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### An empirical study of securitisations of non-performing loans

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# Abstract

After addressing the securitisation of non-performing loans (NPLs) within the broader context of the ECB's efforts to reduce NPL stocks and inflows, we investigate the structural and pricing features of NPL securitisations, issued by large banks in the euro area, by drawing on a unique and comprehensive dataset. In doing so, we provide an overview and typology of NPL securitisations issued in the past five years by large banks in the euro area and propose a concrete framework to compare and assess NPL securitisations across multiple dimensions. Despite methodological constraints resulting from the inherently bespoke nature of securitisations, we are able to identify structural differences between transactions that rely solely on private market participants and transactions that benefit from government guarantee schemes. Indeed, the existing data indicates that transactions involving government guarantee schemes display distinct structural features and higher costs for originating banks when compared with purely private market transactions in our dataset. Our analysis indicates that government guarantee schemes might not solely act as an incentive to new investors who would otherwise not invest in NPLs, but possibly also create conditions, for a new market, distinct in particular from the private NPL securitisations market (in terms of asset quality, capital efficiency, etc.). We believe that further research on the impact of government guarantee schemes on market participants' behaviour and on the pricing and structuring of NPL transactions, as well as their impact over time would greatly help policymakers and supervisors to strengthen the design of future policy options for dealing with NPL stocks.

**Keywords:** Securitisations, non-performing loans, state guarantees, asset quality, lending conditions, government policy and regulation.

**JEL Codes:** G21, G28, G29.

## Non-technical summary

Numerous studies have investigated the negative consequences of high levels of non-performing loans (NPLs) on the balance sheets of financial institutions. Studies indicate that besides putting pressure on individual banks' profitability, high NPL stocks can exacerbate macroprudential fragilities and potentially trigger negative macroeconomic feedback loops through reduced credit supply from banks and subdued credit demand stemming from heightened corporate debt levels.

In order to tackle the heightened NPL levels observed in a range of euro area countries in the aftermath of the great financial crisis, the Single Supervisory Mechanism (SSM) increased the associated supervisory scrutiny and burden, thereby encouraging banks to actively address their NPLs.

In response to this stance, recent years have seen an increased use of securitisations to reduce banks' NPL stocks, making these financial transactions key in efforts to improve the soundness and efficiency of the European banking system. Some of these NPL securitisations were private market-based transactions, whereas others benefited from government guarantee schemes, which provided financial guarantees on the most senior tranches.

This paper provides an overview and typology of NPL securitisations issued by large banks in the euro area in the past five years and proposes a concrete framework to compare and assess NPL securitisations across multiple dimensions. More concretely, we investigate the efficiency of NPL securitisations and compare private transactions with transactions under government guarantee schemes, attempting to establish whether these schemes make NPL securitisations structurally different and potentially distortionary.

Our analysis draws on an internal and centrally maintained ECB repository of securitisations<sup>1</sup> issued by banks in the SSM. This database contains material transaction and portfolio-related information for all NPL transactions that were originated and not objected to between 2017 and mid-2021. It is important to acknowledge that our analysis and results are limited to the time of issuance of the securitisations. Consequently, our assessment does not encompass differences in the management and work-out of NPL portfolios following issuance of the securitisation. Furthermore, due to the relatively small sample size, we are unable to isolate possible time or country dependencies, which we consider to be a caveat.

We find that securitisations have proven to be a key instrument in reducing NPL stocks on banks' balance sheets by aligning the interests of banks, investors and public authorities. Furthermore, we identify some important structural differences depending on whether state involvement is required to enable the issuance of securitisation transactions. NPL securitisations without state involvement benefit from materially lower purchase price discount levels, which could for example be due

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<sup>1</sup> This refers to securitisations issued by supervised banks for the purpose of significant risk transfer (SRT), whereby the competent supervisory authority can object to or derecognise the SRT.

to better asset quality, higher investor trust or even a combination of the two. Transactions under a government guarantee scheme seem to be comparatively costly to banks, both in terms of capital cost and disbursements to private mezzanine tranche investors. Despite this, banks do engage in these transactions, potentially indicating the existence of adverse selection, whereby more complex or problematic portfolios require the involvement of a government guarantee scheme for successful market placement. Finally, transactions with state involvement seem to exhibit different securitisation structures, with disproportionate reliance on the senior tranche and the government guarantee.

We conclude, based on our findings, that government guarantee schemes might not solely act as incentives, but rather as active creators of new NPL transaction markets. Similarly, we find that further research on NPL securitisations would greatly help policymakers and supervisors to further strengthen the design of future policy options for dealing with NPL stocks. This should notably focus on those elements that have facilitated and enabled successful private market-based NPL securitisations in the past.

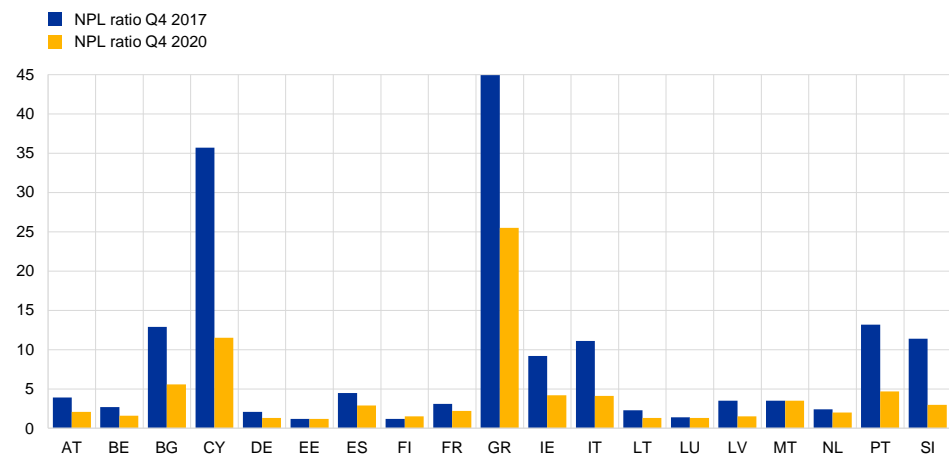
# 1 Introduction

It is widely accepted that high levels of stocks of non-performing loan (NPLs) have a negative impact on bank lending to the economy stemming from the effects NPLs have on balance sheets, profitability, management costs and capital constraints faced by affected banks, (Council of the EU, 2017)<sup>2 3</sup>. This has particularly affected several European countries, where high levels of NPL stocks have persisted in the aftermath of the great financial crisis, negatively affecting lending and economic activity.

**Chart 1**

NPL ratios of significant institutions across all SSM countries

(NPLs as percentage of total loans)



Source: ECB data.

Consequently, the European Central Bank (ECB) as supervisor of all significant institutions in the euro area has singled out reducing NPL levels in the euro area as a core supervisory priority. It has furthermore formulated clear supervisory expectations regarding banks' treatment of NPLs to help resolve the high level of NPLs stocks and to push for an end to the "wait-and-see" approaches observed in the past.

<sup>2</sup> See Council of the European Union (2017a).

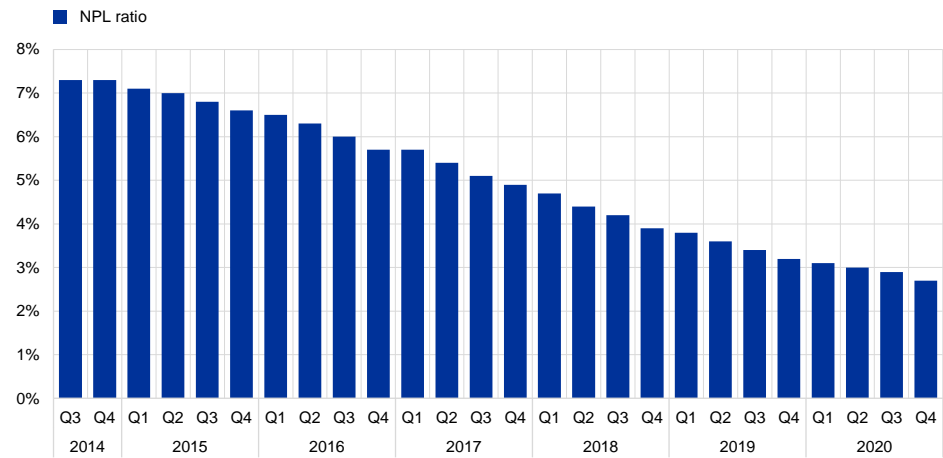
<sup>3</sup> See Council of the European Union (2017b).

<sup>3</sup> See Garredo, J., Kopp, E. and Weber, A. (2016).

## Chart 2

### Evolution of the NPL ratio across SSM significant institutions

(NPLs as percentage of total loans)



Source: ECB data.

This ECB policy priority was reflected in three key publications in 2017 and 2018:<sup>4</sup>

1. the [ECB's Guidance to banks on non-performing loans](#) (NPL Guidance), which was published in 2017 and clearly stipulates that high NPL banks are expected to develop their own strategies to address NPL stocks;
2. the [Addendum to the ECB's NPL Guidance](#), which was published in 2018 and which sets out supervisory expectations for prudential provisioning for new non-performing exposures (NPEs);
3. the supervisory expectations for the provisioning of NPE stock, as communicated in a [press release](#) issued in 2018.

**The higher supervisory scrutiny and increased costs for banks associated with improved prudential provisioning has meant banks have had to actively address their high levels of NPL stocks.** A number of approaches and measures, such as improved work-out and restructuring processes, direct portfolio sales and structured solutions such as securitisations have been widely used to reduce the burden of high levels of NPLs on banks' balance sheets.

**NPL securitisations have a long-standing history with the first transactions in the United States dating back to the 1980s.**<sup>5</sup> Similarly, NPL securitisations were identified by European banks as viable instruments to reduce their NPL stocks and relieve their balance sheets.

**These transactions would be market-based at first, thus complying with regulatory and supervisory expectations, without state support. However, in a second stage and in certain countries with high NPL stocks, especially Italy**

<sup>4</sup> See European Central Bank (2019), "[Communication on supervisory coverage expectations for NPEs](#)", Frankfurt am Main.

<sup>5</sup> See Deloitte (2020), "NPL securitisations and related governmental guarantee schemes in Europe", October.

and Greece (which had no active, material NPL securitisation markets), government guarantee schemes were established to explicitly encourage and facilitate NPL securitisations.

1. **In Italy, the “Fondo di Garanzia sulla Cartolarizzazione delle Sofferenze” (GACS) scheme was introduced in 2016<sup>6</sup>** to support Italian banks in reducing their NPL stocks. The scheme, which has since been extended basically involves bundling the NPLs to be securitised into a special purpose vehicle with tranches of varying seniority. The most senior tranche is guaranteed by the government, contingent on obtaining an investment-grade rating and the sale to private investors of a material portion of the more junior tranches. In this respect the guarantee is only activated when at least 50% plus one of the junior tranche securities are sold at a positive value. Additionally, the government guarantee is to be remunerated at arm’s length (market-based pricing).
2. **In Greece, the “Hercules Asset Protection Scheme” (HAPS) scheme was introduced in 2019<sup>7</sup>** and is largely based on the GACS scheme, albeit with some differences, as requirements tend to be less strict (e.g. no investment-grade rating requirement for the senior tranche).<sup>8</sup> As in the GACS case, HAPS requires a minimum sale of 50% plus one of the junior tranche securities to third party private investors at a positive value (it cannot be zero but can be as low as €1). Most importantly, the Italian GACS scheme does not cover exposures classified as unlikely-to-pay, whilst HAPS does foresee the inclusion of these kinds of exposures.<sup>9 10</sup>

See Box 1 for an additional, more granular, comparison.

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<sup>6</sup> See Italian law decree no 18/2016 and amendments thereof for further details.

<sup>7</sup> See Greek law 4649/2019 for further details.

<sup>8</sup> The Sovereign of Greece, unlike Italy, did not have an investment grade rating, which was a factor in designing the specific criteria.

<sup>9</sup> See PwC TLS (2021), “L’ulteriore proroga della Garanzia sulla cartolarizzazione delle Sofferenze: la GACS”.

<sup>10</sup> See Reuters (2021), “Italy expects EU to OK renewal of GACS bad loan scheme in April”.



## Box 1

### Comparing the GACS and HAPS government guarantee schemes<sup>11</sup>

| Comparison of GACS and HAPS transactions  |  |
|---|--|
| Similarities  | Differences  |
| 1) Senior tranche requiring rating by ECB-approved ECAI                                       | 1) Minimum rating (GACS: BBB vs. HAPS: BB- for the senior tranche)   |
| 2) Payment priority (waterfall structure)   | 2) Guarantee pricing (GACS: Basket of Italian corporate CDS vs. HAPS: Greek government CDS)  |
| 3) Guarantee fee calculated in line with market conditions                                    | 3) Service Fee deferral (GACS: 10% underperformance vs. HAPS: 20% underperformance)  |
| 4) Subordination triggers deferring interest to mezzanine tranche in case of underperformance | 4) Mezzanine interest deferral (GACS: 10% underperformance vs. HAPS: interest deferral of 20% if 20% underperformance)   |
| 5) Guarantee triggers regulating how and when the State will pay senior tranche investors     | 5) Guarantee payout: (GACS: payout within nine months vs: HAPS payout within eighty days)  |
| 6) NPL portfolio managed by external portfolio servicer                                       | 6) Servicer replacement upon use of Guarantee: (GACS: underperformance for two consecutive quarters vs. HAPS: 30% underperformance for two consecutive quarters) |

Sources: Ashurst (2019); Deloitte, (2020); KGLAW (2019); KPMG Advisory S.p.A (2019); PWC TLS (2021).

#### In-kind transfers observed in the HAPS

Besides the above differences and similarities, it is important to mention a further distinctive feature of several HAPS transactions. Whilst for GACS transactions, the junior and mezzanine tranches are largely sold to external investors (at a positive value), this is not necessarily the case for HAPS transactions. Indeed, whilst a part is purchased by outside investors, a certain amount of the securities in the junior and mezzanine tranches are transferred in kind to the banks' shareholders (which notably includes the Hellenic Financial Stability Fund that is 100% owned by the Greek State).

**It is important to note that both government guarantee schemes have been classified as being “free of state aid” by the EU Commission’s Directorate-General for Competition<sup>12</sup>**

**Multiple NPL transactions have been executed without requiring a government guarantee, demonstrating that banks are able to attract investors** and thereby dispose of their NPL stocks without the involvement of state support. Banks that are unable or unwilling to tap private investors at usual market terms could then turn to a government guarantee scheme, which could potentially lead to unwarranted side effects.

**Similarly, it is reasonable to assume that the worse a bank’s asset quality, the lower the market trust in that specific bank, and hence the lower the bank’s ability to use available market mechanisms to reduce NPL stocks.** In order to offload large parts of their NPL portfolios, such banks might notably be willing to pay larger premia to junior or mezzanine tranche investors to ensure the execution of the

<sup>11</sup> For transparency purposes it is important to highlight that the features depicted here are neither static, nor comprehensive, as they have been subject to change since the inception of the schemes (e.g. with respect to rating requirements, deferral triggers, etc.). For a more robust, precise understanding of the features, please refer to the respective legal texts and amendments.

<sup>12</sup> See European Commission “[State aid: Commission approves market conform asset protection scheme for banks in Greece](#)”.

transaction in order to benefit from government guarantee support and reduce their NPL stock. This could potentially lead to pricing distortions and affect the private NPL securitisations market.

**A further concern relates to the fact that government guarantee schemes have to date been introduced in two countries only, which could reinforce structural heterogeneities within the euro area instead of fostering similar operating conditions and rules, as foreseen by the capital markets union.**<sup>13</sup> Indeed, banks with portfolios in these countries are able to benefit from this mechanism, whilst other institutions do not have recourse to this option to reduce their NPL stock. If government guarantee schemes were to create persistent and material structural divergences at national or regional level, this would run counter to the broader efforts to establish the capital markets union.

**A European guarantee scheme, which could address the above concerns and contribute to the reduction of current regional or national disparities in NPL ratios, is currently not in place and unlikely to be implemented in the near future.**<sup>14</sup>

We have to date not encountered any empirical study or analysis that has thoroughly analysed and discussed NPL transactions with and without government guarantee schemes issued in the SSM. Despite the inherent relative data scarcity (securitisations remain bespoke and are relatively costly and rare instruments), we attempt to provide an accurate picture and analysis of NPL transactions performed in the euro area between 2017 and mid-2021.

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<sup>13</sup> See European Commission (2018b), "[Capital Markets Union: Common EU rules on securitisation will apply as of 1 January](#)" for further detail on the role of securitisations within the wider capital markets union framework.

<sup>14</sup> Such a European guarantee scheme would naturally still fail to address concerns related to possible market or pricing distortions.

## 2 Data and Methodology

**For the purpose of this analysis, we draw on an internal and centrally maintained ECB repository of securitisations issued by banks in the SSM with the aim of achieving significant risk transfer (SRT).** SRT enables originating banks to reduce own funds requirements for an underlying portfolio, in accordance with the risk transferred or sold via securitised tranches, and is thus key in incentivising banks to offload NPLs via securitisations.

With respect to NPL portfolios, wherever banks deem secondary NPL markets costly and inefficient, securitisation transactions in combination with SRT represent a potentially attractive alternative for achieving the desired reduction in NPL stocks.<sup>15</sup>

Our database includes all NPL transactions notified to the ECB that had already been originated and were not subject to negative supervisory feedback between 2017 and mid-2021.<sup>16</sup>

**The sample consists of a total of 41 transactions, issued by 17 significant institutions.** This dataset was complemented and verified with information from various supervisory analyses, including, for each of the transactions, details on the underlying portfolio size and quality, the presence or absence of a government guarantee scheme, the amount of capital benefit achieved and the cost of protecting the mezzanine tranche.

**In terms of geographical scope, unsurprisingly, Italy and Greece dominated NPL transactions in recent years,** accounting for roughly 90% of the transactions and 95% of the securitised NPL portfolios.

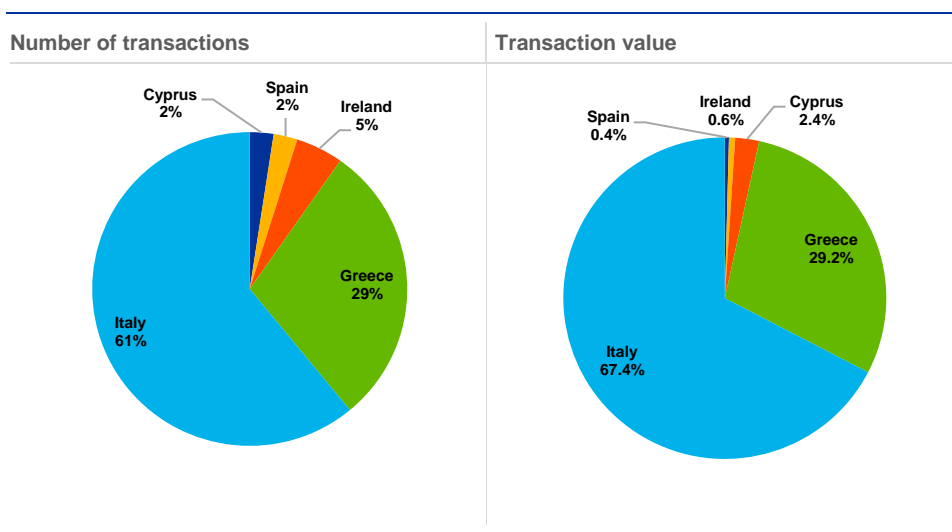
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<sup>15</sup> Securitisations naturally have further advantages compared with outright NPL portfolio sales, as they for instance provide increased possibilities and flexibility regarding risk and return sharing arrangements. Nevertheless, a detailed discussion on this would go beyond the scope of this paper. For further background, please refer for example to the European Commission's [AMC Blueprint](#) which includes a brief passage on the benefits and disadvantages of NPL Securitisations.

<sup>16</sup> Whereby "no negative supervisory feedback" is equivalent to no ex post derecognition of the SRT via a formal supervisory decision.

**Chart 3**

Geographical distribution of NPL securitisations between 2017 and 2021



Source: ECB data.

In terms of gross book value (GBV), slightly over 50% of all NPL exposures securitised since 2017 involved the Italian GACS guarantee scheme, with another 25% involving the more recent Greek HAPS guarantee scheme (see Table 1). The remaining exposures were not covered by government guarantee schemes and can therefore be classed as private market transactions. Overall, NPL reduction achieved via securitisation is considerable, amounting to approximately €120 billion over four and a half years.

**Table 1**  
Portfolio quality measures

(EUR millions)

| Transaction category, | NPL portfolio (GBV), | Expected loss (EL)* | Provisions*   | Purchase price discount (PPD) |
|-----------------------|----------------------|---------------------|---------------|-------------------------------|
| Private transactions  | 20,519               | 11,625              | 11,574        | 12,079                        |
| GACS transactions     | 64,512               | 36,780              | 43,313        | 48,245                        |
| HAPS transactions     | 32,257               | 14,512              | 14,594        | 20,995                        |
| <b>Total</b>          | <b>117,288</b>       | <b>62,937</b>       | <b>69,480</b> | <b>81,319</b>                 |

Source: ECB data.

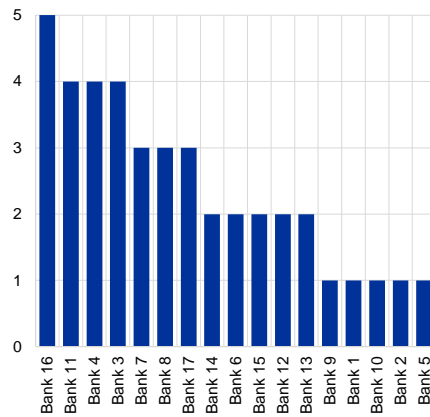
\*For portfolios falling under the standardised approach, expected loss and provisions are assumed to be equivalent.

Originating banks are highly concentrated, with six banks accounting for 55% of total NPL transactions and over 75% of the securitised NPL transaction value (in terms of GBV).

### Chart 4

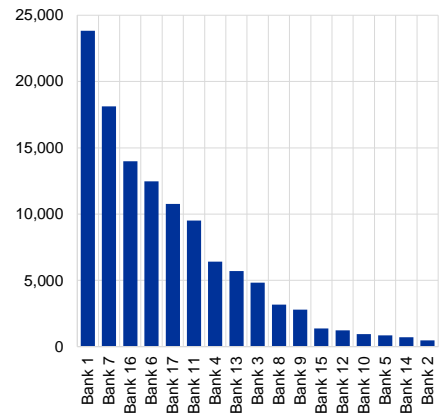
Geographical distribution according to transaction number and value between 2017 and 2021

Number of transactions



Transaction value

(EUR millions)



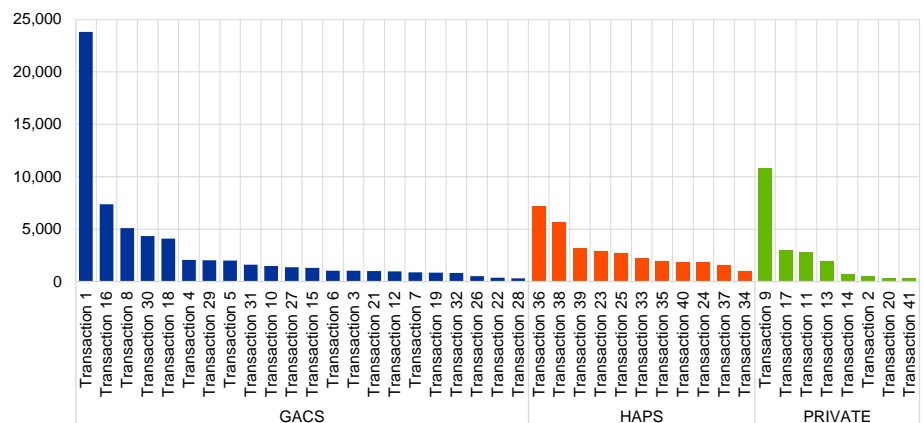
Source: ECB data.

Finally, the data reveals that, both in terms of materiality and number of transactions, NPL securitisations under the Italian GACS guarantee scheme predominate, but a sizeable number of both HAPS and, to a lesser extent, private transactions also exist.

### Chart 5

NPL securitisations ranked by securitised portfolio size and grouped according to government guarantee

(EUR millions)



Source: ECB data.

## 2.1 Methodology/data interpretation

**Securitisations of NPL portfolios remain a relatively low-frequency and bespoke phenomenon, which unfortunately renders robust econometric analysis difficult due to the small sample size and the confluence of other factors, such as COVID-19.** It is important to mention significant limitations to our analysis. First of all, our focus is exclusively on the time of issuance of the securitisations. This naturally implies that the results do not take into account the subsequent development in performance and benefits of the various NPL securitisation types and schemes. Second, we would like to highlight that the various NPL transactions have occurred over a certain period and encompass a variety of portfolio types and country specificities. In the light of the low sample size, we are not in a position to undertake a comprehensive econometric exercise, controlling for instance for country/time/portfolio-specific effects, which, admittedly, reduces the comparability of the transactions. Nevertheless, we believe that the 41 transactions in our sample offer valuable information on current dynamics in the NPL securitisation market.

**Whilst causal inferences cannot be made with sufficient statistical confidence, it is certainly possible to extract trends and patterns which provide valuable input for supervisors when discussing concrete securitisation transactions.** Furthermore, the findings obtained in the analysis could help in establishing benchmarks and best practices and also inform future supervisory expectations regarding the assessment of government guarantee schemes in the NPL securitisation context.

Most importantly, the dataset includes information on (i) portfolio quality, (ii) pricing, and (iii) transaction structure.

### 2.1.1 Portfolio quality

**With regard to portfolio quality, we have collected data on provisions, expected loss and purchase price discount (PPD) incurred.** These variables are proxies for:

1. regulatory (model-based) portfolio quality (expressed via the expected loss);
2. subjective portfolio quality (expressed via the actual provisions that the bank has set aside);
3. objective (market-based) portfolio quality (expressed via the actual PPD incurred).

Whilst the distinction between expected loss (a) and provisions (b) is particularly relevant for banks taking an internal ratings-based (IRB) approach, which therefore know and calculate expected loss figures, banks applying the standardised approach (SA) do not usually distinguish between expected loss and provisions. Given that our sample contains both IRB and SA banks, and we undertake the analysis at a group

level (i.e. private, vs HAPS, vs GACS securitisations), this means that the distinction between regulatory and subjective portfolio quality will be flawed, justifying our focus on divergences between provisions and effective purchase price discounts across securitisation types.

**We believe that if a government guarantee scheme were to act as a mere incentive to attract investors to securitisation transactions, the involvement of these schemes should not be related with a poor(er) underlying portfolio quality**, (as reflected by the above-mentioned regulatory, subjective or objective portfolio quality measures). In other words, there should be no sign of adverse selection linked to the presence of a government guarantee scheme.

## 2.1.2 Pricing

**With regard to pricing, we have collected data on the efficiency of the various transactions (capital costs per unit of securitised NPL exposure), as well as the coupon rates paid to investors in mezzanine tranches of the various transactions.** This latter variable is motivated by the fact that for NPL transactions, losses are in usually exceeded by the PPD. In the rare cases where losses exceed the PPD, they are in general absorbed by the junior/equity tranche.

**The mezzanine tranche should therefore not be affected by any material (expected) losses and can hence serve as a proxy for the maximum price banks want to pay to benefit from the risk-weighted assets (RWA) and NPL reduction impact stemming from the securitisation.**

### Box 2

#### The return on the mezzanine tranche as a neutral pricing proxy

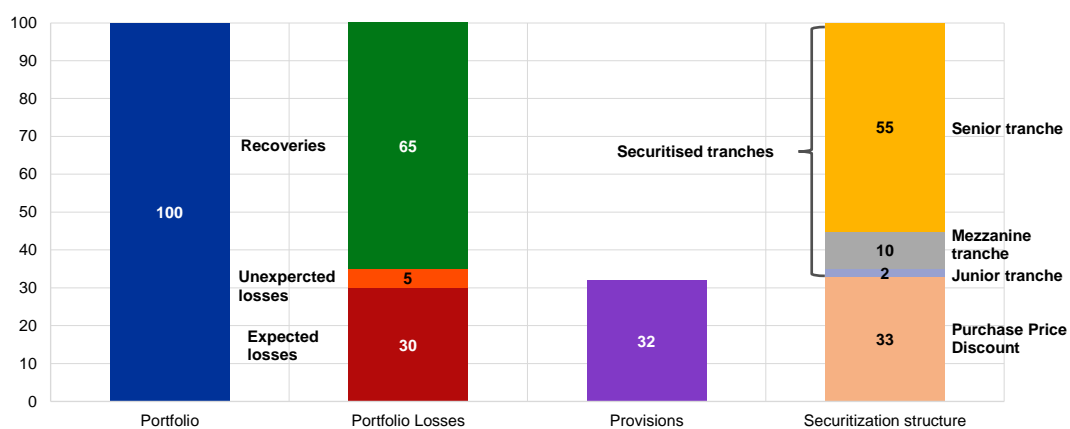
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The NPL securitisation set out below helps to explain the rationale for utilising the return on the mezzanine tranche as a neutral pricing proxy. Losses amount to 35% of the portfolio with (accumulated) expected losses amounting to 30%, unexpected losses totalling 5% and expected recoveries amounting to 65%, with provisions (32%) slightly exceeding the expected losses (unsurprising in the case of an IRB bank since IFRS 9 ECL models and IRB models are expected to diverge). Following the bilateral negotiation between investors and the originating bank, a PPD of 33% has been agreed.

Together with the junior tranche (2%), this means that all losses (35%) are in fact covered by the PPD and the junior tranche, which implies ex ante that no losses are absorbed by the mezzanine tranche. However, the mezzanine tranche must still be remunerated, as investors face the possibility of losses beyond those measured ex ante. We hence deem that, other things being equal, the return on the mezzanine tranche should be comparable to, and reflect, largely divergent loss expectation models and the mere bargaining power of involved parties.

## Chart A

### Schematic overview



Source: ECB data.

Ideally, the presence of a government guarantee scheme should not lead to price distortions. In other words, the coupon paid to investors protecting the mezzanine tranches should be independent from the presence or absence of a government guarantee scheme.

### 2.1.3 Transaction Structure

**In terms of transaction structure, we have collected information on the size of the senior tranche.** Following our stated hypothesis, the structure of an NPL securitisation transaction under a government guarantee scheme and a purely private transaction should not differ.



## 3 Analysis

### 3.1 Portfolio quality

With respect to portfolio quality, the data indicates structural differences when comparing transactions with and without a government guarantee scheme.

**Table 3**  
Data quality measures for NPL transactions

(in percentages)

| Transaction category | Regulatory asset quality<br>(Expected loss) | Subjective asset quality<br>(Provisions) | Market-based asset quality<br>(Price purchase discount) |
|----------------------|---|--|---|
| Private transactions | 56.7%                                       | 56.4%                                    | 59%   |
| GACS transactions    | 57.0%                                       | 67.1%                                    | 75%   |
| HAPS transactions    | 45.0%                                       | 45.2%                                    | 65%   |
| Total                | 53.7%                                       | 59.2%                                    | 69%   |

Source: ECB data.

**Purely market-based transactions exhibit expected losses and provisions that are approximately identical (standing at around 57% of the portfolio).** If all banks in the sample were IRB banks, this could indicate that private transaction provisioning is largely based on (IRB) model outputs which are deemed reliable by investors. Nevertheless, this should be treated with caution as some of the transactions involve non-IRB portfolios (where expected losses and provisioning are equivalent).

**Interestingly, investors deem provisioning figures to be reliable and credible.**

This is confirmed by the PPD demanded by investors for the underlying NPL portfolios, which at just below 60% remains below the PPD required for transactions under government guarantee schemes. In our view, this is a clear sign that investors share the banks' trust in appropriate provisioning levels and risk management practices.

With respect to the transactions involving government guarantee schemes, the following holds.

- **It is noteworthy that GACS transactions exhibit a level of (conservative) provisioning which investors deem insufficient.** The final PPD demanded is materially larger than the provisions and expected losses estimated by the banks materially exceed the 60% calculated for private transactions (reaching 75%). This indicates that investors do not trust the banks' provisioning/regulatory models and demand higher discounts.
- **Furthermore, GACS transactions display provision volumes materially exceeding the banks' expected loss model output.** If we were certain that the portfolios in question were rated via IRB models, this would indicate that the respective banks are aware of modelling deficiencies and/or apply an additional

buffer of conservatism when setting aside provisions. Nevertheless, as SA/ERBA portfolios are also involved, we are not able to make such a statement.

- **For banks benefiting from HAPS, the data clearly show that the final PPD exceeds provisioning levels by 45% and reaches 65%, thus also clearly exceeding private transaction PPD figures.** As in the case of GACS transactions, this implies that investors require an extra buffer of conservatism, indicating in particular a material distrust in the banks' ability to model and provision risk appropriately for the underlying portfolios.

## 3.2 Pricing

**With regard to the pricing of the various transaction types, we observe important differences depending on whether government guarantee schemes are involved or not.** In terms of the efficiency of the transactions we look at the capital cost for achieving significant risk transfer (i.e. the cost for effectively removing the risk of the NPL portfolios) per unit of NPL securitised exposure, where the results are as follows:

**Table 4**  
Transaction efficiency according to securitisation category

(in EUR millions)

| Transaction category | NPL portfolios (A) | Capital cost* (B) | Transaction efficiency (B/A) |
|----------------------|--------------------|-------------------|------------------------------|
| Private transactions | 20,519             | -127.5            | -1%                          |
| GACS transactions    | 64,512             | -4,004.6          | -6%                          |
| HAPS transactions    | 32,257             | -5,116.5          | -16%                         |
| <b>Total</b>         | <b>117,288</b>     | <b>-9,248.6</b>   | <b>-8%</b>                   |

Source: ECB data.

Note: A total transaction efficiency of -8% for the entire sample implies that to offload €1 million of NPLs an SSM bank pays on average €80,000 of Common Equity Tier 1.

### Box 3

#### Deriving a transaction efficiency metric

When discussing the efficiency of an NPL securitisation, we deemed the relationship between the ultimate cost of a transaction on the one hand and the reduction of NPLs on the other as central.

For the reduction of NPLs, we deemed the size of the respective securitised portfolios to be an appropriate proxy. For the cost of the transaction, we concluded that capital costs are a sufficiently reliable and meaningful proxy.

It is relevant to state that the capital cost was calculated according to the following formula, whereby we could take into account the capital impact of the additional PPD in addition to the capital impact stemming from the significant risk transfer and, where applicable, the government guarantee. This would not have been possible, had we solely focused on the RWA developments due to the transaction.

$$\text{Capital benefit}_{\text{transaction } i} = \frac{\text{Capital requirements}_{\text{pre-securitisation}} - \text{Capital requirements}_{\text{post-securitisation}}}{\text{Capital requirements}_{\text{pre-securitisation}}} \quad (1)$$

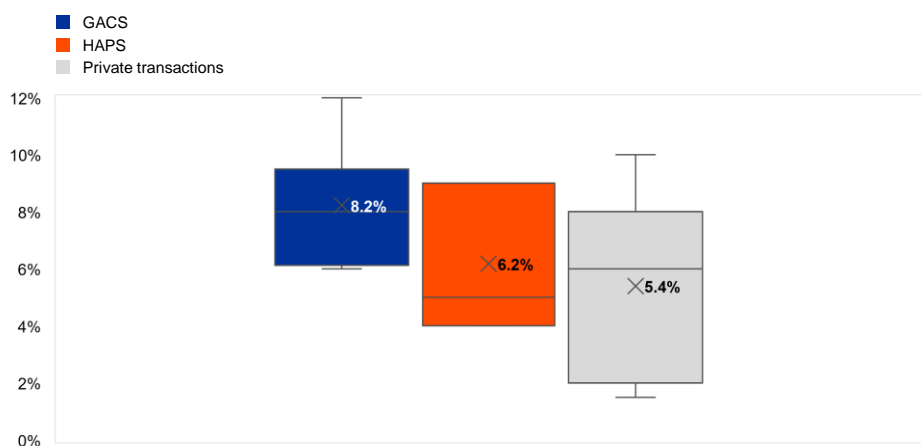
As in regard to other metrics, private transactions perform best, as only €10,000 are needed to remove €1 million of NPL assets from banks' balance sheet and thus from the capital charge calculations (through the SRT obtained). The situation is very different for HAPS banks, which have to pay €160,000 to remove NPLs amounting to €1 million, while GACS banks would still have to pay on average €60,000 to do so.

Furthermore, in addition to having the lowest PPD and displaying the highest transaction efficiency, private transactions on average pay the lowest fixed coupon rate component<sup>17</sup> requested by investors for protection on the mezzanine tranche. It is on average only slightly above 5%, whereas HAPS transactions pay a coupon of more than 6% and GACS transactions require a coupon rate of above 8%.

### Chart 3

Mezzanine tranche costs depending on government guarantee scheme (or absence thereof)

(in percentages)



Source: ECB data.

## 3.3 Transaction Structure

Finally, we are also able to observe important differences in terms of transaction structure depending on whether government guarantee schemes are used or not. Private transactions appear to have significantly smaller senior tranches when compared to transactions using a government guarantee scheme.

<sup>17</sup> Whereby the total coupon rate is composed of a variable component (usually three-month EURIBOR) and a material fixed coupon rate.

**Table 5**  
Characteristics of the senior tranche

(in percentages)

| Transaction category | Average* | Standard deviation* |
|----------------------|----------|---------------------|
| Private transactions | 71%      | 9.25%               |
| GACS transactions    | 86.20%   | 6.40%               |
| HAPS transactions    | 97.70%   | 1.80%               |
| Total                | 86%      | 11%                 |

Source: ECB data.

\* Considering market values of securities tranches.

**Senior tranches for transactions under government guarantee schemes are, on average, larger in size than for private transactions and are for the most part retained by the originating bank. Conversely, the mezzanine and first loss tranches are smaller for transactions with government guarantee schemes.**

This is likely a result of the bank's quest to maximise the size of the senior tranche thereby minimising the risk weighting on the senior tranche due to the government guarantee.

#### Box 4

##### Tranche sizes based on factors beyond loss considerations

When banks structure their portfolios into tranches, considerations beyond loss allocation come into play.

On the one hand, banks might want to keep the junior and mezzanine tranches as small as possible, given that these command the highest coupon payments and are usually purchased by outside investors. Achieving a large senior tranche is most efficient from this perspective. This applies all the more as the risk weight is lowest for the senior tranche and is even equivalent to zero when subject to a government guarantee scheme.

On the other hand, banks understand that the senior tranche must be as well protected as possible from defaults, given that they either directly retain the tranche or need to secure a strong enough rating to qualify for the government guarantee scheme. This creates pressure to make the junior and mezzanine tranches as large as possible.

The final tranche thickness is the result of external demands and conditions as well as the above-mentioned internal trade-off. When looking at the data, it seems that whenever no government guarantee scheme is involved, the junior and mezzanine tranche turn out larger, meaning that loss-protection considerations for senior tranche holders prevail over cost considerations. For transactions under government guarantee schemes, the reverse seems to be the case.

## 4 Conclusion

As mentioned, NPL securitisation data remain scarce, thereby rendering econometric analysis and proof of causality difficult. A range of observations could also be related to country-specificities, which we have not been able to sufficiently take into account. Despite this, we believe that the unique dataset collected and the analysis performed enable us to make a range of relevant and important observations.

1. **Transactions without state involvement in our sample exhibit materially lower PPD levels, which could for example be due to better asset quality or higher trust from investors.** The potential risk of adverse selection due to the existence of government guarantee schemes thus needs to be carefully considered.
2. **Transactions under government guarantee schemes seem to be highly costly to banks, both in terms of capital cost and coupon paid to mezzanine investors.** Nonetheless, banks do engage in these transactions as a means to reduce their NPL stocks.
3. **Transactions with state involvement seem to exhibit divergent securitisation structures, with disproportionate reliance on the senior tranche/state guarantee.**

**The above observations, taken together, indicate that government guarantee schemes do not act solely as incentive, but rather as active creators of new NPL transaction markets.** We believe this needs to be acknowledged and taken into account when defining a supervisory stance.

**Based on the currently available data and the possible distortionary impact of transactions with government guarantee schemes, supervisors and policymakers might want to monitor transactions more closely** and strive to realign transaction structures in order to avoid long-term market distortions and an unexpected increased involvement of the sovereign in the banking system.

**There is no reason to negate the right to exist of NPL securitisations under government guarantee schemes as they have undoubtedly contributed to reducing banks' NPL stocks. At the same time, it is important to acknowledge that they are not purely market-based instruments** and entail an implicit continued involvement of the sovereign, which needs to be openly analysed and justified, also from a European perspective.

**Similarly, we believe that further work and research into NPL securitisations would be highly beneficial.** We believe further research and investigations on market-based securitisations are merited to clearly identify success mechanisms and relevant patterns to foster this instrument and trigger the full range of benefits.

**The availability of further data will allow for further statistical analysis to substantiate the trends uncovered by this paper, as well as a performance review of NPL transactions post-maturity.** This will verify the appropriateness of the calibration of tranches of NPL securitisations and confirm if losses are borne by the state. Further areas we deem of particular interest relate notably to NPL portfolio servicers, which are key to the performance of the securitisations and therefore can impact investors and ultimately create the need for government guarantee schemes to cover any losses.

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