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RETURN OF THE NPLs TO THE BRIGHT SIDE: WHICH UNLIKELY TO PAY FIRMS ARE MORE LIKELY TO PAY?

by Massimiliano Affinito* and Giorgio Meucci*

Abstract

Unlikely to pay loans (UTPs) are non-performing loans (NPLs) that have a non-zero probability of returning to the performing state. This paper draws on Italian Central Credit Register data on the entire population of Italian UTP firms from 2005 to 2019, matched with firm and bank balance sheet data, to detect the characteristics of UTP firms that have returned to the performing state. During the crises, even in the most acute phases, the share of UTP firms returning to the performing state has never been negligible. This suggests that the analysis of the factors most closely related to the return of UTP firms to the performing state could also provide policy guidance during the pandemic. Our results show that the factors that have a stronger statistical and economic correlation with the probability of a UTP firm recovering are (negatively) its size and the absolute value of its debt, and (positively) its capital. Results are strongly heterogeneous over time and across economic sectors and Italian regions. Lending bank characteristics matter, but less than firm characteristics.

JEL Classification: G21, G33, C23, C24.
Keywords: non-performing loans; firm distress; firm recovery.
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Contents

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'…it was the season of Light, it was the season of Darkness
it was the spring of hope, it was the winter of despair,
we had everything before us, we had nothing before us,
we were all going direct to Heaven, we were all going direct the other way…'
[Charles Dickens, A Tale of Two Cities]

1. Introduction[1]

Since the global financial crisis, non-performing loans (NPLs) increased dramatically in many EU countries as a result of the long recession. In Italy they tripled reaching almost 17 per cent of total loans in 2015. The high share of NPLs in EU bank balance sheets spurred an intense debate among policymakers and researchers over their origin, consequences and possible solutions (e.g., Aiyar et al., 2015; Nouy, 2017; Angelini, 2018; Enria, 2019). The main concerns about NPLs are that they may jeopardize the soundness of the banking system and impair banks' capacity to finance the real economy. Among the possible solutions envisaged, loan securitization and sales have come to the forefront. Yet, another way through which NPLs decrease, largely unexplored, is their return to the performing state as a result of the recovery of borrowers.

NPLs are, in fact, not all the same. Bank loans are divided into performing and non-performing loans and NPLs are in turn divided into categories characterized by different degrees of difficulty of the debtor and level of risk for the creditor bank. In Italy it is common to distinguish between NPLs where the debtor is insolvent and the odds of returning to solvency are negligible (*bad loans*) and those where the debtor faces repayment difficulties but could still return to being performing (*unlikely to pay loans* or *UTPs*). The latter category thus explicitly recognizes that there is a non-negligible probability that the borrower may return to the performing state. As of December 2019, the gross exposure towards UTP borrowers in Italy was around €65 billion, more than 40 per cent of total NPLs.[2] Almost 90 per cent of UTP loans were taken out by non-financial firms.

Understanding how many and which UTP firms are more likely to return to the performing state is relevant for two reasons. First, from the point of view of bank managers and supervisors, identifying the characteristics of firms that are more likely to return to the performing state may be useful to assess the adequacy of bank loan loss provisions. Second, from a policy perspective, an empirical investigation of the factors mostly related to the probability of a UTP firm returning to the performing state can be useful to identify possible measures that may increase the likelihood of this outcome. This is particularly important in the wake of large, albeit temporary, shocks affecting the

[1] We would like to thank Giorgio Albareto, Emilia Bonaccorsi di Patti, Giorgio Gobbi and Roberto Felici for their helpful comments. The opinions expressed are our own and do not necessarily reflect those of the Bank of Italy.
[2] The Bank of Italy's Financial Stability Report uses consolidated banking group data in reporting total NPLs, bad loans, UTP loans, and past due positions. We use statistics drawn from the Italian Central Credit Register, updated to September 2019 and referring only to non-financial firms.

liquidity of firms, such as the one induced by the current COVID-19 pandemic. Identifying firms that are financially distressed but economically viable could provide guidance to avoid: a loss of production and employment; an unjustified increase in loan loss provisions and risk weighted assets; and a sharper contraction in the lending supply (IMF, 2015 and 2017; Balgova et al., 2016).

In this paper we analyse highly granular data for the period between 2005 and 2019 to detect the characteristics of the UTP firms that have returned to the performing state. We employ data from the Italian Central Credit Register (CR) referring to the entire population of UTP firms, matched with firm and bank balance sheet data. We follow the status of each UTP firm for three years, quarterly, that is, until 2008 for the UTP firms of 2005 and so on, until 2019 for the UTP firms of 2016. We then estimate logit regressions, saturated by a large set of fixed effects, to analyse which characteristics are more likely to be associated with the probability of returning to the performing state within three years. A longer (even lifetime) horizon would allow us to detect a larger number of status changes for each firm but, on the other hand, this would cause right censoring for the most recent cohorts of UTP firms. The three-year horizon is justified by the observation that approximately 90 per cent of firms that reverted to performing did so within three years.

Our results show that the probability of a UTP firm to recover changes strongly over time, even controlling for loan and firm characteristics, suggesting a role for cyclical and institutional factors. The share of UTPs returned to the performing state declined throughout the global financial and the euro-area sovereign debt crises, but has never been negligible, even during the most acute phases of the crises. At the onset of the global financial crisis, in 2008, the share of UTP firms returned to the performing state was 21 per cent; the share dropped to a minimum of almost 11 per cent in 2013 and increased thereafter. The size of the firm, its leverage and the absolute value of its debt are negatively correlated with the probability of recovery. The profitability of the firm when it first becomes UTP, its age, and the ratio of collateralized debt to total debt are instead positively associated with the probability of recovering, but with a lower economic effect. Holding constant other characteristics, the probability of recovery varies geographically and across industries: it is higher in the Northern regions of Italy and lower for firms of the Constructions sector. Preliminary results suggest that the probability of returning to the performing state also varies across banks.[3] UTP firms borrowing from fewer banks and from financially sounder banks have a higher probability of

[3] The literature on financial distress documents that the probability of a firm's default depends not only on where the firm stands in terms of fundamentals, but also on the number of creditors (through the likelihood of their coordination failure) and on their characteristics, decisions and abilities, since even creditors that normally play a passive role in firms' operations can become highly influential in the firm's destiny at crucial decision-making points (e.g. Berger and De Young, 1997; Kaminsky and Reinhart, 1999; Keeton, 1999; Jiménez and Saurina, 2006; Bofondi and Ropele, 2011; Louzis et al., 2012; Klein, 2013; Messai and Jouini, 2013; and Angelini et al., 2017).

returning to the performing state. However, in economic terms, bank characteristics have a smaller effect than firm characteristics.

So far the literature studying the change of status or the transition process between performing and non-performing loan categories has focused on the drivers of entry into the pool of NPLs rather than on the drivers of exits from this pool. The seminal work in this field is the study by Altman (1968) of the determinants and predictions of borrower defaults, followed by numerous works relying both on borrower-level and aggregated data.[4] The literature finds the drivers of the entry into the NPL state depend on general macroeconomic dynamics and micro features related to loan, firm and bank characteristics. We leverage on and contribute to this literature, both exploring all micro (loan, firm and bank) factors that may be related to the probability of status changes and showing that those micro factors influence not only the default but also the return to the performing state of the firms. Regarding bank characteristics, in particular, our results are consistent with two streams of the literature. The literature on concentrated borrowing shows that firms borrowing from fewer banks have better access to credit, in particular during a crisis (e.g., Petersen and Rajan, 1994; Angelini et al., 1998; Gobbi and Sette, 2014). We find that they also have more chances of returning to the performing state once they have been classified as UTPs. Consistent with the literature on firm defaults finding that healthier banks select their borrowers better and their borrowers default less (e.g., Gilson et al., 1990; Berger and De Young, 1997; Keeton, 1999; Morris and Shin, 2004; Brunner and Krahnen, 2009; Hertzberg et al., 2010; Klein, 2013; Ghosh, 2015), we observe that sounder banks are also more likely to be associated with UTP firms that return to the performing state.

The rest of the paper is organized as follows. Section 2 presents some descriptive evidence on Italian UTP firms in the last fifteen years. Section 3 presents our empirical strategy to identify the main characteristics of the UTP firms that have returned to the performing state. Section 4 describes the dataset. Section 5 presents our baseline results. Section 6 extends the analysis to bank factors. Section 7 delves into the issue of firms that only temporarily return to the performing state. Section 8 summarizes the main conclusions.

2. The UTP firms in Italy: some descriptive evidence

The work draws on data from the Italian Central Credit Register (CR) from September 2005 to September 2019. The CR, managed by the Bank of Italy, contains information on outstanding (gross) loan exposures of all banks and other intermediaries operating in Italy vis-à-vis Italian non-financial

[4] Shumway (2001); Beaver et al., (2005); Campbell et al., (2008); Bharath and Shumway (2008); Jacobson et al (2011); Gonzales-Aguado and Moral-Benito (2012); Traczynski (2017); and Bonaccorsi and Cascarino, 2020).

firms. Intermediaries report borrowers having a total exposure of at least €30,000.[5] Exposures are divided into performing and non-performing loans, and among the latter, between bad loans, UTPs and past due loans. These distinctions allow us to bound and focus on the portion of NPLs that have a non-negligible probability of returning to the performing state.[6]

We identify UTP firms through the CR attribute 'adjusted UTP' (*UTP rettificato*), which assigns UTP status to any firm that has been classified as a UTP by at least one creditor bank regardless of the possible different decisions of other lending banks.[7] The CR allows us to identify the entire population of Italian UTP firms (provided their borrowing exceeds the minimum threshold), to track the quarter when each firm is reported as a UTP for the first time and any subsequent change of status. Data refer to both non-financial corporations and producer households (i.e., sole proprietorships and small companies that employ up to 5 employees).

In September 2019, out of about 1.8 million firms reported in the CR, those classified as UTPs made up about 61,000 (3.4 per cent of the total) and their total debt from reporting intermediaries was about €66 billion (7.4 per cent of the total). This amount increased between 2008 and 2015 and decreased afterwards (Figure 1). The share of UTP firms that returned to the performing state declined between 2005 and 2013 and increased thereafter (Figure 2). Considering all UTP firms that have returned to the performing state since 2005, most completed the transition process within one year (about 50-70 per cent of the total; Figure 3, blue area); an additional 20 per cent within two years (orange area), and 10 per cent within three years (grey area). [8] Overall, almost 90 per cent of UTP firms that have returned to the performing state completed their recovery within three years.

[5] Before January 2009 only data on exposures larger than €75,000 were collected in the CR. However, data on bad loans, i.e. exposures to insolvent clients, are (and were) collected irrespective of their amounts (since the threshold of €250 is very low).

[6] In the Bank of Italy classification: (i) *bad loans* are exposures to debtors that are insolvent or in substantially similar circumstances, that is, where the debtor has ceased the business activity and has no prospects of returning to the performing state; (ii) *UTPs* are exposures where the debtor is in difficulty and the bank considers the debtor is unlikely to meet contractual obligation in full, unless actions such as enforcement of guarantees are taken, however the debtor is still operating and could return to the performing state; (iii) *past due* are exposures whose repayment delay has exceeded 90 days. In the recent European harmonized classification there are only two categories (UTP and past due positions): therefore, bad loans are not separately indicated and some UTPs are classified in the past due category once 90 days have elapsed. The distinction between bad loans and UTPs, although not harmonized, is widely used in many European countries (see Mancini and Casellina, 2020). The Italian definition enables us to compute long time-series and in particular (since it distinguishes between bad loans and UTPs) allows us to bound and focus more precisely on the portion of NPLs that has a non-negligible probability of returning to the performing state.

[7] More in detail, the CR employs the definition of 'adjusted UTPs' for clients borrowing from more than one bank based on one of the following conditions: (i) at least one bank has classified the debt towards the firm as a UTP and this debt amounts to at least 70 per cent of the firm's total debts towards the system; (ii) the sum of the firm's debts classified as UTP is equal to at least 20 per cent of the firm's total debts toward the system. If either of these conditions is verified, any performing debts of the firm towards other intermediaries are classified as UTP and therefore the firm is viewed as a 'UTP firm'.

[8] The length of these transition intervals is computed as the number of quarters that have elapsed from the first classification of each firm in the UTP state (as of September 2005) to the first return to the performing state. Since our dataset ends in September 2019, the last interval is computed from September 2015 onwards.

3. Empirical strategy

Our empirical analysis is based on the following logit regression model (1):

$$\text{Prob}(y_{i,t}=1) = \beta'_1 C^{EXP}_{i,t-1} + \beta'_2 C^{FIR}_{i,t-1} + \gamma' p\times t + \varepsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is equal to 1 if the firm i, classified as a UTP firm for the first time at the time t, returns to the performing state within three years. The subscript t identifies the year of the first classification of each firm in the UTP state (cohort). The three-year horizon to estimate the possible return to the performing state has been chosen because, as shown in the previous section (Figure 3), since 2005 around 90 per cent of the UTP firms that have returned to the performing state has completed the positive transition process within three years. Clearly, a longer (even lifetime) horizon would enable us to detect a larger number of status changes for each firm, but on the other hand would cause right censoring for the most recent cohorts.[9]

The two matrices of regressors C^{EXP} and C^{FIR} contain covariates capturing, respectively, exposure and firm characteristics measured in the year preceding the first classification of each firm in the UTP state. β_1, β_2, and γ are vectors of coefficients; ε is a vector of identically and independently distributed errors. The vector $p\times t$ includes interaction terms between the *Province* and *Time* dummies, referring respectively to the geographical location of each firm and its cohort.[10] Each firm usually appears only once in the data and the model is estimated using a set of cross-sections of different firms. Since firm fixed effects cannot be used in this set up, the vector $p\times t$ (made of 960 fixed effects) allows us to control for both (local) macroeconomic trends and other unobservable sources of time varying heterogeneity. In particular, the probability of a return to the performing state for UTP firms in the same cohort can be influenced by common factors such as general economic conditions and regulatory or supervisory changes. For robustness purposes, we also apply the approach suggested by Degryse et al. (2018) by inserting fixed effects at the industry, location and year level through double

[9] To exemplify, the three-year probability of returning to the performing state may be estimated up to the firms classified in the UTP state for the first time in 2016 (their three-year probability ends in 2019); if we chose a 4-year horizon we should limit our estimations to the UTP firms of 2015, and so on.

[10] Firm location dummies refer to the province of the firm's head office. Provinces refer to the Italian administrative "counties". In Italy the provinces are administrative divisions of intermediate level between a municipality (*comune*) and a region (reg*ione*). From 2015, the provinces were reorganized into "institutional bodies of second level". During our sample period the number of provinces varies between 103 and 110; they represent an ideal set to take into account local characteristics.

interactions (*Industry* × *Time* or *Region* × *Time* or *Industry* × *Region*) or triple interactions (*Industry* × *Region* × *Time*).[11]

4. The data

We combine data from the following three archives: i) the Italian Credit Register (CR); ii) the Cerved Group archive of firms' balance sheets; and iii) the Supervisory Reports submitted by Italian banks to the Bank of Italy. The CR allows us to detect all Italian UTP firms, to track the quarter of their first classification in the UTP state and any following, possible change of status over time. We also employee the CR information on firms such as their total borrowing as reported by intermediaries, the degree of collateralization of their debts, location, economic activity and legal form. The Cerved Group archive contains balance sheet data on Italian limited liability companies, excluding producer households. Supervisory Reports are employed to construct bank characteristics, such as the capital ratio and earnings of banks.

In detail, we build our dataset as follows.

First, we select all firms that are reported as UTPs towards the end of 2005 (September) and then track quarterly any change of their status until three years later (i.e., September 2008). We follow the same procedure for all cohorts of UTP firms towards the end of each year (September) up to and including the UTP firms of 2016 (therefore, the status of the last cohort is tracked quarterly until September 2019). When a firm is already in our dataset since it is classified as a UTP at the end of the previous year, it is not repeated.[12] Moreover, we compute for each UTP firm the number of years that have elapsed since its first classification as an impaired firm in order to disentangle the older from new UTP firms. After this computation, we drop observations referring to the first years of the dataset (2005-2007) because their history is left censored.

Second, the value of the dependent variable $y_{i,t}$ refers to the status observed at the end of the three-year horizon and is set as follows: (i) firms that at the end of the third year are performing are considered as having 'returned to the performing state' ($y_{i,t} = 1$); ii) firms that are still classified as UTPs or reported as having other types of non-performing loans are 'still non-performing' ($y_{i,t} = 0$) provided they have never been reported as performing during the previous three years; (iii) firms that recovered during at least one quarter but relapsed to non-performing at the end of the three-year

[11] Robust standard errors are clustered at the firm level to check for any autocorrelations within the same clusters.
[12] Each firm is therefore typically considered only at the end of the year in which it is classified as a UTP for the first time. The same firm is repeated more times only when it is classified again as a UTP, after changing its status, more than three years after the previous classification as a UTP; only cases of this kind are substantially similar to those of a first classification.

period are treated as not having recovered ($y_{i,t} = 0$) in our main regressions, but we carry out several robustness tests on them;[13] and (iv) firms that are no longer reported in the CR at the end of the third year are treated as $y_{i,t} = 1$ if their last observed status was performing, and as $y_{i,t} = 0$ if their last observed status was insolvent.[14]

Equation (1) is estimated using two samples. The first sample includes about 285,000 observations, refers to the universe of Italian UTP firms and includes only variables based on CR data. The matrix C^{EXP} includes the gross exposure at the time of entry into the UTP state and some firm characteristics (location, legal form). The second sample includes firms that are in both archives: CR and Cerved (105,000 observations). The advantage of this smaller sample is the inclusion of relevant firm variables in the matrix C^{FIR} (firm size, capital, profitability).

Descriptive statistics for the first sample are presented in Table 1. The variable *Debt Size* is the natural logarithm of the overall gross debt of each borrower and captures at the same time the size of the debt in the strict sense and the size of the firm.[15] The variable *Number of Creditor Banks* is the number of banking groups or stand-alone banks lending to each borrower. *Debt Size* and *Number of Creditor Banks* are closely correlated, hence we use them alternatively. *Collateral* is the share of loans that are collateralized. *Firm Age* is a proxy computed as the number of years that have elapsed since the firm was first reported in the CR. *Impairment Length* measures the number of years that have elapsed since the firm was first reported as non-performing. The dummy variable *Limited Liability Company* is equal to 1 if the firm is a limited liability company and 0 otherwise. *Producer Household* is a dummy equal to 1 if the firm belongs to the producer household sector. *Medium-Large* is a dummy equal to 1 if the firm has more than 20 employees. From the information on the sector of activity of each firm, we obtain 4 industry dummies: *Agriculture*, *Manufacturing*, *Construction* and *Services*. Finally, in some specifications, the information on the granular geographical location (provinces) of the firms is grouped to compute 4 geographical dummies corresponding to the Italian macro-areas: *North-West*; *North-East*; *Centre*; *South and Islands*.

Descriptive statistics for the matched CR-Cerved sample are shown in Table 2. The two dummies *Producer Household* and *Medium-Large* are excluded because of their low significance in

[13] In the baseline regressions these *temporary performing firms* are treated as 'still non-performing' firms (i.e. they are treated as $y_{i,t} = 0$) because this is their status at the end of the third year. In the checks they are either excluded from estimations or included but flagged differently. Moreover, we use a variable counting the number of 'performing quarters' experienced by each of them (see Section 7).

[14] A firm is no longer reported in the CR either when it fully pays its debt back or when it fails and goes bankrupt or when its residual debt falls below the threshold of €30,000. We assume that: (i) when a firm disappears from the CR records while it is classified in the performing state, it disappears thanks to the debt's repayment (and thus in our estimations it is $y_{i,t} = 1$); (ii) when a firm disappears while it is classified among bad loans, it went bankrupt ($y_{i,t} = 0$); (iii) when a firm disappears while it is still classified as a UTP, it could be because of the threshold and so, as a conservative solution, we drop it in the estimations.

[15] Exposures are considered gross of any provisions to have continuous and comparable time series; they are considered at their nominal value at the moment of their classification as UTPs.

the sample. The variables based on Cerved information are: *Firm Size* (the natural logarithm of each firm's total assets); *Firm Capital* (the ratio between equity capital and total assets); *Firm ROA* (return on assets) and *Firm Age* (the age of each firm, irrespective of reports in the CR). Our choice of variables stems from the literature on economic and financial distress, which emphasizes the role of a firm's leverage and variables measuring cash flow such as profitability and income (e.g., Leland, 1994; Kahl, 2002; Traczynski, 2017). To contain possible measurement errors and the effect of outliers, all data in the two samples are winsorized at the 1st and 99th percentile of the distribution of each variable.

5. Baseline results

5.1 Full sample results

Table 3 shows the baseline results obtained with the full sample CR variables. Results are stable across the different specifications, both when we include the covariates one-by-one and simultaneously. *Debt Size* and *Number of Banks*, used alternatively, are both significant and negative implying that the probability that a UTP firm returns to the performing state within three years is negatively associated with the overall gross debt and positively with the concentration of lending banks. These findings are consistent with the literature on creditors' coordination failure, which shows that the higher the number of creditors, the more diverse their interests, the greater the likelihood of coordination failure (e.g., Bolton and Scharfstein, 1996; Anderson and Sundaresan, 1996; Morris and Shin, 2004; Bris and Welch, 2005). In the case of UTPs, a single lender may have larger incentives to help the firm to recover because it can reap greater benefits if there are no competitors for the same credit. Likewise, the return to the performing state is less likely when the amount of the debt is larger because not only can a larger debt complicate the restructuring process, but it is typically associated with a larger number of lenders.[16] As regards the effect of firm size, the dummy variable, *Medium-Large* also presents a negative coefficient; however, we return to this issue in the next section that introduces the specific variable *Firm Size*.

The coefficient of the variable *Collateral* is positive and significant suggesting that firms with more collateralized exposures have a higher probability of returning to the performing state. The result is, on the one hand, unexpected since collateralized loans are *ex ante* more likely to trigger liquidation because of the lender's priority on collateral. However, on the other hand, the result is expected since it is consistent with the literature on the use of collateral in debt contracts, which finds

[16] Cross-country studies indicate that multiple banking is more common in Italy than in other countries (Ongena and Smith, 2000; Degryse et al., 2018).

that collateral mitigates moral hazard and increases *ex post* incentives to repay loans (Boot, Thakor, and Udell, 1991; Boot and Thakor, 1994; Aghion and Bolton, 1997; Holmstrom and Tirole, 1997; Jiménez, 2006; Affinito et al., 2019).

The coefficient of the variable *Firm Age* is significant and positive, implying that the chances of recovery are higher for older firms. The empirical literature shows that often new clients differ in many dimensions compared with existing ones. In our case, results suggest that for younger firms it is more difficult than for older ones to leave the UTP state and return to the performing state, probably because of reputational and relational reasons.[17] *Producer Households* present a higher probability of returning to the performing state, probably because these firms have unlimited liability, which incentivizes the owner to try to renegotiate the debt.[18]

As a robustness check and in order to exploit the time and geographical dimension of our data, we replace in Equation (1) the vector $p \times t$ of all the interactions *Province* × *Time* fixed effects with different sets of interacted fixed effects. Our results are reported in Table 4.[19] The signs and magnitude of the coefficients are always confirmed. The stability of the results allows us to group the granular location dummies in order to carry out separate estimations for the four Italian macro-area dummies, first one-by-one and then simultaneously (Table 5). This exercise shows that, while the effect of the other covariates remains unchanged, the geographical dummies are positive for the regions of the North-East and North-West and negative for the regions of the Centre and the South of Italy. The last column of Table 5 reports the contemporary effect of three geographical dummies (excluding the *South and Islands* as a benchmark) and shows that the difference from the benchmark is positive for all the other areas and it is larger for the North-East, followed by the North-West and the Centre.

Table 6 reports the results by progressively introducing the four dummies referred to the sectors of economic activity: *Agriculture*, *Manufacturing*, *Construction* and *Services*. The conditional correlation with the probability of returning to the performing state is negative only for the firms belonging to the construction sector. The last specification of Table 6, which simultaneously includes three dummies and excludes *Agriculture* as a benchmark, shows that UTP firms in the agriculture sector are the most likely to return to the performing state, followed by manufacturing and services

[17] As clarified, the variable *Firm Age* is proxied counting the years from the first CR reporting of each firm. Later on in the paper, when we match CR data with Cerved information on firms' balance sheets, we replace the proxy with the actual age of each firm. However, as long as we use the proxy, the variable *Firm Age* is constrained by *Construction*. To take into account this constraint, we ran all our estimations including a dummy equal to 1 for all firms with the same maximum age. All results remain unchanged and the dummy is statistically insignificant.

[18] The dummy *Limited Liability Company* is weakly significant; we drop it from other specifications since it does not affect results.

[19] Specification 1 of Table 4 repeats Specification 11 of Table 3 (using *Province* × *Time* fixed effects); Specification 2 uses the interactions *Industry* × *Time*; Specification 3 *Region* × *Time*; Specification 4 *Region* × *Industry*; and Specification 5 *Region* × *Industry* × *Time*.

firms, with almost identical negative coefficients, and by construction firms with a negative coefficient of double magnitude.

To verify whether the factors associated with the return to the performing state change over time, we split our sample period into three phases. The first phase spans from 2008 to 2010 and coincides with the global financial crisis; the second phase spans from 2011 to 2013 and coincides with the involvement of Italy in the euro-area sovereign debt crisis; and the third phase starts in 2014 and coincides with 'normal conditions' until the COVID-19 pandemic. The regression model is augmented with the three dummies identifying the three phases and interacting each of them with all the covariates in a single empirical model (e.g., Morck et al., 1988) so as to gain efficiency compared with a simple sample splitting and to allow direct comparison between the coefficients. For this exercise we use Specification 5 of Table 6 as our CR baseline estimation since it includes the complete set of regressors. Table 7 repeats the same specification in the first column (labelled as Total) and reports in the remaining columns the coefficients of the same set of covariates interacted with the three phase dummies. Results show that the signs and the statistical significance of all regressors remain stable across the three phases. However, the magnitude of the coefficients decreases slightly for two variables in the last phase: *Debt Size* and the dummy *Medium-Large*. The difference turns out to be mild but statistically significant, which suggests that the size effect tends to decrease in normal conditions.

5.2 Sample with firm balance sheet variables

In this section, we discuss results from the matched CR-Cerved data containing information on firms' balance sheets. First of all, Table 8 compares the results obtained with the first and the second sample. Since two covariates (the two dummies *Producer Households* and *Medium-Large*) are poorly represented in the Cerved database, they are dropped in Specifications 2 of Table 8. The comparison between the two samples shows that the signs, statistical significance and magnitude of coefficients are unchanged for all variables. This outcome allows us to extend the analysis to the firm characteristics available in the Cerved archive without any concerns about sample selection.

In Table 9, firm characteristics are first included one-by-one to verify their stability and then estimated simultaneously and along with the exposure characteristics. The results of all the factors discussed so far are confirmed.[20] Regarding firm characteristics, *Firm Capital* and *ROA* are positively associated with the probability of a UTP firm returning to the performing state; while *Firm Size* is negatively associated, implying that for larger firms (once they have been classified as UTPs) it is

[20] This also holds for the variable *Firm Age (actual)*, which from now onwards replaces the previous proxy variable.

harder to recover (Specifications 5-9).[21] Other studies show that larger firms are more unlikely to be downgraded as non-performing borrowers (Bonaccorsi and Finaldi, 2017; Bofondi et al., 2019), we find that they are also more unlikely to recover once the downgrade occurs. Results also confirm that the *Number of Creditor Banks* is negatively associated with the probability of a UTP firm recovering (Specifications 9 and 10).[22]

To further explore the role of *Firm Size* and to verify the possible presence of non-linearities in the relationship between *Firm Size* and the probability of a firm returning to the performing state, in Table 10 we experiment (i) with the inclusion of the squared term of the variable (Specification 2): the results reject the hypothesis of non-linearities; and (ii) with the splitting of the variable into three dummies for the three terciles of the variable distribution: the results confirm that the probability is higher for smaller firms (those in the first tercile) and lower for larger firms (those in the third tercile). The results by sub-period (Table 11), obtained as earlier by interacting all covariates with the three span dummies (*global financial crisis*, *sovereign debt crisis* and *normal conditions*) in a single empirical model, confirm that the role of *Firm Size* remains significantly negative in all phases, but the coefficients' magnitude decreases in normal conditions (the difference compared with the previous phases is statistically significant).

Location and industry may not only have a direct effect on the likelihood that a UTP firm may recover, but they may also affect the role of the other factors. To investigate this possibility, we estimate again Equation (1) by interacting each regressor in the matrixes C^{EXP} and C^{FIR} with the four macro-area dummies (*North-West*; *North-East*; *Centre*; *South and Islands*) and the four industry dummies (*Agriculture*, *Construction*, *Manufacturing* and *Services*). These regressions (unreported but available from the authors) show that relations are univocal across regions and branches of economic activity. However, they also show that the effect of *Firm Size* is much stronger in the regions of the North and in the Construction sector, while the effect of *Collateral* is stronger in the provinces of the Centre and South and in Services.

In addition to the statistical significance, it is possible to estimate which exposure and firm characteristics are more closely linked, in economic terms, to the probability of a firm recovering. Results are reported in Table 12 (probability of returning to the performing state by year of

[21] Specifications 5-9 alternate the use of the pair of variables *Firm Size* and *Debt Size* because of their collinearity. When the two variables are both included (Specification 5), the coefficient of *Debt Size* remains statistically negative (such as in the previous estimations), while the coefficient of *Firm Size* turns out to be statistically insignificant. When the two covariates are utilized alternatively (Specifications 6 and 7), each of them results significantly negative. It should be noted that in all cases all the other results remain unchanged, even when both the variables are omitted (Specification 8). In a nutshell, our results show clearly that *Firm Size* is negatively associated with the probability of a UTP firm returning to the performing state.

[22] Specifications 9 and 10 couple with Specifications 6 and 7 replacing *Debt Size* with *Number of Creditor Banks*. It should be noted that the contemporaneous presence of the pair *Firm Size* and *Number of Creditor Banks* does not alter the results.

classification as UTP and by branch of economic activity) and in Table 13 (by firm and exposure characteristics). Table 12 reports the results computed on both samples (only CR and CR + Cerved). The results referring to the small sample are necessary as a benchmark to assess the magnitude of the firm characteristics (reported in Table 13), which can only be computed on this sample.[23]

The average probability of a UTP firm between 2008 and 2016 returning to the performing state within three years is equal to 14.1 per cent. It is worth stressing that this probability changes strongly over time (Table 12). It is 21.6 per cent in 2008, at the onset of the global financial crisis; it drops throughout the two crises up to a minimum equal to 10.6 per cent in 2013; and then climbs up again reaching 16.5 per cent in 2016 (the last year for which it is possible to compute the three-year probability). The drop during the two crises is explained by the severe double-dip recession experienced by the Italian economy in those years, with the addition of a strong credit crunch characterized by the rising cost of credit and the contraction of lending amounts.[24] However, it is worth remarking that the average probability of a UTP firm returning to the performing state has never been negligible, even in the midst of the crises. On the other hand, the upturn in the probability of recovery in the years following the two crises is a confirmation that a UTP firm's return to the performing state is more likely when cyclical economic conditions and loan growth rates improve. By branch of economic activity, the average probabilities are 11.2 per cent for *Construction*, 14.4 per cent for *Services* and 15 per cent for *Manufacturing*.

Table 13 shows that the two firm characteristics most closely related (in economic terms) with the return to the performing state are *Firm Size* and *Firm Capital*. Moving from the 10th to the 90th percentile of the distribution of the variable *Firm Size* (i.e., from a firm with total assets of approximately €194,000 to a firm with total assets of about €7 million), the probability of recovery drops from 15.2 to 9.8 per cent (a 35 per cent decrease). Likewise, the probability of returning to being a performing firm is equal to 9.5 per cent at the 10th percentile of *Firm Capital* and it rises to 14.4 per cent at the 90th percentile. The estimated relation is milder for *ROA* and Collateral. Once again the effect of *Debt Size* mirrors almost exactly the results of *Firm Size* and corroborates our

[23] To this end, we use again Specifications 6 and 9 of Table 9 as our baseline specifications and compute the *ceteris paribus* estimated probability of a UTP firm returning to the performing state (changing the distribution percentile of each covariate and keeping all the other regressors steady at that time). In Table 12 we report the average probability of the sample (overall, by year and by sector). It coincides with the changing probability over time of a UTP firm returning to the performing state estimated year-by-year through a specification akin to that of Specification 6 of Table 9, whereas time and province fixed effects are estimated separately rather than in interaction.

[24] Italy lost 6.8 per cent of GDP in the biennium 2008-2009. After a short and shallow recovery in 2010 (1.1 per cent), Italy was hit by the euro-area sovereign debt crisis in 2011, which led to an additional 4.8% drop in GDP. The scarcity of bank loans may have exacerbated the downturn of UTP firms returning to the performing state during the crises and may have favoured the upturn subsequently. This issue is the subject of Section 6.

choice of keeping only one.[25] The effect of the *Number of Creditor Banks* is not large in economic terms: it is 13 per cent with one lender and decreases to 11 per cent with five lenders.

The probability of a UTP firm returning to the performing state changes greatly across Italy's administrative provinces (Figure 4). Such as for the macro-areas, the provinces with the highest odds of recovering tend to be in the North and those with the lowest odds in the South. However, there are several exceptions, both among positive and negative outcomes. The different probability of returning to the performing status across provinces is probably linked to different local economic conditions and trends. However, it may also have to do with how long it takes to recover credit through the court system in different parts of the country. While civil law and procedures are formally the same across Italian regions, the effectiveness and efficiency of local courts vary significantly (Djankov et al., 2003; Carmignani and Giacomelli, 2009) with significant economic effects (Giacomelli and Menon, 2013), including on financial conditions (Jappelli et al, 2005) and debtor behaviour (Schiantarelli et al., 2016).

6. Bank heterogeneity

So far we have shown that the probability of a UTP firm returning to the performing state is correlated with the initial characteristics of both the debt and the firm. In this section we explore whether and to what extent the probability that a firm may recover from the UTP state is also correlated to creditor bank characteristics. The literature on financial distress documents that the probability of a firm's default depends not only on where the firm stands in terms of fundamentals, but also on the creditor characteristics since even creditors that normally play a passive role in firms' operations can become highly influential in the firm's destiny at crucial decision-making points (Gilson et al., 1990; Morris and Shin, 2004; Brunner and Krahnen, 2008; Hertzberg et al., 2010; Lee, 2013). The same argument may apply when the crucial decision-making point regards the firm's recovery. Creditors' decisions to grant or deny refinancing, to accept or decline private restructuring terms, and the quality and sophistication of their lending officers may influence both the firm's likelihood of a definite default and of its recovery.

The empirical literature on firms' distress typically uses bank balance sheet features to proxy for banks' lending policy and quality of the lending officers and uses financial soundness and

[25] The results of the variable *Debt Size* are computed using Specification 7 of Table 9 (which includes *Debt Size* while excluding *Firm Size*). The impact of all the other regressors on the estimated probabilities are very similar using this specification.

efficiency indicators to capture lenders' ability to assist firms in difficulty.[26] We follow the same approach and analyse the conditional correlation of four variables: *Bank Capital*; *Bank Bad Loans*; *Bank ROA* and *Bank Size*.[27] In the literature on firm defaults, *Bank Capital* is associated inversely with the rise in defaults because banks with low capital bases may have a moral hazard incentive to engage in risky lending practices;[28] *Bank Bad Loans* is associated positively because banks with poor credit quality have further moral hazard incentives to increase the riskiness of their loan portfolio;[29] and *Bank ROA* is associated negatively because highly profitable banks have fewer incentives to engage in high-risk activities.[30]

Accordingly, we extend Equation (1) estimating the following Equation (2):

$$\text{Prob}(y_{i,j,t}=1) = \beta'_1 C^{EXP}_{i,t-1} + \beta'_2 C^{FIR}_{i,t-1} + \beta'_3 C^{BAN}_{j,t} + \gamma'_1 \text{pt} + \gamma'_2 \text{b} + \eta_{i,,j,t} \quad (2)$$

where $y_{i,j,t}$ is equal to 1 if the firm i, borrower of the bank j, classified as a UTP firm for the first time at time t, returns to the performing state within three years. Unlike Equation (1), the model of Equation (2) is estimated with bank-firm data. The suffix j in the dependent variable $y_{i,j,t}$ detects all banks j that are creditors of the firm i at the time t. This allows Equation (2) to relate firm i's creditor banks to the matrix of regressors C^{BAN} and the vector of bank fixed effects b. The matrix C^{BAN} contains the four bank variables. While all the other components of Equation (2) are defined as in Equation (1), β_3 and γ_2 are vectors of coefficients and η is a vector of identically and independently distributed errors.

In order to estimate Equation (2), we match the CR and Cerved data with the data drawn from the Bank of Italy's Supervisory Reports on bank balance sheets. We aggregate data at the banking group level for banks belonging to groups since lending policy decisions, including those on distressed firms, are mostly taken at group level. We build pro-forma data to control for M&As (that is, we consider banks A and B as a sole entity for the whole period if bank A acquires bank B during

[26] For example Berger and De Young (1997); Keeton (1999); Espinoza and Prasad (2010); Macit (2012); Louzis et al. (2012); Klein (2013); Messai and Jouini (2013); Jakubik and Reininger (2013); Makri et al. (2014); Ghosh (2015); Angelini et al. (2017).

[27] In the literature on firm defaults, the rise of defaults is associated: (i) inversely to bank capitalization because banks with low capital bases may have a moral hazard incentive to engage in risky lending practices along with poor credit scoring (Keeton and Morris, 1987; Klein, 2013; Messai and Jouini, 2013; Makri et al., 2014); (ii) positively to the amounts of accumulated NPLs because banks with poor credit quality have further moral hazard incentives to increase the riskiness of their loan portfolio (Keeton and Morris, 1987; Keeton, 1999; Espinoza and Prasad, 2010; Messai and Jouini, 2013; Klein, 2013; Jakubik and Reininger, 2013; Ghosh, 2015); and (iii) negatively to profitability because highly profitable banks have fewer incentives to engage in high-risk activities (Berger and De Young, 1997; Louzis et al., 2012; Jakubik and Reininger, 2013).

[28] Keeton and Morris, 1987; Klein, 2013; Messai and Jouini, 2013; Makri et al., 2014.

[29] Keeton and Morris, 1987; Keeton, 1999; Espinoza and Prasad, 2010; Messai and Jouini, 2013; Klein, 2013; Jakubik and Reininger, 2013; Ghosh, 2015.

[30] Berger and De Young, 1997; Louzis et al., 2012; Jakubik and Reininger, 2013.

the period).[31] Descriptive statistics for the bank variables are presented in Table 14. The final dataset counts a larger number of observations compared to the previous exercises because multiple-bank firms are repeated as many times as the number of creditor banks. This is standard in the literature on bank-firm relationships (e.g., Khwaja and Mian, 2008; Jiménez et al., 2013; Gobbi and Sette, 2014). Indeed, these repetitions enable the inclusion of bank fixed effects *b* (which control for lender fixed effects) and the double clustering at firm and bank level (to obtain standard errors robust to heteroskedasticity and check for any autocorrelations within the same clusters). On the other hand, in order to take into account that a bank's loan officer may have a different role in the borrower's destiny according to the size of the credit, bank covariates are weighted by the loans granted by each bank as a share of the total debt of each firm.

6.1 Baseline bank characteristics

Results of Equation (2) are reported in Table 15. First, we replicate the previous exercises with the bank-firm dataset: Specifications (a1) and (a2) repeat the estimations with all UTP firms in the CR archive (such as in Tables 3-7); Specifications (b1) and (b2) replicate the estimations with the sample of firms resulting from the matching of CR and Cerved data (such as in Tables 8-13). In both cases, all previous results are confirmed.

Specification (c) adds the four bank covariates.[32] Results show that, while the results of firm and exposure characteristics are confirmed, bank characteristics do matter as well. *Bank Size*, *Bank Capital* and *Bank ROA* are significantly and positively correlated to the probability that a UTP firm will recover, while *Bank Bad Loans* is significantly and negatively correlated. The effects of *Bank Capital* and *Bank Bad Loans* are also significant in economic terms, even though smaller than the economic effects of firm characteristics. Using the estimated marginal effects of Specification (c), the probability of returning to the performing state rises from 10.2 to 13 per cent moving from the 10th to the 90th percentile of the *Bank Capital* variable, and it drops from 12.9 to 9.1 per cent moving from the 10th to the 90th percentile of the *Bank Bad Loans* variable.

These results complement those of two strands of research. First, they parallel the findings of the literature on firm defaults. This literature finds that the more profitable and better capitalized

[31] Since lending policy decisions are mostly taken at bank group level, we also include UTP disposals, when they remain in the same banking group (that is, when the UTP loan is transferred to other banks or to other financial vehicles or intermediaries of the same group). Instead, when UTP loans are transferred outside the banking group, we exclude them from the estimations because, although these UTP firms may still return to the performing state, it is unlikely that their return to the performing state is related to the characteristics of the banks that sold the UTP loan outside the group.

[32] The number of observations is much larger than in the previous exercises (respectively, about 586,000 and 283,000 observations) because of multiple-bank firms. The number of observations in Specification (c) slightly decreases in respect of Specification (b), almost 240,000 versus 283,000 observations, because of the firms that borrow from non-bank intermediaries or whose loans have been securitized and derecognized from Italian banking groups' balance sheets.

banks and those less saddled with credit portfolios of poor quality select their borrowers better and accumulate fewer (new) bad loans. We find that banks with these characteristics are also more likely to be associated with UTP firms that return to the performing state. Second, our results match those of the recent body of research studying the relation between weak banks and the risk of credit misallocation.[33] The literature points out that less capitalized banks and banks with higher NPL ratios are less able to select the creditworthiness of borrowers (and keep on lending to unproductive firms). We find that banks with these characteristics are also less likely to be associated with the most credit-worthy UTP firms that return to the performing state.

6.2 Bank characteristics by period and type of bank-firm relationship

Table 16 shows the interaction of the bank variables with the three span dummies defined above in a single empirical model. Results show that the positive relation between *Bank Capital* and the probability of firms' recovering is significantly confirmed in each phase, while notably *Bad Loans* becomes insignificant in the last span, exactly when many banks reduced their NPL burden through sales.

Since the number of creditors may have a direct and independent impact on the relations between bank characteristics and the probability of a firm returning to the performing state, in the estimations of Table 17, we interact the bank variables with two dummies (again in a single empirical model): the first dummy is equal to 1 for single-bank firms and the second dummy is equal to 1 for multiple-bank firms. It is interesting to note that in the two firm-bank relationship settings, the results of firm characteristics do not change - only the magnitude of some coefficients differs. Mainly, results confirm that *Bank Capital* and *Bank Bad Loans* are significantly and uniformly associated (positively and negatively respectively) with the probability of firms' recovery for both types of bank-firm relationships.[34]

[33] For example, Peek and Rosengren (2005); Caballero et al. (2008); Albertazzi and Marchetti (2010); Blattner et al. (2017); Schivardi et al. (2017); Acharya et al. (2019); Passalacqua et al. (2019).

[34] The results of the *Bank Size* variable are less stable. However, the magnitude of the economic impact of the variable is constantly very low. *Bank Size* is positive in the overall estimation, it is negative in the third span, and it is positive for multiple-bank firms and negative for single-bank firms. In other terms, a UTP firm is more likely to recover when it borrows from a small single-creditor bank; however, if it borrows jointly from more banks, its chances of recovery grow if its multiple creditor banks are larger. The negative result of *Bank Size* in our third span is explained by the increasing share of single-bank firms in the last years of the sample. In fact, in an unreported estimation (and available upon request) with triple interactions between *single- and multiple-bank firms* × *bank characteristics* × *time spans*, *Bank Size* is significantly negative in the last phase for single-bank firms and statistically insignificant for multiple-bank firms.

7. Robustness checks: UTP firms that temporarily return to the performing state

In the estimations described so far our dependent variable is set to $y_{i,t} = 0$ if a UTP firm is reported as non-performing at the end of the third year, *even if it temporarily reverted to the performing state in at least one quarter during the three years*. We run a set of robustness checks on these firms. Specification (1) of Table 18 repeats as a benchmark Specification (d) of Table 15 (i.e., the full-regressor specification including bank covariates). Then, we carry out the following checks.

First, we drop all observations referring to these firms. All results remain confirmed (Specification 2). Likewise, unreported (and available) results remain unchanged even if only firms that have experienced a longer period in the performing state (at least three quarters, half time, etc.) are removed.

Second, we invert the baseline hypothesis and treat those temporarily performing firms as firms that have definitely returned to the performing state, that is, we add them to $y_{i,t} = 1$. Again results remain unchanged (Specification 3).[35]

Third, we carry out a new logit model where the dependent variable is $w_{i,t} = 1$ when the firm is a temporarily performing firm, while it is $w_{i,t} = 0$ when the firm has never returned to the performing state (therefore, in this exercise, the firms that have definitely returned to the performing state are excluded). Results indicate that the firm characteristics significantly associated with the probability of a temporary return to the performing state coincide with those associated with the permanent return (Specification 4). However, the smaller magnitude of the coefficients of *Firm Size*, *Capital*, *ROA* and *Age* suggest that the role of the factors is minor in the case of a temporary recovery and thus the transition process appears easier. Bank-side factors also present the same signs.

Finally, we run a linear-regression model, where the dependent variable is a continuous variable counting (in natural logarithms) the total number of quarters in which each temporary performing firm has been classified in the performing state (again firms that have definitely recovered are excluded from the exercise). Results indicate that irrespective of the magnitude of coefficients, which are not directly comparable because of the different regression model, all factors related to the probability of returning to the performing state (including bank health indicators) have the same association with the length of the temporary recovery (Specification 5).

[35] Only Bank Size turns out to be statistically insignificant. Again we tried different subsets of firms: either including in $y_{i,t} = 1$ all firms that have experienced a period of performing state of any length; or only those that have experienced a long period (more than half the time) and the results are stable.

8. Conclusions

NPLs are divided into different classes, characterized by different degrees of difficulty of the debtor and riskiness for the bank. UTPs may play an important role because, unlike bad debts, they present a non-negligible probability of returning to the performing state. A UTP firm's recovery implies that a solution has been found to the debtor's distress and therefore that the firm comes back to healthy activity, with positive effects for the real economy in terms of production and employment, and for financial stability in terms of less vulnerable firms and a reduction of impaired loans and related provisions and losses in banks' balance sheets. Detecting the factors mostly related to the probability of a UTP firm recovering may be useful to assess the adequacy of bank loan loss provisions and to identify possible private and public measures that may increase the likelihood of the recovery, in normal times as well as during the pandemic, since the share of UTP firms that have returned to the performing state has never been negligible, even during the crises. Our results indicate in fact that the probability of a UTP firm returning to the performing state within three years presents a high dispersion over time, including controlling for loan and firm characteristics, from 10.6 per cent in 2013 to 16.5 per cent in 2016, which was the last year for which it can be calculated.

The probability of a UTP firm returning to the performing state is negatively associated with its size and the absolute value of total debt, while it is positively associated with its endowment of capital. The firm's profitability, age, and the ratio of collateralized debt to total debt are positively associated with the probability of returning to the performing state, but with a smaller economic effect. The geographical location of the companies and the sector of economic activity matter significantly: UTP firms in the North of Italy are more likely to return to the performing state than those in the Centre and the South. Construction firms are less likely to recover than those in the other sectors. On the other hand, firm characteristics related to the return to the performing state do not present heterogeneous effects across areas and sectors.

The probability of a UTP firm recovering is also associated with the number and the characteristics of the lending banks. UTP firms borrowing from fewer banks and those that are clients of sounder banks have a higher probability of returning to the performing state. The magnitude of the economic effects related to bank characteristics is however lower than the magnitude of the economic effects related to firm characteristics.

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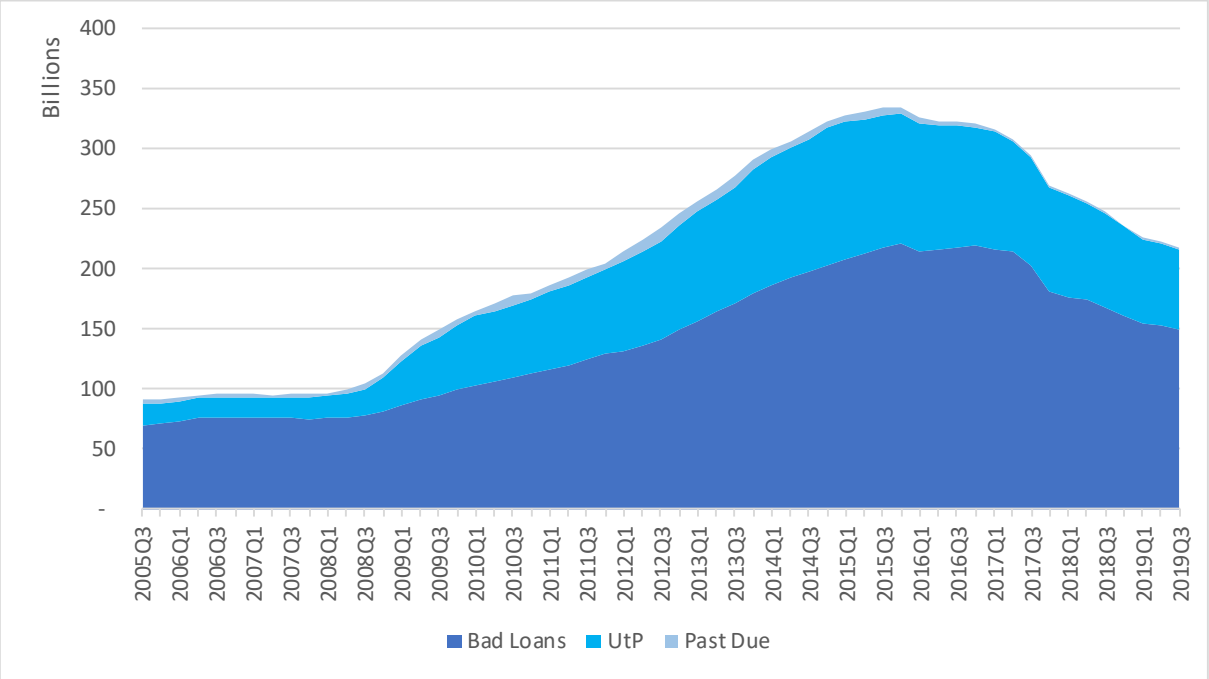
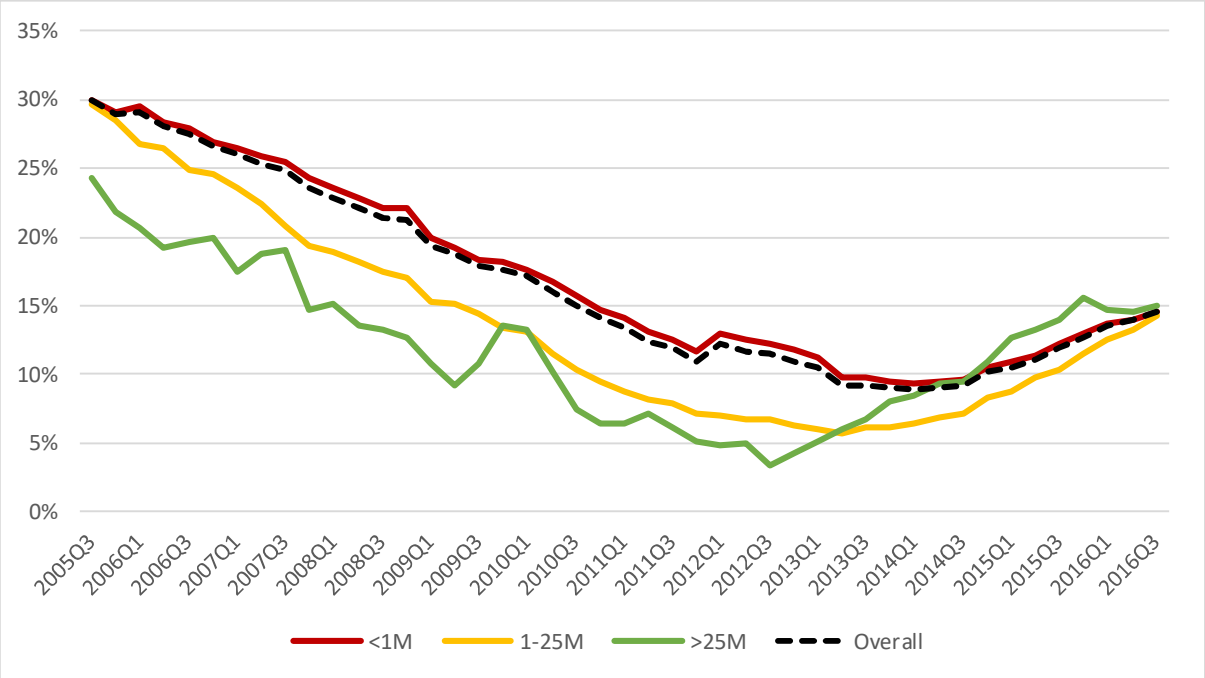
Figures and Tables

Figure 1. Gross NPL outstanding amounts towards Italian firms (2005 – 2019)



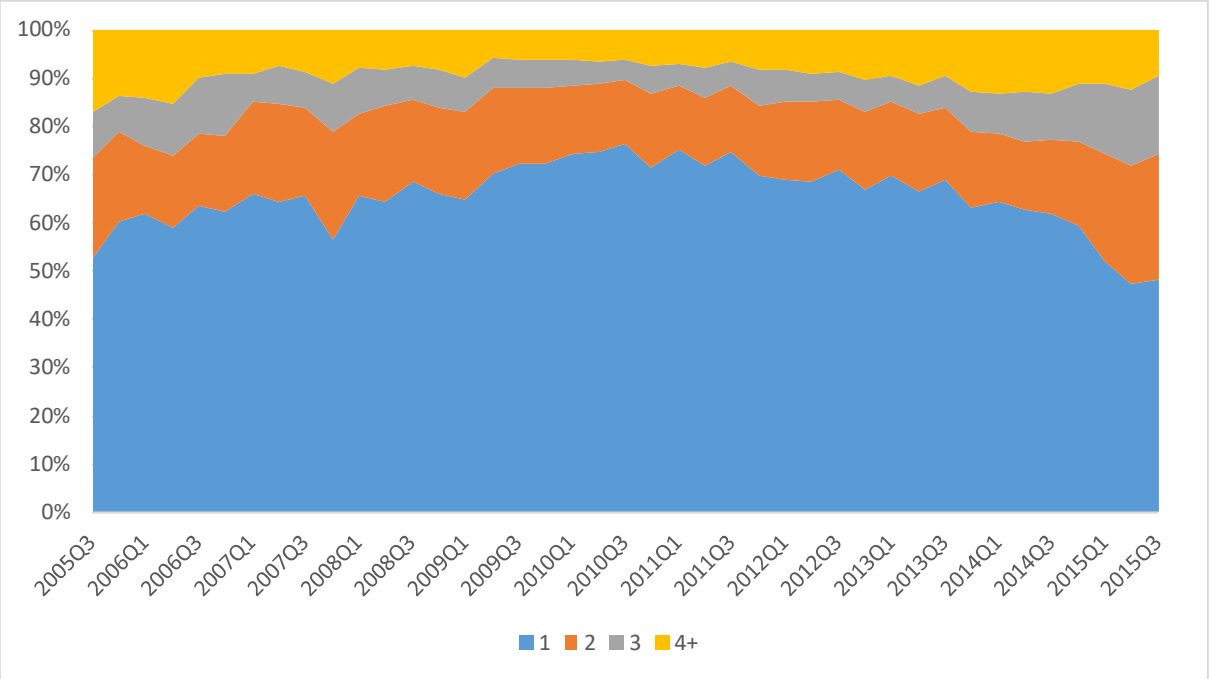
Source: Authors' calculations based on CR data.

Figure 2. Percentage of UTP firms once again in the performing state by year and debt size



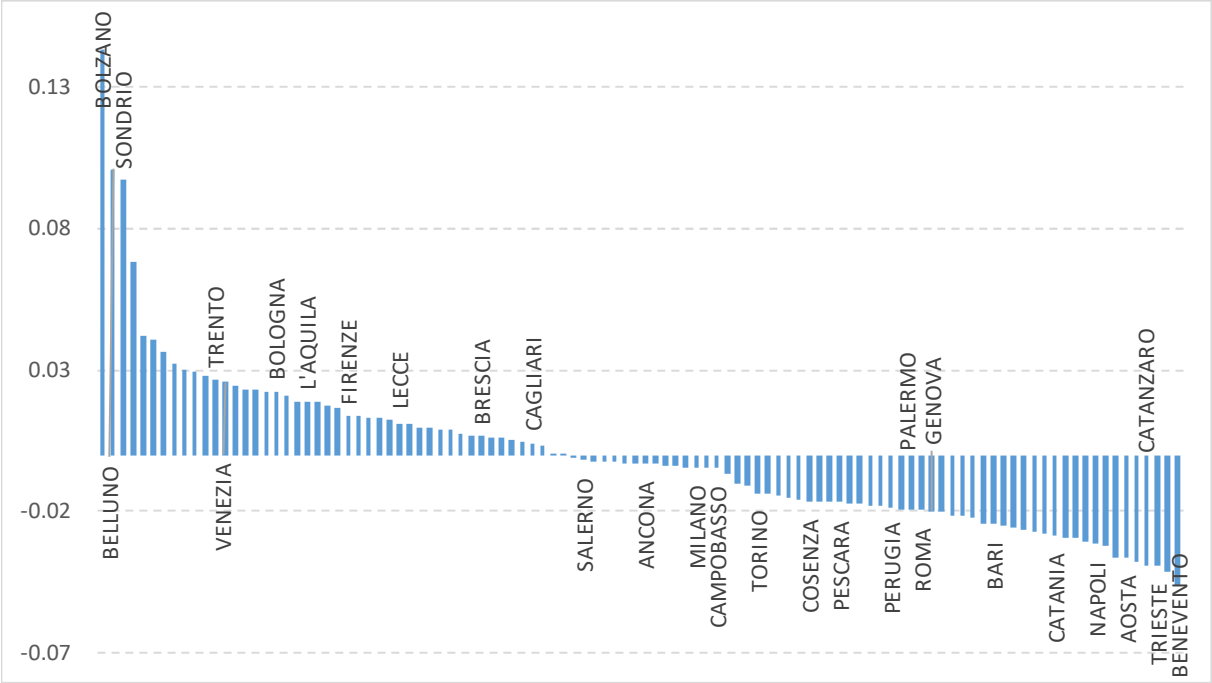
Source: Authors' calculations based on CR data.

Figure 3. Distribution of years elapsed before returning to the performing state by year of classification in the UTP state



Source: Authors' calculations based on CR data.

Figure 4. Probability of a UTP firm returning to the performing state by location



Source: Authors' calculations based on estimation of Equation (1), Specification 6 of Table 9.
Firm location refers to the province of the firm's head office.

Table 1. Exposure (and some firm) characteristics: descriptive statistics of the large sample drawn from the Italian Credit Register (CR) census data

Variable	Description	N	Mean	SD	P25	P50	P75
Debt Size	Natural logarithm of the overall gross debt of each firm	285.528	12,1	1,6	11,1	11,9	13,0
Number of Creditor Banks	Natural logarithm of the number of banking groups or stand-alone banks lending to each borrower	285.528	1,0	0,4	0,7	0,7	1,1
Collateral	Ratio between collateralized loan amount and total gross debt at firm level	285.528	0,3	0,4	0,0	0,0	0,8
Firm Age (proxy)	The years from the first year in which the firm is reported in the CR	285.528	2,0	0,8	1,6	2,1	2,6
Impairment Length	Natural logarithm of the number of years elapsed for each firm since it was classified as a non-performing firm for the first time	285.528	0,8	0,2	0,7	0,7	0,7
Medium-Large	Dummy equal to 1 if the firm has more than 20 employees	285.528	0,4	0,5	0,0	0,0	1,0
Producer Households	Dummy equal to 1 if the firm belongs to the producer household sector	285.528	0,4	0,5	0,0	0,0	1,0
Limited Liability Company	Equal to 1 if the firm is a limited liability company	285.528	0,4	0,5	0,0	0,0	0,0

Table 2. Exposure and firm characteristics: descriptive statistics of the smaller sample, matching Italian Credit Register (CR) and Cerved (firm balance sheet) data

Variable	Description	N	Mean	SD	P25	P50	P75
Firm Size	Natural logarithm of each firm's total assets	105.852	7,0	1,5	6,1	7,0	8,0
Firm Capital	Ratio between capital and total assets	105.852	0,0	0,6	0,0	0,0	0,1
Firm ROA	Ratio between profits and total assets	105.852	0,0	0,2	0,0	0,0	0,1
Debt Size	Natural logarithm of the overall gross debt of each firm	105.852	13,0	1,6	11,8	12,9	14,0
Number of Creditor Banks	Natural logarithm of the number of banking groups or stand-alone banks lending to each borrower	105.852	1,2	0,5	0,7	1,1	1,4
Collateral	Ratio between collateralized loan amount and total gross debt at firm level	105.852	0,3	0,4	0,0	0,0	0,6
Firm Age (actual)	The effective age of each firm	105.852	2,3	0,9	1,8	2,3	2,9
Impairment Length	Natural logarithm of the number of years elapsed for each firm since it was classified as a non-performing firm for the first time	105.852	0,7	0,1	0,7	0,7	0,7
Medium-Large	Dummy equal to 1 if the firm has more than 20 employees	105.852	1,0	0,1	1,0	1,0	1,0
Producer Households	Dummy equal to 1 if the firm belongs to the producer household sector	105.852	0,0	0,0	0,0	0,0	0,0
Limited Liability Company	Equal to 1 if the firm is a limited liability company	105.852	0,9	0,2	1,0	1,0	1,0

Table 3. Initial exposure (and some firm) characteristics associated with the probability of a UTP firm returning to the performing state

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on Italian Credit Register (CR) census data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Debt Size	-0.0839***								-0.141***		-0.141***	
	(0.00361)								*(0.00446)*		*(0.00445)*	
Number of Creditor Banks		-0.108***								-0.153***		-0.155***
		(0.0127)								*(0.0142)*		*(0.0142)*
Collateral			0.424***						0.430***	0.280***	0.430***	0.279***
			(0.0131)						*(0.0145)*	*(0.0137)*	*(0.0145)*	*(0.0137)*
Firm (proxy) Age				0.292***					0.356***	0.306***	0.356***	0.306***
				(0.00809)					*(0.00869)*	*(0.00882)*	*(0.00869)*	*(0.00882)*
Impairment Length					-0.715***				-0.986***	-0.936***	-0.986***	-0.937***
					(0.0391)				*(0.0399)*	*(0.0398)*	*(0.0399)*	*(0.0398)*
Limited Liability Company						-0.398***			-0.0261	-0.0808**		
						(0.0118)			*(0.0338)*	*(0.0338)*		
Medium-Large							-0.406***		-0.126***	-0.178***	-0.150***	-0.252***
							(0.0116)		*(0.0347)*	*(0.0346)*	*(0.0156)*	*(0.0153)*
Producer Household								0.368***	0.0953***	0.160***	0.0952***	0.160***
								(0.0113)	*(0.0152)*	*(0.0150)*	*(0.0152)*	*(0.0150)*
Constant	-0.539***	-1.465***	-1.726***	-2.074***	-1.051***	-1.452***	-1.441***	-1.716***	0.103	-1.357***	0.105	-1.356***
	(0.147)	*(0.141)*	*(0.142)*	*(0.142)*	*(0.144)*	*(0.142)*	*(0.142)*	*(0.141)*	*(0.155)*	*(0.147)*	*(0.155)*	*(0.147)*
Observations	285527	285527	285527	285527	285527	285527	285527	285527	285527	285527	285527	285527
Province × Time FEs	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Table 4. Initial exposure (and some firm) characteristics associated with the probability of a UTP firm returning to the performing state - Different sets of interacted FEs.

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on Italian Credit Register (CR) census data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)
Debt Size	-0.141***	-0.127***	-0.133***	-0.124***	-0.137***
	(0.00445)	*(0.00440)*	*(0.00438)*	*(0.00435)*	*(0.00442)*
Collateral	0.430***	0.449***	0.444***	0.427***	0.442***
	(0.0145)	*(0.0144)*	*(0.0142)*	*(0.0145)*	*(0.0146)*
Firm Age (proxy)	0.356***	0.380***	0.366***	0.268***	0.356***
	(0.00869)	*(0.00864)*	*(0.00862)*	*(0.00825)*	*(0.00868)*
Impairment Length	-0.986***	-1.058***	-0.991***	-1.130***	-1.017***
	(0.0399)	*(0.0398)*	*(0.0397)*	*(0.0399)*	*(0.0399)*
Medium-Large	-0.150***	-0.211***	-0.192***	-0.218***	-0.181***
	(0.0156)	*(0.0154)*	*(0.0153)*	*(0.0154)*	*(0.0155)*
Producer Household	0.0952***	0.0526***	0.0832***	0.0849***	0.0778***
	(0.0152)	*(0.0154)*	*(0.0150)*	*(0.0153)*	*(0.0155)*
Constant	0.105	0.391***	-0.509***	-12.02	-0.293***
	(0.155)	*(0.0996)*	*(0.0677)*	*(17.71)*	*(0.0908)*
Observations	285527	285528	285527	285528	285517
Province × Time FEs	yes	no	no	no	no
Industry × Time FEs	no	yes	no	no	no
Region × Time FEs	no	no	yes	no	no
Industry × Regions FEs	no	no	no	yes	no
Industry × Regions × Time FEs	no	no	no	no	yes
Firm cluster	yes	yes	yes	yes	yes

Table 5. Initial exposure (and some firm) characteristics associated with the probability of a UTP firm returning to the performing state – By macro area

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on Italian Credit Register (CR) census data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)
Debt Size	-0.128***	-0.133***	-0.127***	-0.134***	-0.138***
	(0.00440)	*(0.00440)*	*(0.00440)*	*(0.00440)*	*(0.00440)*
Collateral	0.448***	0.441***	0.447***	0.446***	0.439***
	(0.0144)	*(0.0145)*	*(0.0144)*	*(0.0145)*	*(0.0145)*
Firm (proxy) Age	0.379***	0.368***	0.380***	0.367***	0.360***
	(0.00864)	*(0.00865)*	*(0.00864)*	*(0.00864)*	*(0.00865)*
Impairment Length	-1.051***	-1.039***	-1.055***	-1.032***	-1.015***
	(0.0398)	*(0.0398)*	*(0.0398)*	*(0.0398)*	*(0.0398)*
Medium-Large	-0.208***	-0.188***	-0.207***	-0.198***	-0.178***
	(0.0154)	*(0.0154)*	*(0.0154)*	*(0.0154)*	*(0.0155)*
Producer Household	0.0555***	0.0638***	0.0530***	0.0704***	0.0770***
	(0.0154)	*(0.0154)*	*(0.0154)*	*(0.0154)*	*(0.0154)*
North-West	0.104***				0.347***
	(0.0124)				*(0.0156)*
North-East		0.355***			0.542***
		(0.0128)			*(0.0159)*
Centre			-0.0831***		0.201***
			(0.0130)		*(0.0161)*
South and Islands				-0.358***	
				(0.0131)	
Constant	0.376***	0.377***	0.408***	0.597***	0.267***
	(0.0995)	*(0.0997)*	*(0.0996)*	*(0.0999)*	*(0.1000)*
Observations	285528	285528	285528	285528	285528
Industry × Time FEs	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes

Table 6. Initial exposure (and some firm) characteristics associated with the probability of a UTP firm returning to the performing state – By industry

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on Italian Credit Register (CR) census data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5) Baseline with only CR data
Debt Size	-0.145***	-0.141***	-0.137***	-0.138***	-0.141***
	(0.00444)	*(0.00445)*	*(0.00446)*	*(0.00447)*	*(0.00446)*
Collateral	0.427***	0.437***	0.446***	0.428***	0.445***
	(0.0145)	*(0.0145)*	*(0.0145)*	*(0.0145)*	*(0.0146)*
Firm Age (proxy)	0.353***	0.352***	0.348***	0.358***	0.345***
	(0.00868)	*(0.00873)*	*(0.00867)*	*(0.00870)*	*(0.00871)*
Impairment Length	-0.992***	-0.983***	-0.995***	-0.990***	-0.998***
	(0.0399)	*(0.0399)*	*(0.0399)*	*(0.0399)*	*(0.0399)*
Medium-Large	-0.148***	-0.149***	-0.125***	-0.144***	-0.125***
	(0.0156)	*(0.0156)*	*(0.0157)*	*(0.0156)*	*(0.0157)*
Producer Household	0.0579***	0.0991***	0.105***	0.103***	0.0743***
	(0.0154)	*(0.0152)*	*(0.0152)*	*(0.0152)*	*(0.0155)*
Agriculture	0.333***				
	(0.0223)				
Manufacturing		0.0790***			-0.245***
		(0.0159)			*(0.0262)*
Construction			-0.321***		-0.568***
			(0.0146)		*(0.0252)*
Services				0.0882***	-0.274***
				(0.0114)	*(0.0227)*
Constant	0.169	0.0959	0.130	0.0190	0.452***
	(0.154)	*(0.155)*	*(0.155)*	*(0.155)*	*(0.157)*
Observations	285527	285527	285527	285527	285527
Province × Time FEs	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes

Table 7. Initial exposure (and some firm) characteristics associated with the probability of a UTP firm returning to the performing state – By period

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on Italian Credit Register (CR) census data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	Total	**Global financial crisis**	**Sovereign Debt Size crisis**	**Normal conditions**
Debt Size	-0.141***	-0.167***	-0.186***	-0.0740***
	(0.00446)	*(0.00757)*	*(0.00786)*	*(0.00786)*
Collateral	0.445***	0.506***	0.400***	0.418***
	(0.0146)	*(0.0246)*	*(0.0268)*	*(0.0246)*
Firm (proxy) Age	0.345***	0.363***	0.370***	0.297***
	(0.00871)	*(0.0126)*	*(0.0169)*	*(0.0171)*
Impairment Length	-0.998***	-0.941***	-0.922***	-1.047***
	(0.0399)	*(0.0811)*	*(0.0722)*	*(0.0596)*
Medium-Large	-0.125***	-0.154***	-0.164***	-0.0606**
	(0.0157)	*(0.0260)*	*(0.0281)*	*(0.0278)*
Producer Household	0.0743***	0.0583**	0.129***	0.0462*
	(0.0155)	*(0.0253)*	*(0.0277)*	*(0.0279)*
Manufacturing	-0.245***	-0.258***	-0.274***	-0.190***
	(0.0262)	*(0.0434)*	*(0.0474)*	*(0.0460)*
Construction	-0.568***	-0.584***	-0.635***	-0.492***
	(0.0252)	*(0.0425)*	*(0.0457)*	*(0.0435)*
Services	-0.274***	-0.270***	-0.294***	-0.256***
	(0.0227)	*(0.0381)*	*(0.0412)*	*(0.0391)*
Constant	0.452***		0.689***	
	(0.157)		*(0.184)*	
Observations	285527		285527	
Province × Time FEs	yes		yes	
Firm cluster	yes		yes	

Table 8. Initial exposure (and some firm) characteristics associated with the probability of a UTP firm returning to the performing state – Comparison between CR (census) data and the dataset matching CR+Cerved (firm balance sheet) data

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based both on Italian Credit Register (CR) census data and on a dataset matching CR and Cerved (firm balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	CR sample		**CR-Cerved sample**	
	(1)	**(2)**	**(1)**	**(2)**
Debt Size	-0.141***	-0.166***	-0.162***	-0.163***
	(0.00446)	*(0.00403)*	*(0.00701)*	*(0.00700)*
Collateral	0.445***	0.501***	0.415***	0.418***
	(0.0146)	*(0.0139)*	*(0.0278)*	*(0.0278)*
Firm (proxy) Age	0.345***	0.355***	0.330***	0.331***
	(0.00871)	*(0.00867)*	*(0.0169)*	*(0.0169)*
Impairment Length	-0.998***	-0.992***	-0.807***	-0.807***
	(0.0399)	*(0.0399)*	*(0.0825)*	*(0.0825)*
Medium-Large	-0.125***		-0.732***	
	(0.0157)		*(0.0960)*	
Producer Household	0.0743***		0.161	
	(0.0155)		*(0.303)*	
Manufacturing	-0.245***	-0.306***	-0.307***	-0.314***
	(0.0262)	*(0.0257)*	*(0.0739)*	*(0.0737)*
Construction	-0.568***	-0.629***	-0.658***	-0.667***
	(0.0252)	*(0.0248)*	*(0.0727)*	*(0.0725)*
Services	-0.274***	-0.328***	-0.373***	-0.378***
	(0.0227)	*(0.0222)*	*(0.0711)*	*(0.0709)*
Constant	0.452***	0.762***	1.699***	0.992***
	(0.157)	*(0.154)*	*(0.307)*	*(0.294)*
Observations	285527	285527	105518	105518
Province × Time FEs	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes

Table 9. Initial firm characteristics associated with the probability of a UTP firm returning to the performing state

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on a dataset matching CR and Cerved (firm balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6) Baseline CR-Cerved 1	(7)	(8)	(9) Baseline CR-Cerved 2	(10)
Firm Size	-0.0130**			-0.0814***	0.0158	-0.142***			-0.112***	
	(0.00634)			*(0.00695)*	*(0.0126)*	*(0.00805)*			*(0.00968)*	
Firm Capital		0.962***		0.829***	0.681***	0.757***	0.690***	0.651***	0.739***	0.662***
		(0.0447)		*(0.0483)*	*(0.0450)*	*(0.0456)*	*(0.0445)*	*(0.0463)*	*(0.0453)*	*(0.0450)*
Firm ROA			1.552***	0.870***	0.961***	0.967***	0.958***	1.038***	0.979***	1.032***
			(0.0667)	*(0.0761)*	*(0.0788)*	*(0.0774)*	*(0.0783)*	*(0.0826)*	*(0.0779)*	*(0.0811)*
Debt Size					-0.174***		-0.164***			
					(0.0106)		*(0.00689)*			
Number of Creditor Banks									-0.166***	-0.330***
									(0.0255)	*(0.0208)*
Collateral					0.374***	0.274***	0.372***	0.174***	0.229***	0.126***
					(0.0281)	*(0.0274)*	*(0.0281)*	*(0.0267)*	*(0.0283)*	*(0.0263)*
Firm (actual) Age					0.214***	0.220***	0.217***	0.147***	0.233***	0.204***
					(0.0135)	*(0.0135)*	*(0.0133)*	*(0.0124)*	*(0.0136)*	*(0.0133)*
Impairment Length					-0.657***	-0.643***	-0.659***	-0.566***	-0.700***	-0.715***
					(0.0832)	*(0.0833)*	*(0.0832)*	*(0.0823)*	*(0.0837)*	*(0.0834)*
Manufacturing					-0.221***	-0.235***	-0.220***	-0.269***	-0.208***	-0.199***
					(0.0746)	*(0.0746)*	*(0.0746)*	*(0.0742)*	*(0.0746)*	*(0.0743)*
Construction					-0.598***	-0.618***	-0.599***	-0.625***	-0.612***	-0.610***
					(0.0736)	*(0.0736)*	*(0.0736)*	*(0.0732)*	*(0.0736)*	*(0.0733)*
Services					-0.308***	-0.324***	-0.311***	-0.292***	-0.313***	-0.283***
					(0.0719)	*(0.0719)*	*(0.0719)*	*(0.0715)*	*(0.0718)*	*(0.0715)*
Constant	-1.347***	-1.475***	-1.464***	-0.898***	1.001***	-0.134	0.981***	-1.051***	-0.144	-0.685**
	(0.266)	*(0.260)*	*(0.264)*	*(0.267)*	*(0.296)*	*(0.290)*	*(0.296)*	*(0.284)*	*(0.292)*	*(0.288)*
Observations	105518	105518	105518	105518	105518	105518	105518	105518	105518	105518
Province × Time FEs	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Table 10. Initial firm characteristics associated with the probability of a UTP firm returning to the performing state – Focus on firm size

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on a dataset matching CR and Cerved (firm balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Size	-0.142***	-0.00446					
	(0.00805)	*(0.0577)*					
Firm Size squared		-0.00943**					
		(0.00397)					
Firm small			0.255***			0.452***	
			(0.0225)			*(0.0271)*	
Firm medium				0.118***		0.335***	-0.116***
				(0.0201)		*(0.0245)*	*(0.0240)*
Firm large					-0.380***		-0.452***
					(0.0226)		*(0.0271)*
Firm Capital	0.757***	0.752***	0.697***	0.653***	0.722***	0.734***	0.734***
	(0.0456)	*(0.0461)*	*(0.0459)*	*(0.0470)*	*(0.0476)*	*(0.0472)*	*(0.0472)*
Firm ROA	0.967***	0.961***	1.006***	1.031***	0.968***	0.963***	0.963***
	(0.0774)	*(0.0780)*	*(0.0799)*	*(0.0831)*	*(0.0802)*	*(0.0792)*	*(0.0792)*
Collateral	0.274***	0.269***	0.231***	0.171***	0.245***	0.262***	0.262***
	(0.0274)	*(0.0274)*	*(0.0273)*	*(0.0267)*	*(0.0270)*	*(0.0273)*	*(0.0273)*
Firm (actual) Age	0.220***	0.218***	0.181***	0.147***	0.198***	0.208***	0.208***
	(0.0135)	*(0.0135)*	*(0.0129)*	*(0.0125)*	*(0.0131)*	*(0.0133)*	*(0.0133)*
Impairment Length	-0.643***	-0.642***	-0.603***	-0.569***	-0.628***	-0.637***	-0.637***
	(0.0833)	*(0.0833)*	*(0.0828)*	*(0.0824)*	*(0.0831)*	*(0.0832)*	*(0.0832)*
Manufacturing	-0.235***	-0.236***	-0.252***	-0.273***	-0.255***	-0.249***	-0.249***
	(0.0746)	*(0.0745)*	*(0.0744)*	*(0.0741)*	*(0.0744)*	*(0.0745)*	*(0.0745)*
Construction	-0.618***	-0.621***	-0.615***	-0.632***	-0.631***	-0.625***	-0.625***
	(0.0736)	*(0.0736)*	*(0.0734)*	*(0.0732)*	*(0.0734)*	*(0.0735)*	*(0.0735)*
Services	-0.324***	-0.324***	-0.305***	-0.295***	-0.323***	-0.325***	-0.325***
	(0.0719)	*(0.0719)*	*(0.0717)*	*(0.0714)*	*(0.0717)*	*(0.0718)*	*(0.0718)*
Constant	-0.134	-0.612*	-1.180***	-1.089***	-0.980***	-1.383***	-0.931***
	(0.290)	*(0.350)*	*(0.286)*	*(0.283)*	*(0.283)*	*(0.285)*	*(0.284)*
Observations	105518	105518	105518	105518	105518	105518	105518
Province × Time FEs	yes	yes	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes	yes	yes

Table 11. Initial firm characteristics associated with the probability of a UTP firm returning to the performing state – By period

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (1). Estimations are based on a dataset matching CR and Cerved (firm balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	Total (Baseline 1) (CR-Cerved)	**Global financial crisis**	**Sovereign Debt Size crisis**	**Normal conditions**
Firm Size	-0.142***	-0.206***	-0.195***	-0.0348***
	(0.00805)	*(0.0141)*	*(0.0147)*	*(0.0132)*
Firm Capital	0.757***	0.652***	0.809***	0.805***
	(0.0456)	*(0.0726)*	*(0.0858)*	*(0.0777)*
Firm ROA	0.967***	0.611***	0.957***	1.524***
	(0.0774)	*(0.108)*	*(0.137)*	*(0.164)*
Collateral	0.274***	0.479***	0.159***	0.215***
	(0.0274)	*(0.0495)*	*(0.0510)*	*(0.0429)*
Firm (actual) Age	0.220***	0.320***	0.241***	0.106***
	(0.0135)	*(0.0234)*	*(0.0244)*	*(0.0226)*
Impairment Length	-0.643***	-0.488***	-0.612***	-0.699***
	(0.0833)	*(0.167)*	*(0.160)*	*(0.120)*
Manufacturing	-0.235***	-0.236*	-0.245*	-0.182
	(0.0746)	*(0.136)*	*(0.136)*	*(0.118)*
Construction	-0.618***	-0.495***	-0.645***	-0.662***
	(0.0736)	*(0.136)*	*(0.134)*	*(0.115)*
Services	-0.324***	-0.269**	-0.318**	-0.351***
	(0.0719)	*(0.132)*	*(0.131)*	*(0.113)*
Constant	-0.134	-0.0779		
	(0.290)	*(0.343)*		
Observations	105518	105518		
Province × Time FEs	yes	yes		
Firm cluster	yes	yes		

Table 12. Probability of a UTP firm returning to the performing state – By year and industry

Average probability of UTP firms returning to the performing state		CR sample	CR-Cerved sample
		14.1	12.2
By year of classification as a UTP (cohort)	*2008*	*21.6*	*18.0*
	2009	*17.6*	*15.5*
	2010	*16.3*	*13.5*
	2011	*12.9*	*10.3*
	2012	*11.8*	*9.4*
	2013	*10.6*	*8.7*
	2014	*10.8*	*9.7*
	2015	*14.5*	*13.5*
	2016	*16.5*	*17.5*
By sector of economic activity	Agriculture	*20.7*	*17.4*
	Manufacturing	*15.0*	*13.6*
	Construction	*11.2*	*9.8*
	Services	*14.4*	*12.7*

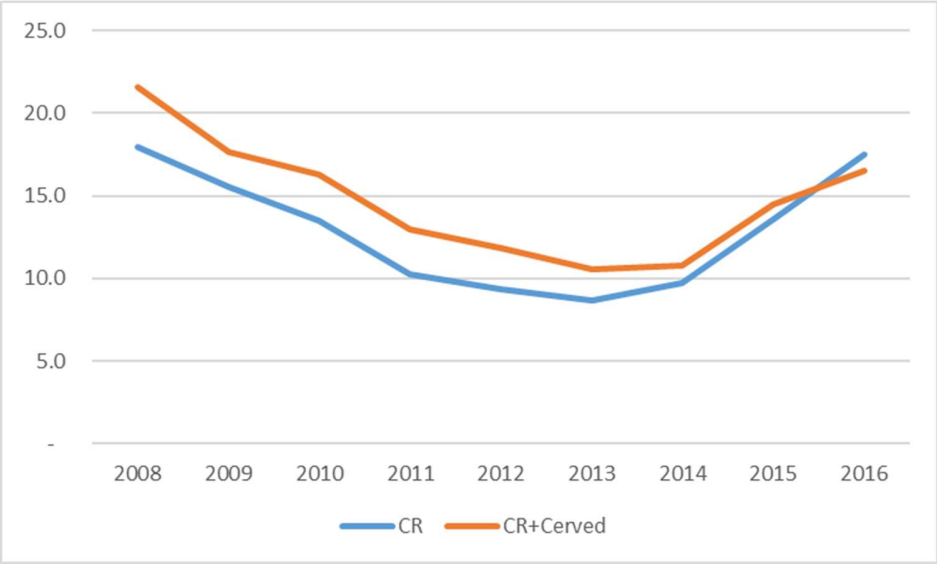


Table 13. Probability of a UTP firm returning to the performing state – By initial exposure and firm characteristic

Covariate		Variable distributions and probability of returning to a performing state computed at different percentiles						
		Average	**SD**	**P10**	**P25**	**P50**	**P75**	**P90**
Firm Size (total assets)	variable distribution - natual logarithm	7,04	1,45	5,27	6,06	6,97	7,96	8,95
	variable distribution - thousands of euros	3.507	7.783	194	429	1.067	2.873	7.713
	probability of returning to a performing state			***15,2***	***13,8***	***12,4***	***11,0***	***9,8***
Firm Capital	variable distribution - ratio	-0,04	0,55	-0,33	0,00	0,05	0,15	0,31
	probability of returning to a performing state			***9,5***	***11,8***	***12,2***	***13,0***	***14,4***
Firm ROA	variable distribution - ratio	-0,04	0,24	-0,22	-0,04	0,01	0,06	0,12
	probability of returning to a performing state			***10,2***	***11,8***	***12,3***	***12,8***	***13,4***
Number of Creditor Banks	variable distribution - natual logarithm	1,17	0,48	0,69	0,69	1,10	1,39	1,79
	variable distribution - numbers	2,69	2,28	1	1	2	3	5
	probability of returning to a performing state			***13,0***	***13,0***	***12,3***	***11,8***	***11,1***
Collateral	variable distribution - ratio	0,29	0,38	0,00	0,00	0,00	0,63	0,98
	probability of returning to a performing state			***11,4***	***11,4***	***11,4***	***13,2***	***14,2***
Firm (actual) Age	variable distribution - natual logarithm	2,30	0,85	1,39	1,79	2,30	2,89	3,37
	variable distribution - numbers	12,67	11,18	3	5	9	17	28
	probability of returning to a performing state			***10,2***	***11,0***	***12,1***	***13,5***	***14,7***
Impairment Length	variable distribution - natual logarithm	0,74	0,14	0,69	0,69	0,69	0,69	1,10
	variable distribution - numbers	1,12	0,36	1	1	1	1	2
	probability of returning to a performing state			***12,5***	***12,5***	***12,5***	***12,5***	***10,0***
Debt Size	variable distribution - natual logarithm	6,06	1,62	4,02	4,86	5,95	7,13	8,20
	variable distribution - thousands of euros	2.030	6.533	55	128	382	1.248	3.652
	probability of returning to a performing state			***16,1***	***14,3***	***12,3***	***10,5***	***9,0***

Table 14. Initial bank characteristics – Sample descriptive statistics

variable	description	N	mean	sd	p25	p50	p75
Bank Size	natural logarithm of each bank's total assets	239,330	11.0	2.4	9.7	11.6	13.2
Bank Capital	ratio between Tier 1 and risk weighed total assets	239,330	0.12	0.13	0.08	0.11	0.15
Bank ROA	ratio of profits to total assets	239,330	0.002	0.003	0.001	0.002	0.003
Bank Bad Loans	ratio of bank's bad loans to total loans	239,330	0.2	0.1	0.2	0.2	0.3

Table 15. Initial bank characteristics associated with the probability of a UTP firm returning to the performing state

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (2). Estimations are based on a dataset matching CR, Cerved (firm balance sheet) and supervisory (bank balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	CR (census) data		**CR + Cerved data**		**CR + Cerved + supervisory data**
	(a1)	**(a2)**	**(b1)**	**(b2)**	**(c)**
Debt Size	-0.208***	-0.225***	-0.228***		
	(0.00593)	*(0.00540)*	*(0.00937)*		
Firm Size				-0.216***	-0.206***
				(0.0111)	*(0.0118)*
Firm Capital				1.012***	1.013***
				(0.0543)	*(0.0550)*
Firm ROA				1.470***	1.479***
				(0.102)	*(0.103)*
Number of Creditor Banks					
Collateral	0.314***	0.349***	0.399***	0.197***	0.179***
	(0.0180)	*(0.0172)*	*(0.0350)*	*(0.0345)*	*(0.0347)*
Firm (proxy) Age	0.355***	0.366***			
	(0.0112)	*(0.0112)*			
Firm (actual) Age			0.222***	0.195***	0.199***
			(0.0168)	*(0.0175)*	*(0.0174)*
Impairment Length	-1.101***	-1.094***	-0.766***	-0.659***	-0.617***
	(0.0475)	*(0.0475)*	*(0.104)*	*(0.104)*	*(0.104)*
Medium-Large	-0.107***				
	(0.0186)				
Producer Household	0.0295				
	(0.0185)				
Manufacturing	-0.188***	-0.233***	-0.194**	-0.164*	-0.155*
	(0.0320)	*(0.0312)*	*(0.0905)*	*(0.0915)*	*(0.0919)*
Construction	-0.589***	-0.635***	-0.640***	-0.631***	-0.604***
	(0.0303)	*(0.0297)*	*(0.0891)*	*(0.0902)*	*(0.0906)*
Services	-0.279***	-0.318***	-0.334***	-0.315***	-0.313***
	(0.0273)	*(0.0266)*	*(0.0873)*	*(0.0883)*	*(0.0888)*
Bank Size					0.0115**
					(0.00446)
Bank ROA					16.97***
					(4.517)
Bank Capital					5.790***
					(0.608)
Bank Bad Loans					-1.696***
					(0.196)
Constant	1.280***	1.471***	1.949***	0.374	0.0339
	(0.190)	*(0.187)*	*(0.347)*	*(0.327)*	*(0.345)*
Observations	585659	585659	282835	282835	238205
Province × Time FEs	yes	yes	yes	yes	yes
Bank FEs	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes
Bank cluster	yes	yes	yes	yes	yes

Table 16. Initial bank characteristics associated with the probability of a UTP firm returning to the performing state – By period

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (2). Estimations are based on a dataset matching CR, Cerved (firm balance sheet) and supervisory (bank balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	Total	Global financial crisis	Sovereign Debt Size crisis	Normal conditions
Firm Size	-0.206***	-0.295***	-0.228***	-0.100***
	(0.0118)	*(0.0200)*	*(0.0232)*	*(0.0183)*
Firm Capital	1.013***	0.852***	1.147***	1.031***
	(0.0550)	*(0.0962)*	*(0.101)*	*(0.0870)*
Firm ROA	1.479***	0.911***	1.641***	2.077***
	(0.103)	*(0.142)*	*(0.181)*	*(0.222)*
Collateral	0.179***	0.328***	-0.0706	0.266***
	(0.0347)	*(0.0623)*	*(0.0647)*	*(0.0549)*
Firm (actual) Age	0.199***	0.361***	0.189***	0.0541*
	(0.0174)	*(0.0292)*	*(0.0322)*	*(0.0287)*
Impairment Length	-0.617***	-0.447**	-0.553***	-0.710***
	(0.104)	*(0.197)*	*(0.187)*	*(0.156)*
Manufacturing	-0.155*	-0.169	-0.188	-0.0844
	(0.0919)	*(0.180)*	*(0.167)*	*(0.141)*
Construction	-0.604***	-0.448**	-0.702***	-0.616***
	(0.0906)	*(0.179)*	*(0.164)*	*(0.138)*
Services	-0.313***	-0.221	-0.352**	-0.341**
	(0.0888)	*(0.175)*	*(0.161)*	*(0.135)*
Bank Size	0.0115**	-0.00249	-0.00384	-0.0184**
	(0.00446)	*(0.00801)*	*(0.00774)*	*(0.00790)*
Bank ROA	16.97***	21.31*	10.10	14.56***
	(4.517)	*(12.33)*	*(10.98)*	*(5.411)*
Bank Capital	5.790***	4.608***	8.616***	2.971***
	(0.608)	*(0.878)*	*(1.002)*	*(0.940)*
Bank Bad Loans	-1.696***	-0.328	-1.293***	-0.263
	(0.196)	*(0.626)*	*(0.384)*	*(0.276)*
Constant	0.0339	0.200		
	(0.345)	*(0.425)*		
Observations	238205	238205		
Province × Time FEs	yes	yes		
Bank FEs	yes	yes		
Firm cluster	yes	yes		
Bank cluster	yes	yes		

Table 17. Initial bank characteristics associated with the probability of a UTP firm returning to the performing state – By period

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (2). Estimations are based on a dataset matching CR, Cerved (firm balance sheet) and supervisory (bank balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	Total	Single-bank firms	Multi-bank firms
Firm Size	-0.206***	-0.0452***	-0.231***
	(0.0118)	*(0.0155)*	*(0.0135)*
Firm Capital	1.013***	0.805***	1.092***
	(0.0550)	*(0.0707)*	*(0.0707)*
Firm ROA	1.479***	0.540***	1.682***
	(0.103)	*(0.123)*	*(0.129)*
Collateral	0.179***	0.325***	0.0981**
	(0.0347)	*(0.0445)*	*(0.0447)*
Firm (actual) Age	0.199***	0.174***	0.206***
	(0.0174)	*(0.0224)*	*(0.0212)*
Impairment Length	-0.617***	-0.306***	-0.728***
	(0.104)	*(0.111)*	*(0.142)*
Manufacturing	-0.155*	-0.424***	-0.128
	(0.0919)	*(0.126)*	*(0.106)*
Construction	-0.604***	-0.651***	-0.600***
	(0.0906)	*(0.118)*	*(0.105)*
Services	-0.313***	-0.377***	-0.302***
	(0.0888)	*(0.114)*	*(0.103)*
Bank Size	0.0115**	-0.0784***	0.0320***
	(0.00446)	*(0.00938)*	*(0.00577)*
Bank ROA	16.97***	28.41***	8.904
	(4.517)	*(6.387)*	*(5.528)*
Bank Capital	5.790***	2.122**	7.155***
	(0.608)	*(0.984)*	*(0.820)*
Bank Bad Loans	-1.696***	-2.082***	-1.783***
	(0.196)	*(0.230)*	*(0.252)*
Constant	0.0339	0.205	
	(0.345)	*(0.349)*	
Observations	238205	238205	
Province × Time FEs	yes	yes	
Bank FEs	yes	yes	
Firm cluster	yes	yes	
Bank cluster	yes	yes	

Table 18. Robustness checks on firms that have returned temporarily to the performing state

The table reports regression coefficients and associated standard errors in parenthesis of the logit estimation of Equation (2). Estimations are based on a dataset matching CR, Cerved (firm balance sheet) and supervisory (bank balance sheet) data. Observations are clustered at firm level, thus obtaining heteroskedasticity-robust standard errors and controlling for possible autocorrelations across the same firm. ***, **, and * denote statistical significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5) Linear regression
Firm Size	-0.206***	-0.220***	-0.199***	-0.174***	-0.0199***
	(0.0118)	*(0.0119)*	*(0.00924)*	*(0.0129)*	*(0.00140)*
Firm Capital	1.013***	1.084***	0.905***	0.704***	0.0596***
	(0.0550)	*(0.0565)*	*(0.0429)*	*(0.0586)*	*(0.00417)*
Firm ROA	1.479***	1.560***	1.239***	0.859***	0.0720***
	(0.103)	*(0.105)*	*(0.0776)*	*(0.103)*	*(0.00813)*
Collateral	0.179***	0.206***	0.230***	0.279***	0.0410***
	(0.0347)	*(0.0352)*	*(0.0283)*	*(0.0417)*	*(0.00512)*
Firm (actual) Age	0.199***	0.208***	0.152***	0.0960***	0.0139***
	(0.0174)	*(0.0175)*	*(0.0138)*	*(0.0196)*	*(0.00226)*
Impairment Length	-0.617***	-0.697***	-0.844***	-1.103***	-0.0954***
	(0.104)	*(0.105)*	*(0.0846)*	*(0.127)*	*(0.0103)*
Manufacturing	-0.155*	-0.173*	-0.213***	-0.222*	-0.0374*
	(0.0919)	*(0.0940)*	*(0.0801)*	*(0.122)*	*(0.0193)*
Construction	-0.604***	-0.631***	-0.484***	-0.245**	-0.0417**
	(0.0906)	*(0.0927)*	*(0.0788)*	*(0.119)*	*(0.0190)*
Services	-0.313***	-0.328***	-0.276***	-0.158	-0.0300
	(0.0888)	*(0.0909)*	*(0.0776)*	*(0.118)*	*(0.0189)*
Bank Size	0.0115**	0.00828*	-0.00353	-0.0195***	-0.00141**
	(0.00446)	*(0.00451)*	*(0.00367)*	*(0.00528)*	*(0.000653)*
Bank ROA	16.97***	16.82***	7.828**	-6.008	0.388
	(4.517)	*(4.570)*	*(3.960)*	*(6.594)*	*(0.615)*
Bank Capital	5.790***	6.202***	4.604***	2.462***	0.0566**
	(0.608)	*(0.618)*	*(0.512)*	*(0.728)*	*(0.0274)*
Bank Bad Loans	-1.696***	-1.766***	-1.328***	-0.760***	-0.0502**
	(0.196)	*(0.197)*	*(0.161)*	*(0.238)*	*(0.0253)*
Constant	0.0339	0.325	0.815***	-0.217	
	(0.345)	*(0.347)*	*(0.312)*	*(0.553)*	
Observations	238205	218804	239182	210009	212355
Province × Time FEs	yes	yes	yes	yes	yes
Bank FEs	yes	yes	yes	yes	yes
Firm cluster	yes	yes	yes	yes	yes
Bank cluster	yes	yes	yes	yes	yes