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# Bad loan recovery rates

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*Summary*

The scarcity of reliable public data on banks' track record in bad loan recovery generates market uncertainty and tends to have a negative effect on the valuation of this category of debt. This note is written in order to bridge this gap using data from the Central Credit Register. It demonstrates that the recovery rates of the Italian banking system are on average consistent with the coverage ratios reported in banks' balance sheets and that recoveries for positions closed following standard work-out procedures are significantly higher than those recorded for positions sold. The data also show that the recovery rates vary significantly among banks, confirming that they must resolutely push forward with the interventions already under way to make the management and recovery of non-performing loans more efficient.

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## Introduction and main conclusions

The scarcity of reliable public data on the bad loan recovery rates achieved by banks generates market uncertainty and tends to have a negative effect on the valuation of this category of debt. This note helps to bridge the gap using data from the Central Credit Register (CCR), which enable recovery rates to be estimated for the period 2006-15. It also sets out to respond to questions such as: What portion of bad loans do banks recover? Do recovery rates vary depending on whether the debts are secured or unsecured, the type of counterparty (households or firms), and the age of the positions? How much do the average rates vary? Is there room for improvement in the recovery rates that banks can achieve? How long are recovery times and how have these evolved over the years? When selling bad loans on the market, do banks engage in 'cherry picking'?

Our analysis reached the following main conclusions.

Bad loan recovery rates for Italian banks are on average consistent with the coverage ratios reported in their balance sheets.[1)] In December 2015 the average coverage ratio was 59 per cent, corresponding to an expected recovery rate of 41 per cent. In the ten years 2006-15 the rate averaged 43 per cent.

In 2014-15, recovery rates fell to an average of 35 per cent. Part of the decline is attributable to the rise in the number of positions closed following debt sales.

The recovery rates for positions closed following their sale on the market were starkly inferior to those recorded for positions closed following standard work-out procedures (23 per cent, against 47 per cent on average during the reference period).

Recovery rates for debts secured by collateral were significantly higher than those recorded on other positions (55 per cent on average during the reference period, against 36 per cent).

Recovery rates for households' bad loans were higher than those on debts held by non-financial firms (53 per cent on average during the reference period, against 40 per cent).

The older the debt position is when closed, the lower the recovery rate.

Recovery rates vary significantly from bank to bank. In the reference period some banks demonstrated recovery rates that were consistently above or below the average.

Average closure times for bad loans lengthened considerably during the reference period. Since 2014 there has nevertheless been a notable increase in the number of closures, which could signal a reversal of this trend.

1) The coverage ratio is the amount of loan loss provisions in relation to the corresponding gross exposure.

These results confirm and elaborate on those of recent studies[2] and carry important implications for banks and supervisory authorities. The amounts obtained in internal standard recovery procedures are much higher than the prices banks generally obtain following sales to private investors, and vary significantly from bank to bank. This suggests that banks have both leeway and incentives to press on with the interventions already under way to improve the efficiency of their internal processes for the recovery and management of non-performing loans (NPLs), identifying the optimal mix of in-house management, outsourcing to external servicers and sales on the market capable of maximizing the value of these assets. On the other hand, the supervisory authorities must carefully assess the validity of individual firms' strategies and identify the most appropriate interventions in relation to each bank's circumstances, in the knowledge that a blanket adoption of policies for the rapid unwinding of NPLs would translate into a transfer of value from banks to investors active in this market. The non-binding guidance on NPLs recently submitted for public consultation by the Single Supervisory Mechanism goes in this direction, asking banks to implement an active management policy for these assets.[3]

## 1 The data and estimation methodology

*The analysis refers to the universe of closed bad debt positions, available in the CCR ...*

The data used in this note relate to delinquent debtors reported on a monthly basis by individual banks and banking and financial institutions belonging to banking groups that participate in the CCR. With the exclusions detailed in the Appendix, the universe of closed bad debt positions was surveyed: between 2006-15 nearly 2 million positions were closed for a gross value of about €88 billion, equal to just under half of the gross stock of outstanding bad debts at the end of 2015. This allows us to rule out the presence of sampling distortions.

*... to estimate recovery rates from 2006-15 ...*

For each year in the reference period, the recovery rates were calculated at the individual debtor level. The CCR contains data on the losses reported by banks over the lifetime of the position, which include lost revenue from interest payments and other customer penalty charges. The actual amounts recovered are not available and are estimated on the basis of the difference between the gross value of the exposure when it was classified as a bad loan and the accumulated losses (including partial write-off made before the closure).

The aggregate recovery rates are weighted by amount and discounted i.e. the need to include interest to compensate for extended repayments was taken into consideration.

2) L. Carpinelli, G. Cascarino, S. Giacomelli and V. Vacca, The management of non-performing loans: a survey among the main Italian banks, Banca d'Italia, Questioni di economia e finanza (Occasional Papers), No. 311, February 2016. The paper presents data on recovery rates relative to firms for the years 2011-14, drawn from a sample survey of Italy's 25 leading banking groups. As will be seen further on, the rates illustrated in this Note are instead based on the entire universe of bad loans vis-à-vis households and firms, available in the CCR for the period 2006-15.

3) Draft guidance to banks on non-performing loans, ECB, September 2016. Written for *significant* banks, the Guide is non-binding and covers key aspects of NPL management. More specifically, it calls on banks to draw up an effective strategy for managing NPLs, setting quantitative objectives for reducing the stock in the medium term and taking account of all available options (internal or external management, sales on the market, the purchase of goods as security, out-of-court agreements, etc.) to maximize the value of these assets. It also calls for the adoption of managerial arrangements capable of ensuring the effective execution of the strategy and of minimizing conflicts of interest.

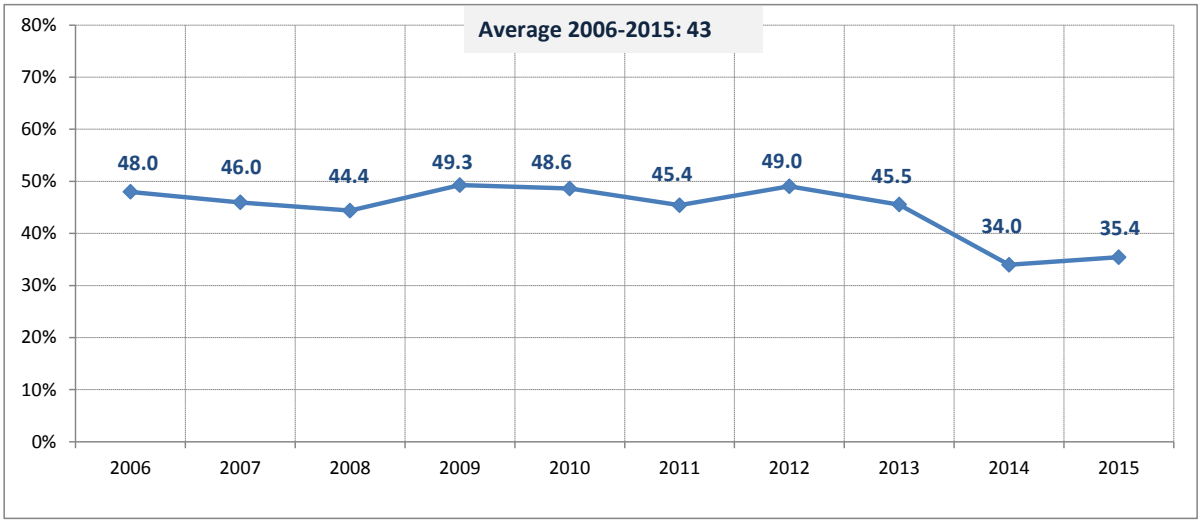
The characteristics of the data available in the CCR required the use of hypotheses to generate the estimates. The hypotheses appear conservative and are supported by qualitative and quantitative data. The Appendix provides a detailed explanation of the methodology used and provides measures of the results' sensitivity to the hypotheses advanced.

## 2 Bad loan recovery rates

*The recovery rate averages 43 per cent from 2006-15 …*

Between 2006-15 the bad debt recovery rate averaged 43 per cent (Figure 1), oscillating between a low of 34 per cent and a high of 49 per cent. The data do not follow any clear pattern. It is noteworthy that recovery rates did not fall with the onset of the economic crisis.

**Fig. 1 – Bad loan recovery rate by year of closure**
*(per cent)*




Source: Based on CCR data.

*… falling to 35 per cent in the two years 2014-15, partly as a result of the increase in sales on the market …*

Recovery rates nonetheless remained relatively low in the two years 2014-15 (averaging 35 per cent over the two years). The change in the composition of bad loan positions closed during this time compared with previous years contributed to the decline. In fact, the share of positions sold to third parties increased (accounting for 23 per cent of the total number of positions closed, against 13 per cent on average from 2006-13; 34 per cent against 7 per cent if one considers the amounts involved in the respective periods). We shall see that positions sold to third parties are characterized by very low recovery rates compared to those closed following standard procedures (Table 2). The average recovery rate recorded in the two years would have come to 40 per cent had the share of positions sold on the market remained equal to the average observed from 2006-13. Put differently, the composition effect explains almost half of the decline in the two years 2014-15 compared with the average rate of 47 per cent recorded in the previous period.

This change in composition may also have reflected steps taken by banks to repair their balance sheets – partly following the asset quality review (AQR) – through the closure of positions that had fewer prospects of recovery.

*The number of positions closed increases significantly in 2014-15*

This hypothesis is supported by the sharp rise in the number of positions closed during the two years: 270,000 on average per year, against 140,000 on average in the previous period (Table 1).

**Table 1 – Number of closed and open bad loan positions**
*(annual data; number of positions and per cent)*

| Year | Num. of closed positions | Num. of new positions | Num. of positions outstanding in each year | Num. of closed/ outstanding positions at the start of the year (%) |
|---|---|---|---|---|
| 2006 | 198,588 | 158,713 | 547,175 | 36.3 |
| 2007 | 161,209 | 189,720 | 575,686 | 28.0 |
| 2008 | 123,615 | 176,769 | 628,840 | 19.7 |
| 2009 | 133,976 | 183,033 | 677,897 | 19.8 |
| 2010 | 128,168 | 233,966 | 783,695 | 16.4 |
| 2011 | 145,538 | 199,196 | 837,353 | 17.4 |
| 2012 | 128,653 | 230,694 | 939,394 | 13.7 |
| 2013 | 112,331 | 228,153 | 1,055,216 | 10.6 |
| 2014 | 287,685 | 341,271 | 1,108,802 | 25.9 |
| 2015 | 257,965 | 325,488 | 1,176,325 | 21.9 |
| TOTAL | 1,677,728 | 2,267,003 | | |
| Media | 167,773 | 226,700 | 833,038 | 21.0 |

Source: Based on CCR data.

The growth in the stock of bad loans observed during the entire reference period reflects the number of positions closed per year, which was almost always lower than that of newly classified bad loan positions. This may be because the technical 'disposal capacity' was either unchanged or did not increase sufficiently: if the number of courts and judges remains the same and the technology used by banks to process recoveries does not improve significantly, the number of positions that can be closed within one year will remain more or less constant. In a period of marked growth in NPLs, such as the one recorded during the economic crisis, the share of positions closed compared to those outstanding at the start of the year will therefore tend to fall.

*Recovery rates are sharply lower for bad loans sold to third parties*

Table 2 highlights two interesting facts. First, the recovery rates on positions closed following sales to third parties averaged 23 per cent in the decade considered, systematically below the share of positions closed by banks following internal standard procedures (47 per cent). This gap reflects the NPL valuation criteria applied by purchasers operating in this market, which in turn are reflected in transfer prices that incorporate high return expectation. Notably, purchasers discount expected cash flows from bad loans using the

target rate of return on the investment while banks, acting in accordance with accounting principles, use the rate of interest applied on the positions.[4] The gap is instead determined only to a limited extent by the different composition of transferred bad loans compared to those closed following standard work-out procedures.[5] Second, the large number of positions closed in the last two years also reflects an increase in sales to third parties, both in absolute terms (62,000 closures on average in 2014-15, compared with an average of 27,000 for the period as a whole) and, as mentioned above, as a proportion of the total.

**Table 2 – Recovery rates by type of closure: standard procedure or sales on the market**
*(number of positions, millions of euros and per cent)*

| Year | TOTAL | | | of which: positions that were not sold | | | of which: positions sold on the market to third parties (1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Recovery rate (%) | Positions closed | | Recovery rate (%) | Positions closed | | Recovery rate (%) | Positions closed | |
| | | Amount (mln) | Number | | Amount (mln) | Number | | Amount (mln) | Number |
| 2006 | 48.0 | 9,039 | 198,588 | 48.4 | 8,803 | 183,345 | 30.2 | 236 | 15,243 |
| 2007 | 46.0 | 8,742 | 161,209 | 50.1 | 7,443 | 135,983 | 22.1 | 1,299 | 25,226 |
| 2008 | 44.4 | 6,580 | 123,615 | 44.8 | 6,225 | 110,509 | 37.4 | 355 | 13,106 |
| 2009 | 49.3 | 6,109 | 133,976 | 50.0 | 5,893 | 117,707 | 28.9 | 216 | 16,269 |
| 2010 | 48.6 | 6,667 | 128,168 | 49.3 | 6,454 | 108,591 | 26.7 | 213 | 19,577 |
| 2011 | 45.4 | 8,718 | 145,538 | 46.1 | 8,442 | 127,922 | 23.3 | 276 | 17,616 |
| 2012 | 49.0 | 7,472 | 128,653 | 53.0 | 6,207 | 102,510 | 29.8 | 1,266 | 26,143 |
| 2013 | 45.5 | 7,683 | 112,331 | 46.9 | 7,229 | 96,714 | 23.8 | 454 | 15,617 |
| 2014 | 34.0 | 13,613 | 287,685 | 39.0 | 9,463 | 241,056 | 22.4 | 4,150 | 46,629 |
| 2015 | 35.4 | 13,258 | 257,965 | 44.9 | 8,157 | 180,898 | 20.3 | 5,101 | 77,067 |
| **TOTAL** | | **87,881** | **1,677,728** | | 74,316 | 1,405,235 | | **13,565** | **272,493** |
| **Average** | **43.2** | **8,788** | **167,773** | **46.9** | 7,432 | **140,524** | **23.0** | 1,357 | 27,249 |

Source: Based on CCR data.
(1) The data on the number and value of the positions closed following sales to third parties on the market may be lower than those from other sources (see the Methodological Appendix).

Average data on recovery rates show that these vary according to the various categories of bad loans.

4) See L. G. Ciavoliello, F. Ciocchetta, F. M. Conti, I. Guida, A. Rendina, G. Santini, What's the value of NPLs?, Banca d'Italia, *Notes on Financial Stability and Supervision*, No. 3, 2016.

5) The recovery rate on sold positions would increase only by 1 percentage point (from 23 to 24 per cent) were the composition, in terms of secured or unsecured bad loans, to coincide with that of positions closed following standard work-out procedures.

*Loans secured by collateral display very high recovery rates compared to unsecured loans*

*2.1 Loans secured by collateral vs other forms of credit.*[6] – Recovery rates for loans secured by collateral were much higher: 55 per cent on average in the reference period, against 36 per cent for the other bad loan positions (Table 3). Table 3 suggests a notable difference in the individual amounts of these two types of exposure (on average €215,000 for loans secured by collateral and €35,000 for other forms of credit). This reflects the existence of a positive relationship between loan amounts and the presence of collateral as well as the very large quantity of consumer credit transactions, characterized by smaller loan amounts and the absence of collateral. Recent analyses highlight how banks made increased use of loans secured by collateral during the reference period: the new bad debt rate for loans secured by collateral rose from 25 per cent in 2006 to 46 per cent in 2015.[7] This reflects the increasingly cautious approach taken by banks during the economic crisis.

**Table 3 – Recovery rates by type of guarantee: positions secured by collateral vs other positions**
*(number of positions, millions of euros and per cent)*

| | TOTAL | | | of which: secured by collateral | | | of which: unsecured by collateral | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Positions closed | | | Positions closed | | | Positions closed | |
| Year | Recovery rate (%) | Amount (mln) | Number | Recovery rate (%) | Amount (mln) | Number | Recovery rate (%) | Amount (mln) | Number |
| 2006 | 48.0 | 9,039 | 198,588 | 61.6 | 3,038 | 18,707 | 41.1 | 6,001 | 179,881 |
| 2007 | 46.0 | 8,742 | 161,209 | 60.3 | 2,690 | 16,617 | 39.6 | 6,051 | 144,592 |
| 2008 | 44.4 | 6,580 | 123,615 | 55.7 | 2,752 | 13,183 | 36.2 | 3,828 | 110,432 |
| 2009 | 49.3 | 6,109 | 133,976 | 60.6 | 2,698 | 13,544 | 40.3 | 3,411 | 120,432 |
| 2010 | 48.6 | 6,667 | 128,168 | 58.6 | 2,564 | 12,539 | 42.4 | 4,103 | 115,629 |
| 2011 | 45.4 | 8,718 | 145,538 | 55.2 | 3,706 | 13,672 | 38.2 | 5,012 | 131,866 |
| 2012 | 49.0 | 7,472 | 128,653 | 60.0 | 3,111 | 14,858 | 41.2 | 4,361 | 113,795 |
| 2013 | 45.5 | 7,683 | 112,331 | 57.6 | 3,060 | 13,154 | 37.5 | 4,623 | 99,177 |
| 2014 | 34.0 | 13,613 | 287,685 | 45.6 | 5,469 | 23,942 | 26.2 | 8,144 | 263,743 |
| 2015 | 35.4 | 13,258 | 257,965 | 45.1 | 5,221 | 19,352 | 29.2 | 8,038 | 238,613 |
| **TOTAL** | | **87,881** | **1,677,728** | | **34,309** | **159,568** | | **53,572** | **1,518,160** |
| **Average** | **43.2** | **8,788** | **167,773** | **54.5** | **3,431** | **15,957** | **36.0** | **5,357** | **151,816** |

Source: Based on CCR data.

6) Loans secured by collateral are those secured, in whole or in part, by the following collateral classes as reported in the Central Credit Register: pledges, mortgages and liens. The other loans includes those secured by personal guarantees and unsecured loans.

7) Financial Stability Report, No. 1, 2016. The share is calculated using data from the supervisory reports. The numerator only comprises bad loans wholly secured by collateral.

*Recovery rates vis-à-vis firms are lower than those for households*

*2.2 Loans to firms and households.* – The recovery rate on non-financial firms' bad loans averaged 40 per cent during the reference period, significantly lower than the rate on households' bad loans (53 per cent; Table 4). In the two years 2014-15, there was a pronounced decline in the recovery rate for both categories, and for households especially. This was largely due to the fact that many banks made numerous sales of small- and medium-sized positions, in many cases of older debts that had been almost entirely written down, also because they were unsecured by collateral.

**Table 4 – Recovery rates by type of debtor: firms vs households**
*(number of positions, millions of euros and per cent)*

| | TOTAL | | | of which: firms | | | of which: households | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Positions closed | | | Positions closed | | | Positions closed | |
| Year | Recovery rate (%) | Amount (mln) | Number | Recovery rate (%) | Amount (mln) | Number | Recovery rate (%) | Amount (mln) | Number |
| 2006 | 48.0 | 9,039 | 198,588 | 43.7 | 6,555 | 76,415 | 59.2 | 2,484 | 122,173 |
| 2007 | 46.0 | 8,742 | 161,209 | 41.8 | 6,510 | 66,183 | 58.2 | 2,231 | 95,026 |
| 2008 | 44.4 | 6,580 | 123,615 | 40.8 | 5,029 | 46,749 | 55.9 | 1,551 | 76,866 |
| 2009 | 49.3 | 6,109 | 133,976 | 44.9 | 4,594 | 46,278 | 62.6 | 1,515 | 87,698 |
| 2010 | 48.6 | 6,667 | 128,168 | 46.5 | 5,135 | 47,265 | 55.8 | 1,532 | 80,903 |
| 2011 | 45.4 | 8,718 | 145,538 | 41.9 | 7,100 | 55,902 | 60.7 | 1,618 | 89,636 |
| 2012 | 49.0 | 7,472 | 128,653 | 44.6 | 5,807 | 52,589 | 64.5 | 1,666 | 76,064 |
| 2013 | 45.5 | 7,683 | 112,331 | 41.0 | 5,948 | 47,467 | 61.2 | 1,735 | 64,864 |
| 2014 | 34.0 | 13,613 | 287,685 | 32.5 | 9,852 | 87,755 | 37.9 | 3,760 | 199,930 |
| 2015 | 35.4 | 13,258 | 257,965 | 34.3 | 10,222 | 89,519 | 39.4 | 3,036 | 168,446 |
| **TOTAL** | | **87,881** | **1,677,728** | | **66,752** | **616,122** | | **21,129** | **1,061,606** |
| **Average** | **43.2** | **8,788** | **167,773** | **40.1** | **6,675** | **61,612** | **52.9** | **2,113** | **106,161** |

Source: Based on CCR data.

*As bad loan positions increase with age, recovery rates fall*

*2.3 Recovery rates by age of bad loan.* – Recovery rates decline as the age of the bad loan positions closed increase: the longer they remain on banks' balance sheets, the less banks succeed in recovering (Table 5).[8] This is true of exposures to both firms and households and also reflects the discounting of the recovery rates referenced in Section 1 and the Appendix.

8) The table does not show the real recovery curves relative to the age of the debt position. From CCR data we can infer the average amounts recovered on positions closed after a certain number of years, but not the temporal distribution of the recoveries. For example, the table indicates that for positions closed between 4 and 5 years after they were first classified as bad loans, recovery rates averaged 41 per cent. However, it is not possible to know when the related amounts were collected (the recovery could have occurred regularly throughout the lifetime of the position, or entirely at the beginning, or vice versa). Of course, this caveat does not apply to positions closed within the first year and becomes more significant as debts increase in age. However, insofar as they are discounted, the recovery rates for the various age classes can be compared.

**Table 5 – Recovery rates by age of bad loan**
*(per cent)*

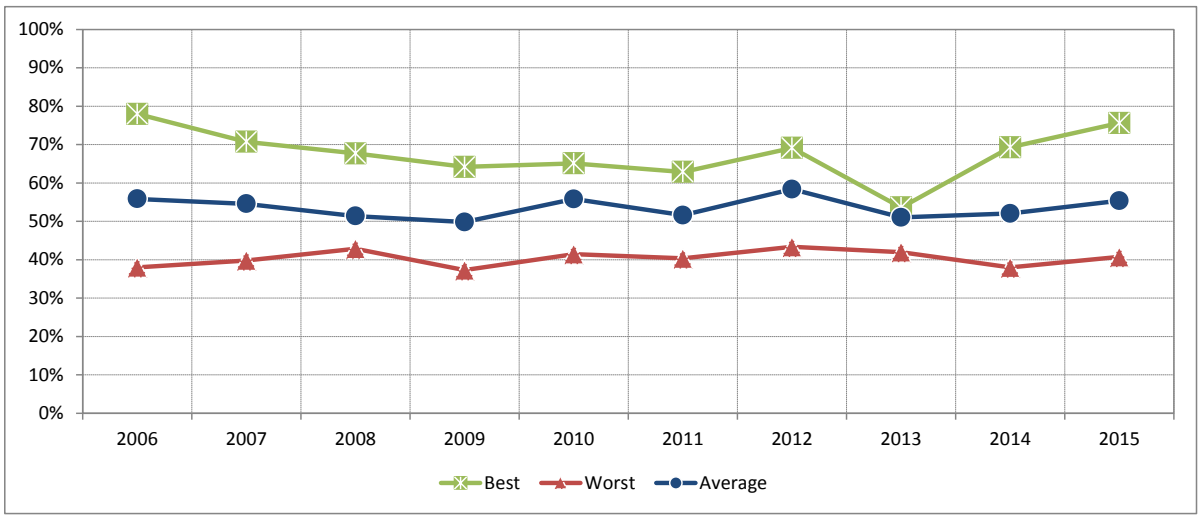
| Recovery time | TOTAL | of which: secured by collateral | of which: unsecured by collateral | of which: firms | of which: households |
|---|---|---|---|---|---|
| < 1 year | 60.6 | 77.8 | 51.7 | 57.2 | 60.2 |
| between 1 and 2 years | 54.1 | 70.8 | 44.8 | 46.8 | 60.4 |
| between 2 and 3 years | 50.1 | 60.8 | 41.2 | 40.6 | 58.9 |
| between 3 and 4 years | 43.9 | 53.2 | 35.3 | 37.8 | 52.6 |
| between 4 and 5 years | 41.1 | 52.5 | 32.2 | 35.3 | 50.6 |
| More than 5 years | 29.8 | 38.8 | 23.7 | 27.8 | 38.2 |

Source: Based on CCR data.

*Recovery rates differ from bank to bank*

*2.4 Dispersion of recovery rates among banks.* – During the reference period, some banks demonstrated a recovery capacity that was consistently above or below the average. Figure 2 illustrates the trend in recovery rates for two categories of bank, chosen from the 25 banks with the largest stock of closed bad loan positions. The average recovery rate of the five banks that systematically report the best recovery rates in the reference period ('best' in Figure 2) is around 14 percentage points higher than that referring to the sample as a whole. For the five banks that systematically report the worst rates ('worst' in Figure 2), the deviation from the average is around 15 percentage points. These results do not appear to depend on differences in composition: they are confirmed in analogous figures (not included here), drawn from homogenous credit portfolios by type of guarantee, counterparty and debt age. These

**Figure 2 – Different recovery rates among banks** (1)
*(per cent)*




Source: Based on CCR data.
(1) Calculations of the recovery rates exclude the positions sold in order to focus on the efficiency of internal recovery procedures. The annual recovery rates in the various classes are calculated as the simple average of the values for each bank in each class. The data refer to a sample of 25 banks.

data suggest that it is possible for banks to adopt measures designed to improve the recovery in value of bad loans. To this end, the identification of suitable strategies and internal organizational arrangements can play a central role, as can incentive mechanisms – all topics that are addressed in detail in the draft guidance on NPLs cited in footnote 3.

## 3 Closed bad loan positions: recovery times, volume and characteristics

What is the average life of a bad loan? How long does it usually remain on banks' balance sheets? How have these variables evolved over time? Unfortunately, the time series available do not offer a precise answer to these questions, especially as regards their evolution over time. As better detailed in the Methodological Appendix, data is available only from 2005 onward, and for outstanding positions at the start of the period there is no information on the date they were classified as bad loans. Accordingly, for the positions closed in 2006 and the years immediately following, it is not possible to calculate reliable average recovery times. This is why we used alternative measures to gauge the speed at which bad loans were reduced.

*Closure times are lengthier in the period considered*

More specifically, we calculated the share of positions that were closed within 1 year of their classification as a bad loan, or within the following 2 or 3 years. These indicators point to a deceleration in the disposal process. For example, the share of positions closed within 2 years of being classified as a bad loan, above 50 per cent of the total in 2006-07, fell to between 34 and 41 per cent during the economic crisis. The first signs of a reversal in this trend were recorded in 2014, when the share of bad loan positions closed within the first year rose from 21 to 26 per cent (Table 6).

**Table 6 – Share of new positions closed within 1 - 5 years of being classified as a bad loan**
*(per cent)*

| Year of classification as bad loans | within 1 year | within 2 years | within 3 years | within 4 years | within 5 years |
|---|---|---|---|---|---|
| 2006 | 47 | 59 | 66 | 71 | 75 |
| 2007 | 41 | 53 | 58 | 65 | 69 |
| 2008 | 32 | 39 | 49 | 54 | 58 |
| 2009 | 30 | 41 | 50 | 56 | 65 |
| 2010 | 24 | 34 | 40 | 54 | 62 |
| 2011 | 24 | 39 | 48 | 56 | |
| 2012 | 20 | 34 | 43 | | |
| 2013 | 21 | 38 | | | |
| 2014 | 26 | | | | |

Source: Based on CCR data.

Similar indications emerged from variations in the share of bad loan positions closed each year, calculated as the ratio of the number of positions closed to the total outstanding positions at the start of the year. This share gradually declined to 11 per cent in 2013, before rising again to more than 20 per cent in the last two years

considered (Table 1). The growth in sales contributed to this increase, which may be attributable to the more active management of bad loans by banks (Table 2). Looking ahead, changes to the legislation on NPLs introduced from 2015 onward are likely to have a positive effect.[9)]

## 4 Do banks 'cherry pick' when managing NPLs?

We have seen how the recovery rates illustrated above are calculated relative to the universe of closed positions and, as such, are themselves representative of the phenomenon. It is nonetheless possible to hypothesize that banks carefully select the positions that they close, keeping on their books those that they know will yield little or nothing and closing those with high recovery rates ('cherry picking'). In this case the recovery rates observed would not be representative of the entire stock of bad debts.

*The hypothesis of cherry picking the positions to close is not backed up by the data*

The available data do not allow us to exclude this hypothesis, but they provide indirect evidence against it. For example, average recovery rates decline as the bad loans age. If banks were to cherry pick the positions to close, they would assign priority to the 'youngest' bad loans to limit losses; similar behaviour would be reflected in a decline in the number of 'old' bad loan positions closed each year. Table 7 illustrates that this did not occur. The share of bad loans classified as such for more than 5 years does not exhibit a clear trend during the reference period and accordingly no evidence of cherry picking emerges.

**Table 7 – Share of bad loans closed per year by recovery time**
*(per cent)*

| Closed bad loan positions by year of closure and recovery time | | | | | | |
|---|---|---|---|---|---|---|
| Recovery time | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
| < 1 year | 4.3 | 3.7 | 5.7 | 6.4 | 6.1 | 8.2 |
| between 1 and 2 years | 12.6 | 9.1 | 10.0 | 9.2 | 10.4 | 18.8 |
| between 2 and 3 years | 11.7 | 7.5 | 7.6 | 11.4 | 9.1 | 7.5 |
| between 3 and 4 years | 10.2 | 8.1 | 7.5 | 10.0 | 8.6 | 6.4 |
| between 4 and 5 years | 7.2 | 7.4 | 8.8 | 7.1 | 8.0 | 7.7 |
| More than 5 years | 54.0 | 64.2 | 60.3 | 55.9 | 57.7 | 51.4 |

Source: Based on CCR data.

9) See M. Marcucci, A. Pischedda, V. Profeta, The changes of the Italian insolvency and foreclosure regulation adopted in 2015, Banca d'Italia, Notes on Financial Stability and Supervision, No. 2, 2015, and E. Brodi, S. Giacomelli, I. Guida, M. Marcucci, A. Pischedda, V. Profeta, G. Santini, New measures for speeding up credit recovery: an initial analysis of Decree Law 59/2016, Banca d'Italia, Notes on Financial Stability and Supervision, No. 4, 2016. For the reform of the tax treatment of loan losses, see A. De Vincenzo, G. Ricotti, The use of tax law from a macroprudential perspective, Notes on Financial Stability and Supervision, No. 1, 2014.

## Methodological Appendix

### A.1 The data used and the definitions

The data used in this note were taken in anonymous form from the archives of the Central Credit Register (CCR) and refer to the universe of customers with bad loan positions reported on a monthly basis by banks that participate in the CCR. The information needed to calculate the recovery rates are only available from 2005, following a review of the reporting criteria of the CCR; the 2005 data are not taken into consideration because their quality was impaired by a number of simplifications rendered necessary during the transition phase. Only reports from individual banks and from banking and financial institutions belonging to banking groups participating in the CCR are used. Foreign bank subsidiaries, financial companies and banks specialized in leasing or in recovery activities are excluded, together with those under resolution or in comparable situations.

The data on sales to third parties reported in Table 2 are estimated based on reports by the CCR of debts sold to third parties. Sales of non-performing exposures other than bad loans are excluded by construction.

Infra-group sales, self-securitizations and mergers lead to the 'technical' closure of positions in the CCR. These operations do not, however, lead to a position being closed from an 'economic' standpoint. Moreover, in these cases the transfer prices of bad loans do not generally deviate significantly from the balance sheet values and would therefore artificially have increased the recovery rates. This is why the positions involved in such operations were identified and considered as still open during the post-transaction phase until their 'genuine' closure was verified.

For these reasons, and given the exclusions illustrated above, data on the volume of sales could be lower than those reported in the Bank of Italy's *Financial Stability Reports*, and more in general than data from market sources.

To extract the data by bank utilized in Figure 2, in the case of banking groups reference is made to the composition of the groups at December 2015.

A dataset was created for each customer reported as a bad debtor, containing 'elementary' data and 'processed' data, not only from the CCR archives (data on individual exposures) but also from the Bank of Italy's Register (data on the main features of individuals and companies) and Supervisory registers (qualitative data on reporting entities and mergers).

The methodology adopted for calculating the 'processed' data is described below.

**Date on which the loan was first classified as bad and closure date**: starting with the monthly CCR reports, the first date on which the bad loan was reported and the last reporting date (if on or before 31 December 2015) were specified for each code identified and for each reporting entity: the dates are considered as the bad loan

classification date and the closure date, respectively.[10] The duration of each position, indicated by *n* hereafter, can therefore be observed in the CCR.

**Amount used**:[11] the amount reported on the classification date, indicated by $E_0$ hereafter. The amounts for the subsequent months are available in the CCR, but they have not been extracted in order to curtail data processing times.

**Amount secured:** sum of the secured amounts for each debtor reported by a specific entity in the 'bad loans' category. When secured by collateral, the secured amounts reported are considered. The value of the collateral is unknown.

**Losses:** when a position is closed, those reporting to the CCR are required to indicate the total cumulative amount of the losses incurred. This amount refers to the overall exposure of the debtor (including the interest charged following classification as a bad loan) and does not allow for a distinction between the share of losses referring to secured credit lines and that referring to unsecured ones. The recovery rate calculated therefore refers to the overall exposure of the counterparty, which is wholly classified as an exposure secured by collateral regardless of whether the loan is partially or totally secured by collateral.

**Recoveries:** these are calculated as the difference between the amount utilized, raised to take account of the interest charged by banks to customers (see below), and the losses reported by the bank. The CCR data do not permit the observation of the temporal distribution of individual in- and outflows occurring between the bad loan classification date and that of the position's closure; it is only possible to monitor the exposure's evolution, which means high data processing costs.

**Recovery rate:** ratio between the discounted amount of the recoveries and the amount utilized.

### A.2 Methodology for estimating the recovery rates

In principle, the recovery rate $TR_0$, to be calculated on a position classified as a bad loan at time 0, is expressed by the following formula:

$$TR_0 = \frac{\sum_{i=1}^{n} R_i \, (1+r)^{-i}}{E_0} \qquad (1)$$

where $R_i$ is the amount recovered as of date *i*, *r* the effective interest rate when the loan is classified as bad, $E_0$ the exposure reported when the loan is so classified, and *n* the number of years required to close the exposure.

10) The calculation is based on the data reported by each entity, but is presented at banking group level. When a counterparty is itself financed by more than one entity from the same group, the two dates are represented respectively by the date of classification as bad loans and the last reporting date (if present) recorded by any member of the group.

11) Bad loans are reported gross of possible write-downs and write-offs.

However, the recoveries $R_i$ obtained at various times are not available in the CCR, but only the cumulative loss incurred by the bank on the position's closure. This amount comprises both the partial or total failure to recover $E_0$, and lost revenue from interest payments (including possible penalties) charged to the customer over time, thus increasing $E_0$. The amounts recovered must therefore be estimated by subtracting the losses incurred by banks from the exposure. The cumulative loss reported in the CCR, $\hat{P}_0$, may be written as follows:

(2) $$\hat{P}_0 = E_0 - \sum_{i=1}^{n} R_i + m \sum_{i=0}^{s} E_i$$

where:

(3) $$E_i = E_{i-1} - R_i$$

and $m$ is the interest rate including late payment interest, $m>r$. In equation (2) the second sum adds to $E_0$ the interest and late payment charges on the residual position, i.e. net of the recoveries made on previous dates. This interest is only calculated up to the period $s<n$. This is because, on the basis of the rules governing CCR operations, contractual interest and accrued late payment interest on bad loans are reported for as long as banks consider them collectable. Equation (2) makes it clear that  is actually a measure of the discounted loss, even if the discounting is not standard. By dividing by $n$ and rearranging it, (2) may be written as follows:

(4) $$\bar{R}_i = \frac{1}{n} \sum_{i=1}^{n} R_i = \frac{1}{n} \left[ E_0 + m \sum_{i=0}^{s} E_i - \hat{P}_0 \right]$$

Bearing in mind that the intermediate exposures $E_i$ are not observable, and hypothesizing that with $i \leq s$ $E_i \cong E_0$ we obtain:

(5) $$\bar{R}_i = \frac{E_0(1 + ms) - \hat{P}_0}{n}$$

Finally, by inserting (5) into (1) we obtain:

(6) $$\widehat{TR}_0 = \frac{\sum_{i=1}^{n} \bar{R}_i \, (1+r)^{-i}}{E_0}$$

(6) is the formula used to calculate the estimated recovery rates, $\widehat{TR}_0$, as illustrated in this paper. The result is that $\widehat{TR}_0$ may be higher or lower than the theoretical rate $\widehat{TR}_0$, higher taking into account that $m>r$ and lower considering that $s<n$.

### A.3 Calibration

It is worth recalling that in (5) and (6) the variables observable in the CCR include $E_0$ and $\hat{P}_0$ but *m*, *r* and *s* are not available. To obtain the estimates of $\widehat{TR}_0$ it was accordingly necessary to: (i) evaluate the validity of the hypothesis $E_i \cong E_0$ for $i \leq s$ used to derive (5) and adopt some hypotheses on (ii): the temporal distribution of recoveries and (iii) the values of *m*, *r* and *s*. The rest of this Appendix illustrates and motivates these hypotheses, and provides measures of the sensitivity of the results to variations.

*(i) The values of the exposure $E_i$ for $i \leq s$.* – To evaluate this hypothesis, the positions that were part of the 2006 cohort were extracted from the CCR (those classified as bad loans in 2006 and closed during the period 2007-15). For these positions the performance of $E_i$ exposures was monitored on a quarterly basis, differentiating between firms and households. The results of this analysis showed that $E_i$ increases in the years immediately following the bad loan classification, reflecting the charging of late payment interest for amounts greater than repayments by debtors. These checks were also carried out on the 2007 cohort, yielding similar results. The hypothesis formulated, $E_i \cong E_0$, is therefore conservative (it distorts the estimated recovery rates downwards).

*(ii) The temporal distribution of recoveries*. – In order to formulate hypotheses on the temporal distribution, reference is made to both the analysis of the 2006 cohort and to the results of recent analyses,[12] which indicate that recoveries are spread out over time. In calculating (6), a constant flow of recoveries over the lifetime of the position was therefore hypothesized.

*(iii) The values of m, r and s.* – The interest rate *r* was set at 4 per cent, the average value for outstanding bad loans at the time of the 2014 asset quality review. The late payment interest rate *m* was set at 8 per cent, double that of *r* on the basis of informal surveys carried out on some banks. With regard to the value of *s*, banks charge interest and late payment charges in the first few years following the bad loan classification; the reports are subsequently differentiated to reflect the likelihood of recovering a specific bad loan, taking account of the collateral securing the position and the outcome of any recovery actions already under way in relation to debtors and guarantors. For bad loans of firms subject to insolvency procedures, for example, contractual and late payment interest is no longer reported once an insolvency procedure has begun, generally about two years after the first bad loan report, according to the leading market operators. Based on the data gathered it has been hypothesized that, following the transition to a bad loan, interest is charged on average for two years for households and one year for firms. This hypothesis also appears conservative. The curves of the exposures $E_i$ in (i), which refer to the total 2006 cohort, increase on average for 3-4 years for households and for 1-2 years for firms.

12) L. Carpinelli, G. Cascarino, S. Giacomelli and V. Vacca, The management of non-performing loans: a survey among the main Italian banks, Banca d'Italia, Questioni di economia e finanza (Occasional Papers), No. 311, February 2016. This analysis shows that recoveries are concentrated in the first 4-6 years following the start of the loan liquidation procedure (by means of insolvency procedures or foreclosures).

To evaluate the sensitivity of the results to the choices illustrated, the recovery rates have been recalculated based on alternative hypotheses as to the temporal distribution of recoveries and the charging of late payment interest. In particular, in the results summarized in the table A1 below:

- for the column 'Lower limit' (worst-case scenario) it is hypothesized that the compounding of interest only occurs in the first year for firms and in the first two years for households and that the recoveries all take place in the last year of the position's lifetime;
- for the column 'Upper limit' (best-case scenario) it is hypothesized that the compounding of interest occurs in the first three years for households and in the first two years for firms, and that the recoveries take place in a linear way during the lifetime of the position. To this end, reference is made to the data collected from the two cohorts examined, which would also support the hypothesized compounding of late payment interest for longer periods of time than those considered in the text.

**Table A1 – Sensitivity of the recovery rates to the hypotheses** (1)
*(per cent)*

| | Recovery rates | | |
|---|---|---|---|
| Year | Lower limit | Baseline (cited in the text) | Upper limit |
| 2006 | 44.5 | 48.0 | 53.7 |
| 2007 | 42.6 | 46.0 | 51.3 |
| 2008 | 41.1 | 44.4 | 49.6 |
| 2009 | 46.0 | 49.3 | 54.0 |
| 2010 | 45.5 | 48.6 | 53.1 |
| 2011 | 42.0 | 45.4 | 50.4 |
| 2012 | 45.2 | 49.0 | 54.1 |
| 2013 | 41.4 | 45.5 | 50.8 |
| 2014 | 31.0 | 34.0 | 39.2 |
| 2015 | 32.7 | 35.4 | 40.5 |
| **Average 2006-2015** | **39.9** | **43.2** | **48.3** |

Source: Based on CRR data.
(1) The baseline scenario refers to the hypotheses described in the text: the compounding of interest for the first year for firms, and for the first two years for households; annual recoveries are broken down uniformly during the lifetime of the position.