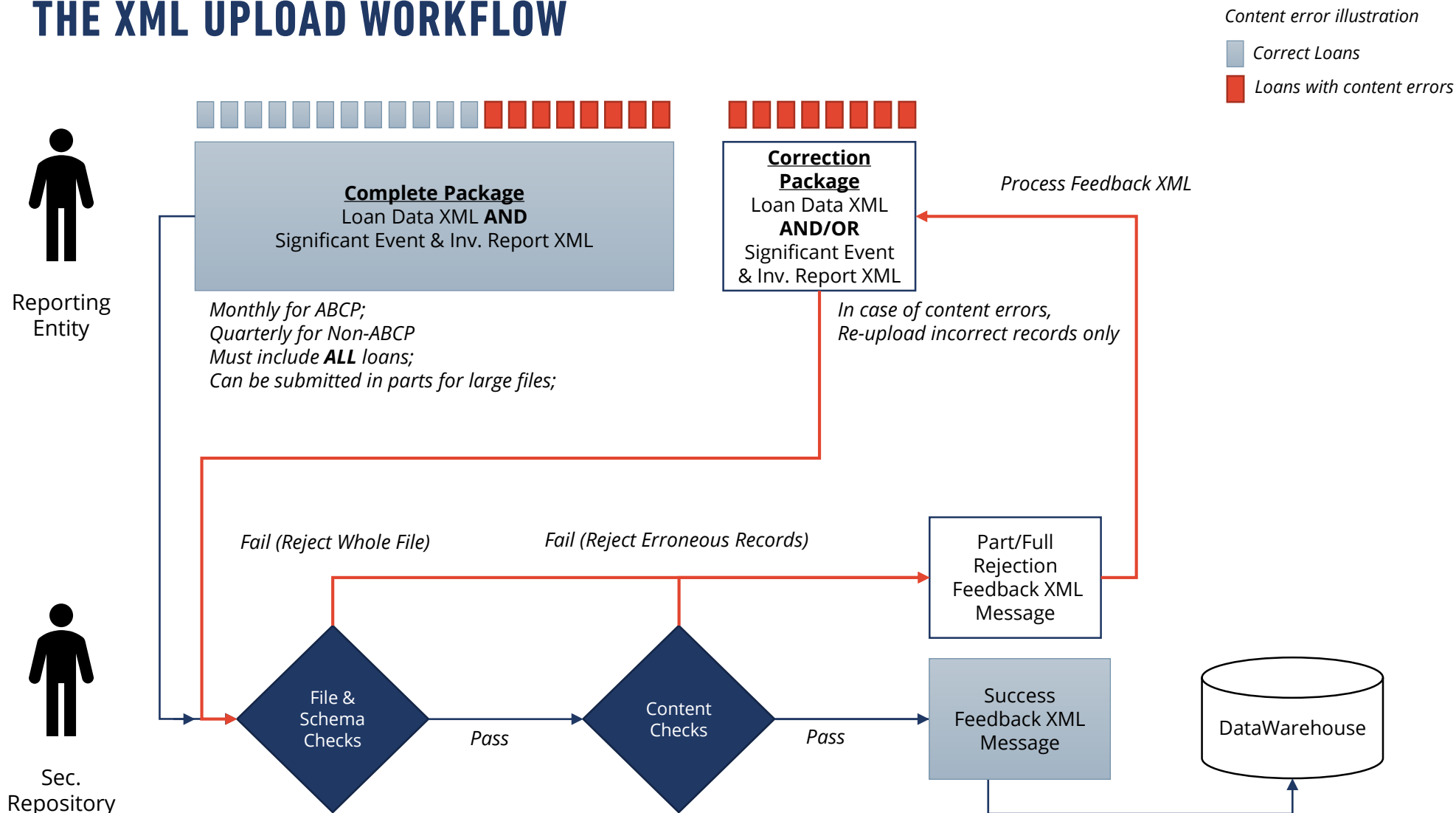
Check the FAQs in the converter website



Refer to the Reporting Instructions Excel files provided by ESMA

Source: https://www.esma.europa.eu/sites/default/files/library/esma65-8-6469_securitisation_disclosure_templates_xml_schema.zip

THE XML UPLOAD WORKFLOW



GREEN INITIATIVES

EIRINI KANONI, EUROPEAN DATAWAREHOUSE

EUROPEAN DATAWAREHOUSE ANNOUNCED CLIMATE INITIATIVES

ED will plant more than 2000 trees over the next three years

In light of the current discussion on climate change, European DataWarehouse has decided to support a 3-year-initiative to plant 750 trees per year, sequestering up to 50 metric tons of CO₂ annually.



KLIMASCHUTZ - PARTNER

EUROPEAN DATAWAREHOUSE

PRESS RELEASE

European DataWarehouse Announces Green Initiatives Ahead of the United Nations Climate Change Conference

FRANKFURT, GERMANY – 27 November 2019 – European DataWarehouse today announced its commitment to the environment and corporate climate responsibility. Beginning today, the firm will plant a new tree for every deal created on its platform, including active deals that have already been uploaded.

Dr. Christian Thun, CEO of European DataWarehouse noted, "In the absence of technological advancements to remove CO₂ from the atmosphere, reforestation is the most effective and affordable way to offset our carbon footprint. The decision to plant a tree for every deal created is an easy step our firm can take to help combat climate change."

This announcement comes as leaders and environmentalists prepare to meet at the 2019 United Nations Climate Change Conference (COP 25) in Madrid, Spain.

As part of this initiative, European DataWarehouse plans to plant more than 2000 trees in the next three years. To further demonstrate its commitment to the environment, European DataWarehouse plans to expand its already green practices. Current programs include a company e-bike leasing scheme, public transport tickets, green printing practices, and travel policies that support train use over air travel.

Notably, European DataWarehouse is also part of the Energy Efficiency Data Protocol and Portal EeDaPP, an initiative which aims to create a standardised energy efficient data protocol and portal for European mortgages. The market-led protocol will enable the large-scale recording of data relating to energy efficient mortgage assets (loan-by-loan), via a standardized reporting template.

European DataWarehouse was established in 2012. Since its inception, ED has collected loan-level data and relevant documentation for more than 1,400 ABS transactions.

About European DataWarehouse GmbH

CRITERIA FOR IDENTIFYING GREEN BONDS AND LOANS

ICMA Green Bond Principles	Guidelines that recommend transparency and disclosure and promote integrity in the development of green bonds
Climate Bond Initiative	Climate Bonds Standard & Certification Scheme is a labelling scheme for bonds. It sets out criteria for verifying the green credentials of a bond
Rating Agencies	Green evaluation ratings by rating agencies: Moody's Green Bond Assessment Green Evaluation by S&P Fitch's ESG scoring system
EU Technical Expert Group on Sustainable Finance	In June 2019, the TEG published a report on EU Taxonomy which is an EU classification system to determine whether an economic activity is environmentally sustainable
AFME	In September 2019, AFME published a Position Paper outlining their thoughts on the development of a green securitisation framework. One key point is that AFME is not supportive of "shades of green" but rather a Green vs. non-Green collateral approach
Energy Efficient Mortgages Initiative	In December 2018, the EEMI published a common definition of an Energy Efficient Mortgage (EEM)

ENERGY EFFICIENT MORTGAGES INITIATIVE – EEMAP & EEDAPP



The **Energy Efficient Mortgages Initiative** is a market-led initiative, funded via the European Commission's Horizon 2020 Programme, which aims to deliver a standardised European framework and data collection architecture for energy efficient mortgages

Action Plan (EeMAP)

The aim of **Energy efficient Mortgages Action Plan (EeMAP)** was to create a framework for “**energy efficient mortgages**”

Data Protocol & Portal (EeDaPP)

The **Energy efficiency Data Protocol and Portal (EeDaPP)** aims to design and deliver a **market-led-protocol** for the collection of energy efficient mortgage data through a **standardised template** which will be made accessible via the design of a **common data portal**.

EEMAP – DEFINITION OF ENERGY EFFICIENT MORTGAGE

One of the main objectives of the EeMAP was the definition of the “Energy Efficient Mortgage” (EEM)

EEMs are intended to finance the purchase/construction and/or renovation of both residential (single family & multi-family) and commercial buildings where there is evidence of:

- (1) energy performance which meets or exceeds relevant market best practice standards in line with current EU legislative requirements
- (2) and/or an improvement in energy performance of at least 30%.

This evidence should be provided by way of a recent EPC rating or score, complemented by an estimation of the value of the property according to the standards required under existing EU legislation. It should specifically detail the existing energy efficiency measures in line with the EEM Valuation & Energy Efficiency Checklist.

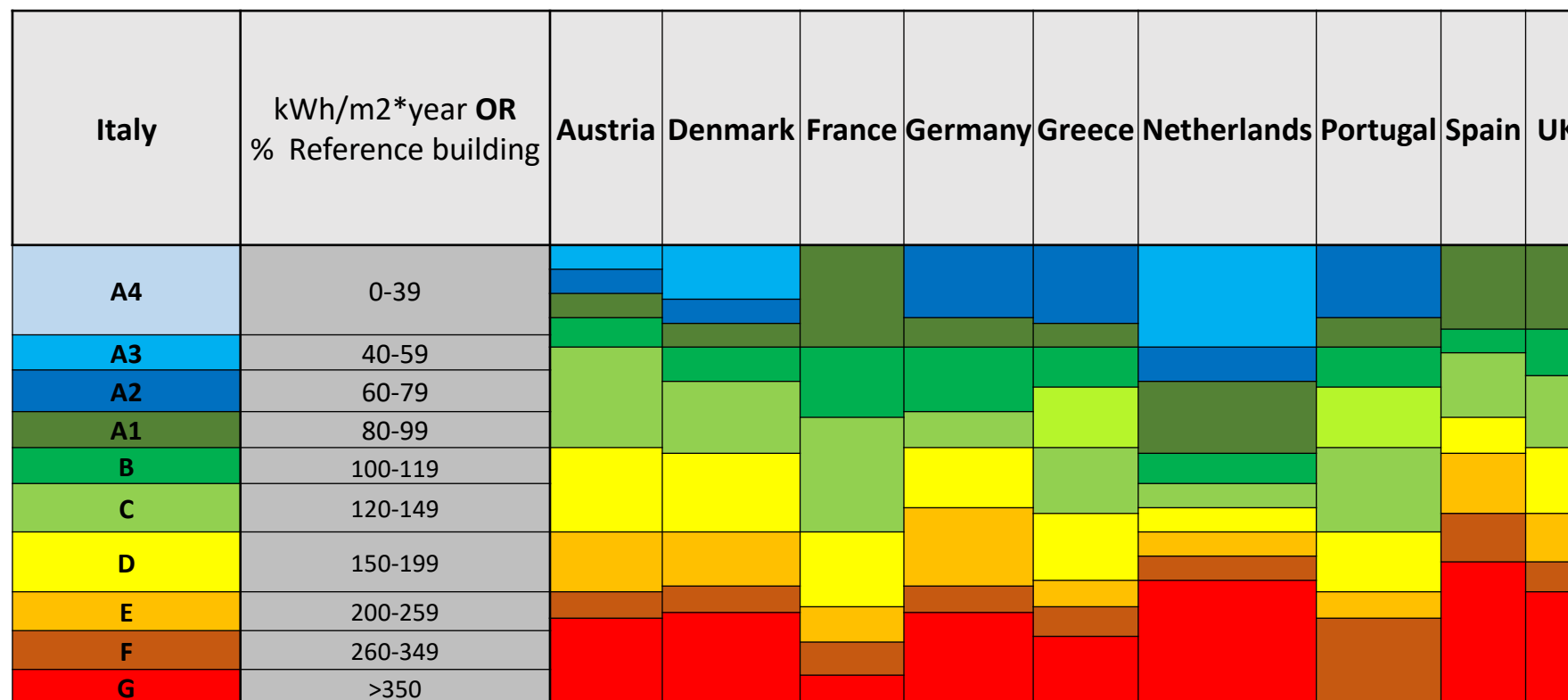
EEDAPP MASTER TEMPLATE (1)

Category	Field Name	Description
Energy Performance Certificate	EPC Register	Type of the EPC register (based on BPIE 2016): <ul style="list-style-type: none"> - Government Body - Third Body - Professional Association - Mixed (Specify)
Energy Performance Certificate	Energy Performance Certificate Provider Name	Enter in the legal name of the energy performance certificate provider. Where a Legal Entity Identifier (LEI) is available in the Global Legal Entity Foundation (GLEIF) database, the name entered shall match the name associated with the LEI.
Energy Performance Certificate	EPC Rating Format	Type of Rating: <ul style="list-style-type: none"> - Energy Label - Continuous Scale
Energy Performance Certificate	EPC Software	The method used in the assessment of the energy performance certificate of the collateral at the time of origination (based on BPIE, 2016): <ul style="list-style-type: none"> - Theoretical public (EPC rating based on a software tool elaborated by the public authorities) - Theoretical private (EPC rating based on a commercial software tool) - Theoretical Mixed (EPC rating based on both public and commercial software) - On-site (EPC rating based on inspection and on-site visit)
Energy Performance Certificate	Energy Performance Certificate Value	The energy performance certificate value of the collateral at the time of origination: A (EPCA) B (EPCB) C (EPCC) D (EPCD) E (EPCE) F (EPCF) G (EPCG) Other (OTHR)

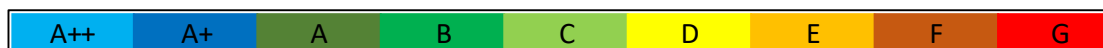
EEDAPP MASTER TEMPLATE (2)

Category	Field Name	Description
Energy Performance Certificate	EPC Score	Score between 0 and 100
Energy Performance Certificate	EPC Qant. Energy	Final energy Consumption estimate (in kWh/m ² /year)
Energy Performance Certificate	EPC Qant. Carbon	Estimate Carbon Emission as per the data delivered by the Energy Performance Certificate
Energy Performance Certificate	Issue Date	Date of deliverance of the EPC
Energy Performance Certificate	Term Date	Date of end of validity of the EPC (depending on the length of validity)
Energy Efficiency financing schemes	Benefitted from EE financing scheme associated to the loan	Yes/No - indication if the loan benefitted from a guarantee and/or subsidy granted by a public institution / governmental agency (example - "zero interest rate" loan)
Energy Efficiency financing schemes	Scheme name	Name and details of the financing scheme (regional/National Level; third parties involved ect..)
Energy Efficiency financing schemes	Amount Received	amount received in monetary terms or interest margin or level of guarantee granted
Energy Efficiency financing schemes	EE Incentive scheme received by the borrower	Yes/no - if the borrower benefitted from a fiscal or lump sump subsidies associated with the energy improvement of its property
Energy Efficiency financing schemes	Scheme name	details of the scheme
Energy Efficiency financing schemes	Amount Received	amount received (in tax rebates or subsidies) in monetary terms

ENERGY EFFICIENCY RATINGS ACROSS EUROPE BASED ON CONSUMPTION



Source: ED calculations



“GIUDITTA” THE ENERGY EFFICIENCY SOLUTION

OPENDATA - DATI CENED+1.2



Property Address



Giuditta is a dedicated solution designed by European DataWarehouse (ED) for matching energy efficiency data of buildings with the corresponding address. It offers the following solutions:

- Retrieve and store energy efficiency data for buildings present in a geographical area
- Retrieve and store mortgage or other related loans granted to customers
- Use a third party infrastructure to match the two datasets in order to assess how many buildings in a portfolio have “green label” information available
- Periodic addition of energy efficiency information retrieved from external or internal databases using the ED private area solutions

Source: Lombardia Region database with energy efficiency details available at www.cened.it

DOES ENERGY EFFICIENCY PREDICT MORTGAGE PERFORMANCE?

BENJAMIN GUIN, BANK OF ENGLAND



Does energy efficiency predict mortgage performance?

Benjamin Guin

(joint work with Perttu Korhonen)

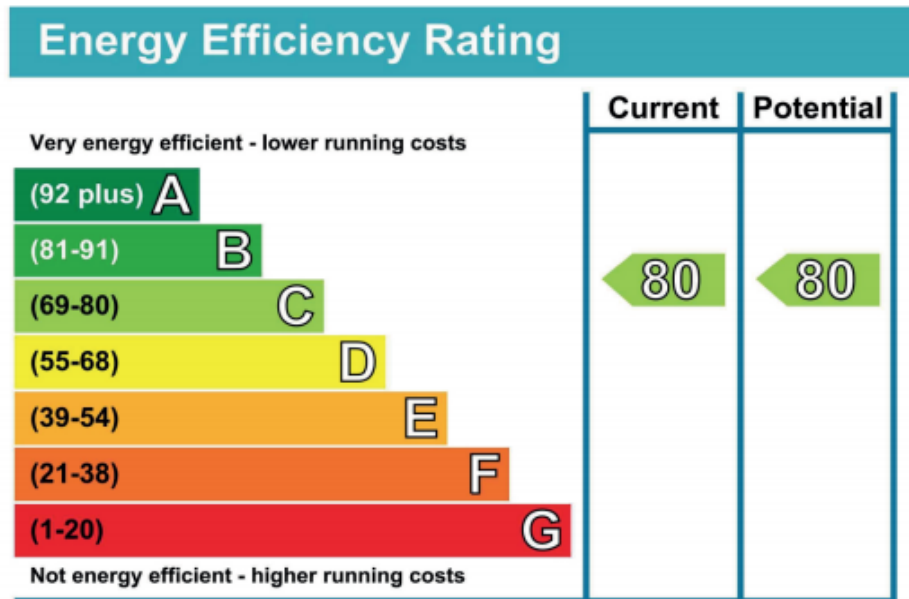
based on Bank of England *Staff Working Paper No. 852*

5 February 2020, ED Workshop in London

Disclaimer: The views expressed here are those of the authors. They do not represent the views of the Bank of England, the Prudential Regulation Authority or the Qatar Financial Centre Regulatory Authority (QFCRA).



House insulation can lower households' energy bills



Energy efficiency	High	Medium	Low
Rating	A-C	D	E-G
2-bedroom flat	£417	£676	£1,023
3-bedroom house	£578	£891	£1,340
4-bedroom house	£695	£1,130	£1,775

- Protects households from unexpected decreases in income or increases in expenses.
- Are mortgages against energy-efficient properties are less credit-risky?

Research question

*Are mortgages against energy-efficient properties less frequently past due
(than mortgages against energy-inefficient properties)?*

This specific question is relevant as:

- Mortgages are the largest asset class of retail banks ([Jordà et al, 2016](#)).
- Residential housing accounts for ca. 14% of greenhouse gas emissions in the UK ([BEIS, 2016](#))
- ... and expenses on energy costs can be sizeable ([Guin and Korhonen, 2018](#)).

We assemble a novel dataset from sources in the UK

- Payment arrears of residential mortgages in the entire UK (FCA's Product Sales Database 007).
 - Borrower characteristics (e.g. income, LTV) at origination (FCA's Product Sales Database 001).
 - Prices in house transactions (HM Land Registry).
 - Energy performance certificates (EPCs) of houses ([MHLC](#)).
- Final sample is a cross-section of 1.8 million mortgages as of year-end 2017.

There is evidence of a risk differential

Energy efficiency	High (1)	Medium (2)	Low (3)	Difference (1)-(3)
Arrears (in %)	0.94 (N=412,704)	1.00 (N=893,913)	1.14 (N=527,026)	-0.21*** (N=939,730)

→ The share is 0.21 percentage points, or about 18%, lower!

Robust to controlling for a rich set of risk drivers

	Arrears (1)	Arrears (2)	Arrears (3)	Arrears (4)
<i>Energy efficiency</i>				
High energy efficiency	-0.0023*** (0.0005)	-0.0027*** (0.0003)	-0.0011*** (0.0003)	-0.0010*** (0.0003)
Medium energy efficiency	-0.0015*** (0.0003)	-0.0018*** (0.0002)	-0.0005*** (0.0002)	-0.0005** (0.0002)
<i>Main control variables</i>				
Gross income		0.0003 (0.0011)	-0.0005 (0.0006)	-0.0006 (0.0005)
LTV		-0.0024*** (0.0006)	0.0032*** (0.0003)	0.0032*** (0.0003)
Age of borrower		0.0017 (0.0034)	0.0036* (0.0022)	0.0036* (0.0022)
Borrower control variables	No	Yes	Yes	Yes
Property control variables	No	No	Yes	Yes
Regional x origination year FE	No	No	Yes	Yes
Inspection year FE	No	No	No	Yes
Observations	1,833,653	1,826,399	1,826,162	1,826,117
Pseudo R2	0.0005	0.0086	0.0445	0.0446
Mean of dep. variable	0.0103	0.0103	0.0103	0.0103

Conclusion

- Mortgages against energy-efficient properties are less frequently in payment arrears.
→ **Energy efficiency of a property is a relevant predictor of mortgage payment arrears.**
- This does **not necessarily suggest a causal relationship**.
 - There might be a number of factors which we do not control for.
 - However, energy efficiency of a property could be factor in credit risk model estimating PDs.
 - It might become a relevant factor for risk-adjusted pricing of mortgages.
- Future work could **expand the analyses** to other countries in Europe(?)

MACHINE LEARNING IN CREDIT DATA ANALYTICS

ALEXANDER BARANSKI, CARLTON HILL PARTNERS

Machine Learning In Credit Data Analytics

February 2020



HUBERT NIEWIADOMSKI, PhD
CEO

Co-founded Cledar in 2009

Previous experience

- European Organization for Nuclear Research in Switzerland (CERN)
- Director of Department of Innovations, Ministry of Development, Poland
- PhD in Particle Physics (Manchester University, UK)
- MSc in Computer Science (Warsaw University of Technology, Poland)



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Previous experience

- European Organization for Nuclear Research in Switzerland (CERN)
- NComputing
- MSc in Computer Science (AGH University of Science and Technology, Cracow, Poland)



ALEKSANDER BARANSKI

Carlton Hill Partners

Previous experience

- McKinsey & Company
- The Blackstone Group
- US hedge funds (Perry Capital, Smith Cove Capital Management)
- Wharton School of the University of Pennsylvania, USA



International Clients and Partners

EUROPEAN
DATAWAREHOUSE

MOODY'S



 **Guidehouse**

 **IPstant**

nuvoole
Cloud-based Smart Security

celestix

 **iCERTAIN**
SAFE MADE CERTAIN

 **Cloudbus**

 **join**TM

 **chocolate**

 **FamiCord**[®]

 **LUMEN**
NETWORKS

 **zettablock**

 **DTI**

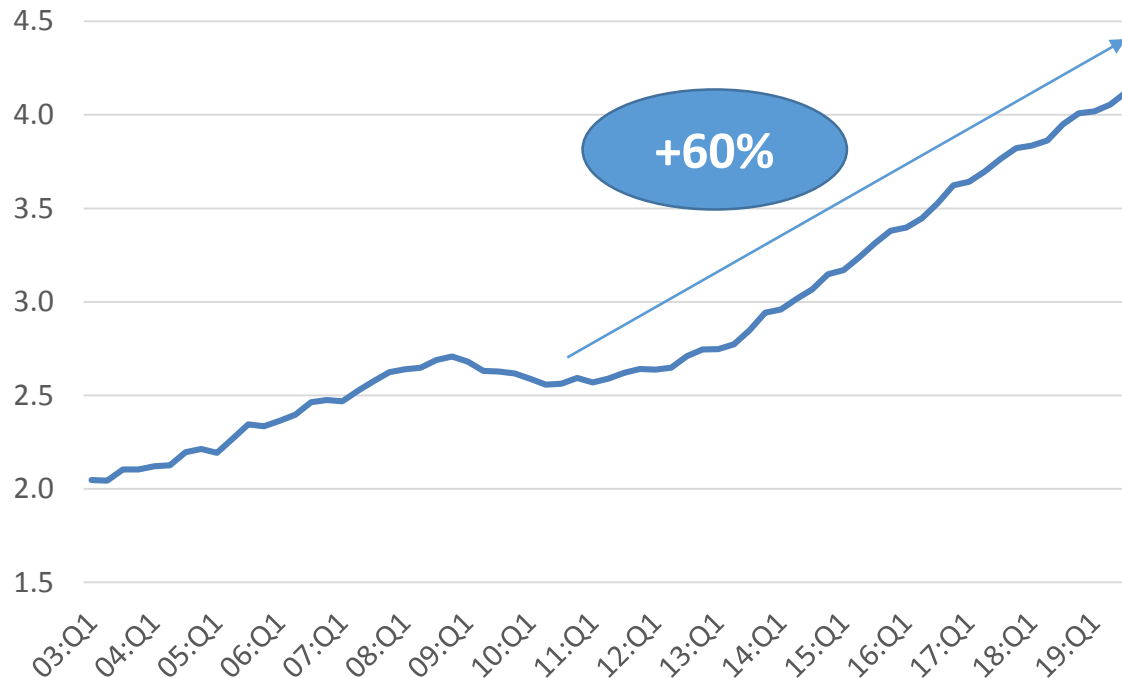
 **Polski Bank**
Komórek Macierzystych
FamiCord Group

Growing Levels of Consumer Debt

- US consumer debt, excluding real estate, grew from \$2.6 trillion in 2011 to over \$4.1 trillion in 2019¹
- Delinquency rates have started to increase

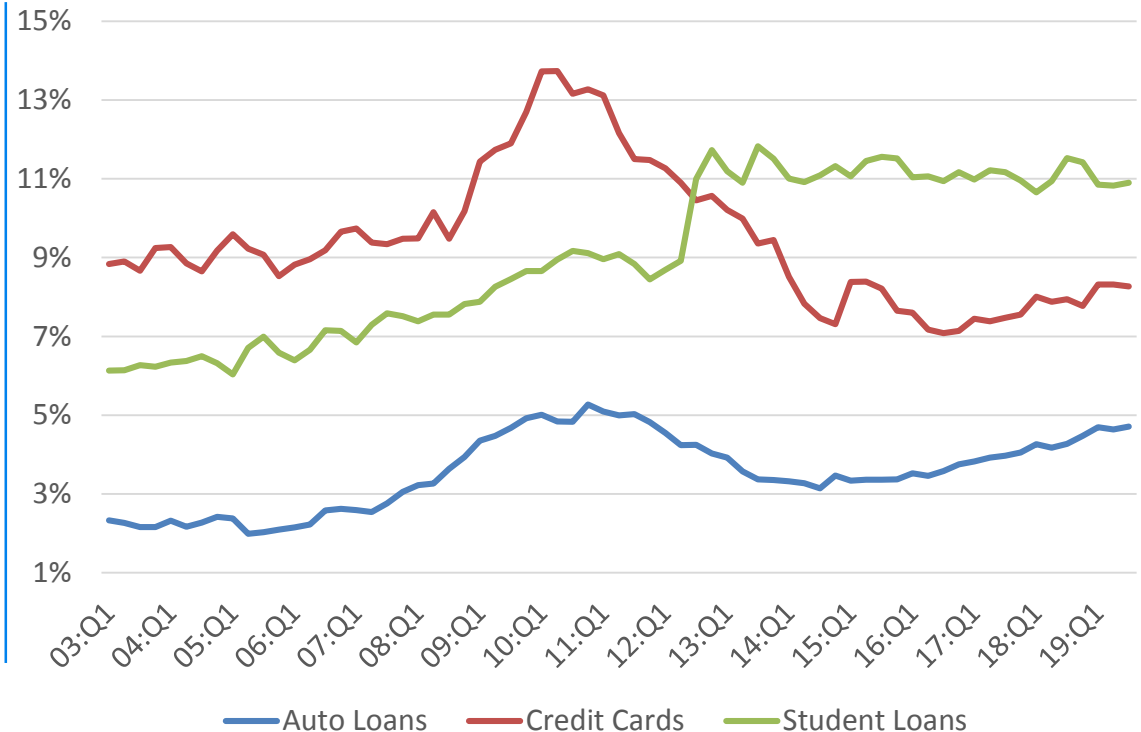
US Consumer Debt, ex. Real Estate

Outstanding balance, \$ trillion



Delinquency Rates

Percent of Balance 90+ Days Delinquent by Loan Type



1) Includes auto loans (Q3 '19: \$1.3 trillion), credit card debt (Q3 '19: \$0.88 trillion), student loans (Q3 '19: \$1.50 trillion) and other, ex real estate (Q3 '19: \$0.43 trillion). Excludes residential real estate debt (Q3 '19: \$9.83 trillion)

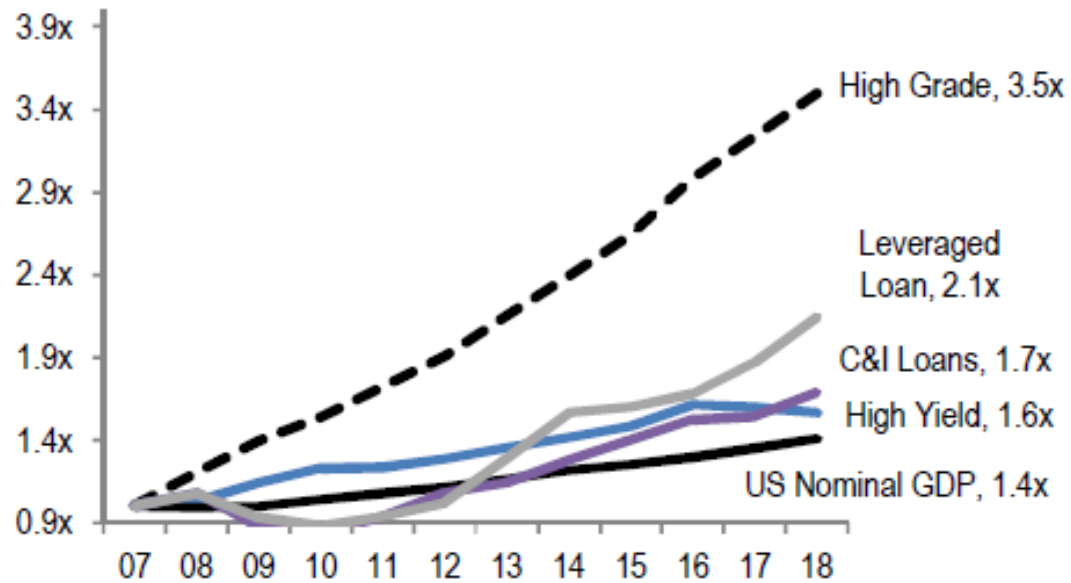
Source: Federal Reserve Bank of New York

Growing Levels of Corporate Debt

- Corporate debt has grown materially, while the quality has deteriorated

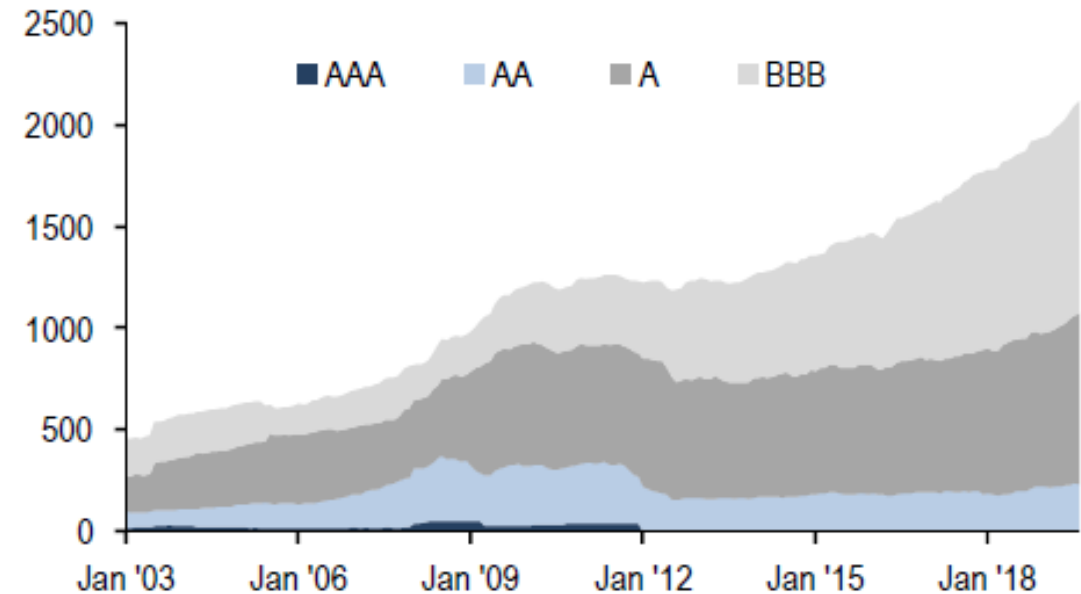
US Credit Market

Relative growth since the global financial crisis



European Investment Grade Market

€ billion, outstanding balance

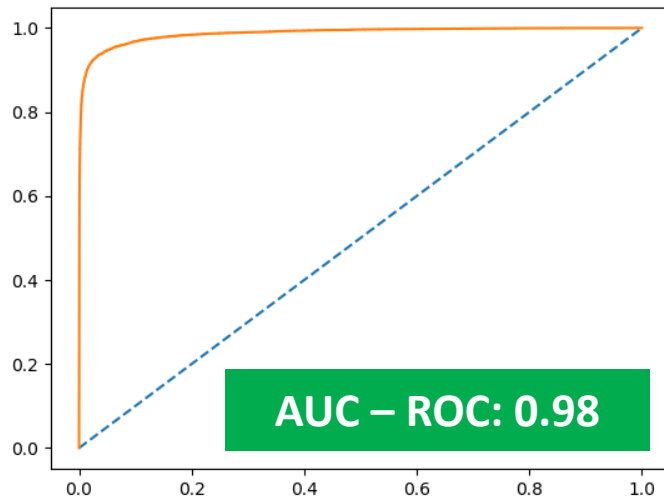


The amount of USD-denominated BBB rated debt has increased by 5.3x

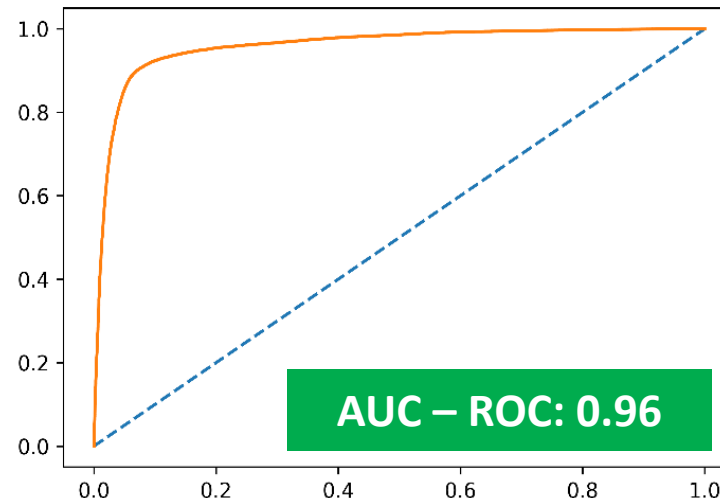
Benefits of Machine Learning

- Improved forecasts and higher quality insights
- Potential to improve profitability and capital allocation

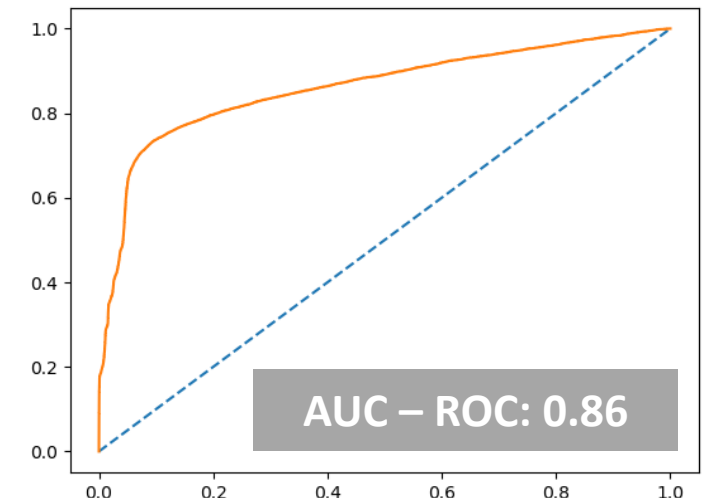
XGBoost



EBM



Logistic Regression



Value Proposition

Banks / Challengers

- Improve credit origination process: identify more credit-worthy borrowers, offer competitive interest rates on credit products, reduce losses
- Calibrate rating systems
- Proactively manage portfolio

Investors

- Forecast portfolio performance
- Differentiate between short-term and fundamental changes in portfolio performance

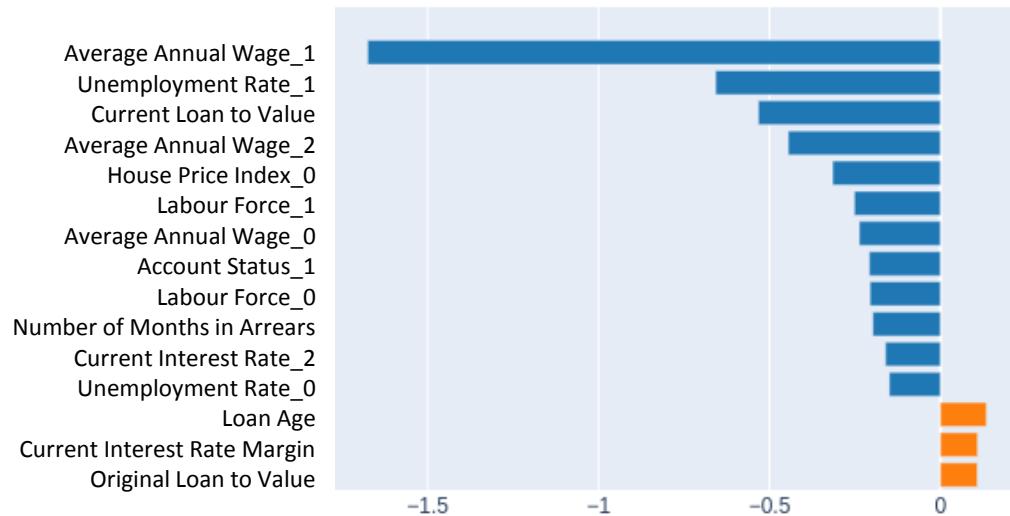
Regulators

- Generate higher quality insights from database initiatives, e.g., the ECB's AnaCredit

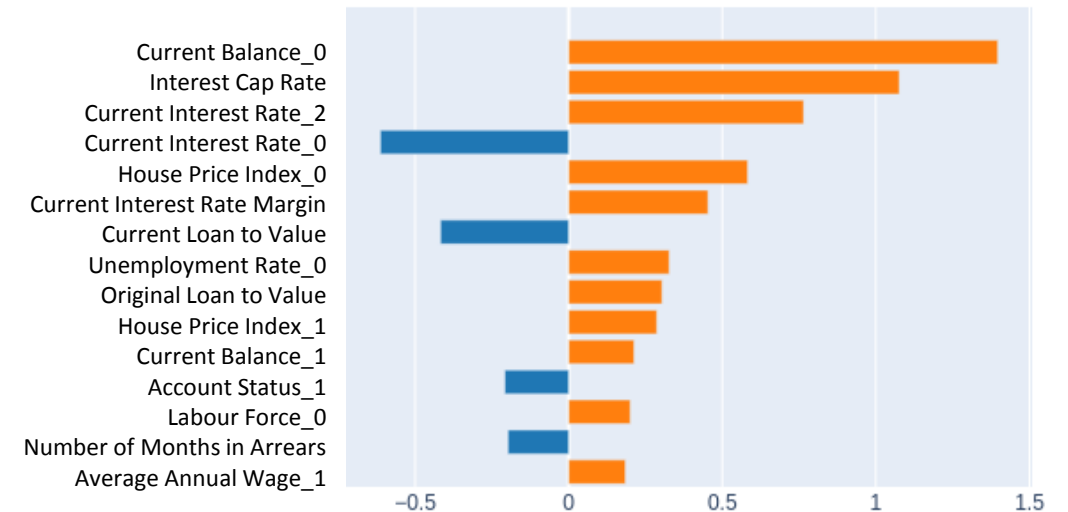
Use Case: Assessment of Individual Loans

- Interpretability of model results at an individual loan or loan application level
- Weights assigned to specific parameters

Performing Loan (Example)



Defaulted Loan (Example)

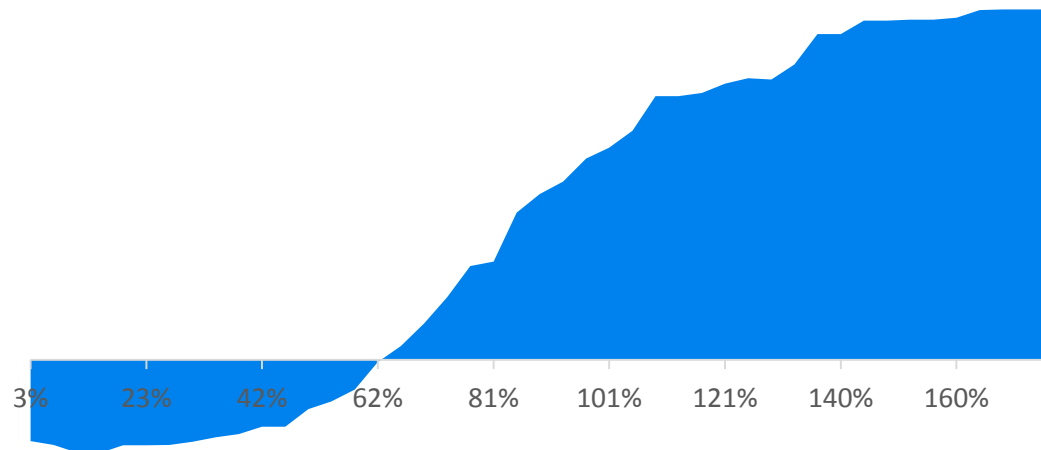


Use Case: Portfolio Analytics and Management

- Improved insights into portfolio risk
- Analysis of non-linear relationships

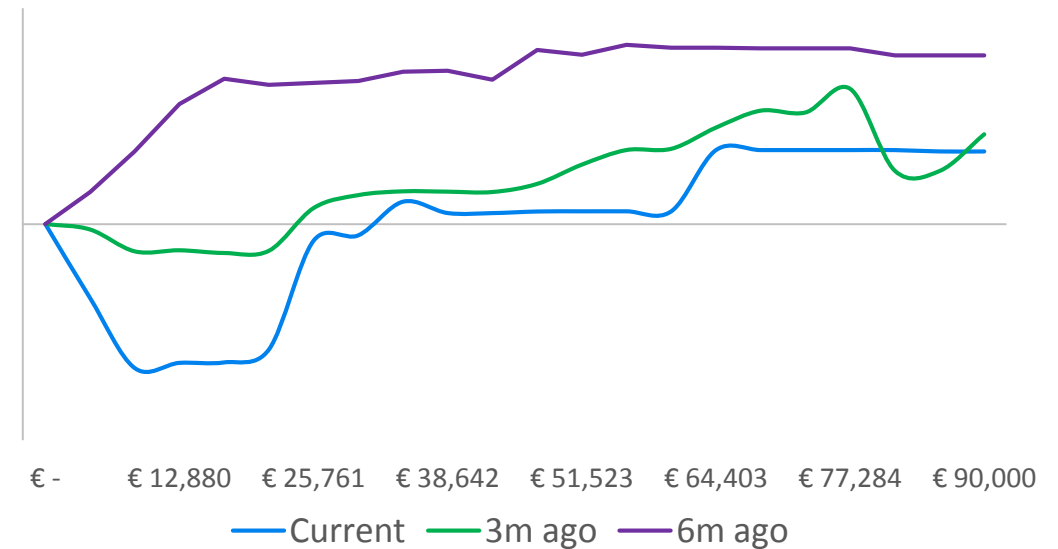
Impact of Current LTV on Default Probability

Algorithm's Internal Scoring - Current Loan to Value



Impact of Arrears Balance on Default Probability

Algorithm's Internal Scoring - Arrears Balance



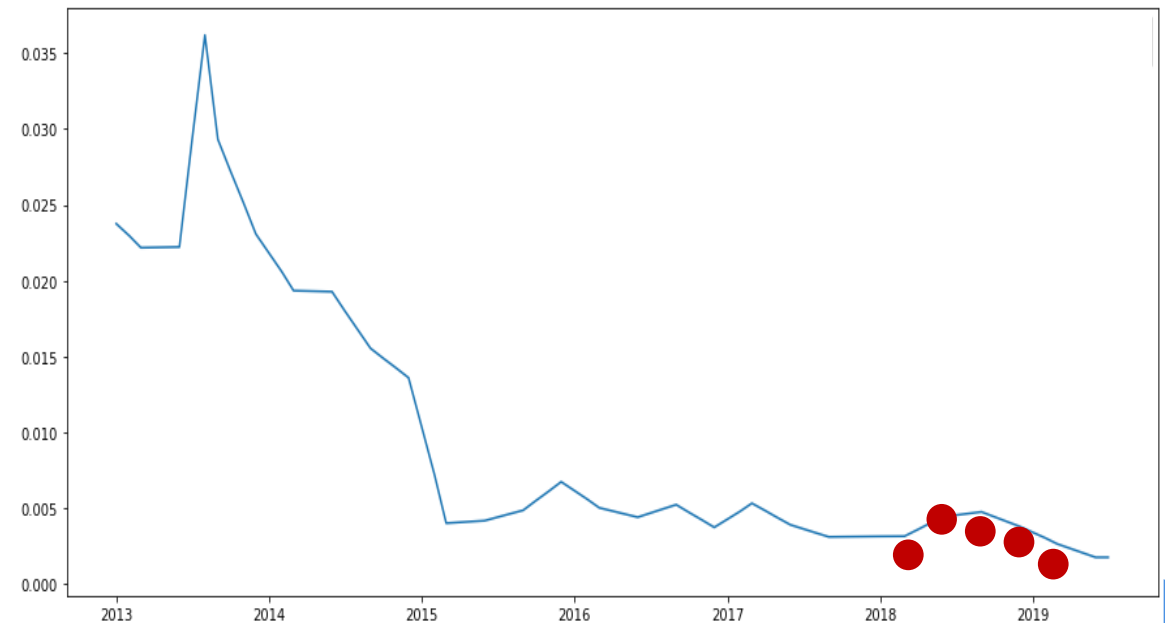
Use Case: Portfolio-Level Forecasts

- Accurate predictions of key performance metrics
- Ability to capture trend reversals

30 – 60-day Delinquency Ratio



90-day+ Delinquency Ratio

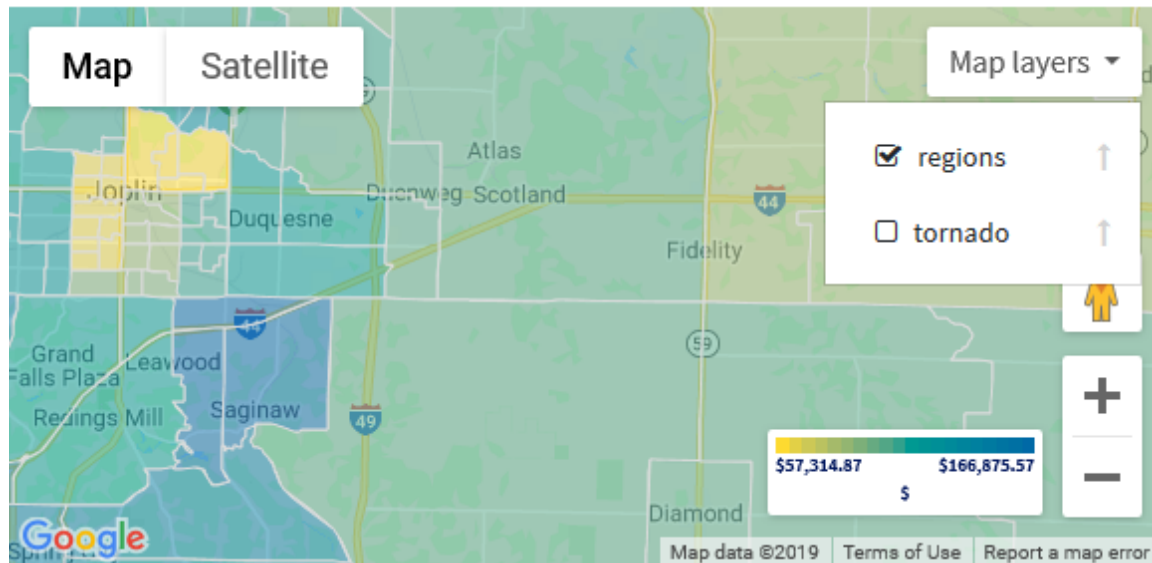


— Actuals
● Predictions

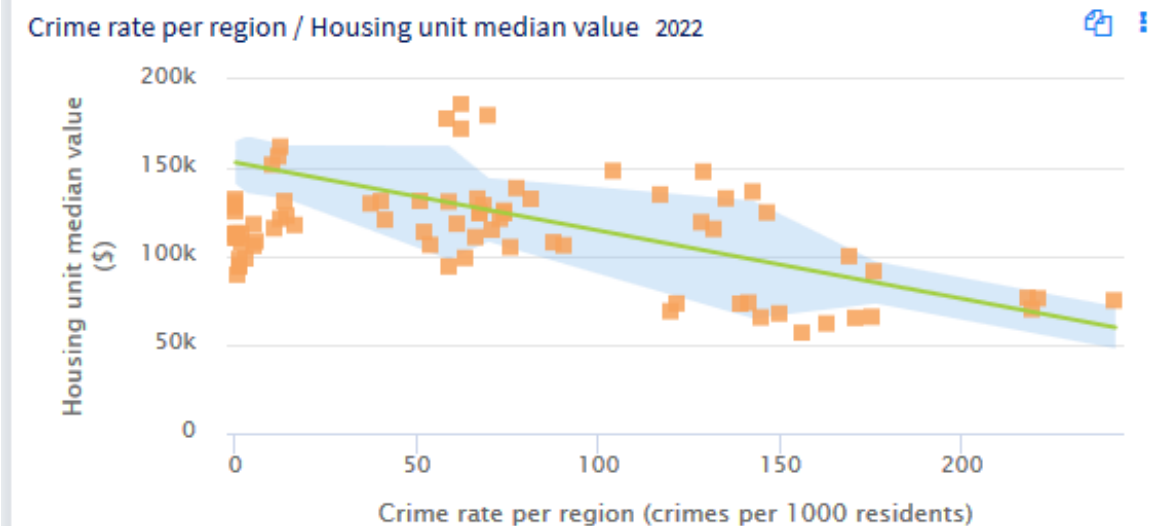
Use Case: Collateral Value Analysis

- Identification of financial and non-financial variables
- Forecasts of collateral values under various scenarios

House Prices Forecasts – Aggregated View



House Prices Forecasts – Granular View





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REGULATORY AND ENERGY EFFICIENCY ROUND TABLE DISCUSSION AND Q&A:

- Marco Angheben, European DataWarehouse [Moderator]
- Christian Moor, European Banking Authority
- Alessandro Pighi, Fitch Ratings
- Tom Quoroll, Linklaters
- Steve Gandy, Santander
- Ian Stewart, UK Covered Bond Council



Q&A

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APPENDIX