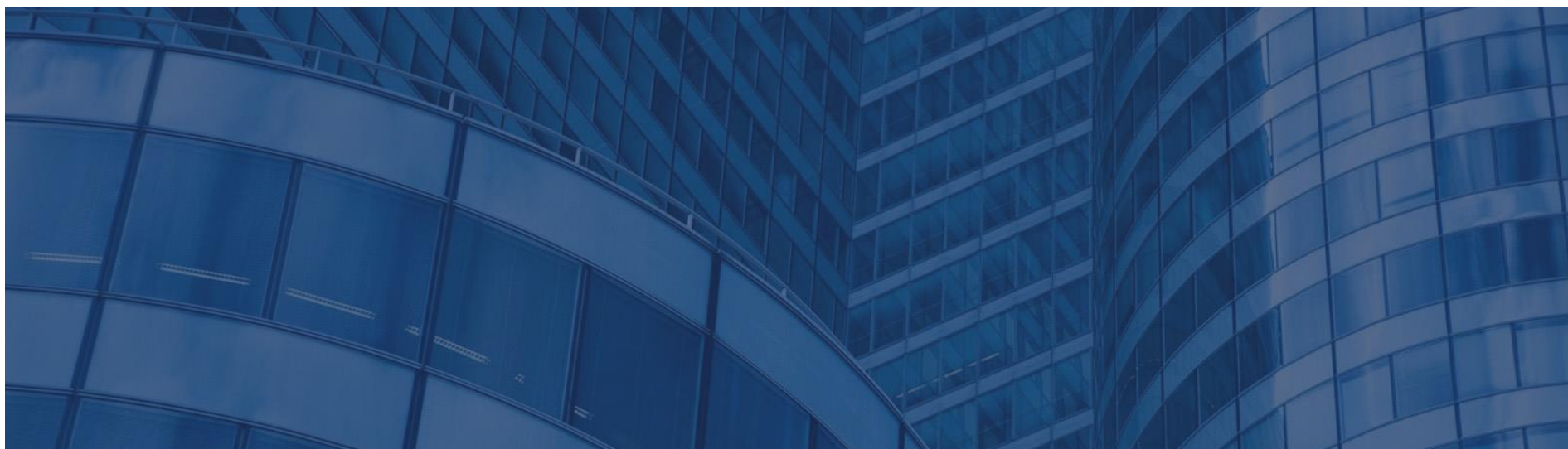


2023 DATA QUALITY INITIATIVES

01 JUNE 2023



AT TODAY'S WORKSHOP

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AGENDA

WELCOME AND INTRODUCTION

DATA QUALITY – CURRENT STATE OF AFFAIRS

- Phasing out of ECB templates
- EDW's data quality process
- Current status of data quality
- Invitation letter from ECB/CEPH

EDW'S ACTIVITIES WITH ABS REPORTING ENTITIES

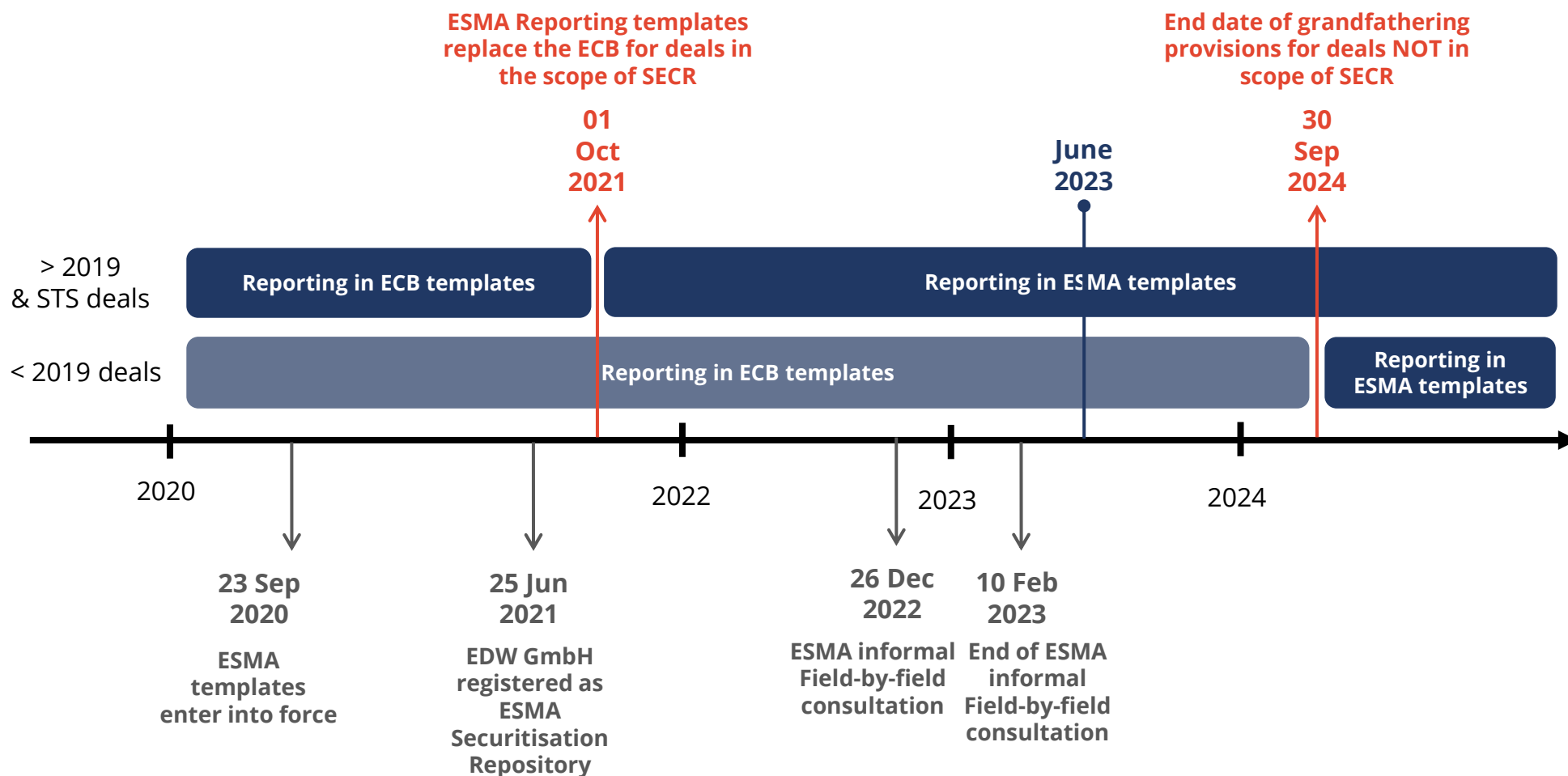
- EDW Automated feedback
- EDW Deal report
- EDW Ticketing system

CLOSING REMARKS

Q&A

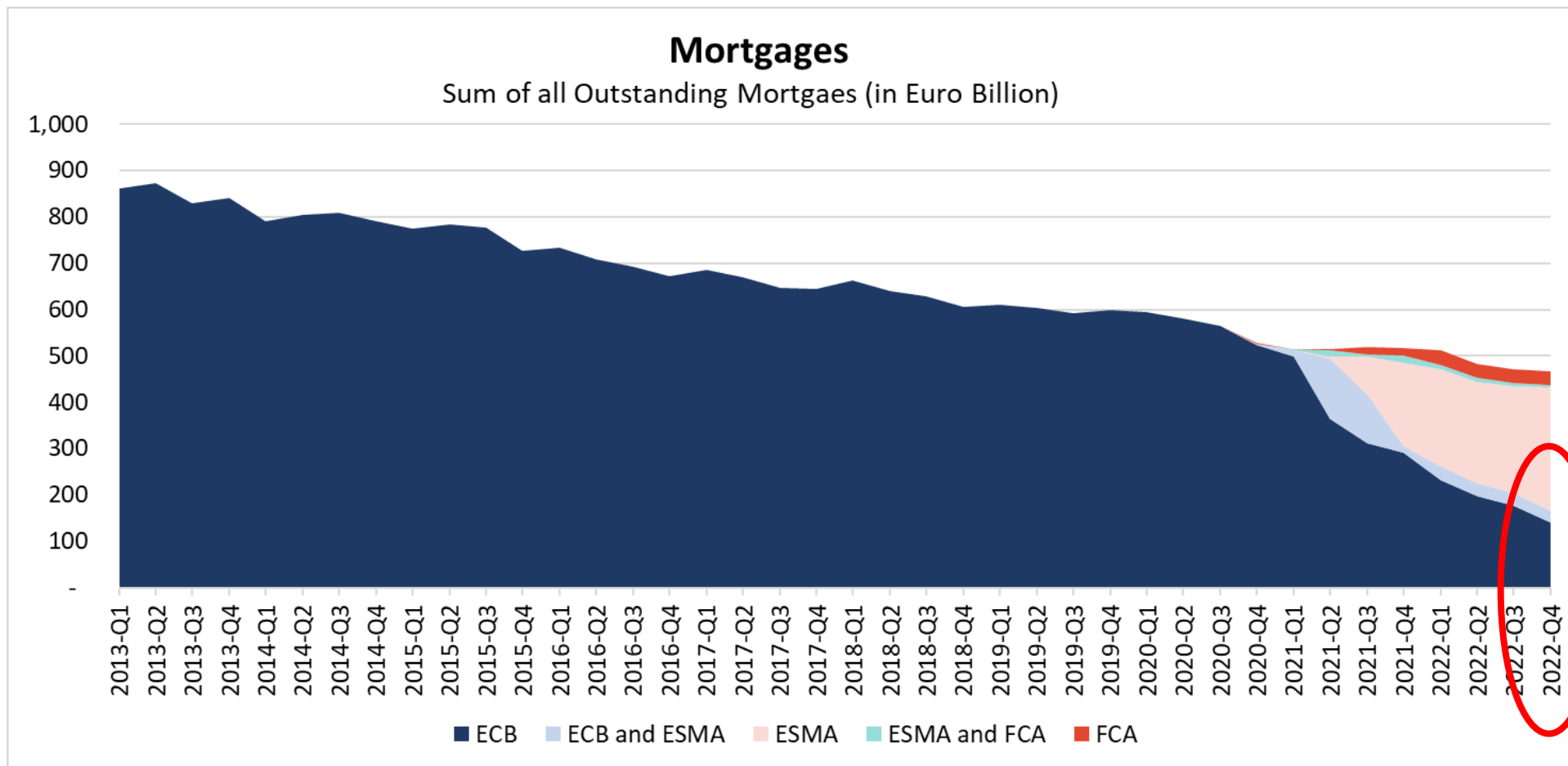
DATA QUALITY – CURRENT STATE OF AFFAIRS

CHANGES TO THE EUROSISTEM'S LOAN-LEVEL DATA REQUIREMENTS

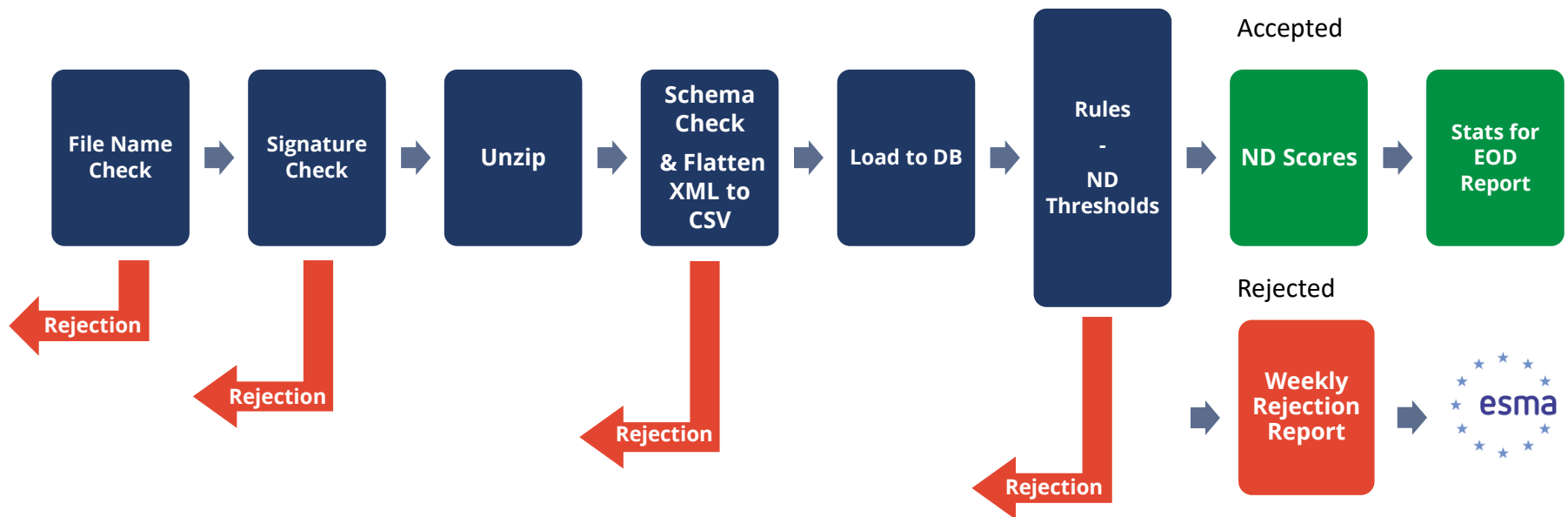


Source: Timeline is based on the information provided in the ECB [press release](#) as of 28 June 2021

ECB VS ESMA VS FCA DATA AVAILABILITY



DATA SUBMISSION WORKFLOW

**Please note:**

In case of errors, each step is fully completed before producing an error file.

RULES BASED DATA QUALITY ANALYSIS

EDW implemented >2,700 data quality checks that are executed with every template upload

1

**Mandatory
Checks req. as
per Sec.Reg
(ca. 1,200)**

**Schema
checks**

- Verification of file structure and the format of the data submitted

**Validation
rules**

- Rules defined by ESMA that lead to a submission rejection

**EDW
additional
rules**

- Additional rules that are developed by EDW, as part of regulatory requirements

2

**Additional
EDW checks
(>1,500)**

**Data Quality
Plus**

- Additional voluntary rules developed by EDW

**Data
Quality
Score**

- A subset (ca. 400) of Data Quality Plus rules used to calculate the **Data Quality Score (DQS)**

EUROPEAN DATAWAREHOUSE – PROPRIETARY DATA QUALITY SCORE (DQS)

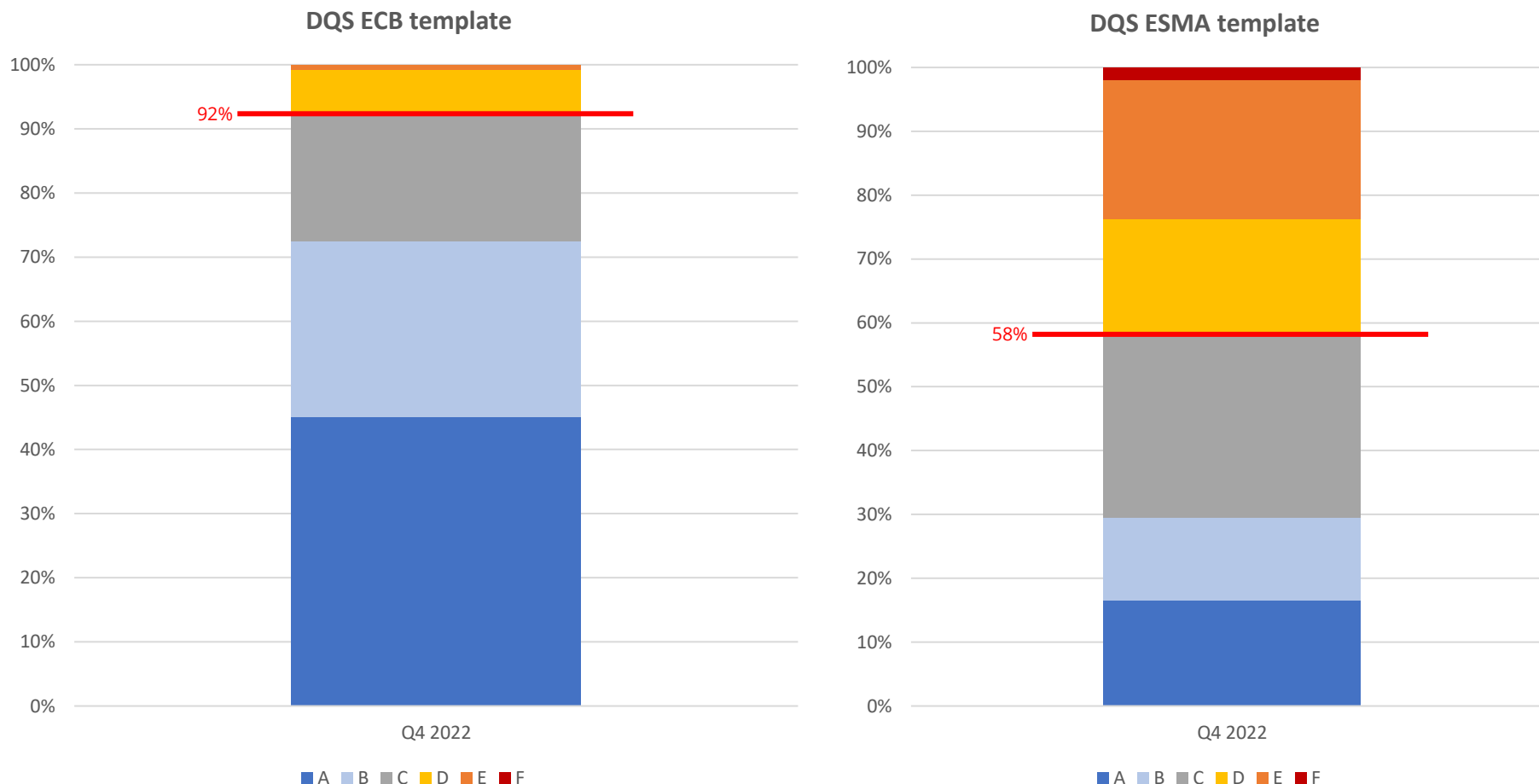
- Automated score based on hard failed rules – subset of EDW Data Quality Plus rules
- Objective and common approach for all deals, jurisdictions and asset classes
- The score is calculated for all deals passing the minimum ESMA validation checks
- Based on the following formula: $\frac{\sum_1^n(F_f)}{n \times MF}$

Where:

- n is the total number of loans for each relevant field
- F_f represents a field that failed a rule
- MF represents the number of the field for which there is at least one DQS rule. This number is specific per each asset class.

DQS Score	Min. Fail Ratio	Max. Fail Ratio	Ratio
A	0.0000%	0.0001%	Up until 1 in a million
B	0.0001%	0.005%	Up until 5 in 100k
C	0.005%	0.1%	Up until 1 in a thousand
D	0.1%	1%	Up until 1 in a hundred
E	1%	4%	Up until 4 in a hundred
F	4%	100%	> 4 in a hundred

DATA QUALITY - DEVELOPMENT ECB TEMPLATE VS. ESMA TEMPLATE



The quality of the data in the ESMA reporting templates submitted in Q4 2022 was comparable to the quality of the data in ECB reporting templates submitted in EDW in Q4 2014.

MAIN DRIVERS OF THE DQS

Only a few fields contribute to the highest number of data quality issues

Top 10	ESMA Field	No. of loans
1	Current Principal Balance	4,390,456
2	Origination Channel	2,144,630
3	Redemption Date	671,313
4	Credit Impaired Obligor	576,474
5	Original Term	214,294
6	Number Of Days In Arrears	202,831
7	Maturity Date	199,998
8	Original Loan-To-Value	191,297
9	Original Principal Balance	173,446
10	Current Valuation Date	149,362

Top 10	ESMA Field	No. deals
1	Number Of Days In Arrears	201
2	Redemption Date	154
3	Current Principal Balance	126
4	Default Amount	95
5	Current Valuation Date	71
6	Reason for Default or Foreclosure	58
7	Maturity Date	51
8	Original Loan-To-Value	49
9	Original Principal Balance	49
10	Current Valuation Date	48

- Current Principal Balance with 'count zero' (CZ) problem
- Origination Channel with inappropriate use of ND5
- Performance-related fields are not the major problem when looking at number of loans, but many deals suffer in data quality in those fields

MISSING DATA ON CRITICAL FIELDS USED FOR ABS PRICING RMBS

Feedback from CEPH, in charge of the Eurosystem ABS pricing

Field Name	Field Code	ND5	CZ	Other
Maturity Date	RREL24	✓		
Interest Rate Type	RREL42	✓		✓
Current Interest Rate Index	RREL44	✓		✓
Current Interest Rate	RREL43	✓	✓	
Current Interest Rate Index Tenor	RREL45	✓		✓
Current Interest Rate Margin	RREL46	✓	✓	
Current Principal Balance	RREL30	✓	✓	
Original Principal Balance	RREL29	✓	✓	
Amortisation Type	RREL35			✓
Scheduled Interest Payment Frequency	RREL38	✓		✓

The CEPH has reported missing data on these fields (e.g. use of 'ND5' or 'Other'). This feedback has been provided for the following asset classes: RMBS, AUTO, CONSUMER, LEASING, and CORPORATE.

Sources: Banque de France, EDW

MOST IMPACTED FIELDS (INCLUDING DATA QUALITY PLUS RULES)

- Inappropriate use of ND5 is a widespread issue across all cash flow relevant fields
- Significant use of the list field option "Other" (OTH) requires further clarification

Cash Flow relevant data fields	CROSS TEMPLATE	UNUSUAL ZEREOES	INTER-FIELD CHECKS	ND5	NEGATIVE VALUES	USE OF "OTHER"	UNUSUAL DATES	UNUSUAL HIGH VAL	UNUSUAL LOW VAL	Grand Total
Current Interest Rate Margin		3,222,359		3,803,377	7,639			33	99,846	7,133,254
Current Interest Rate		3,624,413		1,268,152	22,366			459,007	180,472	5,554,410
Current Principal Balance	117	4,384,816	24,101	5,640	222,869			663,582		5,301,125
Current Interest Rate Index				37,557		3,321,913				3,359,470
Current Interest Rate Index Tenor				590,502		2,298,848				2,889,350
Amortisation Type						1,963,987				1,963,987
Scheduled Interest Payment Frequency				79,182		861,350				940,532
Maturity Date				199,817			181			199,998
Original Principal Balance		6		173,445	1					173,452
Interest Rate Type				9,005		19,475				28,480
Grand Total	117	11,231,594	24,101	6,166,677	252,875	8,465,573	181	1,122,622	280,318	27,544,058

- Zero values or negative values as interest rate and interest rate margin might be correct but could be worth clarifying
- Unusually high & unusually low values are often decimal point issues

CAMPAIGN TO ADDRESS DATA QUALITY ISSUES

EDW has been invited by the ECB and the Common Eurosystem Pricing Hub (CEPH) to participate in series of a **data quality improvement initiatives for ECB-eligible deals**.

To help improve data quality, EDW intends to:

- **Arrange dedicated meetings and calls** between EDW Deal analysts and your organisation to:
 - Highlight relevant data fields where certain data quality issues have been identified
 - Provide clarification on various data fields, particularly the ones related to performance of underlying assets
 - Encourage your organisation to collect and report climate-related fields, while discouraging reporting entities to simply report “no data”
- **Educate issuers on the various means of improving data quality, accuracy and completeness** of loan-level-data reported to ESMA:
 - Explain the EDW Data Quality Tracking system
 - Define best practices in ensuring high-quality data
 - Provide the necessary tools to improve data quality such as EDW Deal Reports, EDW Data Quality Scores and EDW's ticketing system
- Host a series of **Data Quality Webinars**:
 - [Wednesday, 26 April at 16:00 CEST](#)
 - [Tuesday, 08 May at 16:00 CEST](#)
 - [Thursday, 01 June at 16:00 CEST](#)
 - [Tuesday, 20 June at 16:00 CEST](#)

EDW'S ACTIVITIES WITH ABS REPORTING ENTITIES

RULES BASED ANALYSIS OF DATA SUBMISSIONS

EDITOR's 'Download feedback' function allows issuers to view the failing checkIDs for the submitted ESMA templates

RuleId	RuleDesc	TemplateType	Status	Records
RREL63/UD/A/01	Prepayment Date (RREL63) later than Data Cut-Off Date (RREL6).	RMB	RJCT	5
RREL4/IS/A/01	[WARN] Original Obligor Identifier (RREL4) reports a different value than in the previous submission.	RMB	WARN	6
RREL37/IS/A/01	[WARN] Scheduled Principal Payment Frequency (RREL37) reports a different value than in the previous submission.	RMB	WARN	1
RREL48/CZ/A/01	[DQS] Interest Rate Cap (RREL48) equal to zero; for active loans.	RMB	WARN	5467
RREL49/IIC/A/01	[Data Quality Plus] Interest Rate Floor (RREL49) higher than Current Interest Rate (RREL43).	RMB	WARN	3320
RREL68/UHV/A/01	[Data Quality Plus] Number Of Days In Arrears (RREL68) greater than 180 when Account Status is not 'Defaulted' or 'Other' (RREL69 not in ('DFLT'; 'NDFT'; 'DTCR'; 'DADB'; 'OTHR')).	RMB	WARN	12
RREL69/OTH/A/01	[Data Quality Plus] Account Status equal to 'Other' (RREL69 = 'OTHR').	RMB	WARN	22
RREL73/ND5/A/01	[DQS] Allocated Losses (RREL73) reports ND5 when Sale Price (RREC21) or Date Of Sale (RREC20) are populated; for active loans.	RMB	WARN	6150
RREL8/IIC/A/01	[Data Quality Plus] Date Of Repurchase (RREL8) is populated when Account Status is not 'Repurchased' or 'OTHR' (RREL69 not in ('REBR'; 'REDF'; 'RERE'; 'RESS'; 'REOT'; 'OTHR')).	RMB	WARN	7421
RREL8/UD/A/02	[DQS] Date Of Repurchase (RREL8) earlier than 1980-01.	RMB	WARN	7443

- **RJCT** → Validation rules that lead to a rejection of a template submission
- **[WARN]** → Rules developed by EDW that indicates a potential data quality issue (regulatory requirement to define additional rules)
- **[DATA QUALITY PLUS]** → Voluntary rules developed by EDW to improve the quality of ESMA submissions
- **[DQS]** → A subset of Data Quality Plus rules used to calculate the DQS score

EDW DEAL REPORT BASED ANALYSIS

Comprehensive deal report allows to disclose gaps and data quality issues at a glance in each section

BOND REPORT						
	Class A Notes	Class B Notes	Class C Notes	Class D Notes	Class E Notes	Class F Notes
ISIN	XS2473716210	XS2473716723	XS2473717028	XS2473717457	XS2473717614	XS2473718000
Type	Other	Other	Other	Other	Other	Other
Cur	EUR	EUR	EUR	EUR	EUR	EUR
Original Balance	119,200,000	38,300,000	23,600,000	13,500,000	12,400,000	4,000,000
Current Balance	80,784,973.70	25,956,916.88	15,994,340.43	9,149,304.91	8,403,805.99	2,710,905.16
Issue Date	2022-05-25	2022-05-25	2022-05-25	2022-05-25	2022-05-25	2022-05-25
Maturity Date	2031-07-18	2031-07-18	2031-07-18	2031-07-18	2031-07-18	2031-07-18
IPD	2022-12-19	2022-12-19	2022-12-19	2022-12-19	2022-12-19	2022-12-19
Paym.Freq	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Current Coupon (%)	0.02	0.03	0.04	0.05	0.06	0.08
Cur. Int.Rate Mrgn/Sprd (%)	0.01	0.02	0.02	0.03	0.05	0.07
Step Up/Dn Coupon	-	-	-	-	-	-
Step Up/Dn Date	-	-	-	-	-	-
Coupon Floor (%)	-	-	-	-	-	-
Coupon Cap (%)	-	-	-	-	-	-
Current Int. Rate Index	Euribor	Euribor	Euribor	Euribor	Euribor	Euribor
Next Call Date	-	-	-	-	-	-
Next Put Date	-	-	-	-	-	-
Curr Atch Point (%)	47.39	30.48	20.06			
Orgl Atch Point (%)	45.26	27.67	16.83			
Cur. Cred Enhmnt (%)	47.16	30.19	19.73			
Orig. Cred Enhmnt (%)	48.15	31.49	21.23			
Protection Type	-	-	-			
Unpaid P.Dfcy Ldgr Bal	0	0	0			
BOND REPORT						
COLLECTIONS & RECOVERIES						
Principal Collections				7,711,201.93		
Interest Collections				1,297,410.37		
Principal Recoveries				420,063.19		
Interest Recoveries				13,194.01		
Repurchased Exposures				0		
Restructured Exposures				0		
Defaulted Exposures				3,912,390.03		
Defaulted Exposures CRR				3,912,390.03		
Annualised CPR (%)				97.94		
Annualised CDR (%)				0.25		
CPR History				CDR History		

SWAP INFORMATION

	Notional	Benchmark	Maturity
Interest Rate SWAP	289,927,011.90	EURi	2033-07-20

	Notional	Currency - Payer	Currency - Receiver	Exchange Rate	Maturity
Currency Rate SWAP	-	EUR	EUR	-	-

ACCOUNT INFORMATION

Account Type	Amortising?	Ccy	Target Balance	Actual Balance
Cash Reserve Account	No	EUR	2,800,000	2,800,000
Other Account	No	EUR	0	0

COUNTERPARTY INFORMATION

	RISK	Rating
Verification agent	-	-
Trustee	-	-
Suer	0	-
Account Bank	0	-
Allocation Agent	0	Aa2 (Moody's), NR (DBRS), P-1 (Moody's)
Paying Agent	-	-
Manager	0	-
Other	-	-
Interest Rate Swap Provider	1.03	Aa (low) (DBRS), Aa3 (Moody's), P-1

EDW DEAL REPORT BASED ANALYSIS

Example for data quality issues easily discovered via deal report analysis

SWAP INFORMATION

	Notional	Benchmark	Maturity
Interest Rate SWAP	-	-	-

	Notional	Currency - Payer	Currency - Receiver	Exchange Rate	Maturity
Currency Rate SWAP	-	-	-	-	-

ACCOUNT INFORMATION

Account Type	Amortising?	Ccy	Target Balance	Actual Balance
Cash Reserve Account	Yes	EUR	7,486,800	7,486,800
Other Account	Yes	EUR		0

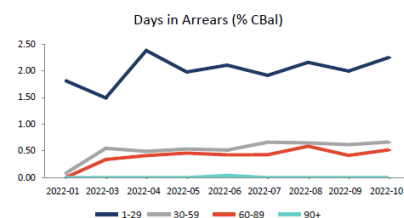
COUNTERPARTY INFORMATION

Counterparty Name	Type	Rating
CITIBANK EUROPE PUBLIC LIMITED COMPANY	AI	
	CI	
	PI	

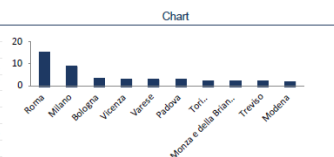
DELINQUENCY INFORMATION

# Days in Arrears	Loans in Arrears				All Loans			
	#Loans	Cur.Bal	% Cbal	% Cbal (Prev)	Arrears. Bal	Arrears Bal / Curr. Bal	Curr.Bal	% Cbal (Prev)
1 - 29 Days	1,119	20,971,814.87	2.25	1.99	375,166.47	0.02	21,383,283.50	2.29
30 - 59 Days	334	6,220,689.45	0.67	0.62	192,551.37	0.03	6,780,097.21	0.73
60 - 89 Days	250	4,854,443.18	0.52	0.42	219,769.25	0.05	5,600,529.13	0.60
90 - 119 days								
120 - 149 days								
150 - 179 days								
>= 180 days								

Performance History

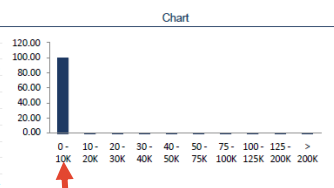


Obligor Region (Top 10)	#Loans	Cur.Bal	% Cur.Bal	% Prev.PCD
Roma	4,434	79,240,934	15	15.01
Milano	2,478	46,407,728	8.79	8.78
Bologna	1,015	18,924,168	3.58	3.58
Vicenza	886	16,188,292	3.07	3.07
Varese	870	15,929,909	3.02	3.02
Padova	866	15,816,120	2.99	2.99
Torino	674	13,020,277	2.47	2.46
Monza e della Brianza	701	13,089,999	2.48	2.48
Treviso	699	12,544,803	2.38	2.38
Modena	587	11,135,875	2.11	2.11



Primary Income Verification	#Loans	Cur.Bal	% Cur.Bal	% Prev.PCD
Verified	28,809	528,137,636.40	100	100

Primary Income	#Loans	Cur.Bal	% Cur.Bal	% Prev.PCD
0 - 10K	28,655	524,865,967	99.38	99.38
10 - 20K	108	2,375,619	0.45	0.45
20 - 30K	17	335,114	0.06	0.06
30 - 40K	2	53,915	0.01	0.01
40 - 50K	3	79,989	0.02	0.02
		31,324	0.01	0.01
		46,275	0.01	0.01
		51,926	0.01	0.01
		94,126	0.02	0.02
		203,381	0.04	0.04



Counterparty information is missing

Unusually low salaries

Prepayment information is missing

DATA QUALITY TICKETING SYSTEM

Identified data quality issues are raised one by one in EDW's Ticketing System

Tickets (6)									
<div> <div>Requiring Attention (0)</div> <div>Open & Pending (6)</div> <div>Closed (0)</div> <div>All (6)</div> </div>									
Deal Analyst: <input type="text"/>				Search: CMRSFR000083101120210					
Ticket ID	Issue Category	Description	Primary Field	Data Provider	Data Owner	Priority	Status	Last Reply By	Last Reply Date
1009	CZ	[Data Quality Plus] Principal Collections In The Period (IVSS16) equal to zero.	IVSS16	Eurotitrisation	BPCE	Clarification	Open	ED	2023-03-09
1006	MIS	[Data Quality Plus] None of the Counterparty Type (SESP4) is equal to 'Arranger' (ARRG).	SESP4	Eurotitrisation	BPCE	Clarification	Open	ED	2023-03-08
1005	MIS	[Data Quality Plus] None of the Counterparty Type (SESP4) is equal to 'Originator' (ORIG).	SESP4	Eurotitrisation	BPCE	Clarification	Open	ED	2023-03-08
876	IS_COM	[WARN] Original Underlying Exposure Identifier (CMRL2) whose status in the previous submission was not defaulted, matured or repurchased (previous CMRL55 not in DFLT/NDFT/DTCR/DADB/REBR/REDF/RERE/RESS/REOT/RDMD) is missing in the current submission.	CMRL55	Eurotitrisation	BPCE	High	Open	ED	2023-02-17
873	CZ	[Data Quality Plus] Annualised Constant Prepayment Rate (IVSS22) equal to zero.	IVSS22	Eurotitrisation	BPCE	Clarification	Open	ED	2023-02-17
872	ND5	[DQS] Origination Channel (CMRL24) populated with ND5, for active loans.	CMRL24	Eurotitrisation	BPCE	Clarification	Open	ED	2023-02-17

Each ticket allows us to track the development of the finding; e.g. ticket creation, status, the entire communication

CLOSING REMARKS

2023 Data Quality Initiatives from EDW

Tuesday, 20 June 2023 16:00 - 16:30

(UTC+02:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

Host

European DataWarehouse

in Spanish language

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When your registration is approved,
you'll receive an invitation to join the
webinar.

[Register](#)



Q&A

THANK YOU//CONTACT US

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